27.8.81

SOCIAL REINFORCEMENT OF THE WORK BEHAVIOUR OF RETARDATES AND NORMALS

by

Leonie Waters, B.A.Hons.(Adelaide)

Thesis submitted for the
Degree of Doctor of Philosophy

Department of Psychology
The University of Adelaide

1980

Awarded 12 June 1981.

TABLE OF CONTENTS

		Page
	SUMMARY	(xii)
	STATEMENT	(xvi)
	ACKNOWLEDGEMENTS	(xvii)
OVERVIEW		1
CHAPTER 1.	THE STATUS OF WORK AS A PSYCHOLOGICAL CONCEPT	2
1.1.	INTRODUCTION	2
1.2.	STUDIES OF WORK IN ORGANIZATIONAL SETTINGS	4
1.	The Efficiency Approach - Industrial Engineering and Ergonomics	5
2.	The Psychological Approach - Early History	7
3.	The Psychological Approach - Current Developments	9
(a)	Alternative decision-making processes	10
(b)	Job Design and Job Satisfaction	10
(c)	Group processes at work	14
4.	Summary of Work in Organizational Settings	14
5.	The Operant Paradigm in the Organizational Setting	16
1.3.	"WORK" AS AN OPERANT	17
1.	Biological Controls	19
(a)	The generality of work behaviour across species	19
(b)	Prepared linkages between work and specific reinforcers	21
(c)	Biological controls: Conclusion	24

		Page
CHAPTER 1.	(continued)	
1.3.	(continued)	
2.	The Interaction between Intrinsic and Extrinsic Reinforcement in Work	25
3.	Social Controls	28
	(a) The financial controller	30
	(b) Social controllers	31
	(c) Aversive consequences at work	33
	(d) Social controls: Conclusion	34
1.4.	CONCLUSION	34
CHAPTER 2.	SOCIAL REINFORCEMENT - ORIGINS	36
2.1.	INTRODUCTION	36
2.2.	DEFINITIONS	36
2.3.	INNATE ASPECTS	41
2.4.	THE IMPRINTING OF SOCIAL REINFORCEMENT	46
2.5.	SOCIAL REINFORCEMENT AND CONDITIONED REINFORCEMENT	47
2.6.	LANGUAGE AND REINFORCEMENT	50
2.7.	CONCLUSION	54
CHAPTER 3.	DETERMINANTS OF EFFECTIVE SOCIAL REINFORCEMENT	56
3.1.	INTRODUCTION	56
3.2.	DETERMINATIONS OF THE STRENGTH OF SOCIAL REINFORCEMENT: OVERVIEW OF CURRENT THEORETICAL POSITIONS	57
1.	Deprivation-Satiation Theory of Social Reinforcement	57
2.	Anxiety/Arousal due to Pre-experimental Manipulations	63

		Page
CHAPTER 3.	(continued)	
3.2.	(continued)	
3.	Frustration	67
4.	Valence of the Experimenter	67
5.	The Incentive-Anxiety View	77
6.	General Stimulus Deprivation	81
7.	The Informational View	83
3.3.	CONCLUSION	97
CHAPTER 4.	THE NEED OF RETARDATES FOR SOCIAL REINFORCEMENT: LABORATORY INVESTIGATIONS	101
4.1.	INTRODUCTION	101
4.2.	SOCIAL DEPRIVATION AND MOTIVATION FOR SOCIAL REINFORCEMENT FROM THE EXPERIMENTER	103
1.	Social Deprivation in Institutionalized Retardates	103
2.	Deprivation in Noninstitutionalized Retarded Subjects	109
3.	Deprivation Effects Specific to Type and Length of Institutionalization	111
4.3.	THE POSITIVE AND NEGATIVE REACTION TENDENCIES FORMULATIONS	116
4.4.	OUTER-DIRECTEDNESS AS REACTION TO FAILURE	125
4.5.	CONCLUSION	136

Page

CHAPTER 5. THE USE OF SOCIAL REINFORCEMENT FROM THE TEACHER TO PROMOTE WORKING BEHAVIOUR IN STUDENTS 141

5.1. INTRODUCTION 141

5.2. OVERVIEW OF CHAPTER 5 143

5.3. TEACHER SOCIAL REINFORCEMENT FOR ATTENDING IN THE NORMAL CLASSROOM 149

1. Introduction 149

2. Studies using reinforcement for attending in conjunction with techniques to decrease undesired behaviours 154

(a) Social reinforcement for desired behaviour plus extinction 154

(b) Social reinforcement for attending plus aversive consequences 164

3. Social Reinforcement to condition appropriate behaviour 169

(a) Social Reinforcement used alone 169

(b) Studies using Teacher Social Reinforcement to condition appropriate behaviour in combination with other techniques 179

5.4. TEACHER SOCIAL REINFORCEMENT FOR OUTPUT IN THE NORMAL CLASSROOM 187

1. Techniques - Overview 187

2. Social Reinforcement Alone to Increase Output 188

3. Social Reinforcement Applied in Conjunction with other Control Techniques for Output 192

5.5. TEACHER SOCIAL REINFORCEMENT FOR BOTH OUTPUT AND ATTENTION IN THE NORMAL CLASSROOM 200

Page

CHAPTER 5. (continued)

5.6. SOCIAL REINFORCEMENT IN SPECIAL CLASSROOMS 207

1. Introduction 207

2. Social Reinforcement for Appropriate Behaviour and some Penalty for Disruptive/Inappropriate Behaviour 209

3. Social Reinforcement (either alone or combined with other reinforcers) to Condition Appropriate Behaviour in the Special Classroom 213

4. Social Reinforcement (alone or combined with other techniques) to increase Output in Special Classroom Students 217

5. Social Reinforcement to Increase both Output and Attending/Appropriate Behaviour in the Special Classroom 222

5.7. CONCLUSION 233

CHAPTER 6. SOCIAL REINFORCEMENT TO INCREASE ATTENTION OR OUTPUT IN RETARDED SUBJECTS IN THE SHELTERED WORKSHOP 237

6.1. INTRODUCTION 237

6.2. SOCIAL REINFORCEMENT FOLLOWING APPROPRIATE BEHAVIOUR IN THE SHELTERED WORKSHOP 238

6.3. SOCIAL REINFORCEMENT USED TO STIMULATE PRODUCTIVITY 241

6.4. SOCIAL REINFORCEMENT AS PART OF A COMBINED TECHNIQUE TO INFLUENCE OUTPUT AND APPROPRIATE BEHAVIOUR 246

6.5. SOCIAL REINFORCEMENT DURING BASELINE 252

6.6. CONCLUSION 255

		Page
CHAPTER 7.	SOCIAL REINFORCEMENT OF THE WORKING BEHAVIOUR OF RETARDATES IN A REHABILITATION CENTRE: EXPERIMENTS 1, 2 AND 3	257
7.1.	INTRODUCTION	257
7.2.	EXPERIMENT 1	259
7.3.	EXPERIMENT 2	267
7.4.	EXPERIMENT 3	273
7.5.	GENERAL DISCUSSION OF EXPERIMENTS 1, 2 AND 3	277
CHAPTER 8.	EXPERIMENTS 4 AND 5: SOCIAL REINFORCEMENT IN A LABORATORY SETTING USING A COGNITIVE TASK	284
8.1.	INTRODUCTION	284
8.2.	EXPERIMENT 4	290
8.3.	EXPERIMENT 5	299
8.4.	CONCLUSIONS FROM EXPERIMENTS 4 AND 5	304
CHAPTER 9.	SOCIAL AND VICARIOUS REINFORCEMENT EFFECTS IN A SCHOOL SETTING	306
9.1.	INTRODUCTION	306
9.2.	REVIEW OF VICARIOUS EFFECTS OF SOCIAL REINFORCEMENT IN NATURALISTIC SETTINGS	306
9.3.	EXPERIMENT 6	319
9.4.	CONCLUSION	333
CHAPTER 10.	SOCIAL AND VICARIOUS REINFORCEMENT IN A SHELTERED WORKSHOP: OUTPUT AND ATTENTION MONITORED CONCURRENTLY	334
10.1.	INTRODUCTION	334
10.2.	EXPERIMENT 7A	340

		Page
CHAPTER 10.	(continued)	
	10.3. EXPERIMENT 7B	349
	10.4. CONCLUSIONS FROM EXPERIMENTS 7A AND 7B	357
CHAPTER 11.	COMPARISON OF DIFFERENT TYPES OF SOCIAL REINFORCEMENT	358
	11.1. INTRODUCTION	358
	11.2. PRE-EXPERIMENTAL VALIDATION OF REINFORCING STIMULI	362
	11.3. EXPERIMENT 8	363
	11.4. CONCLUSION	372
CHAPTER 12.	EXAMINATION OF OUTPUT AND ATTENTION IN DIRECTLY AND VICARIOUSLY REINFORCED SHELTERED WORKSHOP CLIENTS	373
	12.1. INTRODUCTION	373
	12.2. EXPERIMENT 9A	375
	12.3. EXPERIMENT 9B: A MODIFIED VERSION OF EXPERIMENT 9A	379
CHAPTER 13.	GENERAL DISCUSSION	402
	13.1. THE EFFECTS OF SOCIAL REINFORCEMENT ON WORKING BEHAVIOUR	402
	13.2. NONCONTINGENT REINFORCEMENT	407
	13.3. VICARIOUS REINFORCEMENT	411
	13.4. COMPARISONS BETWEEN PERSONS WITH GENERAL AND SPECIFIC BEHAVIOURAL DEFICITS	416

Page

CHAPTER 13. (continued)

13.5. THE USE OF SOCIAL REINFORCEMENT IN "POST-INDUSTRIAL" SOCIETY 420

APPENDICES 426

BIBLIOGRAPHY 443

LIST OF TABLES

		Page
7.1.	Mean percentage of intervals spent working by each subject in each week of Phase E3 in Experiment 1	266
7.2.	Mean percentage of intervals spent working by each subject in each week of Phase E3 in Experiment 3	276
8.1.	Mean number of questions completed per session by each subject in each group in Experiment 4	293
8.2.	Differences between pre- and post-treatment scores in number of items rated at the anxious extreme for each subject in Experiment 4	295
8.3.	Mean number of questions answered correctly by each group in the pre- and post-treatment General and Programme tests in Experiment 4	297
8.4.	Mean number of questions completed per session by each subject in each group in Experiment 5	301
8.5	Differences between pre- and post-treatment anxiety scores for all subjects in Experiment 5	302
8.6.	Mean number of items correct on pre- and post-treatment General and Programme tests for all groups in Experiment 5	303
9.1.	Design of Experiment 6	320
9.2.	Mean percentage attending rates for each group in each phase in Experiment 6	324
9.3.	Summary of results for three initial analyses of variance for each phase separately	324
9.4.	Mean number of responses at the extremely anxious end of the Maths Anxiety Questionnaire before and after treatment for each group in Experiment 6	327
9.5.	Mean end-of-term examination performance (percentages) for each group prior to and following Experiment 6	328

TABLES (continued)

		Page
10.1.	Mean percentage attending and mean output scores for each subject in each phase in Experiment 7A	346
10.2.	Mean percentage attending and mean output scores for each subject in each phase in Experiment 7B	353
11.1.	Mean output during reinforcement and nonreinforcement phases for female and male subjects in Experiment 8	367
11.2.	Mean percentage attending behaviour during reinforcement and nonreinforcement phases for female and male subjects in Experiment 8	369
12.1.	Mean output and attention scores (and standard deviations) for each group in Experiment 9A	378
12.2.	Design for the analysis of variance including Control Group in Experiment 9B	384
12.3.	Design for the analysis of variance of Experimental Groups only in Experiment 9B	385
12.4.	Univariate analysis for Output (including Control Group) for Experiment 9B	390
12.5.	Univariate analysis for Attending (including Control Group) for Experiment 9B	391
12.6.	Univariate analysis for Output (Experimental Groups only) for Experiment 9B	394
12.7.	Univariate analysis for Attention (Experimental Groups only) for Experiment 9B	395

LIST OF PLATES AND FIGURES

		Page
PLATE 7.1.	Experimental Setting for Experiments 1, 2 and 3, showing Observer	260
11.1.	Retarded client working on the packing task used in Experiment 8	365
12.1.	Clients working at two of the experimental tasks in Experiment 9B	381
FIGURE 7.1.	Mean percentage time spent working by each group in each phase in Experiment 1	264
7.2.	Mean percentage time spent working by each group in each phase in Experiment 2	271
7.3.	Mean percentage time spent working by both groups in each phase in Experiment 3	275
8.1.	Simulated photograph of the experimental setting for Groups A and B in Experiment 4	292
9.1.	Mean percentage of time spent working by all subjects on each day of the Baseline phase in Experiment 6	326
10.1.	Mean percentage of time spent attending by both groups in each phase in Experiment 7A	345
10.2.	Mean output of both groups in each phase in Experiment 7A	346
10.3.	Mean percentage attending behaviour for each group in each phase in Experiment 7B	353
10.4.	Mean output for each group in each phase in Experiment 7B	354
12.1.	Seating plan for subjects in Experiment 9A	376

SUMMARY

This work is concerned, in general, with investigation of the social reinforcement of working behaviour in a variety of settings. In theoretical terms, work is considered as an instance of operant behaviour, and comparisons are made between it as an operant and work conceptions deriving from ergonomics and industrial/organizational psychology. Possibilities concerning the origin of social reinforcement are examined, as are theories proposed that explain its operation. The special need of retardates for social reinforcement is also discussed. The literatures on behaviour modification in classrooms involving social reinforcement and on the use of such reinforcement in sheltered workshops are reviewed.

A series of experiments was conducted to investigate the efficacy of social reinforcement in a number of work situations. Experiment 1 investigated the effect on working behaviour in retarded clients of social reinforcement from the supervisor contingent upon working behaviour within a sheltered workshop. Significant improvements in working behaviour in treated subjects confirmed this as a useful technique. The time of day in which reinforcement was delivered was not a significant factor.

Experiment 2 investigated the importance of the reinforcement contingency in the same situation. Noncontingent social reinforcement (achieved via yoking) was as effective in increasing attending behaviour of the mildly retarded clients as was such

reinforcement delivered contingently, except during a phase of twice daily reinforcement sessions.

The durability of supervisor social reinforcement in the sheltered workshop was tested in Experiment 3. This study investigated a decline in reinforcer effectiveness noted in Experiment 1 after several weeks of exposure. Experiment 3 showed that contingent social reinforcement was still effective after prolonged periods of treatment.

Experiments 4 and 5 examined social reinforcement with tertiary students involved in a complex cognitive task. Experiment 4 compared the effects on performance of contingent and noncontingent social reinforcement from the experimenter, and showed that noncontingent reinforcement was ineffective in this situation. However, contingent social reinforcement was effective in increasing progress and in producing specific knowledge gains. The interaction between anxiety level and responsivity to contingent social reinforcement was examined in Experiment 5, testing the prediction that more anxious subjects would be most influenced by the reinforcement. This hypothesis was not supported although the overall efficacy of social reinforcement was confirmed.

Experiment 6 investigated social reinforcement in a high school classroom using reinforcement from the teacher to increase attention to mathematics work. In this study, the effect of such reinforcement on the behaviour of adjacently seated peers who thus received vicarious reinforcement was observed.

Contingent reinforcement was superior to noncontingent reinforcement as under one condition in Experiment 2, and vicarious reinforcement was equally as effective as direct reinforcement. A significant trend upwards in responding during the initial baseline phase indicated that the observer's presence was influencing students' performance.

Further experiments monitored attending behaviour and output concurrently. Experiment 7A investigated the effect of contingent social reinforcement on both attending behaviour and output of retarded clients in a sheltered workshop. The delivery of social reinforcement led to a significant increase in attending behaviour in experimental subjects, but output increased in both treated and nontreated subjects, suggesting that control subjects were somewhat affected by the reinforcement to targets. In Experiment 7B vicarious reinforcement in clients seated at the same table with direct reinforcement subjects was examined. Vicarious reinforcement was as effective in increasing attending behaviour as direct reinforcement and output was similarly affected.

The nature of the reinforcing stimulus was considered in Experiment 8. Retarded clients working at a simple packing task in a laboratory-type situation received social reinforcement contingent upon output. The social reinforcement was either "warm" or "cold" and either standardized or nonstandardized. "Warm" reinforcement did lead to higher output but standardization was not a significant factor. Attending to the task was also

monitored and was unaffected by the type of reinforcement, although a main reinforcement effect occurred.

Experiments 9A and 9B investigated the effects of vicarious and direct reinforcement, both contingent and noncontingent, on the working behaviour and output of retardates in a sheltered workshop. As in Experiments 2 and 6, social reinforcement from the supervisor was given either contingently upon attending to task or noncontingently via yoking. The social reinforcement treatment was again effective. Contingent reinforcement was associated with higher attention than noncontingent reinforcement but not with higher output. Correlations between changes in the two performance measures during experimental intervention (as found in Experiments 7A and 7B) were found to be significant. Vicarious reinforcement was not inferior to direct reinforcement.

The results of the experimental series are discussed in terms of the power and usefulness of both vicarious and non-contingent reinforcement as control techniques, and the value of social reinforcement in improving performance in the disadvantaged groups studied. Implications for future research are considered along the following lines: the importance of the reinforcement contingency in the situations studied; the nature of the vicarious reinforcement effect; and the similarity between retardates and normals viewed as populations exhibiting behavioural deficits differing substantially only in extent.

STATEMENT

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and to the best of my knowledge and belief contains no material previously published or written by another person, except where due reference is made in the text.

Signed

Leonie Waters

December, 1980

ACKNOWLEDGEMENTS

The author wishes to express thanks to the following persons:

To Dr. E. Rump and Mr. R. Willson, both of the Psychology Department, The University of Adelaide, for their help with the statistical analyses, and to Dr. Rump for supervising the final two months of the work.

To Mrs. M. Patrickson of the South Australian Institute of Technology for her thoughtful comments.

To Mrs. M. Blaber, Mrs. M. Hallo, and Miss I. Scapinello for typing early drafts and the final copy of the thesis.

To Mrs. J. Fallon for her assistance with tables, graphs, and references.

To Mrs. L. van Ruth for preparing final copies of graphs and photographs.

Particular thanks are due to the author's supervisor, Dr. F.R. Dalziel, of the Psychology Department, The University of Adelaide, for being so generous with his time and encouragement throughout the period of work for this research.

Finally, thanks are due to the Management, Staff, and Clients of Bedford Industries and Minda Home, and the Staff and Students of St. Ignatius College for their assistance and cooperation without which this work could not have been completed.

OVERVIEW

The series of experiments reported in this thesis takes its form from empirical work on operant conditioning. The motivation for the research is essentially applied, being designed to generate information relevant to the control of, principally, the working behaviour of retardates and, to a lesser extent, the equivalent behaviour in normals acquiring mathematics skills. Since neither the form nor the aim of the work is closely determined by a fixed underlying theoretical view, it is not crucial to set out such a position in detail.

The theoretical suppositions of the author have, however, undoubtedly influenced the design of the experiments, and also in some measure coloured their interpretation; for this reason it will be useful to make these basic general assumptions explicit. Such a clarification will also facilitate the understanding of the directions which the author sees the research as taking in the future.

The two groups of subjects to be studied are not in any way to be considered as controls for each other, as they obviously differ in many other characteristics than the ones treated in the experimental work. They should rather be thought of as groups representing two sections of the population having a similar problem; coping with an inadequacy in producing a piece of behaviour demanded by society. The aim of the research is to explore the possibilities of a particular range of techniques to help such groups in these aims and hence achieve required goals. Limited comparisons will, of course, be made where these are deemed to be possible and appropriate.

UNIVERSITY OF ABERDEEN LIBRARY

CHAPTER 1.

THE STATUS OF WORK AS A PSYCHOLOGICAL CONCEPT

1.1. INTRODUCTION

The status of work as a psychological concept is a complicated question. Starting with the traditional distinction between work and leisure, the problem immediately arises of stating objectively what differentiates the two activities. One way of contrasting work and leisure is in terms of their controlling conditions, especially those conditions normally labelled motivational: the same activity may fall into either category, depending on our reasons for doing it. The conditions for facilitating either activity may also be a distinguishing feature. Thus, in Parker's (1971) example, mountaineering is work for the guide but leisure-in-work for the amateur climber. Money may act as a motivation for the guide whereas adventure may be the important reinforcer for the amateur engaging in this activity. Similarly, bad weather may deter the guide but facilitate the behaviour in the amateur, acting to spur him on.

As an example of the type of definition to be used in defining work, play would seem to provide an obvious instance. Play, as one of the major behavioural components of leisure, is an area of much current theoretical and experimental interest (e.g. Simpson, 1976; Smith, 1978). There are many difficulties in defining play. It is quite heterogeneous in form; some behaviour sequences which might usually be regarded as work may also appear as play, depending on the controlling variables. Behaviour which would be labelled as hunting sequences were it

to appear under the appropriate circumstances in adult carnivora, is regarded as play under other circumstances, for example, in the activities of kittens (Leyhausen, 1956); of young mongeese (Rensch & Ducker, 1959); and of young polecats (Poole, 1978). Play, then, can be seen as a model for a behavioural concept which is defined not by the behaviour within it but by the controlling conditions. It might be hoped that work would be similarly defined.

A qualification is necessary here in that these two behaviours are not quite identical in differing contexts, and some quite minor cue (notably involving emotive display) may allow another organism to infer the controlling conditions of the behaviour and to thus classify it correctly. It is not always necessary to see the controlling conditions in order to make a classification.

Thus play could easily be mistaken for work but is not. Although hard to define, there is a high degree of agreement amongst human observers as to when play occurs, and the principal defining characteristic seems to be that it gives the human observer "....the impression of a lack of 'seriousness'" (Hinde, 1970, p.356).

Other varieties of nonwork (e.g. mating behaviour, feeding, sleeping) all have their own distinctive controls and are partially defined by these, in that behaviour of similar form may appear in other sequences. For instance, mating behaviour, especially in the primates, may be seen as furnishing part of

the content of greeting ceremonies, presenting, and submission gestures (e.g. Goodall, 1968). Thus a piece of behaviour of varied content can be defined in terms of controlling conditions, and the form alone of a particular behaviour is insufficient to allow definition of its function without knowledge of these conditions.

The purpose of the present chapter is to examine knowledge of the controls for work behaviour arising from within psychology. Extensive exploration of the controlling conditions of work has been conducted within the framework of industrial and organizational psychology, and an important conception of work within psychology is that which derives from research in organizational settings. It can be noted that the views arising from this area are quite compatible with an operant analysis of behaviour (which emphasises the possibilities of manipulating and controlling the behaviour), as adopted in the present work, and areas of overlap between these two approaches are discussed in Section 1.3.

1.2. STUDIES OF WORK IN ORGANIZATIONAL SETTINGS

Historically, the controlling conditions for stimulating and maintaining output have been explored within the real life work setting, and such research has had a major influence on psychological concepts of work. Hence this area will be considered first. The earliest theories of work, concerned primarily with efficiency, have been succeeded by broader

perspectives which also address the well-being and job satisfaction of workers in the quest for increased productivity.

1. The Efficiency Approach - Industrial Engineering and Ergonomics

Dunnette (1976), in his authoritative work on industrial/organizational psychology, defined the field as encompassing in practice such endeavours as: job and task analysis and engineering psychology; recruitment; selection and placement; personnel training; management and organizational effectiveness assessment; conflict management; organizational development techniques; and the management of inefficient performance. This field first came of age as a separate section within the broad spectrum of research into industrial behaviour with Mayo's (1933) account of the well known Hawthorne findings.

Prior to this, a major area of research and industrial consideration was the work of Taylor (e.g. 1911) and others concerned with the organization of work and the promotion of efficient methods. Taylor's main concern was with efficiency and the possibility of maximum output for a given amount of effort. The view of work which survived Taylor's approach is that economic factors are the primary motivation for work behaviour, a view which it has since become customary to attack (Warr & Wall, 1975). Following on from this assumption, various payment schemes have been adopted by industry in the attempt to get employees to be more productive. Piece-work payment was popular in the early years of this century. Lupton (1971)

reviewed various financial incentive arrangements and listed group piece-work, group productivity bonuses, profit-sharing, overtime schemes and productivity bargaining. Unfortunately, however, even well-engineered and well-managed incentive schemes have declined in effectiveness and other forms of motivation have been sought to replace "payment by results". As early as (1968), Blum and Naylor made a definitive statement: "In view of the complexity of motivation in man, it can be definitely stated that industry has overemphasised the importance of financial incentives" (p.340).

The synthesis of the work of Taylor and his followers on Time Study and of the Gilbreth's Motion Study approach (e.g. Gilbreth, 1909), led to the development of Time and Motion Study (the forerunner of modern Work Study). One important feature of this rapprochement was the emergence of predetermined motion-time systems. A current example of this is Methods - Time Measurement, first published in 1948 by Maynard, Stegemerten and Schwab, and applied across a wide range of Australian industries in the 1950's. Modern Work Study has as its objective the optimal and efficient use of human and material resources. It shares this aim with several other major techniques, including operations research, network analysis, systems analysis, and ergonomics, all of which are based on the optimizing process.

Ergonomics, in particular, has generated much of the psychological interest in work. As noted by Warr (1978): "Psychologists have long been interested in the design of work

and work environments. This is partly a matter of social organisation and distribution of response.... but it is also a question of understanding and controlling the ways in which men and machines operate together as 'man-machine systems'" (p.76). This relatively new and interdisciplinary field has an applied basis, linking pure research with practical application to working problems.

Ergonomists' concern with optimal efficiency of man-machine systems has concentrated on the physical factors involved rather than the motivational ones, and there is now an extensive literature concerned with people at work, covering such areas as information displays (e.g. Singleton, 1971); layout of work spaces (e.g. Jones & Cohen, 1968); noise (e.g. Kryter, 1970); efficiency of inspection (e.g. Hopkinson & Collins, 1970); and thermal comfort (e.g. Faber & Kell, 1966).

The general conception of work arising from the areas of industrial engineering and ergonomics would seem to be that efficient working conditions should be the main focus of attention, with employee well-being and motivation given less priority. The conception of work would thus be one where behaviour is strongly controlled by working conditions, and other considerations are of less importance. Other approaches stress the "psychological" controlling conditions operating in the work setting.

2. The Psychological Approach - Early History

Much early industrial psychology was concerned with selection and placement. Münsterberg (1913) was highly optimistic

about the possibilities of proper placement: "The economic experimental psychology offers no more inspiring idea than this adjustment of work and psyche by which mental dissatisfaction in the work, mental depression and discouragement, may be replaced ....by overflowing joy and perfect inner harmony" (p.309).

Whereas scientific management in general placed its emphasis on the physical and psychological factors surrounding work and associated payment schemes, another major thrust of early industrial psychology (Mayo, 1933, 1945) fostered recognition of the interpersonal aspects of working and consideration of the organization as a social system. In its latter stages, the well known Hawthorne research turned to an investigation of the social factors contributing to employee effectiveness. The results of the 1939 study, reported by Roethlisberger and Dickson (1939), seemed to show that output was more affected by social relationships with the group and the supervisor than by wage incentives and physical surroundings. Mayo commented in his account of the findings at the Hawthorne plant that: "....the failure of workers and supervisors to understand their work and working conditions and widespread sense of personal futility...." (Mayo, 1933, p.166) was typical of societies in which rapid scientific and technological advances were being made. Mayo extended the term "anomie" to incorporate this erosion of self-belief and social purpose at work. The indication that factors other than money could affect productivity was enthusiastically accepted,and the conclusion frequently drawn

(incorrectly) from these studies that money did not matter at all.

Although there have been serious doubts about the validity of the conclusions drawn from this research (e.g. Carey, 1977), the emphasis on the state of the worker led to the development of a new approach in the understanding of behaviour at work; the Human Relations Movement, of which Mayo is generally credited as the forerunner. This motivational approach stressed training of management in social and supervisory skills as well as employee counselling, but although it did remove much of the dissatisfaction reflected in absenteeism and turnover rates (e.g. Argyle, 1972), there was no associated increase in output. Current motivational approaches have aimed at rectifying this deficit.

3. The Psychological Approach - Current Developments

Extensive and varied research has resulted from recent attempts to stimulate motivation in workers by seeking out the appropriate controlling conditions for the production and maintenance of desired working behaviour.

The Hawthorne studies have stimulated much wider research into behaviour at work; for instance, although management training in human relations is a continuing practice, the link between such training and any improvement in worker motivation is still far from clear. Herzberg (1968a) scathingly commented of the application of communications training to industry: "Then both employees and management were communicating and listening to each other more than ever, but without much improvement in motivation" (p.56).

Modern research activity can be subdivided into the following major categories: (a) alternative decision-making processes; (b) job design and job satisfaction; and (c) group processes at work.

(a) Alternative decision-making processes

Investigation of employee-participation in decision-making also stems from the Hawthorne studies and overlaps considerably with research in group dynamics and leadership processes. There is now considerable evidence (e.g. Warr & Wall, 1975) that workers prefer participation as a facilitatory condition rather than more autocratic management. This reference must be qualified, however, by the fact that it is far from universal (e.g. Vroom, 1960).

Later research on participation has clarified this issue by the use of moderating variables such as the nature of the task itself (e.g. Hackman & Lawler, 1971); the relationship of that task to the supervisory role (e.g. Heller & Yukl, 1969); and the individual preference of employees (e.g. Hulin & Blood, 1968).

(b) Job Design and Job Satisfaction

Another possibility for producing work behaviour is the redesigning of jobs to make them more satisfying. Within current organizational behaviour thinking, consideration of the nature of the task itself has become an important subsection known as Job Design.

While the evidence concerning repetitive work and its effect on workers is somewhat ambiguous, there is sufficient

evidence (e.g. Warr & Wall, 1975), that most people prefer more varied and complex jobs. Job design has the primary aims of firstly increasing job satisfaction and secondly maintaining output and quality of work life for the worker. It can be noted that work study has the same aims but reverses their priority.

Redesigning jobs to avoid the consequences of job fragmentation, task specialization and minimal worker control over production processes that frequently accompany technological development has taken various forms.

Job rotation, by allowing movement between jobs, aimed to increase the variety of operations performed by workers. The use of autonomous work groups is another technique (Walton, 1972, 1975). Horizontal job enlargement is concerned with ".... the expansion of job content to include a variety of tasks and to increase the worker's self-determination of pace, responsibilities for checking quality and discretion for method" (Conant & Kilbridge, 1965, p.380).

Proponents of job enlargement believe that it lowers monotony, increases satisfaction and decreases turnover and restrictive practices. However, there is some argument with this general view. In a review of the job enlargement literature, Hulin and Blood (1968) contended that this technique has been overrated and is useful only with some sections of the work force; in particular, white collar supervisory workers and nonalienated blue collar workers.

When job enlargement was found not to be effective under all conditions an alternative technique was proposed. This

important contribution, arising from organizational psychology, is in the form of redesigning the job to increase its intrinsic motivating potential. The theories of two psychologists (Maslow; Herzberg) have been particularly influential in promoting this current approach.

Maslow's theory of human motivation, based on his famous hierarchy of needs, was first published in 1943 and subsequently developed (1954, 1968, 1970, 1973). This theory has been widely accepted in occupational and organizational psychology, and is still taught in many organizations despite the difficulties of acquiring validating experimental data.

Herzberg's well known Two Factor theory of motivation, also based on human needs, developed from the finding that when people described satisfactory times at work, they seemed to be concerned with activities different from those involved when they spoke of dissatisfaction at work (Herzberg, Mausner & Snyderman, 1959). These two factors Herzberg respectively called hygiene factors (those mainly affecting dissatisfaction), and motivating factors (those mainly affecting satisfaction).

Herzberg's own research provides much support for his theory (e.g. 1968a, 1968b, 1976), but other researchers have been less successful. The Herzberg Controversy has been amply reviewed by Greene (1972), and Schwab and Cummings (1970). One major consequence of this controversy has been the focus of attention on enrichment as a method of redesigning work, and particularly on the conditions necessary to make job enrichment an effective

technique (e.g. Locke, Cartledge & Knerr, 1970; Hackman & Lawler, 1971).

Much of the literature in organizational behaviour in recent years has been concerned with the effects on employee motivation of "enriched jobs". Results suggest that enrichment programmes are often associated with increased satisfaction, reduced turnover, and lowering of absenteeism and, in some cases, higher performance (e.g. Hackman & Oldham, 1975, 1976, 1979; Steers & Spencer, 1977; Hackman & Suttle, 1977).

Job enrichment has been expanded to include extrinsic reinforcement in the formulation of expectancy models of motivation,which suggest that people make choices based on the expected payoff of the alternatives, the payoff of different efforts being a function of the probability of various outcomes and the value of those outcomes. Reviews of expectancy models are provided by Mitchell (1974), and Connolly (1976). While Vroom (1964) is the originator of this approach, a major contemporary theory is that of Porter and Lawler (1968), which allows for individual abilities and role perceptions in the understanding of expectancy and valence of an outcome. In such models the linking of the intrinsic value of a job with the role of consequences represents a major theoretical advance.

It can be seen that current developments are aimed at improving job motivation through increasing job satisfaction potential,because it is believed that improving the quality of working life is a worthwhile objective. Examples of other

current techniques in the Australian context are provided by Lansbury and Prideaux (1978), and include studies of flexitime (e.g. Department of Employment & Industrial Relations, 1976); improving the organizational climate through, for instance, feedback (e.g. Peter, 1975); team development (e.g. Andreatta & Rumbold, 1974); occupational stress (e.g. Ferguson, 1973); and personnel practice (e.g. Lansbury & Knight, 1976).

(c) Group processes at work

To this point, this section has considered the individual in the working situation, and has not discussed research areas dealing with the individual as part of a working unit. Part of the controlling conditions for the production and maintenance of work behaviour is undoubtedly the behaviour of fellow workers, and this aspect of the work situation has recently been somewhat underplayed. Current research in the area of Group Dynamics, including leadership investigation, has been amply summarized by Zander (1979), who commented that since the 1960's this has been a declining area of research effort. Three areas only have attracted recent research interest: the origins of group cohesiveness; the nature of social pressures within a group; and the dynamics of making group decisions.

4. Summary of Work in Organizational Settings

Two broad types of theory have resulted from examination of the controlling conditions for the occurrence and maintenance of work behaviour in the work setting. Firstly, investigation of

the environmental factors of the working situation focused on higher productivity as the dependent variable, and ignored improvement in satisfaction.

The second main approach concentrates largely on satisfaction as the dependent variable with output as a secondary variable. Output is thus increased by increasing the motivating potential of jobs, and can also be influenced by considering the relationship of the job to other factors such as interpersonal relationships, structural relationships, and organizational factors.

Hackman (1979), in his exploration of possibilities for the design and management of work in the future, compared the implications of these two possible avenues. Either we can pursue the motivation behind job enrichment programmes and increase the level of challenge and autonomy in jobs ("Route One"); or we can design work for maximum economic and technological efficiency, and provide alternative sources of satisfaction for people facing an unfulfilling work experience ("Route Two").

Hackman concluded that: "....we are moving with some vigor down Route Two" (p.476), for several reasons. Our knowledge about applying innovative redesigned work is still primitive, as are our methods for assessing the costs of so doing. Also, "Route One" tactics are received with some degree of scepticism by management, being out of line with traditional organizational models and management practices. The inertia, both of employees and managers in contemporary organizations,is a further barrier.

5. The Operant Paradigm in the Organizational Setting

The application of operant conditioning methods is another possible avenue in the search for increasing worker motivation. The introduction of the operant paradigm into organizational settings as an alternative management technique is quite recent. Luthans (1973) coined the term "Organizational Behaviour Modification" (or "O.B.Mod.") to refer to the integration of operant conditioning with knowledge about organizational behaviour. As Nord noted in 1969: "Since the major concern of managers of human resources is the prediction and control of behavior of organizational participants, it is curious to find that people with such a need are extremely conversant with McGregor and Maslow and totally ignorant of Skinner" (pp.375-376). Others, too, have seen the potential for operant conditioning techniques (e.g. Campbell, 1971; Brethower, 1972; Schneier, 1974; Luthans & Kreitner, 1975).

Luthans and White (1971) commented: "Manpower management is a unique but appropriate direction for behaviour modification" (p.47), and Mitchell (1979), in a review of empirical studies applying operant principles to the work setting called for "....investigations that examine how operant procedures and cognitive events jointly result in increased motivation" (p.261). Hackman (1979), following from his conclusion that the focus in work design in the next decade is likely to be on efficiency and optimization, predicted that management will need to rely increasingly on behaviour modification programmes involving such

reinforcers as pay and supervisory praise, given conditions of minimal personal worker control and close monitoring of behaviour: "Desired on-the-job behavior will be elicited and maintained by extensive sophisticated use of extrinsic rewards" (p.468).

1.3. "WORK" AS AN OPERANT

Having examined in the previous section the controlling conditions of work as they emerge from research within the work setting, it is now useful to examine how operant conceptions of work can be related formally to those controls. Attitudes to operant behaviour differ, but for the purposes of the present work, a traditional view, as set out in this section, is adopted.

Accepting Skinner's (1938) definitions of the key concepts in the analysis of operant behaviour, we regard a stimulus as an environmental event which influences the occurrence of a particular response; reinforcers as a subclass of stimuli whose presentation increases the rate of behaviour on which they are contingent; and an operant as the class of response which shows an orderly increase in rate when reinforced.

Skinner defined discrimination as the correlation of reinforcement with a stimulus or response possessing some specific property, and such stimuli are labelled discriminative stimuli; an S^D is a discriminative stimulus which is positively correlated with reinforcement.

Some clear points of comparison emerge between the fields of operant conditioning and ergonomics. These two fields do not present rival explanations of behaviour; rather, they focus

on different aspects of the control of the response. In terms of the above scheme, ergonomics might be said to be more concerned with stimuli other than the reinforcing stimuli (e.g. temperature conditions, instrument layout, etc.),while operant conditioning tends to focus exactly on the conditions of presentation of reinforcement and is less concerned with other environmental stimuli. If stimuli other than the reinforcer are investigated, the focus in operant conditioning is on cue properties rather than on other factors affecting the organism's performance. The study of effort, in particular, has been of interest to ergonomists (e.g. Kroemer, 1969), but has not been much to the fore in operant work. However, it can be investigated using operant techniques and can be introduced as a variable into operant experimental situations. Notterman and Mintz (1965), for example, showed that effort can be measured and is a controllable operant, subject to schedule of reinforcement effects in the same way as are frequency and probability measures. However, there are some forms of work, especially "mental work", for which effort would be an inappropriate measure, while fatigue measures would be more applicable.

Given the above paradigm, it can be seen that the concept of "work" covers a number of operant situations which bear functional relationships to certain stimuli. The question then arises as to whether there is anything distinctive in the

stimulus control of these particular operants, or whether they are no more than part of the general category of operant behaviour.

1. Biological Controls

Having stated the operant paradigm formally, it is important to investigate whether there are any linkages of a biological nature between work and any particular reinforcers.

(a) The generality of work behaviour across species

In considering the possibility that work might be a general operant with particular biological controls, the questions of evolutionary age and generality of the behaviour are important. If work is a behaviour that is both general across a number of related species and of considerable evolutionary age, then the possibility of biological controls for it becomes potentially important. Taking the comparison behaviour employed in Section 1.1, play certainly has built-in biological controls, being demonstrated in a wide variety of mammalian species and with wide similarities, although of course the particular controls are species-specific. As Hinde (1970) commented: "The kitten playing with a piece of wool or the dog chasing a ball are common enough domestic examples which find parallels in the majority of mammals and many lower species" (p.356). Also, deaf-and-blind born children exhibit play behaviour (Eibl-Eibesfeldt, 1973). Because of the evolutionary history of the species involved, certain stimuli have the capacity to

elicit play behaviour; for example, play in lion cubs is elicited by the adult lion swishing the tail (Rudnai, 1973).

It is possible that work is a phenomenon which is unique to the human species. The definition of work proposed by Neff (1968) is in accord with this view. Neff, in his attempt to distinguish work from play, stresses the goal-directed character of work. He sees the ability of men to make planful changes to the environment as the factor which distinguishes human work from animal activity. Work is: "....an instrumental activity carried out by human beings, the object of which is to preserve and maintain life, which is directed at a planful alteration of certain features of man's environment" (p.78).

Others do not restrict work to the human species and the opposite view is also in the literature. Argyle (1972), having noted that the concept of work is usually reserved for human behaviour, commented that the antecedents of work (e.g. hunting and gathering, building nests and shelter) are found in all species: "The patterns of work behaviour in a particular species are largely, and in some cases entirely, innate" (p.7). Restle (1975) also asserted high generality of work behaviour across species. If we accept the generality of work behaviour, along with Argyle and Restle, then the possibility of biological controls must be seriously considered.

As well as the question of generality, the evolutionary age of work must be considered. It is possible that work is a late evolutionary phenomenon. Homo sapiens is a comparatively recent

species, probably less than 100,000 years old (Leakey & Lewin, 1977), and hunting and gathering have been the means of existence for most of that time, dominating human existence till as recently as 10,000 years ago when agriculture had its origins. As Leakey and Lewin commented: "For a huge slice of our evolutionary career we were hunters and gatherers" (p.148). If hunting and gathering are deemed to fall outside of the range of activities which we call "work", then the possibility of biological controls for the behaviour remaining becomes less plausible, given the recency of our species and within that the recency of such activities. Even if we accept that hunting and gathering as an activity does constitute work, and agriculture certainly does, the fact that these different aspects of work are of different ages makes the possibility of a common biological control somewhat unlikely.

(b) Prepared linkages between work and specific reinforcers

If work does have built-in biological controls, then various linkages are possible. Using an operant framework, the connections of the most interest will be biological controls linking work with specific reinforcers. This is not to deny that linkages with eliciting stimuli are also possible. There is recent evidence that such linkages between stimulus, response and reinforcement do exist due to biological constraints.

According to the traditionally accepted principle of equipotentiality or equivalence of associability, all elements of the learning situation - stimulus, response, and reinforcement -

are arbitrarily chosen. Teitelbaum (1966) noted: "In effect, in any operant situation, the stimulus, the response and the reinforcement are completely arbitrary and interchangeable. No one of them bears any biologically built-in fixed connections to the others" (p.567). Hilgard and Bower (1975) commented: "It is essentially this principle of equivalence of associability that accounts for the very arbitrary, almost bizarre and unnatural choices of stimuli and responses which learning psychologists have used over the past 80 years...." (p.84).

Such ideas, of course, are not recent. Thorndike (1898) noticed that certain stimulus conditions and responses seemed to belong naturally together. His cats quickly learned how to pull a string or push a button to exit from the box, but had difficulties when required to lick or scratch themselves in this context. Even if they did learn, these responses tended to diminish in form to become a "mere vestige of a lick or a scratch".

The same arbitrariness was thought to be a feature of classical conditioning as well: "It is obvious that the reflex activity of any effector organ can be chosen for the purpose of investigation, since signalling stimuli can get linked up with any of the inborn reflexes" (Pavlov, 1927, p.17).

If true, the assumption that any reinforcing stimulus could easily be connected with any response would, of course, simplify the framing of laws of behaviour change. It is the truth of this assumption which is now being empirically challenged, and a current popular point of view is that there are biological predispositions

governing response-reinforcer connections, leading Hilgard and Bower (1975) to assert a "natural fittingness principle" (p.575). In other words, some stimuli are better reinforcers for particular behaviours than others.

A most important development in this area was the work of Garcia and associates (e.g. Garcia & Koelling, 1966) on the classical conditioning of aversions to taste. The constraints observed in rats' associations of various stimuli with subsequent illness led Garcia, Clarke and Hawkins (1973) to comment: "The coping behavior of an organism in the artificial (laboratory) niche can only be understood in terms of its behavior in the natural (evolutionary) niche and its specialized receptors and neural circuits" (p.1).

Seligman (1970) clarified this work, proposing a continuum between learned and innate behaviour. His concept of preparedness suggests that organisms are prepared to associate certain events, unprepared to associate some, and contraprepared to associate others. Seligman criticised the choice of arbitrary responses, maintaining that regularities discovered in traditional conditioning situations may relate only to unnatural "unprepared" associations. We need also to look at "prepared" and "contra-prepared" associations, seeking systematic differences along the preparedness dimension. Preparedness also has a role in human functioning. Seligman and Hager (1972) suggested that language, child development, and psychopathological behaviour are all subject to evolutionary constraints.

These and other controversial phenomena led Hinde and Stevenson-Hinde (1973) to conclude: "....generalisations about learning must be hedged about by reservations relating to species, task, and context " (p.469).

Despite the reasonable likelihood that prepared associations do exist, there is no evidence as yet that work behaviour in particular is linked with any particular reinforcer in a biological sense, and it would be unwarranted to assume any such connection at this time. If there were such linkages in the case of work, an obvious connection is with social reinforcement, which does have every indication of being at least partly innately determined, as will be seen in the following chapter. Such linkages as do occur between work and various reinforcers are more likely to arise as a matter of convenience than evolution.

(c) Biological controls: Conclusion

This consideration of the possibility of biological controls of working behaviour prompts the following conclusions. Work is provisionally defined as being restricted to human behaviour. It is unlikely that work as a whole has biological controls, although it could reasonably be suggested that individual components of work may conceivably have linkages of a biological nature with particular reinforcers. Given the fact that different aspects of work may be of different evolutionary ages, the possibility of specific linkages between it and any particular reinforcer seems slight. If there were such a linkage between work and a specific kind of reinforcer, this is likely to be of a social or linguistic

nature. Thus while it is possible to make general overall statements about play and its biological controls, such generalizations are inappropriate to the concept of work.

2. The Interaction between Intrinsic and Extrinsic Reinforcement in Work

Work is often regarded as relying solely on extrinsic motivation for its maintenance. Neff's (1968) definition stressed the instrumental nature of work, and Restle (1975) defined work as: "....a repeated behaviour flow that is not itself intrinsically satisfying or natural but is maintained by extrinsic rewards" (p.100). Restle views schedules of reinforcement as providing the key for understanding the reason why people continue to work at boring jobs, and the factors influencing output.

Again using play as a comparison behaviour, there is an obvious contrast between work, as an extrinsically motivated behaviour, and play, which is notable for its intrinsic reinforcing qualities. Play seems to be substantially intrinsically motivated; indeed, the voluntary nature of play is often quoted as one of its defining characteristics (e.g. Sylva, Bruner & Genova, 1976).

In fact, the complete reliance on extrinsic reinforcement proposed in Restle's definition of work does not seem to be in accord with reality. Not all work totally lacks intrinsic value, even if it is only the social interaction in the working situation, and much work seems to be relatively independent from extrinsic factors. A combination of both extrinsic and intrinsic motivation would seem more suitably applied to work. Skinner (1972) noted

the need for management to recognise the importance of both types of factors when he commented: "An incentive system isn't the only factor to take into account. How pleasant work conditions are, how easy or awkward a job is, how good or bad tools are - many things of that sort make an enormous difference in what a worker will do for what he receives" (p.39). Some elements of work are undoubtedly intrinsically motivated and the manipulation of the intrinsic value of jobs has constituted a major area within research in the organizational setting (as noted in Section 1.2 above).

Mental health of workers has also been linked to the intrinsic interest of the job. Kornhauser (1965) investigated mental health of semi-skilled factory workers on production lines. Although these boring jobs were free from physical and mental strain, workers reported low general mental health. Kornhauser suggested that: "....feelings of inadequacy, low self-esteem, anxiety, hostility, dissatisfaction with life, and low personal morale...." (p.261) were the result of low grade work.

Given the evidence that intrinsic motivation may also be operating in the work situation, there is a heightened probability of conflict between the two. There is an experimental literature illustrating that reinforcement can have unpredictable effects on beahviour which is intrinsically motivated. Skinner and Morse's (1958) paradigmic study gave a typical result. In this study, rats received Fixed Interval reinforcement for running in a wheel;

almost certainly an innate behaviour. Skinner and Morse noted that: "....reinforcement sometimes suppresses the rate of running below the unreinforced rate" (p.377). Unreinforced behaviour was substantial both before and after the Fixed Interval training in each session.

Work by Harlow and associates also suggested a disrupting effect caused by external reinforcement (e.g. Harlow, Harlow & Meyer, 1950; Gately, 1950). There have been other reports of the inhibiting effect of reinforcement on high frequency behaviour and of improvement upon removal of the reinforcement. Clark and Miller (1966) reported higher running speeds of food-deprived rats in a T-maze during pre-acquisition and extinction trails than during acquisition. Both runway speed and goal speed (reciprocal of time from arrival at the goal box door to goal box entry) increased significantly across trials under both nonreinforced conditions. However, the introduction of food reinforcement into goal boxes caused a decrease in runway speed, while goal speed increased. Paul (1969) and Paul and Calabrese (1973) also found that performance was better in nonrewarded trials in rats running in an alley. These findings suggest that we may expect extrinsic reinforcement to have unpredictable effects if applied to work.

The well known work of Deci and associates has demonstrated that conflict may arise between intrinsic and extrinsic reward in the work situation with human subjects, and the results of this experimentation suggest that intrinsic and extrinsic reinforcement for human work are not additive, but interactive. Deci (1971) in

his paradigmic study, reported that subjects who were paid for engaging in an intrinsically interesting activity were less interested in continuing that activity than were subjects who had not been paid. Deci (1975) explored the application of his findings to the educational setting, suggesting that extrinsic motivation may already be over used in classrooms to the detriment of the children's interest. He quoted a study by Levine and Fashacht (1974) which concluded that token economies may lead to "token learning", since while in operation they control behaviour quite effectively, but once discontinued behaviour is as bad or worse than baseline levels. Fortunately, subsequent investigation (Mawhinney, 1979) has suggested that such conclusions are far too generalized.

3. Social Controls

If, as seems likely, specific biological response-reinforcer linkages do not form a large part of work controls, there may be specific controls because of conventions of society. Perhaps work is habitually subjected to certain types of controls applied by society. If work is socially determined rather than biologically determined, the range of reinforcers used may, in fact, be limited, but in a different sense. Only a limited range of reinforcers is habitually applied to work, but this is a matter of convenience and other reinforcers may, in principle, be used instead. Of course, as a sociobiologist might well feel, this may be how biological preparedness arose in the first place, with a socially derived

reinforcer-operant linkage eventually becoming selective for survival purposes; for example, meat being a characteristic reinforcer for hunting may have led eventually to a prepared association between the two.

This discussion will focus on the types of controls determined by society which are generally associated with work. A variety of motives are applicable to work in present industrial society; studies of the rewards that are most salient to workers arise mainly from the job satisfaction literature within the industrial environment. Herzberg's motivational theory (Section 1.2.3) separates work motivators into two classes: hygiene factors are extrinsic, arising from the organizational context (including pay); while intrinsic factors (satisfiers) stem from the individual's relation to the job itself, and include achievement, recognition and advancement. Other attempts to isolate the important reinforcers are largely in accord with Herzberg's taxonomy. Vroom (1964) reviewed much of the factor analytic work arising from job satisfaction studies to that date, and his analysis produced seven consistently appearing factors: company policies and management; promotional opportunities; job content; supervision; pay; working conditions; and co-worker interaction. Further attempts (Quinn & Cobb, 1971; Dawis, Lofquist & Weiss, 1968) led Campbell and Pritchard (1976) to conclude that two sub-general factors corresponding approximately to Herzberg's breakdown would be most sensible.

In the present analysis, payment will be discussed as an instance of Herzberg's hygiene factors, and the social rewards

present in the work situation will represent the "intrinsic" factors.

(a) The financial controller

Argyle (1972) preferred to keep pay as a quite separate category in his analysis of motivation and work, referring to an autonomous need for money going beyond its instrumental value, at least in some people. Economic motivation is obviously of great importance as a controller of working behaviour in our society. While Herzberg believed pay to be relatively unimportant, Lawler (1971), in a review of 49 studies relating pay to other factors such as job security, interesting work, and chances of advancement, found pay to rank third in importance on the average. Others have documented the importance of pay (e.g. Opsahl & Dunnette, 1966; Campbell, Dunnette, Lawler & Weick, 1970).

The specific role that money plays in work motivation is not clear. While generating much research, the behavioural laws governing the effectiveness of financial incentives as a motivation in industry are difficult to apply. Blum and Naylor (1968) stated: "....the role of money as a reward in modern industry continues to be poorly understood in spite of the fact that our economy seems to be based upon a monetary reward system" (p.344).

In laboratory experiments where money is frequently used as a reinforcer, its controlling properties are better known. Zimmerman and Baydan (1963), for instance, used money as intermittent reinforcement for performing correctly on a conditional matching-to-sample task. Money is frequently used as a negative reinforcement

also; for example, Baron and Kaufman (1966) showed that humans would respond (key-pressing) in order to avoid cessation of a signal of money payment; and Kaufman and Baron (1969) investigated free-operant avoidance behaviour using money as the reinforcer.

(b) Social controllers

A second important category within rewards which are regularly applied to work are those arising from the social content of the work situation. The social aspect of most jobs has emerged as an important factor in most job satisfaction studies (e.g. Vroom, 1964; Quinn & Cobb, 1971), and interpersonal relations appear as a dissatisfier in Herzberg's scheme. Argyle (1972) called the need for social interaction "affiliative motivation", and quoted some evidence that this is a motivator for many workers. Social interaction has been linked with job satisfaction by Seashore (1954).

Rosow (1979) also commented on this need: "Employees are basically social beings with a strong gregarious need. People are drawn to work by both economic and social needs" (p.7). Rosow stressed the increasing role of the work place in providing social support and involvement, due to the declining effectiveness of traditional social supports, such as the family, the small community, and the church.

A second most important area within the social aspect of working is job status and recognition. The category of status and promotional opportunities occupies an important position in the motivational theories mentioned in Section 1.2.3, and emerges as

a major cause of job satisfaction. Status has been linked with mental health (e.g. Gurin, Veroff & Feld, 1960; Kornhauser, 1965).

As Katz and Kahn (1978) pointed out, promotions are usually limited in number and therefore few studies are available which can link productivity and expectations of promotion. However, the authoritative article by Katz (1964) suggested that these factors operate much more to curb absenteeism and turnover, rather than to increase output. Also, as with other extrinsic reinforcers, the reinforcing power of promotion is linked with the individual's expectations of being promoted, which are in turn strongly influenced by feelings of equity (e.g. Adams & Freedman, 1976).

The use of recognition and praise is one of the most important techniques for controlling work in our society (Goode, 1978). Such reinforcers are obviously mediated by language. Verbal reinforcement has been shown repeatedly to influence behaviour, since the early experiments of Greenspoon (1955) and Verplanck (1955). Katz and Kahn (1978) pointed to some difficulties in the use of praise at work: "But it is one thing to reinforce the correct response of a pigeon in a Skinner box and another to programme supervisors so that they emit sounds of approval when the worker makes the right move. It would mean a much higher ratio of supervisors to workers than commonly found now and would entail very close supervision" (p.355). Katz and Kahn commented that employees do not like being closely supervised, quoting a study of office workers by Katz, Maccoby and Morse (1950). However, the findings of the many studies reviewed in Chapter 6

which establish a link between supervisor social reinforcement and worker output and/or attention in sheltered workshops, demonstrate that social reinforcement is an effective controller in such settings.

An additional function of social reinforcement, and one that has received scant coverage in the research literature, concerns its anxiety-reducing potential. Work has been associated with criticism and failure in the history of many individuals, and concern about failure can be reduced through positive reinforcement.

(c) Aversive consequences at work

Whenever there are extrinsic reinforcers, there is also the possibility of punishment, and in the work situation avoidance conditioning, in particular, is likely.

A third and important aspect of social control in the working situation is the use of aversive consequences. Punishment is used widely in our society (Skinner, 1953), and the organizational environment is no exception. Luthans and Kreitner (1973, 1975), for instance, noted the widespread use of punishment in human resource management: "The physical and social organizational environment is literally filled with potential and actual punishing consequences. Criticism, undesirable tasks, nagging, unsatisfactory performance evaluations, layoffs, pay docks, and terminations are common punishing consequences of organizational behavior" (1975, p.113).

"Management by Exception" (e.g. Coventry, 1970; Sisk, 1977) is a supervisory technique whereby supervisors pay attention only when employees either make a mistake or perform at a high level.

This is often recommended as a managerial strategy for optimal use of time. In practice, however, it often has a demotivating effect since managers tend to use it only in the negative sense. As Sisk (1977) commented: "The most efficient use of managerial time and energy is possible when control information stresses the exception and focuses attention upon those functions that need corrective action" (p.463).

(d) Social controls: Conclusion

Human society applies an extensive and varied range of controls to work behaviour. Financial reward, access to the work group, and other social consequences are the types of control favoured in our society in the attempt to produce and maintain working behaviour.

1.4. CONCLUSION

As with play, a close definition of work at this stage is probably not possible. It might be feasible to define work by exclusion; those activities like play, sleeping, mating, eating, etc., can be excluded, and what remains is classified as work. On the other hand, it may be possible to make use of the frequent observation about play exhibiting a lack of "seriousness", and to conclude that work, like play, is quite heterogeneous in form, but the characteristic which always accompanies it is an element of "seriousness".

However it is defined, work does have particular characteristics. Some reinforcers do seem to be used to control

work more frequently than others, even though there are no special relationships in Seligman's sense between work and any particular class of reinforcer. In particular, social reinforcement, and especially language, is frequently used to control work behaviour in our society. While salary operates to keep the worker at work, social and other reinforcers control the fine grain of the behaviour.

Work may also be, in part, characterized as a response which is controlled simultaneously by a multiplicity of sources of reinforcement, thus heightening the probability of conflict between intrinsically and extrinsically motivated reinforcers. This contrasts with play, being more clearly intrinsically motivated, and also with the traditional Skinner Box situation (Skinner, 1958) which employs a unitary source of reinforcement. This difference leads to a number of conclusions. Experimental parallels of working behaviour which employ several reinforcers acting simultaneously may be most appropriate. Alternatively, it may be wise to use the actual work situation, making only such concessions as are necessary for adequate control of experiments, since results from traditional experimental settings may be misleading.

CHAPTER 2.

SOCIAL REINFORCEMENT - ORIGINS

2.1. INTRODUCTION

Chapter 1 was concerned with the definition and theoretical position of work as the dependent variable in the present series of experiments. In considering the independent variable, social reinforcement, the following questions would seem to be of prime importance.

Firstly, how is social reinforcement defined? Secondly, what is its origin and how does it relate to concepts such as conditioned reinforcement and other processes like imprinting? Finally, what role does language play in its development?

An important question arises as to the innateness of social reinforcement, a question which has obvious relevance to its durability. Although the origin of social reinforcement is not crucial to this work, its durability is important, and will be considered experimentally in Chapter 7, Experiment 3.

2.2. DEFINITIONS

The precise definition of "social reinforcement" is arguable. Being a form of reinforcement, an essential feature which must be fulfilled, according to Skinner (1938), is that either its presentation or its removal following a response must increase the frequency of that response, as noted in Chapter 1 (Section 1.3).

However, the "social" aspect of the stimulus has been variously interpreted, and a considerable range of stimulus events has been subsumed under the title "social reinforcement". Some

authors are concerned solely with the verbal behaviour of the agent of reinforcement; the majority of studies have interpreted "social reinforcement" to mean verbal praise. Parton and Ross (1967), for example, defined social reinforcement as "...verbal praise statements by a physically present human" (p.323). The variety and effusiveness of the verbal reinforcement presented is diverse among those adopting this narrow definition. While in some experiments "Good" and/or "Right" are the only reinforcers (e.g. Cairns, 1970), others allow experimenters to choose from a list (e.g. Kazdin, 1977), or make up their own (Gewirtz & Baer, 1958b).

Several different interpretations have been offered. As well as verbal reinforcement, researchers frequently want to include nonverbal behaviour (such as smiling, hugging, or merely "attending"). Mere physical presence of the agent, unaccompanied by any verbal response, was deemed a form of social reinforcement in a study by Cox (1966). Interest items that allegedly have social connotations have qualified as social reinforcers (Reitz & McDougall, 1969), and photographs of liked and disliked persons have been shown significantly to modify performance (Lott & Lott, 1969), as has attitudinal agreement (Kaplan & Olczak, 1970). Comparison of different types of verbal/nonverbal social reinforcement stimuli is the subject of experimentation reported in Chapter 11.

As an adequate definition for the present work, Skinner's (1953) definition represents a very wide view. By implication, "Behavior reinforced through the mediation of other people...." (p.299) is given as a definition of the operation of social reinforcement. Thus

the presentation of a primary reinforcer through the "mediation" of another person constitutes social reinforcement. Any reinforcer conveyed by a person constitutes social reinforcement and any reinforcer not conveyed by a person ("behavior reinforced by the mechanical environment"; Skinner, 1953, p.299) is not social reinforcement. The nature of the reinforcer that is conveyed is irrelevant to this definition.

An alternative definition of social reinforcement focuses on features of the behaviour of some other member of the same species. Presumably, even using Skinner's definition, features of behaviour that accompany the "mediation" must eventually become reinforcing via pairing with a primary reinforcer.

Observing the behaviour of a conspecific has been demonstrated to act as a reinforcer for animals; for example, Swartz and Rosenblum (1980) reported that bonnet macaques responded at high sustained levels on an operant task for presentation of a colour videotaped television image of another female adult moving freely in an enclosed stimulus chamber. Whether or not this type of reinforcement should most usefully be categorized as "social" reinforcement is debatable, and it is probably more usefully classified as a novelty stimulus which reinforces curiosity. A more satisfactory definition of social reinforcement would probably include a qualification that the feature of behaviour on the part of another conspecific should be communicative in nature.

Certainly, this narrower definition of social reinforcement is not restricted to the human species, and work with other species,

especially the primates, suggests there are species-specific reinforcers used in social situations which may fall into this definition of social reinforcement. Lindsley (1963) extended the term "social reinforcement" to cover interactions (not necessarily verbal) between organisms other than humans, with the proviso that "social reinforcement" should be so restricted as not to refer to the social delivery of nonsocial rewards.

Social reinforcement of this kind may even occur between species, and a further modification to this narrower definition may be necessitated following recent research on cross-species communication; for example, greeting can operate cross-specifically. Hediger (1955) gave an example of a tiger's greeting signal uttered in response to meeting its keeper: "In other words, man becomes subject of the tiger's specific ceremony; man is enclosed in the intra-specific behaviour; he is considered and treated as an individual of the same species" (p.9). More specifically, approach behaviour would be reinforced by the production of such greeting behaviour.

Close domestication would provide further obvious examples of inter-species communication. Hafez (1968), speaking of socialization in domesticated animals, commented: "Hand-reared animals become attached to their attendant and respond to him as they might normally do to their own mother or herd mates" (p.213). Another example of social communication across a species boundary occurs in the sense that humans are reinforced by the behaviour of, for instance, chimpanzees who use communicative gestures that

are similar in form to human gestures. This stimulation probably also contains some novelty reinforcement value, and is thus not a case of pure social reinforcement of the "communicative gesture" kind.

A further issue in considering possible definitions of social reinforcement concerns the directionality of such communicative gestures. Other animals, especially the primates, use many non-directional communications, for example, alarm calls, which are not directed at any one individual. Marler (1968) gives several examples of such general communicative behaviour used in maintaining spatial distribution patterns between primate groups, as well as between individual animals.

Whether or not such communication should be included as social reinforcement is arguable; certainly it would be difficult to decide at what point generality of intent of the communication would place it outside the category of reinforcement properly called "social".

Whether or not nondirectional communication is included in a definition, the question of the specific focus of directional communication is also relevant. Does social reinforcement have to be directed at the recipient in order to qualify as such? It is possible that seeing someone else receive social reinforcement may be reinforcing and again it is difficult to decide whether this category of communicative gesture should be excluded from a definition of social reinforcement.

Of course all definitions are arbitrary, but the question of the usefulness of the distinctions made by the definition chosen

would argue against the adoption of Skinner's definition of social reinforcement, since it leads to distinctions which may not be particularly useful. For instance, the delivery of a pellet by an automatic food dispenser into the magazine of a Skinner Box would not constitute social reinforcement, while a dispenser that included some degree of human involvement would culminate in social reinforcement.

In another way, Skinner's definition is too restrictive in that it does not allow for social reinforcement to occur either in other species or between species. There seems no good reason for wanting to separate out the same phenomena occurring within species other than humans, and the possibility of inter-species interaction cannot be ruled out if the same process is involved.

For the purposes of the present work, then, the definition of social reinforcement to be accepted is that it involves some communicative gesture on the part of another organism. Under this definition, conveyance of nonsocial reinforcers by a member of the species would not be included, but interactions between members of various species and cross-species interactions would. Of course it can be noted that social reinforcement in Skinner's sense is frequently accompanied by social reinforcement in the sense it is defined herein.

2.3. INNATE ASPECTS

Goodall's work provides many instances of social interactional gestures in chimpanzees. Goodall (1968) commented: "Primates have

a wide range of expressive movements and calls, many of which have a communicative function; that is, they appear to have some effect on other individuals that see or hear them and thus may help to maintain inter-individual relationships within the social structure as a whole" (p.313).

Greeting responses after separation are a clear example of a category of a behaviour which seems to reinforce approach behaviour. Although much of this behaviour has not been subjected to experimental analysis, the observational data would suggest fairly strongly that such behaviours are acting as social reinforcers and if made contingent upon some response, these behaviours would increase the rate of that response. Goodall lists a variety of gestures, including bobbing, crouching, grooming, kissing and embracing, which have the purpose of re-establishing status recognition between individuals. The form and intensity of the greeting ceremony is influenced by the length of the separation; a finding duplicated in humans (Callan, 1970), and in other species (e.g. Hediger, 1955; Hafez, 1962; Lorenz, 1966). Callan stated: "....the fact that 'greeting' occurs so frequently in the literature of animal behaviour without any apparent consensus on its status as a causal, functional or descriptive concept surely indicates a lurking assumption that.... 'everybody knows what is meant by greeting' " (p.106).

Other instances of social behaviour in animals which probably act as reinforcers include submissive gestures, reassurance, courtship and soliciting gestures. On the other hand, threat

gestures, postures and calls reinforce submissive/withdrawal behaviour, and act as negative reinforcement and punishment. Goodall (1968) also reported some movements, gestures, and sounds which are made by infants and act as signals to the mother; for instance, young chimpanzees are able to re-establish physical contact by reaching towards the mother, showing a pout face and uttering a "hoo" whimper. Nash (1978) observed that infant wild baboons between the age of five and six months controlled the proximity of mother-infant pair more than did the mother.

Such social interaction is not restricted to primates. Greeting and grooming ceremonies are a frequent component of the social behaviour of lions (Rudnai, 1973; Kuhme, 1966). Rudnai endorsed the interpretation (Kuhme, 1965) that greeting and grooming sessions serve to reinforce mutual dependence and friendliness. Given that socially reinforcing behaviour is observed across such a wide range of species, it is highly likely that social reinforcement is not of recent evolutionary origin, and hence is likely to be at least partly innate.

Further evidence for an innate component comes from the developmental literature. Looking at the matter ontogenetically, there is considerable evidence that social reinforcement behaviour occurs in small babies before the opportunity for learning has arisen. Certainly, infants' behaviour would appear to have eliciting properties which are innate, and it is also probable that the reinforcing quality of the behaviour has some innate components. Observations of newborn infants indicate that they

display a wide repertoire of behaviour patterns which occur both spontaneously and in response to external stimulation. Hinde (1972) commented of such movement patterns as smiling, crying and laughing: "Many of these gestures appear normally in deaf and blind-born children, making it very unlikely that imitation or learning from others is important in their development" (pp.34-35).

It is not only that infants are susceptible to social reinforcement effects; they can use it to reinforce others. While research on parent-child interactions usually focuses on the effects of parents on children (Bell, 1968) and rate of conditioning in babies, it has been observed that the infant is also able to modify the affective and behavioural reactions of other social objects, especially the caregiver. Several researchers have stressed the importance of reciprocal interactional processes (e.g. Gewirtz, 1969a; Bell, 1968, 1971; Lewis & Lee-Painter, 1974; Tronick, Als & Brazelton, 1977). Gewirtz has linked mutual conditioning, especially through crying responses, with the considerable attachment literature (e.g. Gewirtz, 1976; and Gewirtz & Boyd, 1977).

As Moss (1967) stated: "In summary, we propose that maternal behavior initially tends to be under the control of stimulus and reinforcing conditions provided by the young infant" (p.29). This

situation changes, however, when the mother's behaviour acquires reinforcement value and this increases her efficacy in regulating the infant's behaviour. Infant behaviour may function both as a signal regarding the infant state, and as discriminative stimuli for care giving and interactive behaviour. Bowlby (1958) remarked of infant smiling and crying: "....both of them act as social releasers of instinctual responses in mothers. As regards crying, there is plentiful evidence from the animal world that this is so: probably in all cases the mother responds promptly and unfailingly to her infant's bleat, call, or cry. It seems to be clear that similar impulses are also evoked in the human mother...." (p.366). Wiesenfeld and Klorman (1978) demonstrated the specificity of the caretaker's reaction.

The literature on social reinforcement in young infants thus indicates that such reinforcers may indeed be partly innate. As Morris (1980) commented of his conditioned reinforcement analysis of social reinforcement effects: "The approach taken here does not deny the possibility that social stimuli may have primary and/or ecological reinforcing functions" (p.11).

Two possible definitions of social reinforcement have been discussed: a feature of behaviour in another organism, and mediated reinforcement. It is of interest to note that a developmental linkage may exist between these two categories. Mediation of primary reinforcement could be the origin of a behavioural feature becoming a reinforcer in evolutionary terms. Thus, in Goodall's (1968) example of kissing in chimpanzees: "It is

possible also that some forms of 'kissing' may have been derived from the infantile response of suckling, or holding the mother's nipple in its mouth when alarmed or hurt" (p.372). Thus kissing is ritualized in the ethological sense and eventually becomes a primary reinforcer. Other expressive movements are likely to have evolved in the same way. Threat gestures, for instance, involve a fractional part of the presentation of aversive stimulation.

2.4. THE IMPRINTING OF SOCIAL REINFORCEMENT

Although social reinforcement may have distinct innate characteristics, additional reinforcing properties may be acquired. In particular, a possible origin of social reinforcement is that of attainment through imprinting. Perhaps the ability to use social reinforcement is not innate but rather is acquired through the imprinting process, and the reason that humans respond, for example, to smiling is that the smile was imprinted during a critical period.

The smiling response in babies was interpreted by Gray (1958) to be the equivalent of the following response in birds. Several authors (e.g. Scott, 1962; Schneirla, 1965) have compared imprinting in birds and development of social attachments in mammals, and others have written about sensitive periods in early childhood and the effect of separation from the caretaker on later social and intellectual functioning (e.g. Spitz & Wolf, 1946; Bowlby, 1953, 1969). Salzen (1967) suggested that contact stimulation might be necessary for social attachment to develop in the human infant, and Sluckin (1964) observed that human

attachment could be based on responses like clinging and sucking or smiling.

Eibl-Eibesfeldt (1970) noted: "It is possible that imprinting exists also in man...., but there are as yet no experimental investigations" (p.233). Recent evidence, however, suggests that imprinting does occur in the human species. DeCasper and Fifer (1980) described neonates' preference for producing the mother's voice over the voice of another female, and concluded that the period between birth and three days of age is important for initiating bonding to the mother. Thus imprinting may indeed be involved in the attainment of social reinforcement.

2.5. SOCIAL REINFORCEMENT AND CONDITIONED REINFORCEMENT

It has been noted that certain communicative gestures are common to all cultures; especially smiling, crying, laughing and expressions of anger. Eibl-Eibesfeldt (1972), for instance commented: "This suggests that the acquisition of these expressive movements may have sometimes been guided by phylogenetic adaptations involving specific learning dispositions" (p.304); but there are notable differences. Le Barre (1964) noted great cultural diversity, especially in gestures of affection and greeting. Differences are especially likely in movements which replace words, where communicatory acts may be "... the products of differing expressions of cultural universals ..." (Hinde, 1972, p.36). Thus while there are some indications of genetic determination, there are also many opportunities whereby experience may influence the form of nonverbal communication used by man.

One of the most common mechanisms used to explain the acquisition of social reinforcers is that of conditioned reinforcement. The theory of conditioned reinforcement proposes that some stimuli acquire their reinforcing capacity within an individual's past history through association with primary reinforcers.

Although Skinner (1938) gave no clear definition, Ferster and Skinner (1957) defined a conditioned reinforcer as "A stimulus having the effect of a reinforcer because of its relationship to a stimulus already having that effect" (p.724). In 1971 Skinner remarked: "All conditioned reinforcers derive their power from personal reinforcers.... and hence from the evolutionary history of the species" (p.110).

Other definitions follow similar lines. For instance, Sidman (1960) stated: "... a conditioned reinforcer derives its function from association with a stimulus that is already reinforcing...." (p.408). Keller and Schoenfeld (1950) stated: "A stimulus that is not originally a reinforcing one.... can become reinforcing through repeated association with one that is" (p.232). Satisfactory definitions of conditioned reinforcement are not common, but two recent definitions are quoted: Fantino and Logan (1979) stated that "... stimuli that accompany reinforcers may themselves acquire conditioned reinforcing properties" (p.168); and Millenson and Leslie (1979) defined conditioned reinforcing stimuli as stimuli which "... must have <u>acquired</u> their capacity to reinforce at some time during each individual's past history" (p.146).

A particular class of conditioned reinforcers are those which have been positive discriminative stimuli for more than one response. Such reinforcers are called generalized reinforcers (e.g. Skinner, 1957). Many stimuli, including social reinforcement, which are reinforcers for people are of this kind. Skinner (1953) described the development of attention, affection, approval and submission as generalized reinforcers. In 1957, he stated: "A common generalized conditioned reinforcer is 'approval'. It is often difficult to specify its physical dimensions. It may be little more than a nod or a smile on the part of someone who characteristically supplies a variety of reinforcements. Sometimes .... it has a verbal form: Right! or Good! Because these 'signs of approval' frequently precede specific reinforcements appropriate to many states of deprivation, the behavior they reinforce is likely to be in strength much of the time" (p.54).

In 1971 Skinner wrote of reinforcing a musical performer after a good performance: "Some of these things are reinforcing in their own right - a pat on the back may be a kind of caress, and prizes include established reinforcers - but others are conditioned - that is, they reinforce only because they have been accompanied by or exchanged for established reinforcers. Praise and approval are generally reinforcing because anyone who praises a person or approves what he has done is inclined to reinforce him in other ways" (p.45). Skinner's choice of a pat on the back as an instance of an innate reinforcer is reminiscent of Goodall's well-known observation of the same gesture used as reassurance in chimpanzees.

At this point an obvious complication in Skinner's example can be noted which arises due to an unwillingness to admit the importance of language and meaning in the situation. Obviously social and other reinforcers operate above a background of history in which behaviour in response to the reinforcement is linguistically controlled, and individuals learn what is an appropriate response in these circumstances; they do not usually play the piece again. In the real world, any one reinforcer is only part of a whole stimulus complex, and the behaviour which actually emerges will be the result of the whole complex.

Investigation of conditioned reinforcement using nonhuman subjects constitutes an extensive research literature (Hendry, 1969; Fantino, 1977; Gollub, 1977). A less extensive literature investigates conditioned reinforcement with human subjects, and little of that research focuses specifically on the development of social reinforcers. As noted by Morris (1980), the establishment of social reinforcement as a conditioned reinforcer in experimental settings has produced only weak and inconsistent results (e.g. Lovaas, Schaeffer & Simmons, 1965; Steinman, 1968; Locke, 1969). Use of social reinforcement in the laboratory without any prior pairing operations has also been only moderately effective (as will be seen in the experiments reported in Chapters 3 and 4), in comparison with effects observed in natural settings.

2.6. LANGUAGE AND REINFORCEMENT

Although nonverbal aspects of social reinforcement occur with great similarity among humans and other species, the development of

language represents a major difference in reinforcement possibilities.

Language is crucial to the discussion of social reinforcement because it is inevitably part, if not the whole, of the content of the reinforcing stimuli investigated experimentally. Despite its relative recency as a human phenomenon, the use of language greatly augments possibilities for reinforcement and control. Once acquired, language by itself becomes the most pre-eminent of behavioural controls, and may be regarded as the cognitive element in behaviour control.

Language may be seen as having three distinct reinforcing functions. At its most basic, the sound of language, in conjunction with other pieces of behaviour, can act as a reinforcer. In the sense that vocabulary becomes important, language can also be used directly as a reinforcer, as in Greenspoon's (1955) paradigmic experiment where "mm-hmmm" functioned to increase the rate of two response categories. Verbal stimulation can be used as a negative reinforcer, too; solitary confinement is an aversive experience.

In addition, language has a third and more important function; it can be used in an indirect way to assign reinforcing characteristics to previously neutral stimuli like marks, points, medals and grades, thus leading to a variety of possibilities for flexible control. The attribution of reinforcement value or meaning via language is obviously the process underlying the creation of the bulk of human reinforcers, and it is more important

than primary reinforcement, conditioned reinforcement, or imprinting, for creating reinforcers. Attaching a verbal label to a neutral stimulus then generates the appropriate behaviour towards that stimulus. Thus, in Verplanck's (1956) early experiment, which attempted to demonstrate operant conditioning of motor responses in students, the experimenter began with instructions which turned a neutral response into a reinforcer: "Your job is to work for points. You get a point every time I tap the table with my pencil". The experimenter could say "Point" or "Good", etc, but Verplanck suggested it was "most convenient" to use a physical reinforcer.

The same process operates when children are taught to play a game. A class of reinforcers is created through instructions, and if asked to quote the object of the game, children are effectively being asked to state what the reinforcers are. Both temporary and permanent reinforcers are thus set up using language. Similarly, language operates to create monetary systems, a relatively recent usage; contemporary currency dates only from about the 7th century B.C. (Ederer, 1964). Animals have no real equivalent for this subtle and all-pervasive phenomenon.

The nearest parallel for animals is the creation of token reinforcers, as in the early experiments of Wolfe (1936) and Cowles (1937) with chimpanzees. The human analogue to such conditioned reinforcement is the token economy (Ayllon & Azrin, 1968). The concentration of operant studies has been on the characteristics of behaviour at asymptote; however, if we examine the acquisition

procedure in the token economy, we can see that the establishment of a response-reinforcer relationship is made much simpler through the use of language. Verbal instructions can be used to initiate behaviour which can then be reinforced. "By utilising the existing verbal repertoire of humans, the instructions eliminate the necessity of the arduous and impractical shaping procedures such as must be used with animals" (Ayllon & Azrin, 1964, p.330). In fact, the procedure goes further than this in the assignation of meaning to a neutral stimulus, such as a token, without conditioning. This mechanism applies equally well with the Premackian concept of reinforcement in which a high probability response is used to reinforce a low probability behaviour, and the linkage is specified via language. This technique was also used frequently by Ayllon and Azrin.

Although the conventional explanation for the effect of token reinforcement is based on the conditioned reinforcement procedure, in fact acquisition of control is established primarily through verbal instructions, and is thereafter maintained by the exchange system in order to control diminution. More than being merely a convenient way of establishing conditioned reinforcement in people, as Ayllon and Azrin suggest, a new procedure is employed which no other species can use. The capacity of language to turn a neutral stimulus immediately into a reinforcer (and one of arbitrary value), and to remove or reverse such qualities, represents a remarkable way of extending stimulus control. The use of language in this fashion is not developed

by workers in the token economy field, no doubt due to their unease with the concept of meaning. In fact, such a situation could be a tool in studying meaning.

Osgood's work (e.g. 1953) on the relative importance of various semantic space dimensions supports the use of language in this way. The dominance of the evaluation factor, which accounts for between half and three-quarters of the extractable variance in analyses of the Semantic Differential, led to the conclusion (Osgood, Suci & Tannebaum, 1957) that: "....the attitudinal variable in human thinking, based as it is on the bedrock of rewards and punishments, both achieved and anticipated, appears to be primary...." (p.72). This finding that the evaluation factor is a major dimension of linguistic description implies that language has a major capacity to assign value to virtually any stimulus.

2.7. CONCLUSION

In Chapter 1 (Section 1.4) it was concluded that social reinforcement is frequently used as a reinforcer for work behaviour. In particular, language, as one recently developed form of social reinforcement, is used in this context and thus may be linked in the "socially determined" sense with that behaviour. This chapter has considered the definition and origins of social reinforcement.

For the purpose of the present work, the definition of social reinforcement to be accepted would be that it involves some communicative gesture on the part of another organism.

The origins of such a stimulus are likely to be varied, and it is not necessary to take a unitary view regarding its origin as far as the present work is concerned. No doubt all of the mechanisms mentioned in this chapter make a contribution to social reinforcement. It is concluded that, just as work is subject to a multiplicity of reinforcers, so any particular stimulus may have gained its social reinforcing properties through a number of sources; it could be both imprinted and a conditioned reinforcer, as well as being partly innate.

There can be little doubt that language plays a major part, and it would be reasonable to conclude that language has been underrated as a source of reinforcement because of the emphases of the operant approach.

Experimental investigations of the efficacy of social reinforcement in laboratory settings have stimulated a number of theoretical positions concerning factors which influence the strength of social reinforcement. These positions are put forward in the following chapter.

CHAPTER 3

DETERMINANTS OF EFFECTIVE SOCIAL REINFORCEMENT

3.1. INTRODUCTION

The value of social reinforcement has long been recognised: many of us would agree with Mark Twain when he said: "I can live for two months on a good compliment". Although seemingly a simple technique, the application of social reinforcement in the laboratory does not always produce predictable outcomes. However, there is much experimental evidence that words of encouragement and approval such as "good" and "that's good work", when uttered soon after a response, tend to increase the frequency of that response.

It can be noted here that the stimuli employed as social reinforcers in experimental settings generally represent only a subsection of that class of stimuli defined as reinforcers in the present work. In practice, the stimuli generally used are those gestures which apply to ongoing behaviour; unlike greeting responses, for instance, which reinforce approach and continued presence, but do not really comment on ongoing behaviour. Generally, social reinforcement in both laboratory and real life experimental settings is interpreted to imply verbal stimuli indicating some approval or encouragement for ongoing behaviour.

The purpose of the present chapter is to review laboratory-based experimental analyses of the conditions under which social stimuli do and do not function as positive reinforcers. The literature reviewed will be restricted to laboratory investigations into the strength of social reinforcement. Laboratory studies

with the primary aim of exploring subject variables such as social desirability, birth order, number of siblings, locus of control, socioeconomic status and approval motivation, will not be reviewed.

3.2. DETERMINANTS OF THE STRENGTH OF SOCIAL REINFORCEMENT: OVERVIEW OF CURRENT THEORETICAL POSITIONS

Investigations of the effective controls of the strength of social reinforcement are mediated by various theoretical positions, and it will be useful to list these investigations under the theoretical views to which they are allied. Several accounts of the determinants of social reinforcer strength have been proposed.

1. Deprivation-Satiation Theory of Social Reinforcement

The two studies conducted by Gewirtz and Baer in 1958 which gave rise to this explanation are now "classic". The conclusions arising from these studies were that social reinforcers are subject to deprivation and satiation effects in a manner similar to the primary appetitive reinforcers, so that minimal initial social reinforcement (deprivation) will cause enhanced subsequent efficacy, and plentiful initial social reinforcement (satiation) will result in diminished efficacy.

The marble-in-the-hole (MITH) game is frequently used by investigators to monitor social reinforcement strength. This simple motor task has been widely adopted in investigations into effects of social reinforcement on performance; the task uses a bin or some other delivery device which provides a large number of

marbles and a box containing a number of holes into which the marbles must be dropped, perhaps after colour sorting. The performance measure used is either time spent at the task, rate of dropping in comparison with baseline rates, or persistence at the task. Subjects in such investigations are generally children.

The subjects in the Gewirtz and Baer (1958a) study were nursery schoolchildren whose task it was to sort marbles and drop them into one of two holes. Following baseline conditions, subjects received social reinforcement such as "good", "fine", or "mm-hmm" for dropping marbles into the previously least preferred hole. The authors showed that children who were subjected to a 20-minute period of social isolation displayed a greater increase in rate of the nonpreferred response under conditions of social reinforcement than subjects who were not so deprived. Satiation conditions were also investigated: after 20 minutes of friendly conversation with the experimenter, including 30 statements of "praise and admiration" from the experimenter, children showed a lesser increase in the focal response under conditions of social reinforcement. In another experiment (1958b), the effectiveness of pre-experimental deprivation in increasing the salience of adult approval was found to be directly related to the extent of approval-seeking behaviour displayed at school, as rated by teachers.

Another early experiment by Hartup (1958) showed that an adult who was continually nurturant was less effective as an agent of social reinforcement for female preschool subjects than an adult who was initially nurturant and then withdrew nurturance. "Nurturant"

behaviour was behaviour which "...rewarded, encouraged, supported or showed affection" (p.193) to the subject during a pre-treatment period. Berkowitz (1964) also reported that a warm social interaction during the pretraining period led to reduced experimenter social reinforcement effectiveness later, and favoured the satiation-drive explanation for this finding. This experiment used schizophrenic subjects and conditioned a verbal response, not the familiar motor one.

Gewirtz (1967) varied his earlier procedure somewhat, using a different method to create deprivation. Instead of isolating subjects, a technique which is rather dramatic, social reinforcement was dispensed at varying levels during a pretraining period. This altered procedure was also followed in 1969b; he varied the number of approval statements from the experimenter during a pre-test period of 11 minutes length, while subjects looked at picture books; the experimenter said "good" either 0, 2, 6, 16, or 32 times during this period. As predicted, greater satiation was associated with slower responding on the criterion task. Gewirtz commented that the deprivation-satiation effect is independent of contingency of reinforcement presentation, quoting a study by Landau and Gewirtz (1967), who found satiation even when the experimenter delivered approval contingent on the subject's behaviour. However, the fact that the experimenter approval was delivered on a temporal basis, and not following any discrete subject behaviour, reduces the validity of this finding, since it is likely that the subjects did not in fact perceive the social reinforcement as contingent.

Eisenberger (1970) reported replication of the Gewirtz findings in an "impressive number of carefully controlled studies" using choice measures of performance. The evidence arising from rate or duration measures is less clearcut, however. As Parton and Ross (1965) suggested, rate of performance on the marble-dropping task may be a relatively insensitive index of social motivation. Even when experimental groups are separated according to type of subject and stressfulness of the procedure, as suggested by Stevenson and Hill (1966), insignificant differences between reinforced and nonreinforced groups still obtain. Eisenberger added the complaint that adequate control conditions (subjects who undergo the pre-test manipulations but do not receive reinforcement) are rare, too, thus hindering appropriate interpretation of results from rate and duration studies.

The social drive position has stimulated recent research. A replication of the deprivation finding is provided by Hackenberg (1976) wherein a group of subjects receiving fewer social reinforcements prior to testing emitted more responses in the test situation and played for longer than the control groups, even though these differences were not significant. Hackenberg, however, was not successful in reproducing the satiation effect.

Partial support for the social drive position in a naturalistic experiment is provided by Hamilton (1972), who observed the rate of social reinforcement received by pre-school children from adults during brief 3-minute observations of subjects' interactions over a 4-week period. Having selected a low

reinforcement and a high reinforcement group on the basis of these observations, subjects either received a reduced amount (33%) or the same amount of social reinforcement during a marble-dropping task. In keeping with social drive expectations, those subjects who had been used to high reinforcement rates did significantly worse under high social reinforcement rates than those subjects who had low reinforcement expectations in this condition. The reduced social reinforcement level in the test did not differentiate between the high and low standard of social reinforcement groups. Hamilton concluded that the high and low reinforcement standards of the subjects can be viewed as similar to the brief satiation-deprivation manipulations described in experiments above.

Frankel, Simmons and Olson (1977) also replicated the deprivation finding in a classroom setting using retarded and autistic children. This study is included in the present chapter because, unlike most studies involving retardates, it did not consider long-term social deprivation. Having observed the social reinforcing effectiveness of a preferred teacher, observations were conducted in the classroom; one group of subjects were deprived of the attention of that preferred teacher for more than 24 hours. It was found that these socially deprived children increased their rate of a response which played back a voice recording of the preferred teacher. The authors were able to establish that the observed increase arose from sources other than the information value of social reinforcement, novelty, or anxiety.

Retarded and autistic children were similarly affected by this manipulation.

Further support for the deprivation-satiation formulation comes from a study using hospitalized schizophrenic patients as subjects. Mitchell, Mowat, and Stoffelmayr (1975) investigated pre-experimental deprivation (45 minutes of isolation) and satiation (10 minutes of "undemanding conversation" with the experimenter); in the test phase (one minute of marble-dropping), social stimulation from the experimenter was contingent on either an increase or a decrease relative to baseline marble-dropping performance. These authors found that although the contingency of reinforcement made no difference, the subjects showed heightened responsiveness to social reinforcement after the deprivation experience and a reduction after satiation.

The exact nature of the functional relationship between amount of satiation and subsequent reinforcement effectiveness is also in dispute. While the classic Gewirtz experiments found a linear inverse relationship (i.e. more exposure means less effectiveness later), several authors (Lewis, 1965; Cook, 1968; Cook, Hill, Emrick & Wittrock, 1967; Kozma, 1969; Massari, 1971) found the relationship to be curvilinear (i.e. with high-level satiation, performance starts to improve again). Massari (1971) found that progressive satiated exposure to a nonsocial stimulus (a bell) was not associated with the curvilinear relationship when the test stimulus was the same bell sound. As an explanation of the curvilinear finding with social stimuli, Massari proposed that at

intermediate levels of stimulus exposure, the subjects see the stimuli as being irrelevant, whereas at upper levels, subjects ".... search for meaning in the stimuli because there have been so many repetitions they must have some salience" (p.349). Alternatively, the satiation approach might shape inattention to the experimenter himself, since, during the satiation treatment, stimuli were provided by the experimenter in an unreliable or nondiscriminate fashion (on a temporal basis). The use of "inattention" explanations is a different view from Gewirtz's social drive position and is more supportive of an informational interpretation (see 7. below).

2. Anxiety Arousal due to Pre-experimental Manipulations

Walters and Ray (1960) and Walters and Parke (1964a, 1964b) proposed a broader alternative explanation of social deprivation findings, framed in terms of general anxiety arousal elicited by the pre-experimental social isolation. This anxiety would be reduced by presentation of social approval. Walters and Ray (1960) tested this concept by including an anxiety manipulation as a variable in their study of isolation on choice performance in the MITH game. Two levels of anxiety (warm interaction with a familiar figure or aloof interaction with a stranger) were associated either with social isolation for 20 minutes or no such isolation. The effect of the anxiety manipulation was found to be greater than that of isolation, leading the authors to conclude that anxiety was the more potent variable. However, as Eisenberger (1970) noted, level of anxiety was confounded with

amount of social deprivation, a criticism which can be levelled at several studies of this kind.

Interpretation of experimental findings is complicated. For instance, the experiment by Dorwart, Ezerman, Lewis and Rosenhan (1965) examined children subjected to pre-experimental social deprivation (not isolation in the sense usually meant where children sit alone in a room for several minutes; here, the deprivation experience lasted only for the time it took to walk to the experimental room). Children who had experienced the social deprivation were more responsive to a social reinforcement condition ("good" or "fine") than to a buzzer/light conglomerate, when compared with social-satiation conditions (a warm interaction during the short walk to the experimental room). Dorwart et al. (1965) interpreted these findings as supportive of the social drive notion; however, Wodtke and Brown (1967) commented in their review article that approval from the experimenter could be more effective in reducing anxiety aroused by the deprivation than the buzzer and light. It is difficult to be sure what motives are operating in these experiments.

Two other studies reviewed by Wodtke and Brown supported the anxiety view, both using probability learning tasks. Lewis and Richman (1964) found a negative prior interaction with the experimenter to produce an intermediate rise in performance under social reinforcement, in comparison with social isolation and a positive pre-experimental encounter; results which suggested that the negative interaction aroused anxiety in subjects. Social

drive could not account for the finding of any effect here. A subsequent study by Lewis (1965) found that deprivation periods of three and twelve minutes were more effective than six or nine minutes; this curvilinear relationship has also been reported by Kozma (1969) for high anxious subjects. Lewis suggested that the short period of isolation was anxiety provoking, but that with more time in the situation, familiarity could operate. As time went on, anxiety was re-aroused by the ambiguity in the situation. This explanation is different from the "inattention" explanation proposed by Massari (1971) (see 1. above). Wodtke and Brown (1967) commented on the difficulty in evoking a specifically social deprivation, since isolation is bound to provoke anxiety also, at least in some children. Similarly, social reinforcement does not act merely to reduce the need for social contact, but also reduces anxiety and the more general need for stimulation.

Kozma (1969) criticised the confounding of withdrawal of social reinforcement (isolation) and manipulation of anxiety in the Walters and Ray (1960) and Walters and Parke (1964a and b) studies, since in these studies, anxiety was aroused by the experimenter's failure to respond to the subject on the way to the experimental room. Thus social drive and frustration could also have accounted for the "anxiety" findings. Kozma (1969) directly investigated anxiety in the isolation treatment by testing two groups of subjects, high and low anxious children, as measured on a test anxiety scale, on performance on a probability matching criterion task. He proposed that providing a source of visual

stimulation should delay the recurrence of anxiety reported in the Lewis (1965) study after twelve minutes of isolation, and that high anxious subjects should show the recurring anxiety sooner during isolation than low anxious subjects, who are less fearful of the experimenter's return and evaluation.

Kozma's visual stimulation seems rather unimaginative. Surely a video presentation, or at least some changing projection slides, would have been more stimulating that ten posters, however vivid and varied. Kozma's results, however, did seem to be in keeping with his hypothesis; the presence of the vivid stimuli during isolation did temporarily inhibit the occurrence of the social isolation effect, and low anxious subjects did require a longer isolation period to show this effect.

A later experiment by Kozma (1971) also supported the anxiety-arousal view. Kozma investigated the relationship between anxiety-inducing or anxiety-reducing instructions and social isolation on subsequent social reinforcement effectiveness. The criterion task involved probability matching; all subjects received social reinforcement for correct responses. In this study, those subjects who had received the high anxiety-arousal procedure and had been isolated were more susceptible to social reinforcement than were the other three groups, supporting the view that isolation is in fact anxiety-arousing. However, this finding is also consonant with the (modified) incentive-anxiety position (see 5. below).

3. Frustration

Social deprivation may induce frustration in subjects. If social approval is not forthcoming, aggressive behaviour may result. In an experiment by Hartup and Himeno (1959), preschool children participated in isolation for ten minutes and in a positive interaction for ten minutes. After each condition, subjects played with dolls while their aggressive behaviour was observed. Isolation was followed by greater subsequent aggression than the positive social interaction, but since Hartup and Himeno did not report the total amount of play behaviour, it is impossible to test whether the increased aggression was merely a by-product of increased overall play levels. This concept has not proved popular in stimulating further research.

4. Valence of the Experimenter

The effectiveness of any one reinforcement agent is a function of previous interaction with that person, according to the valence theory of Zigler. A person who has been pleasant and supportive will assume positive valence and have more reinforcing effectiveness than a person who has been neutral or unpleasant in a previous interaction. Thus the warmth of the relationship between experimenter and subject is of primary importance in determining any "satiation" effect.

Zigler and his associates also favour the MITH game as a measure of social reinforcer effect but, instead of rate of marble dropping as the performance measure, prefer to record time spent at the task: subjects are generally asked to play as long as they

wish, and the longer they play under conditions of social reinforcement, the more effective this reinforcer is presumed to be.

In the experiment by Berkowitz, Butterfield and Zigler (1965), switching experimenters following a positive encounter reduced persistence on the marble-dropping task, valence being specific to the experimenter involved in the pre-experimental interaction.

McArthur and Zigler (1969) attempted to rectify shortcomings of the revised Gewirtz procedure (1967, 1969b; Landau & Gewirtz, 1967), in which rather than isolating subjects, the number of social reinforcers they received before the criterion task was varied. According to McArthur and Zigler, this technique is still problematic, in that if the same person both controls the pre-experimental manipulation and presents the criterion task, the observed satiation effect may be specific to that individual.

This later study manipulated valence of the agent and satiation independently by having a second experimenter manipulate satiation. Another variation involved the nature of the valence manipulation; instead of the adult experimenter interacting with the child first, subjects viewed a film of the experimenter being "either very kind or rather horrid" to other children. The authors hoped that this would untangle the valence manipulation from the child's success or failure feelings relative to that experimenter.

The findings of this study supported the valence argument, in that subjects who played the MITH game for a positively valenced

adult performed longer than those playing for a negatively valenced adult. Base rate (performance during the first - nonreinforced - minute of play) was measured too; these scores were consistent with the persistence findings, suggesting that rate-changes over baseline may be a poor measure to use. The overall satiation finding was not replicated here.

Irons and Zigler (1969) introduced long-term social deprivation as an independent variable in their further investigation of short-term valence manipulation. A socially deprived group of subjects (institutionalized male juvenile delinquents) were compared with two nondeprived groups (lower- and middle-class boys), again using persistence on the MITH game, with social reinforcement delivered either by a stranger or by someone who had been present in a neutral or a positive fashion (the positive valence treatment). For the nondeprived groups, social reinforcement was most effective after the positive valence manipulation, and these subjects played for less amount of time in the stranger condition. Across experimental conditions, the institutionalized (deprived) group persisted longer on the criterion task than the other two groups. However, the treatment effect (longer playing time after positive interaction) was not found for the deprived subjects, leading the authors to conclude that a short-term manipulation was insufficient to override the long-term build-up of experiences with adults.

Berg, Balla and Zigler (1976) extended the modified technique of Gewirtz. In these studies, the test measure of social

reinforcer effectiveness, following noncontingent social reinforcement in varying amounts on the pre-training task, was shift from initial preference to reinforced preference; generally, Gewirtz found that high level exposure in pre-training was related to a decrease in number of opposite (reinforced) choices later. Berg et al. (1976) failed to find the satiation effect in their replication study which used a new task; choice of one of two pictures (Experiment I). The authors concluded that children's "past history of real-life social reinforcement" could be contaminating the results.

Experiment II aimed to clarify this discrepancy via various setting conditions. In particular, two longer-term setting conditions were used; in one condition, subjects had pre-training exposure on two consecutive days with a different experimenter each day who never delivered social reinforcement. In the second condition, children had a different experimenter on each of the two pre-training days, but the experimenter dispensed 30 social reinforcements each day. Next, conventional deprivation-satiation manipulation occurred, as in Experiment I. Thus, Berg et al. were able to compare the potency of long- and short-term manipulations. This experiment showed that the setting conditions, and not the conventional social deprivation pre-training period, constituted the more powerful determinant of social reinforcer effectivness later.

These findings are in accord with Zigler's substantial research into the effects of institutionalization on retardates' responsivity to social reinforcement (to be considered in Chapter 4).

Two studies showed that introducing a delay between the training and experimental phases caused an alteration in the deprivation-satiation effect. Both the studies of Berkowitz and Zigler (1965) and McCoy and Zigler (1965) reported findings in support of the valence position: positive interaction during the satiation condition, it was concluded, caused subjects to have their negative feelings towards the experimenter reduced, and so they were more motivated to perform for the experimenter's approval later. Negative prior interaction caused subjects to retain their negative feelings, thus making them perform poorly later. Berkowitz and Zigler concluded that the child should not be viewed as "... a passive recipient of social reinforcers that inexorably shape his behavior" (p.505). In the McCoy and Zigler (1965) study, a stranger was less reinforcing (using the persistence measure) than a familiar, neutral adult, who was in turn less reinforcing than an adult with whom subjects had had a "warm, positive relationship". The negative valence experience was used by Zigler, Abelson and Seitz (1973) to explain poor performance on IQ tests of economically disadvantaged children. According to these authors, wariness of unfamiliar experimenters and fearfulness of testing situations could result in maladaptive responding, and if these children were re-tested by the same experimenter after a positive interaction, there should be significantly greater test/re-test gains than those evidenced by similarly treated nondisadvantaged children.

Thus Zigler has provided ample evidence that prior positive contacts between subject and experimenter increase the experimenter's

effectiveness as a reinforcer, whilst negative contacts decrease it.

Convincing support for the valence argument comes from a study by Leventhal and Fischer (1970), in which the experimenter's expressive behaviour prior to the delivery of reinforcement was shown to influence response rate, again on a variation of the MITH game. Leventhal and Fischer commented that it is erroneous to focus on the reinforcement itself; rather, it is the style that the experimenter adopts in the experimental setting that influences the subject's emotional state, which then influences his response rate. A combination of task orientation and social orientation was found to be the most effective style.

Yoshino (1972), in a Japanese study, also found results in keeping with the valence position. Subjects received either a positive interaction with an experimenter ("....E showed a positive interest in each S or his drawing, and spoke to him with familiarity," p.243), or a neutral interaction (no response), and no interaction at all, on the pre-training drawing task. Performance on the criterion marble-dropping task under experimenter social reinforcement was heightened for those subjects who had received the positive treatment; the neutral treatment was associated with worse performance than the control group.

Danielson (1979) has recently tested the valence theory in an attempt to explain cross-sex findings, in which higher performance is achieved when the experimenter and the subject are of opposite sexes. Danielson proposed that the "affect" displayed

by the experimenter during reinforcement sessions (not before sessions) may influence children's performance on the MITH game. Children reinforced in a "warm" manner did respond at a higher rate and with greater accuracy than children reinforced in a "cool" manner. Danielson concluded that this result supported the valence theory within a single testing situation.

The results of a study by Stevenson, Keen and Knights (1963) comparing strangers and parents as reinforcing agents are in conflict with the above results. Strangers were found to be more, not less, effective reinforcers than parents for children playing the MITH game. Since only mothers' supportive statements to girls functioned as positive reinforcers, the authors could only conclude that male agents are in general more anxiety-provoking. McCoy and Zigler (1965), in discussing these results, preferred to argue in terms of the complexity of each individual parent-child interaction, in which parents elicit both positive- and negative-reaction tendencies, in line with the entire social conditioning history of the child. Minimal responsiveness to social reinforcement may not indicate low motivation for such reinforcers; rather, it may reflect inhibition due to a negative-reaction tendency.

Other experimenters have failed to obtain the predicted differential effectiveness following the valence manipulation.

Rosenkrantz and Van de Riet (1974), in another investigation of prior contact on subsequent performance, found that prior contact (50 minutes of social interaction) did not result in

significantly different responding later, but we are told that "... the actual behavior of the experimenters is suspect" (p.89), due to insufficient instruction as to how exactly they should interact with subjects during this pre-treatment phase.

Another finding at odds with the valence position is that of Walters and Ray (1960), whose adult strangers were more effective as social reinforcer agents than familiar adults. Thus the precise effect of a prior relationship between the experimenter and subject remains unclear, and it should also be remembered that when dependent measures other than task persistence were examined, both the studies of Berkowitz and Zigler (1965), and Berkowitz et al. (1965) failed to find the expected differences.

Roodin and Simpson (1976) attempted to clarify the effect of familiarity between the experimenter and the subject; once again the experimenter was either a stranger or familiar (i.e. had tested the children on the previous day). In this study, the same task (MITH) was used on both days, and after one minute of no reinforcement, the experimenter delivered social reinforcement (one of five statements such as "you really know how to play this game very well"), twice each minute, thereafter for three minutes.

The findings from this experiment indicated that age of subject may be a moderating variable in the valence effect; only first grade children were found to be less responsive to social reinforcement from a stranger than children who were reinforced by the same adult on each occasion. The older children (5th grade)

showed no such differences. It should be noted that Roodin and Simpson used the common rate change measure of social reinforcement responsiveness, and not task persistence.

Dickson (1976) also failed to find increased performance in subjects who participated in a 60-minute pre-treatment condition aimed at developing positive attitudes toward the experimenter. This study used emotionally disturbed children as subjects and the task was the learning of paired-associates. The valence exposure did not facilitate learning of this task under conditions of social reinforcement from the experimenter, but such facilitation did occur in subjects who received either token reinforcement or a combination of social reinforcement and tokens.

A recent comprehensive experiment which examined multiple performance measures also leaves the valence theory in a less than clear-cut position. Miller and Kirschenbaum (1979), like McArthur and Zigler (1969), tried to keep the valence and deprivation/satiation manipulations separate by using different experimenters; they also restricted behavioural and verbal cues supplied by the experimenter,which may have contaminated previous efforts,by using pre-recorded approval stimuli.

The filmed negative valence manipulation was quite dramatic; in the negative version, the experimenter instructed some children to draw quietly while he finished working. When one boy dropped scissors on the floor, the experimenter slammed a book on the table and yelled at the children, disparaged their drawings, tore them up, and threw them away. The positive version ended with the

experimenter sharing drinks and cookies with the children. The criterion task was the MITH game. Miller and Kirschenbaum recorded response rate (raw, not change), proportion of correct responses (subjects had to drop marbles in the same of two holes on which they began each trial), and persistence.

It was found that those subjects who had observed the negative valence film and were tested by the same adult on the MITH game, having received minimal social approval immediately prior to testing (the "negative valence/low satiation" group), dropped marbles at a high rate and persisted for longer, but dropped them frequently into the wrong holes. On the other hand, positive valence (in both satiation conditions) was associated with more accurate responding, but not with more rapid marble dropping nor with increased persistence.

Miller and Kirschenbaum commented that conclusions drawn from their results were influenced by which assessment of performance was preferred: the negative valence/low satiation group could have been viewed as least or more responsive, depending on the index used. Multiple assessments are all very well, but they do not enable clear comparison of the social drive and valence positions here. These authors suggested that the negative valence/low satiation subjects were emotionally aroused and anxious, and that this arousal interfered with the learning of this comparatively difficult discrimination; hence the higher error rate. Such a conclusion is in keeping with the results of a study by Lepper (1970) in which subjects who viewed a frightening

film as the negative valence manipulation, also dropped marbles faster and persisted longer. Lepper (1970) suggested that enhanced susceptibility of subjects to experimenter social reinforcement after a negative experience may be due to confounding of anxiety level with experimenter valence.

The importance of the subject's anxiety in the experimental situation is crucial in an alternative theoretical view, which is considered next.

5. The Incentive-Anxiety View

While in the studies mentioned in the previous section (4.) success or failure is implied in the pre-training interaction between the experimenter and subject, some investigations have made failure more explicit in an attempt to untangle the interaction between the incentive and the anxiety-reducing potential of social reinforcers.

The incentive-anxiety reduction proposition was originally stated by Stevenson, Keen and Knights (1963) to account for the effects of adult attention on marble-dropping tasks, in which mild reinforcement (attention) from fathers and strange male adults induced higher performance in nursery school children than reinforcement from mothers and strange female adults. The authors suggested that increased performance could have arisen due to the greater anxiety (and hence motivation) experienced by the subjects with the more anxiety-provoking male figures.

When the adults actually gave verbal social reinforcement, however, it was the women who were the most efficient agents,

suggesting that supportive comments from the male adults were acting to reduce existing anxiety and hence reduce subjects' motivation. Stevenson et al. (1963) proposed that when children are anxious, social reinforcement will operate to reduce anxiety and hence to lower rate of response, while non-reinforcement will maintain or increase anxiety and hence act to maintain or elevate rate of response.

Stevenson and Hill (1965) tested the effects of social reinforcement and nonreinforcement following failure or success in pre-training. Failure during pre-training involved an apparently simple task which could not be assembled in the time allowed; for success subjects, the assembly task was quite feasible. Success during pre-training should reduce any anxiety the subject brings to the experimental situation. Thus in the experimental marble-dropping task, only the incentive value of social reinforcement should be operating. Performance under social reinforcement should thus be better than that under non-reinforcement. Failure in pre-training should, via the same logical process, cause performance to be enhanced under non-reinforcement, and lowered under social reinforcement. The predicted interaction was obtained, leading the authors to conclude that: "....the anxiety level of the child may be a significant variable in determining the effects of both reinforcement and nonreinforcement on children's performance in a simple motor task" (p.424).

Hill (1967) sought to test more directly the role of anxiety through assessing test anxiety of subjects following success or

failure experiences. Hill predicted, following the above results, that low-test-anxiety children tested after success should do better under social reinforcement than under nonreinforcement; for low-test-anxious subjects after failure, and high-test-anxious subjects after success, performance should be similar under reinforcement and nonreinforcement conditions, since subjects could then be assumed to be moderately anxious. High-test-anxiety subjects after failure, however, should be experiencing the anxiety-reducing effects of social reinforcement and their performance should be higher under nonreinforcement. Test anxiety was used to select subjects four weeks before the experiment began. The pre-training task involved the same puzzle assemblies used by Stevenson and Hill (1965), facilitating the induction of objective success or failure experience. The criterion task was also the same.

Hill (1967) reported that there was a curvilinear relationship between rate of response under social reinforcement and anxiety level. At low levels of anxiety, performance was high under social reinforcement due to the incentive value of praise; at moderate levels of anxiety, performance was lower due to the tendency for the two competing properties of social reinforcement to offset each other. However, the predicted decrease of performance under social reinforcement for the high-test anxious subjects after failure did not occur; instead these subjects did consistently better under reinforcement. Hill, in a modified view, suggested that for such subjects the incentive value of

social reinforcement is especially strong, due to high dependency needs in evaluative situations. Thus incentive value surpasses anxiety-reducing value. Hill commented that the higher rate of response found for low-test-anxious subjects after success than for the two groups at moderate levels of anxiety cannot be accounted for by the anxiety-arousal explanation of social reinforcement effectiveness (2. above) which predicts higher performance levels with a supportive experimenter under conditions of anxiety-arousal than nonarousal.

Hill and Moely (1969) tested the generality of the above-found curvilinear relationship by emphasizing the evaluation component of the experimental situation. Describing the task as a game or as a test should elicit similar findings as the success/failure manipulation. Again, subjects played the MITH game under either social reinforcement or nonreinforcement. Hill and Moely found quite different performance patterns for boys and girls at different ages; for older boys, social reinforcement caused higher performance (difference-scores) under game than test instructions and nonreinforcement was associated with higher scores for test than game instructions. For older girls the findings were exactly opposite. These findings are rather similar to those of Hill (1967) for low and high test-anxious subjects respectively. For younger subjects, the setting instructions were not effective and both groups did better under social reinforcement, providing further support for the curvilinear relationship, although Hill and Moely are hard pressed to explain

why this should be: "The basis for these similar findings, however, is not entirely clear" (p.162), although evaluation from same-sex adults may be more anxiety-provoking; and all experimenters were female.

Rosenbaum and Hill (1969) attempted to generalize the curvilinear relationship to institutionalized retarded subjects who either played under game conditions (no specific task to complete); failure (uncompletable task); or success (readily completable task). During pre-training the experimenter either praised or criticized subjects. As predicted, subjects assumed to be at low anxiety (game-praised, success-praised) and high anxiety (failure-criticized) performed at somewhat higher levels on the initial stage of the MITH game, in keeping with the incentive-anxiety position.

The incentive-anxiety position, as such, has not stimulated recent research interest, with investigators preferring simpler explanations of behaviour.

6. General Stimulus Deprivation

The enhanced effectiveness of social reinforcers following isolation/deprivation has also been re-interpreted as being due to general stimulus deprivation.

Walters has made a separate suggestion that social deprivation might represent a specific case of general sensory deprivation (Walters & Karal, 1960; Walters & Quinn, 1960). An experiment by Stevenson and Odom (1962), again comparing the typical isolation condition (a vacant room) with a room containing

interesting toys, had failed to find any difference between the two deprivation conditions. That is, social stimulus deprivation is really just a form of general stimulus deprivation. Hill and Stevenson (1964) were concerned to show the effects of general stimulus deprivation arising from two pre-experimental isolation treatments on subsequent performance on the MITH game under social reinforcement. In one condition, subjects were deprived of both social and sensory stimulation; these subjects showed greater responsivity to social reinforcement, compared with subjects who were deprived only of social stimulation (they watched an interesting film).

Eisenberger (1970) reviewed three studies: Erickson, 1962; Rosenhan, 1967; Endo, 1968, which provided results contrary to those expected by the general stimulus deprivation formulation. However, Eisenberger commented that the amount of stimulus variety provided by the sensory rewards and the brevity of withholding of of social reinforcement in the latter two experiments, make any definitive conclusions invalid. Similarly, Walters and Parke (1964a) had commented on the minimal reinforcing value of the nonsocial rewards (marbles) used in Erickson's study.

Whatever the reason, a much more abbreviated experimenter-subject interaction prior to the experiment proper has still been found to affect subsequent social reinforcer effectiveness. Dorwart et al. (1965) found that aloofly treated subjects maximized more than warmly treated subjects under social reinforcement than under mechanical reinforcement. Such effects may, however, be

task-specific: Allen, Spear and Johnson (1969) used a marble-sorting task and found that it was the warmly treated subjects who did better with social reinforcement, not those who received the "cool" treatment. Similarly, Todd and Nakamura (1970) found that subjects who had been praised prior to the experiment did better under social reinforcement than subjects who had been derogated or had a neutral treatment. Subjects who had received nonverbal reward, however, performed best if they had previously been criticized; in direct contrast to the superiority of social rewards in the experiment of Dorwart et al. (1965).

Spence (1973) attempted a clarification of the above inconsistencies in an investigation of the experimenter-subject pre-experimental interaction and its effects upon a discrimination learning task. She found that lower-class girls and middle-class children of both sexes tended to perform better if they had received a warm and not an aloof treatment for about four minutes; quite a brief exposure. There was no interaction between warmth of pre-experimental treatment and efficacy of social versus nonsocial (buzzer) reinforcement.

The general stimulus deprivation formulation has not generated recent research interest.

7. The Informational View

In this explanation, attention is focused on the functional discriminative cue value of social approval, as seen by the subject. Thus Cairns and his colleagues have claimed that the subject's attention to the experimenter's behaviour is crucial in social

reinforcement. Many investigations pursuing this explanation do not use the MITH game.

Cairns (cited in Panda, 1971, p.58) stated that: "....an event thus acquires and maintains its reinforcement potential only when it provides a reliable and nonredundant signal. Of two stimuli, then, the one more informative event for the subject should have the strongest reinforcement potential". The increased effectiveness of social reinforcement after isolation is due, then, not to a drive variable but to the enhanced meaning and informational value of the reinforcer.

Cairns (1967) investigated the effect of structuring the information content of verbal and nonverbal reinforcement. The subjects were 40 children working at a card-sorting task. Verbal reinforcement for correct choices ("right") or nonverbal reinforcement (a buzzer) was presented with or without instructions as to meaning. Such structuring did serve to enhance the effectiveness of both types of reinforcer. Cairns (1967) suggested that the increased effectiveness of "right" when accompanied by instructions is due to the attenuation in potency of common expressions of approval through over-use in everyday life. The finding that subjects did better under verbal than nonverbal reinforcement when the situation was unstructured was attributed by Spence, Armstrong and Conrad (1969) to Cairns' failure to instruct subjects in the meaning of the experimenter's nonreaction to incorrect responses. When subjects were more fully informed in the latter experiment, no such differences were found.

Lair and Smith (1970) repeated the comparison between verbal and mechanical feedback under structured and unstructured conditions, using male undergraduate students, not children, as subjects. Performance on the discrimination learning task was higher under verbal feedback using both instructed and noninstructed conditions. The lack of agreement with earlier studies was interpreted in terms of the greater salience, due to lengthy exposure, of verbal-symbolic feedback.

Cairns (1970), in a series of three studies, instructed children to insert cards into the mouth of a mechanical-man figure as a pre-experimental task: card insertions were always rewarded with candy on a Variable Ratio schedule. The experimenter said "right" to some children preceding each candy delivery, while others were reinforced with a light-bell combination. Next, all subjects did a two-choice colour discrimination task where subjects were again reinforced after each correct choice. If the satiation view is correct, subjects who had received pre-test pairings of "right" with candy should perform more poorly on the socially reinforced task. Instead, Cairns (1970) reported the opposite result; that pre-test pairings using "right" were associated with improved performance, indicating that the operation had worked to enhance the discriminative value of "right". Cairns concluded that faith in the reliability of social reinforcement is unfounded: we cannot assume that social reinforcement will always be reinforcing.

Cairns and Paris (1971) failed to find a reinforcing effect of two social reinforcers ("fine" and "good") above the effect of

two unknown foreign words ("galat" and "ahwe") for 72 non-institutionalized mildly retarded children, using the Wisconsin Card Sorting Test. Nor did increasing the level of information given to these subjects work to enhance the reinforcing value of the common social reinforcers above that of the foreign words (although this procedure was effective for the latter stimuli). The authors commented that social reinforcers had "....a disappointingly small effect upon performance" (p.369). Their finding is in line with the scepticism expressed by Parton and Ross (1967) that: "....currently we do not have experimental results which indicate whether praise words produce effects which differ from the effects of nonsense words" (p.325).

Paris and Cairns (1972) investigated undefined and defined use of "good", "wrong", and the two foreign words with mildly retarded children using a two-choice discrimination task (Experiment 1). Again, the special instructions failed to enhance the effectiveness of "good"; and "wrong" was more effective than "good" in controlling performance for this group. Experiment 2 investigated the evaluative comments of the teacher in special classrooms for educable retarded children, as a check on the speculation that positive evaluation statements occur frequently and indiscriminately while negative evaluations such as "no", "that's wrong", and "poor" occur less frequently and more

specifically, i.e. related to particular acts or aspects of performance.

In this study, observers made records of teacher-student interactions every five seconds. Analysis of such recording indicated that positive and negative evaluations were indeed delivered differently, and as hypothesized. Positive comments occurred eight times as often as negative comments, and they occurred independently of students' behaviour nearly 40 percent of the time.

Cairns (1973) followed up the "ethological" approach by investigating positive and negative reinforcers as controllers of children's performance in the classroom and in the laboratory. Positive social reinforcement was only of modest effectiveness, and was most effective in both settings when it communicated unambiguous information with respect to performance accuracy. Negative statements, however, were highly effective in both contexts.

Another statement of the need to integrate experimental and "ethological" analyses comes from Paris and Cairns (1971), where again positive and negative evaluative comments operated differently on children's two-choice discrimination performance; negative comments were by far the most effective.

Warren and Cairns (1972) further tested the ambiguity explanation of the satiation effect by presenting social reinforcement in the pre-exposure phase so as to strengthen its reinforcing value, by pairing each approval comment with candy delivery. Under these unambiguous conditions, satiation enhanced

the subsequent reinforcement value of the approval words. Ambiguous approval used in the pre-exposure phase did lead to a subsequent reduction in effectiveness.

The "indiscriminate use" view also received support from a study by Altman, Talkington and Cleland (1971) in which institutionalized retarded subjects either received "traditional" or "novel" verbal reinforcements while performing a perceptual-motor task. The novel verbal reinforcement (actually traditional reinforcement delivered in a novel manner, via a speaker) was more effective than the traditional reinforcement (nonstandardized verbal reinforcement such as "good", and "that's right"), and both treatments were superior to nonreinforcement.

Babad (1972) proposed a modified explanation of the information view,suggesting that the value of a social reinforcer is dependent on previous interaction with a particular experimenter. Under satiation conditions, high frequency of approval makes it difficult for a subject to link the reinforcement with his own behaviour, and he therefore concludes that the effusiveness is a feature of the experimenter and not a response to his own behaviour. Under such conditions, the subject is little influenced by the experimenter's reinforcements. In the deprivation treatment, however, the experimenter's rare emissions of reinforcement are seen as contingent on the subject's behaviour, and so the experimenter's potential for manipulating behaviour remains high. Babad's findings supported the specificity of the deprivation-satiation effect; however, as Perry and Garrow (1975) pointed out

subjects' perceptions of the contingencies of the experimenter's approval were not directly investigated in this experiment.

Perry and Garrow (1975) tested the contingency hypothesis by including an experimenter-contingent pre-exposure treatment in which approval was presented by the experimenter contingent upon his own actions. As well, a subject-contingent treatment involved experimenter approval contingent on a discrete action by the subject, and there was also a noncontingent treatment. The social reinforcement ("good") was delivered either at high or low frequency; thus the subjects ran in one of six conditions.

Only the noncontingent treatment subjects gave evidence of a satiation effect on a subsequent two-choice discrimination task; subjects who had received low frequency of reinforcement did better than those who had received a much greater amount of reinforcement. A post-test questionnaire indicated that most subjects, except those in the high frequency noncontingent group, perceived the approval as being contingent on their own behaviour. There was little difference in performance of subjects in the subject-contingent and experimenter-contingent treatments. Perry and Garrow interpreted their findings as supportive of the informational explanation of social reinforcer effectiveness, and of Babad's suggestion that perception of contingency of the experimenter's reinforcement determines subsequent efficacy of that reinforcement.

Barton and Ascione (1978) challenged the noncontingent treatment in the above experiment, pointing out that these two

groups of subjects never received reinforcement following an action. They included a more random noncontingent group (in which reinforcement did sometimes occur after a subject's action), as well as a control group who received no reinforcement and a control group who did not do the pre-training task.

A satiation effect occurred only for male subjects in the subject-contingent treatment; there was no evidence of satiation for either the explicitly unpaired (similar to Perry and Garrow's "noncontingent" treatment) or random reinforcement conditions. Such results are in conflict with the arguments of both Gewirtz (who predicted that contingency of presentation should not affect the satiation effect), and Perry and Garrow (who predicted that only the noncontingent pre-exposure should lead to satiation).

However, in the area of perception of social reinforcement the above results did parallel those of Perry and Garrow in that most of those subjects who received reinforcement at low rates, and more than half who received high frequency reinforcement in the explicitly unpaired and random reinforcement groups, perceived the experimenter reinforcers as contingent on their own behaviour.

Babad (1973) gave some subjects information about the experimenter's "nature in reinforcing children" before the satiation treatment, in an attempt to clarify further the mediating effect of subjects' perceptions of the experimenter as a source of reinforcement; for example, about the experimenter who delivered reinforcement at a low rate, children were told: "She may say <u>good</u> during the game, but she usually says it only very few times. Do

not expect her to say good many times" (p.3). Other subjects had no such information. Subjects ran under either deprivation (only two utterances of "good" during 10 minutes of pre-training); satiation (20 "goods" during pre-training); or control conditions.

Merely providing information as to the experimenter's usual reinforcing style caused a satiation-like effect, and the effect of the actual treatments was modified by the preceding informational input. For example, the deprivation group who expected the experimenter to say "good" many times gave lower test performance under social reinforcement than most satiation groups, despite the deprivation treatment.

Babad (1973) suggested that these subjects suffered frustration as a result of this treatment, and that even the experimenter's rare emissions lost value when the experimenter failed to "live up to their expectations". Babad concluded: "We must try and look at the learning situation through the subject's perspective and analyse - from his point of view - the underlying mechanisms operating in the interaction between him and the experimenter" (p.5). Certainly, consideration of subjects' perception of the reinforcement procedure is vital.

Babad (1974) switched experimenters after the pre-training period and also included the information factor described above; again, the satiation effect disappeared under these manipulations. The finding of reduced effectiveness of reinforcement when the experimenter is not the same experimenter present in the pre-training conditions, is reminiscent of the "valence" result; for example, that of Berkowitz et al. (1965).

Babad and Weisz (1976) tested the view that the satiation treatment causes subjects to lose a sense of contingency between their behaviour and the experimenter's reinforcement by having the experimenter deliver either social or nonsocial reinforcement in the test situation. There should be no difference between the two types of reinforcement. This study was carried out with Israeli children as subjects. The experimenter emitted "good" (in Hebrew) noncontingently, either at high or low rates during the 10-minute pre-training period, in order to create deprivation or satiation conditions. During the discrimination test which followed, the experimenter reinforced a "correct" choice (preferred choice of first three) either with "good" again or with a plastic token.

Babad and Weisz found no difference, as predicted, between the social and nonsocial reinforcer during the test; a typical satiation effect was found also for the tokens. While their results are in conflict with the findings of Dorwart et al. (1965), Rosenhan (1967) and Endo (1968) regarding nonsocial reinforcement, Babad and Weisz pointed out that these earlier studies used different definitions of deprivation/satiation. Erickson (1962) also found no satiation effect for nonsocial reinforcement, but like the above three studies, her nonsocial reinforcement delivery was mechanical, thereby not allowing for any link with the experimenter. If the subjects do not perceive the reinforcement as coming from the experimenter, there is no reason to expect that their behaviour will be influenced by their

previous interaction with the experimenter, according to Babad's theory of satiation.

Babad (1977) investigated vicarious social satiation in which children observed targets receive low or high rates of experimenter approval prior to a test of reinforcing power; non-targets were also tested by the experimenter to see if decreased performance after high rate reinforcement observation would obtain. Observing another subject receive the satiation treatment did not lead to reduced performance in the nontargets; there was no difference between observers who saw the high rates and those who saw the low rates of presentation.

Babad and Weisz (1977) investigated further the delivery of contingent social reinforcement during the pre-treatment training, proposing that contingent presentation, even at high levels, would not violate the subjects' expectations of contingency between their behaviour and reinforcement, and should not therefore cause the satiation effect. Subjects received either high or low frequency social reinforcement in a contingent and noncontingent manner. Babad and Weisz also included age as a variable, proposing that for younger children, perception of the contingency might be less relevant than the actual number of reinforcers given; as indeed it was.

Also, as predicted, for the older children the satiation effect occurred only after noncontingently presented reinforcers. Thus perceived contingency (or lack of it) is an important factor in producing the satiation effect in children of this age. Even

when the number of contingent reinforcers was further increased, no satiation effect occurred. This finding is in conflict with the view of Gewirtz (see 3.2.1, above) that contingency of reinforcement presentation does not affect the functional relationship between social stimulus presentation and subsequent efficacy; Babad and Weisz (1977) could only suggest the younger age of the subjects as an explanation for the appearance of satiation following contingent reinforcement in studies by Gewirtz (1967) and Landau and Gewirtz (1967).

Ascione and Cole (1977) followed up the early Hartup (1958) finding that greater nurturance (a different definition of satiation than the frequency measure usually investigated), was also associated with a decrease in subsequent reinforcing power. Ascione and Cole compared these two satiation treatments, and also attempted a follow-up of an earlier finding by Ascione (1975) that frequency of verbalization to the experimenter was related to the effect of nurturance withdrawal in male subjects.

The nurturance manipulation in the Ascione and Cole (1977) study involved instructing the two adult agents to behave in a "warm", "attentive" and "supportive" fashion; to be "interested" in the child's play, and also to deliver nonspecified praise when cued. For the nurturance withdrawal condition, the adult agents were instructed to behave quite differently following 7.5 minutes "nurturant behavior"; now they were to avoid interaction with the subjects and not express any positive or negative affect in doing so. The conventional satiation manipulation involved differing

frequencies of cued praise statements (four versus 30 praise statements during the 15-minute interaction). Observers recorded frequency of child verbalization to the adult agent during the manipulation session.

Following exposure to one of the above treatments, a test of social reinforcer effectiveness took place. Each correct response (arbitrarily defined) on a guessing game was followed by "That's right" or "good" from the same adult involved in the manipulation. Incorrect guesses were followed by "That's wrong" or "No".

Neither of the main effects for nurturance manipulation or satiation manipulation were significant. The interaction between frequency of child verbalization and satiation manipulation was, however; thus subjects who verbalized at a high rate did show greater responsiveness to social reinforcement after low exposure than after high exposure during the conventional satiation treatment. This finding was reversed for low frequency of verbalization subjects. This study demonstrates a limitation to the satiation findings, in that satiation will lead to reduced social reinforcer effectiveness in those subjects who verbalized at a high rate. The finding was likened by the authors to the findings using noncontingent pre-training stimuli of Warren and Cairns (1972), and Perry and Garrow (1975). The performance of the low rate verbalization subjects who did better after high than low exposure, is reminiscent of the contingent conditions in the above two experiments. These parallels, the authors suggested, may indicate that frequency of verbalization is negatively related to

actual or perceived contingency between behaviour and the social reinforcement, since programmed social reinforcers may either interrupt or fit awkwardly with the child's own verbalizations.

Eisenberger, Kaplan and Singer (1974) also investigated non-contingent approval. The results of this study were clearly in support of the cue interpretation, and instructions did alter subjects' responsiveness. Hayes (1977) also presented social reinforcement ("good") noncontingently or contingently with or without instruction that "good" means correct and at varied frequencies. Again, presenting social reinforcement in an informative fashion was not associated with declining efficiency on the criterion task (a two-choice discrimination).

Panda is also a proponent of the informational stance (Panda, 1970, 1971; Panda & Lynch, 1972). Panda (1970) investigated social reinforcement using 80 mildly retarded subjects, given the Wisconsin Card Sorting Test under conditions of information feedback ("right" or "wrong") with or without noncontingent verbal support of a nonstandardized nature. The indiscriminate use of verbal support appeared to have a damaging effect on performance, increasing the number of errors made. This finding lent support to the "information feedback" view of social reinforcement effectiveness, in opposition to the motivational explanation.

Panda (1971), in a review of studies investigating social reinforcement effectiveness, called for research to "....find what makes verbal support debilitative for cognitive learning" (p.65). Panda and Lynch (1972) applied the above views to education of the mentally retarded, advising teachers to ensure that verbal feedback is unambiguous. Words of general encouragement should be reserved for interinstructional periods. Panda and Lynch commented that: "...an important aspect of social reinforcement effect, its informative role, has not been given due consideration" (p.115).

Yet another group of studies from the Office of Education, Department of Health, Education & Welfare (U.S.A.) in 1971, underlines the need to apply verbal approval in a consistent, unambiguous fashion, since pre-experimental indiscriminate use can override the experimental manipulation. Again, disapproval words were found to be quite effective in the control of children's learning.

3.3. CONCLUSION

The complexity of the social reinforcement operation is reflected in the inconsistent findings represented in the experimental literature. In particular, adequate measures of responsiveness to social reinforcement are lacking; Parton and Ross (1965) commented in their review on the need for the development of more appropriate tasks to assess responsiveness. Also, the lack of standardization in application of even the most simplistic of situations (e.g. the MITH game) makes the drawing of

definitive conclusions difficult. The use of different techniques and performance measures has already been mentioned. Rate of social reinforcement delivery is also varied; for instance, Rosenbaum (1976) noted that delivery on interval schedules is often linked with rate measures of performance, whereas when persistence was recorded, social reinforcement was often delivered on ratio schedules. Fortunately the findings arising from experiments conducted in naturalistic settings are less equivocal, as will be seen in Chapters 5 and 6.

A caveat with respect to the narrowness of the experimental situation used to provide explanations of social reinforcement effectiveness is provided in a study by Young and Cochrane (1977). These authors criticized the use of young children as subjects, as well as the use of generally unfamiliar experimenters and experimental rooms, suggesting that these constraints may have produced emotional arousal and thus be responsible for artifactual findings. When a familiar experimenter and experimental room were used, and subjects were school age children, social isolation (either conventional isolation or social isolation with stimulating nonsocial materials) was followed by experimenter social reinforcement or nonreinforcement on the marble-dropping task. Neither of the isolation experiences had any effects on response rate, and the delivery of experimenter reinforcement was not effective either.

Morris (1980) also commented on the inconsistency of laboratory based social reinforcement findings: "In laboratory settings, social reinforcement effects often have been weak, inconsistent, and ephemeral" (p.9). This weakness and ineffectiveness

contrasts with the generally strong and consistent effects of aversive social stimuli (e.g. Morris & Redd, 1975; Spence, 1970), and is attributed to their presentation in isolation from their maintaining contingencies.

Despite the inconsistent findings, it can be seen that the three major theoretical positions still stimulating research activity are "social drive", "valence", and "information value". Clarification of the efficacy of these three positions would have important implications for behaviour modification research; should modifiers focus on frequency or warmth of approval delivered, or should they attend closely to the cue value provided? Such clarification is not yet available, although in real life familiar settings the information value of social reinforcement would seem to be relatively less important, in comparison with the laboratory situation where subjects are performing novel tasks and are already highly motivated and performing close to their ability level (Martens, 1970a, 1970b).

Clearly the importance of the information conveyed by the social reinforcer will be a function of the novelty of the situation. Often subjects in laboratory studies participate in experiments which are ambiguous regarding task requirements or completion (for instance, guessing the probabilities of flashing lights; Kanareff & Lanzetta, 1961). Informative feedback must be more salient in this situation than, for example, in a classroom where subjects are doing familiar work. On the other hand, when subjects are performing well-learned motor responses and not

acquiring new skills, social reinforcement has more potential as a motivator.

The responsiveness of mentally retarded subjects to social reinforcement has been investigated using experimental techniques similar to those described in this chapter, and this literature will be considered next.

CHAPTER 4

THE NEED OF RETARDATES FOR SOCIAL REINFORCEMENT : LABORATORY INVESTIGATIONS

4.1. INTRODUCTION

In Chapter 1 it was suggested that a linkage of a biological kind between work as a behaviour and social stimulation as reinforcement is unlikely. It is more probable that such a linkage is socially determined. If, in general, social reinforcement is the kind of reinforcement applied to a particular piece of behaviour, then for people who lack that behaviour, social reinforcement may be especially effective.

Because retardates are behaviourally deficient in many areas and because such deficiencies often lead to socially damaging consequences, social reinforcement may be particularly relevant to them. The same argument would apply to normals in special areas of deficiency (e.g. mathematical skills), where social reinforcement might be more appropriate than, for example, a nonsocial token reinforcer like money.

Retardates' need for social approval has been extensively investigated. Extension of the findings of determinants of social reinforcer strength within normal populations to include retardate functioning has stimulated divergent research areas. Areas which have received much experimental attention over a broad time-span include the social deprivation experienced by many retardates and the role of the institutional experience in social responsivity; the heightened desire for interaction and simultaneous wariness of adults; and the increased reliance on

external cues as a consequence of greater failure typically experienced by the retardate.

This review will focus on studies examining the special need of retardates for social reinforcement from an adult in the laboratory setting. Demonstration of the usefulness of social reinforcement in promoting various desired behaviours in this population of subjects will not be reviewed: nor will studies investigating subject variables such as age, sex, socioeconomic status and various personality indices be considered, except in so far as they relate directly to the areas outlined above.

Many investigators have reported that intellectual level is no more important than personality factors in predicting social adjustment in retardates (e.g. Weaver, 1946; Windle, 1962; McCarver & Craig, 1974). Although cognitive deficits are present and pervasive, much can be done to alleviate the motivational and emotional difficulties often experienced by the retarded which serve to compound those deficits.

The work of Zigler and his colleagues, in particular, has investigated the retardate's need for social approval and in what ways retardates differ from normals in this need. Zigler's work with motivational factors and retardation is extensive, and the majority of the work reported in this chapter is influenced by him. As MacMillan (1971) commented: "Zigler (1966, 1967) has sensitized investigators in the field of retardation to the possibility that motivational and emotional variables depress the performance of retarded children below a level expected on the basis of their cognitive development, i.e. mental age" (p.579).

4.2. SOCIAL DEPRIVATION AND MOTIVATION FOR SOCIAL REINFORCEMENT FROM THE EXPERIMENTER

This area of investigation extends the experimental literature reported in Chapter 3, which investigated the effects of brief pre-experimental social deprivation or satiation on effectiveness of social reinforcement from an experimenter. It will be recalled that Zigler's theoretical position vis à vis this rather artificial situation focused on the valence of the particular agent of reinforcement. Zigler's investigations of retardates have examined long-term social deprivation as an influence on experimenter reinforcer effectiveness (and sometimes as it interacts with pre-experimental social deprivation or satiation).

Measures of retardates' responsiveness used by Zigler and his colleagues vary, although the Marble in the Hole (MITH) game is generally employed. As well as the simple measure of persistence (length of time played on the game), an additional measure involves comparative responding on a two-part satiation task. The subject performs a response and is allowed to continue until he wishes to stop (Part 1), and then performs on the same or a similar task, again till he wishes to stop (Part 2). Generally the experimenter delivers reinforcement during one or both parts of the game.

1. Social Deprivation in Institutionalized Retardates

Zigler (1973) has amply summarized his work in this area to that date. Briefly, the work was prompted by an

attempt to clarify the Kounin rigidity formulation (e.g. Kounin, 1941a, 1941b), wherein retarded individuals are seen as inherently more cognitively rigid than chronologically younger normals at the same mental age. A series of studies by Zigler indicated that the rigid behaviour observed in institutionalized retardates (generally, perseveration on the two-part satiation task), might not be due to any greater cognitive rigidity, since it was frequently observed (Stevenson & Zigler, 1957; Zigler, Hodgden & Stevenson, 1958) that institutionalized retardates tended, unlike normals, to play longer on the second part of the task when the experimenter maintained a supportive role. Zigler has concluded that the experimenter's supportive presence may be the key. Thus institutionalized retardates are conceptualized as having been deprived of social reinforcement generally, and this deprivation influences subsequent relationships with an experimenter in a laboratory setting. This increased desire to interact with and receive support from an adult experimenter was labelled the "positive reaction tendency" (Zigler *et al.*, 1958).

The study of Zigler *et al.* (1958) will be discussed in detail since it provides examples of the use of various indices of play on the simple games to support different theoretical views. Differences between normals and institutionalized retardates (matched for mental age) under support and nonsupport conditions were obtained by comparing the mean length of time subjects spent overall on one of three tasks (in both Part 1 and Part 2) under support (experimenter social reinforcement) or nonsupport

(experimenter presence only). It was predicted that both groups would spend longer under support than nonsupport; this was found to be true for retardates only. Similarly, a comparison was made between length of time played under both treatment conditions for the two groups, and the hypothesis that retardates would spend longer (even nonsupport was thought to be somewhat socially reinforcing, due to experimenter's presence) was confirmed.

A third prediction involved the difference between responding under support and nonsupport for the two groups; as predicted, there was a greater difference between these two conditions for retardates (predicted because support should have a greater motivating effect for retardates).

Three further hypotheses were tested using co-satiation scores. Co-satiation is a measure of the difference between performance on Part 1 and Part 2 of the tasks ("....an index of the degree to which performance on Part 1 of each game influences performance on Part 2"; p.108), and in this instance was calculated by dividing the difference in time spent on either part (Part 1 minus Part 2) by the time spent on Part 1. Retardates would be expected to tend towards negative co-satiation scores because they tend to spend longer on Part 2.

Firstly, it was predicted that co-satiation scores would be smaller when subjects played under support conditions because

performance should be maintained for longer for both groups: this finding was confirmed for retardates only, who did tend to play longer on Part 2 under social reinforcement. It was expected further, that co-satiation would be less for retardates under both support and nonsupport, and this expectation was, in general, fulfilled. A final prediction concerned error rates, and tested the hypothesis that retardates should make fewer errors because of their higher compliance with an experimenter's instructions. In fact, retardates made more errors.

Zigler et al. (1958) concluded: "The most significant finding of this study is that the behavior of the feebleminded Ss was more affected by interaction with an adult and adult approval than the behavior of normal Ss" (p.118).

Confirming studies summarized by Zigler (1973) are: Zigler (1958, 1969); Green and Zigler (1962); Zigler (1963); Zigler, Butterfield and Goff (1966); Harter and Zigler (1968); Zigler, Balla and Butterfield (1968); and the observational study by Balla (1967). Green (1960) also found that institutionalized retarded subjects persisted longer on the second task than either normals or noninstitutionalized retardates; both of which groups were thought not to have experienced as much social deprivation. The finding (Harter, 1967) that institutionalized retardates took longer to do a concept-formation problem solution when they were face-to-face with a warm supportive experimenter, than when the experimenter was silent and out of view, was interpreted to indicate that unmet affectional needs were interfering with the ongoing activity. Zigler (1973) concluded on the basis of his work

that: "An atypically high motivation for social reinforcement appears to be an important factor in the performance of the institutionalized retarded" (p.263).

The finding of Irons and Zigler (1969) that within their institutionalized group (juvenile delinquents, not retardates) the degree of pre-institutional deprivation was not related to persistence on the MITH game, is at variance with Zigler's deprivation hypothesis.

Other early studies not in accordance with the above view are those of Stevenson and Cruse (1961) and Stevenson and Fahel (1961). Stevenson and Cruse (1961) used numbers of marbles inserted in the MITH game (not perseverance) as a measure of the effectiveness of two levels of social reinforcement in a comparison of institutionalized retardates and mental age-matched non-institutionalized normals. In the "reward" condition, the experimenter made supportive remarks using five standardized reinforcing phrases after each fifteenth marble was dropped, as well as nodding and smiling at appropriate intervals during the five daily sessions. In the "attentive" condition, the experimenter made no comments, did not nod or smile or give other types of social reinforcement apart from attention (surely a difficult treatment to maintain for a possible 30 minutes). There was also an "absent" group, where the experimenter left the room after giving instructions.

Stevenson and Cruse (1961) failed to find increased responsivity in the retarded subjects. There was no difference in rate of marble-dropping between the three treatments for the

retarded subjects, although the normal subjects performed as predicted (i.e. best under "reward" and worst under "absent"), and the retardates inserted more marbles than the normals under all three conditions. It should be noted, however, that the "absent" condition was rather unsatisfactory since the retarded subjects typically did not play according to the rules when left alone: instead, they picked up handfuls of marbles and dumped them into the box, rather than putting them correctly by colour into one of the two holes.

Stevenson and Fahel (1961) had subjects play one of two versions (simple and complex) of the MITH game, either under neutral conditions (experimenter attentive but no smiling, nodding or other support), or reward (verbal support given twice each minute and as the subject was responding; five statements given in random order plus appropriate smiling and nodding). The dependent variable was rate of dropping marbles as compared with the first minute's play. The only significant main effect was for institutionalization, with institutionalized subjects (both normal and retarded) showing a greater increment over base rate, thus confirming the social-deprivation hypothesis. There was no support for the view that adult interaction is more reinforcing than attention alone for either type of subject, a finding in agreement with that of Stevenson and Cruse (1961) for retarded subjects only. Again, one wonders whether the lack of a reinforcement effect is due to some contaminating social reinforcement present in the neutral condition.

A study by Alovisetti and Weaver (1975) also failed to find increased social responsivity in institutionalized retardates when compared with noninstitutionalized retardates and normal children. The measure of "psychological distance" used in this study was the distance between a felt cut-out human child and parent figures placed on a felt board; it was hypothesized (rather optimistically) that institutionalized children would demonstrate their increased desire to interact with adults by placing the child figures closer to the parent cut-outs. However, although there were no differences between the two retarded groups on this measure, both retarded groups placed their cut-outs closer than the normals, interpreted to indicate that both groups are more socially deprived.

Zigler and Balla (1972) studied developmental progress of responsiveness to social reinforcement with increasing mental age. Normal and institutionalized retarded children at three age levels (7, 9, and 12 years) were compared in terms of responsiveness to social reinforcement. Both the retarded and the normal groups showed decreasing motivation for social reinforcement with increasing age; and the retarded children were more dependent on social reinforcement from the experimenter at each level.

2. Deprivation in Noninstitutionalized Retarded Subjects

While the initial work of Zigler used institutionalized retardates only, later experiments have indicated that the same motivational explanations may be relevant to retardates not living in institutions.

Zigler and Butterfield (1968) used as subjects mildly retarded culturally deprived children whose experience of social deprivation could be considered as similar to that operating in institutional environments. Those subjects who attended a nursery school were found to increase significantly more in their IQ scores than a comparison group who did not attend. Zigler and Butterfield concluded that this improvement was a result of "....reduction in the effects of debilitating motivational factors rather than to changes in rate of intellectual development" (p.1).

Lipton (1974) investigated the social deprivation of retarded adults living in the community and the effects of brief preliminary social interaction on these subjects' desire for interaction with the experimenter while playing the MITH game. Subjects' history of social deprivation was assessed using Zigler's Social Deprivation Scale (Zigler et al., 1966) and categorized into a "more deprived" or a "less deprived" group. Subjects either received a deprivation or satiation treatment during a pre-training phase.

Those subjects with a history of less social deprivation were not less motivated to interact with the experimenter than those who had experienced greater deprivation, but pre-experimental satiation was associated with lower social motivation, regardless of deprivation history, a finding at odds with the contention (e.g. Zigler, Butterfield & Capobianco, 1970) that long-term deprivation is the more powerful influence. The hypothesis that the more deprived subjects would show a greater satiation-deprivation

difference was not supported; in fact, the difference was in the other direction.

3. Deprivation Effects Specific to Type and Length of Institutionalization

While Zigler has generally focused on pre-institutional deprivation, some studies have investigated the effects of the institution itself on subsequent desires for interaction with an adult experimenter, documenting differences in behaviour in comparable groups of retarded children residing in different institutions.

Butterfield and Zigler (1965a) criticized the tendency to view institutionalization as a homogeneous variable. They examined two different institutions, one with a "warm social climate" and one which was impersonal and rigid. Four groups of moderately retarded residents (two from each institution) played the MITH game under support conditions (one of four verbal reinforcers after each tenth marble dropped, plus a smile), or nonsupport (attention, but no approval indicated). It was found that those children from the more "depriving" institution did play the game for a longer time, as hypothesized. Neither the reinforcement effect nor the reinforcement x institution interaction were significant.

In a second experiment (Study II), Butterfield and Zigler (1965a) ran the support condition only, making the interesting comment that it is difficult to impose nonsupport conditions, since most adult experimenters find it hard not to react to the "frequent

social overtures" of the retarded children. This point is also relevant to the delivery of information feedback devoid of any social interactional quality, an equally difficult procedure to impose. A finding of major importance in Study II concerned the varying effectiveness of the two young male experimenters with subjects from the same two institutions used in Study I. A significant experimenter x institution interaction contains a warning note about designing experiments which use only one experimenter. These two studies underline the importance of ensuring strict comparability of subject populations before making comparisons on experimental findings.

Klaber, Butterfield and Gould (1969) also compared two types of institution in their study of 21 severely retarded children transferred from one institution to another which provided more personal contact with aides and more stimulation in general. These children were compared with 19 matched subjects left in the more impersonal situation. The task involved sticking felt cut-out shapes onto a felt board, and one measure of motivation for contact with the experimenter was the distance from the experimenter that subjects placed the cut-out. Praise (unspecified type) was given after every second trial. Persistence at the task was also measured in the second half of the session, when children were told to continue as long as they liked, and the experimenter continued giving praise after every third trial.

Type of institution was a significant effect on both measures, with children from the "warm" institution placing the cut-outs further away from the experimenter and showing less persistence on the open-ended task.

Balla, Butterfield and Zigler (1974) did find differential effects for varying amounts of pre-institutional social deprivation in their comparative study. Balla et al. evaluated residents of four different institutions ranging in size, turnover rate and care-taking practices. Residents were examined within six months of admission and again after 2.5 years of institutionalization, and scores on IQ, responsiveness to social reinforcement, verbal dependency, imitation of adults, and behavioural variability (a measure of effectance motivation) were obtained. The authors found that few behavioural differences could be ascribed to the particular institutions where residents lived; however, size of institution was related to social reinforcement responsiveness. Residents of the largest institutions were more responsive to social reinforcement than were residents of the other three institutions.

Balla, Kossan and Zigler (1976) studied residents of seven different institutions, varying widely in size. In this study, responsiveness to social reinforcement, wariness of adults and imitation of adults were recorded. Once again, there were small behavioural differences between persons residing in the various institutions, except that size of institution was again related to motivation for social reinforcement. Size of institution and its relationship to quality of care has been a focal point in several research efforts (e.g. Tizard, 1970; McCormick, Balla & Zigler, 1975; Balla, 1976).

Length of institutionalization is another important factor. Zigler and Williams (1963) did a follow-up study of those children

remaining who had originally been tested by Zigler in 1961. Responsivity for social reinforcement had increased for those children who had remained in the institution (assessed using perseveration on the simple marble-dropping task), suggesting that institutional life is in fact socially depriving. Also, children from relatively good homes showed a much greater increase in motivation for social reinforcement than did children from more deprived homes. Thus the motivational effects of institutionalization depend partly on pre-institutional history.

This longitudinal investigation was continued by Zigler et al. (1970) who followed up those children still remaining eight years after the original testing (Zigler, 1961). The remaining children were tested for perseveration on the MITH game five and eight years afterwards. The above reported increased in social responsivity was not found here; instead,there was a general decline in motivation for social reinforcement. Zigler et al. (1970) suggested that these children may have been too old for the simple marble-dropping task.

The finding with respect to pre-institutional social deprivation, however, was in line with the earlier study, even after this greater length of institutionalization. Children from highly deprived homes showed a greater decrease in social responsivity than children from less-depriving backgrounds; again, institutionalization is seen to be relatively more depriving for children coming from relatively good homes. Early social deprivation, then, has a long-term mediational role (Zigler, 1973)

and short-term models such as that of Gewirtz and Baer (1958a, 1958b) are not really appropriate.

Balla and Zigler (1975) extended the study of Zigler et al. (1968) which tested institutionalized retardates for pre-institutional deprivation shortly after admission, using the scale devised by Zigler in 1964 and refined by Zigler et al. in 1966. Zigler et al. (1968) found that subjects scoring high on pre-institutional deprivation did show heightened motivation for social reinforcement from the experimenter (perseverance). Balla and Zigler (1975) used 23 of the same subjects used in the above study and compared them on responsiveness to social reinforcement after six years of institutionalization. On this occasion, no relationship was found between pre-institutional deprivation as measured on the scale and time played on the game, reflecting the findings of Irons and Zigler (1969) with institutionalized non-retarded subjects. Familial retardates (but not nonfamilial retardates) showed a decreased responsiveness to social reinforcement over the six years since last tested. The lack of decrement in responsiveness to social reinforcement in the nonfamilial subjects was interpreted to indicate that pre-institutional deprivation was still exerting an influence for this group, a finding in support of Zigler et al. (1970) that social deprivation can cause an enduring effect.

Short-term adjustment to the institution may occur too; Stevenson and Knights (1962) examined desire for social reinforcement of institutionalized residents after returning from vacationing at home. Children had more intense feelings of

deprivation immediately upon return to the institution, and these feelings were reduced in intensity after the children had re-adjusted to the institutional setting. The institutional variable has been stressed by Zigler in recent work (1976); areas which warrant further research include demography, social psychological characteristics, administrative structure, employee attitudes, and actual resident care.

4.3. THE POSITIVE AND NEGATIVE REACTION TENDENCIES FORMULATIONS

Interwoven with his conception of the effect of social deprivation in institutions, Zigler has proposed a theory of competing tendencies in retarded children's responses to adult experimenters. Several of the earlier studies mentioned above suggested that the retardate has an increased desire for social reinforcement; the "positive reaction tendency". At the same time, they are thought to possess "negative reaction tendencies"; that is, they are wary to interact with an experimenter because of past negative experiences in interactions with adults. Both the desire to interact and the wariness to do so are positively related to the amount of social deprivation encountered.

Zigler postulated these competing tendencies as early as 1958, when he used them to explain more fully why retarded subjects, after satiation on Part 1 of the two-part satiation task, play longer on Part 2, compared with normals. He stated: "Institutionalized feebleminded subjects begin Task One with a positive reaction tendency higher than that of normal subjects. This higher

positive reaction tendency is due to the higher motivation of feebleminded subjects to interact with an approving adult. At the same time, feebleminded subjects begin Task One with a negative reaction tendency due to a wariness of adults which stems from the more frequent negative encounters that feebleminded subjects experienced at the hands of adults" (p.91).

The concept of a heightened negative reaction tendency fits well with the view, accepted by several investigators, that the life histories of retarded children are characterized primarily by failure experiences due to repeated confrontations with tasks with which they are ill equipped to deal, while the histories of normal children are characterized primarily by success (Cromwell, 1963).

Zigler (1961) likewise found a greater tendency amongst retarded individuals than normals to spend more time on Part 2 than Part 1. The positive and negative reaction tendency formulation thus pre-dates Zigler's "valence position" as described in Chapter 3, in which the effectiveness of an experimenter as an agent of social reinforcement for normal children was proposed to depend upon the valence he has for the particular child whose behaviour is being reinforced. The experimentally manipulated negative encounters produced in experiments to support the valence view can be seen as experimental analogues to the encounters that institutionalized retardates have actually experienced.

The rationale behind the co-satiation argument is that an increase in time spent on Part 2 of the two-part game reflects wariness or fearfulness on the part of the subjects. A normal, less fearful child would be expected to become relatively satiated

on both the games and the social reinforcers provided by the experimenter while he plays Part 1, and hence will tend to play Part 2 for a shorter period. The retardate, on the other hand, due to wariness and fearfulness, will use Part 1 to assure himself that no punishing events are forthcoming and then often play Part 2 of the socially reinforced game for as long or longer than he played Part 1.

Although it is arguable that perseveration on Part 2 does actually constitute some measure of wariness in retarded subjects, experimental results interpreted to support this formulation are presented.

A foundation study is that of Shallenberger and Zigler (1961) who compared mental age-matched normals and institutionalized retardates on a two-part marble-sorting satiation task; a similar situation to the earlier mentioned satiation studies, except that experimental games preceded the satiation tasks. After three games played under either positive reinforcement or punishment, playing time on both parts of the satiation task under social reinforcement was measured. Long playing time for both normals and retardates on Part 2 was observed after punishment (disapproval statements) while those subjects who received positive reinforcement performed longer on Part 1. These results were interpreted as supporting the positive and negative reaction tendencies formulation. Thus, the negative reaction tendency enhanced in pre-training under punishment would dissipate slowly during Part 1 with experimenter social reinforcement so that when the subject entered Part 2, the positive reaction tendency would be operating more strongly.

Subjects who received positive interaction with an experimenter in pre-training presumably entered Part 1 of the task with a positive reaction tendency and performed longer on Part 1 than on Part 2, due to fatigue and satiation.

Other studies which have been interpreted in this fashion are those of Berkowitz et al. (1965); Berkowitz and Zigler (1965); McCoy and Zigler (1965); Harter and Zigler (1968).

The study by Zigler et al. (1968) was mentioned above as providing an example of increased desire for experimenter interaction after high social deprivation. This study also provides some clarification of the effect of pre-institutional experiences in creating wariness and fear of adults, since it was the marital harmony factor in the deprivation scale that related most to the manifestation of a negative reaction tendency in these subjects.

Balla, McCarthy and Zigler (1971) examined "specific life history correlates" of negative reaction tendencies in institutionalized retarded children, with the thought that if it were possible to identify factors associated with such extreme wariness, these factors could be modified. Social deprivation scores (as assessed on the deprivation scale), length of institutionalization, and measures of the degree to which important persons in the child's pre-institutional life maintained contact with him were recorded. This latter index involved number of visits by parents, relatives, and friends, and number of days of vacation with parents, friends, etc.

The two-part satiation version of the MITH game was used to assess negative reaction tendency, and the experimenter gave social

reinforcement during play on both parts, after each tenth response. As before, it was expected that children with higher negative reaction tendencies would play relatively longer on Part 2, after having such tendencies reduced by the pleasant interaction with the experimenter in Part 1. Balla et al. (1971) found that wariness, so measured, was not associated with pre-institutional deprivation or with mental age. However, age at institutionalization was positively related to wariness. The "contact" measures were not useful in predicting negative reaction tendency.

Butterfield and Zigler (1965b) used a three-choice size discrimination as criterion task following conditions which they called success, failure or neutrality, but in which the experimenter's verbal appraisal was the only feedback provided, and in fact, all subjects received the same objective amount of success. In this comparison study, success and failure are viewed as instances of positive or negative pre-experimental experiences. The aim was to investigate whether institutionalized retardates, as compared to normals, would react differently following a failure experience. In Study I, the rewards were marbles and no difference was found in children's performances on the criterion task after success or failure.

In a second experiment (Study II), they tested motivation for adult approval following failure or success. There were two groups of subjects; those high in responsivity and low in responsivity to social reinforcement as defined by length of time subjects would play the two-part satiation game, and each group

received either success or failure treatments as used before. In this second study, responsiveness to social reinforcement did significantly interact with the effect of failure for normals and retardates. Responsive retardates and normals showed a striking difference in performance following failure, whereas the non-responsive groups did not. Butterfield and Zigler (1965b) noted: "Failure to control for such idiographic variables as responsivity to social reinforcement may account for the diversity of findings in the success-failure literature" (p.30).

Other authors have investigated the strength of social approach and avoidance tendencies in institutionalized retardates with somewhat equivocal results. Weaver, Balla and Zigler (1971) looked at proximity of positioning in institutionalized and non-institutionalized retardates and mental age-matched normals. Using a situation similar to that reported by Klaber et al. (1969), subjects placed felt cut-outs on a panel under support, punishment (expressed by way of the experimenter's facial expressions and verbalizations), or neutral conditions. The subjects' distance from the experimenter was the dependent variable in this experiment, and not the placing of the cut-outs. The authors pronounced the use of this interpersonal distance measure as an alternative to the usual persistence measures, to be a major contribution of the study.

A free play period following this task differentiated it from a second "game", Task 2, which was the same as Task 1; again, distance scores from the experimenter were recorded. Weaver et al. (1971) predicted that the institutionalized retardates would exhibit greater positive and negative reaction tendencies after support and

punishment respectively on this distance measure than would the other two groups. The results were in keeping with this hypothesis, and there was no difference between the non-institutionalized retarded and normal groups.

Another study which investigated desire for interaction with an experimenter after pre-experimental manipulations in institutionalized retardates on a vocabulary acquisition task was that of Gayton and Bassett (1972). The use of "maximum" and "minimum" social reinforcement is an unusual feature. Maximum social reinforcement was a pat on the back and some nonstandardized verbal reinforcement. Minimum social reinforcement was "good": both were compared with a bell for information feedback. In Experiment I, the maximum version was found to be more effective in increasing acquisition of vocabulary responses (trials to criterion) in accordance with the positive reaction position, but was not superior on the number of correct responses measure (rate of acquisition), perhaps due to a ceiling effect. Minimum social reinforcement was not superior to no reinforcement. Gayton and Bassett (1972) concluded: "The experiment showed consistently that a relationship characterized by friendly social interaction leads to more effective learning" (p.502).

The second experiment examined the effects of a prior interaction with the experimenter on subsequent responsiveness to maximum or minimum social reinforcement; a negative prior interaction with the experimenter condition was included. The negative prior interaction involved the experimenter acting in a "demeaning" manner after each response, while for the positive

prior interaction, the subjects received candy and social reinforcement (verbal approval plus physical contact) on each of 20 responses on a two-choice guessing task. A negative prior interaction was found to lead to slower learning than a positive interaction or no interaction, again on the subsequent acquisition of vocabulary responses under maximum social reinforcement as defined above. The results indicated that negative prior interaction elicits a significantly poorer performance than either positive or no prior interaction when the following event involves maximum social reinforcement. Gayton and Bassett (1972) concluded: "This finding suggests that the deleterious effects associated with negative prior interaction do not express themselves if the adult-child interaction is one characterized by minimum social interaction" (p.506).

Weaver (1966) gave evidence that the negative reaction tendency has its genesis in experiences of social deprivation, rather than in retardation itself. Weaver examined negative reaction tendencies of a group of noninstitutionalized retardates, who experienced either positive or negative reinforcement and then were tested on the measure reported in the Weaver et al. (1971) study mentioned above. Children in the positive reinforcement condition did display positive reaction tendencies, while children in the negative condition became more wary.

An indication of the persistence of wariness of adults caused by socially depriving experiences comes from the study by Balla et al. (1976; see 4.2.3 above), the findings of which were interpreted to show that after about eight years of institutionalization

individuals with a history of high pre-institutional social deprivation were still more wary than less deprived individuals.

The extent to which such findings apply to children who are not institutionalized is less clear. Zigler (1968) stated that such reaction tendencies are apparent in noninstitutionalized children: "Children who do not receive enough affection and attention from the important adults in their life space suffer in later years from an atypically high need for attention and affection" (p.21). Zigler also commented, in describing the child's wariness of adult figures, especially teachers: "The child is simply spending more time protecting the self from potential harm than he is in solving cognitive problems" (p.24).

However, Hayes and Koch (1977) failed to find increased wariness in mildly retarded noninstitutionalized subjects when compared with normals. Expecting their noninstitutionalized subjects to have a stronger negative reaction tendency than normals in a social encounter with a strange adult, Hayes and Koch predicted greater interpersonal distance would be preferred by those subjects over a group of nonretarded children. Instead of the felt cut-out placement method used by Weaver et al. (1971), these investigators had subjects walk as close as they wanted to a strange experimenter, or had an experimenter walk towards them as far as subjects preferred.

The retarded children in this study did not maintain greater interpersonal distance from an experimenter than the nonretarded children. However, there was a difference between the two groups if the experimenter was walking toward the subjects, leading the authors to propose that perception of lessened personal control in that

situation stimulated the stronger negative reaction tendency among the retarded subjects. There is some possibility that the retarded subjects, at least, did not fully understand the instructions about raising their hand or saying "stop" when they wanted the experimenter to stop advancing in the experimenter-approach condition.

Examination of Zigler's positive and negative reaction tendency formulations are few in number. An area which has stimulated more research interest is that of outer-directedness; this area will be considered next.

4.4. OUTER-DIRECTEDNESS AS REACTION TO FAILURE

There is increasing evidence that retarded children may be more involved with the attending adult in the experimental situation described above, relative to normals, than they are with the task itself. Zigler's construct of "outer-directedness" proposes that the cognitive style of the retardate is different from that of the normal in problem solving tasks, as a direct result of the child's history of success or failure in previous tasks.

This over-reliance on external cues has often been interpreted as distractibility; a fallacious interpretation, according to Zigler. The high rates of off-task glancing in evaluative situations observed in children with high measured test anxiety (Nottelman & Hill, 1977) would seem consonant with such a proposal.

Zigler et al. (1958) observed that institutionalized retardates tended to terminate their performance on experimental games following a suggestion to do so from the experimenter, whereas normal subjects did not so comply. Green and Zigler (1962), however, found that noninstitutionalized retarded subjects were even more inclined to terminate upon the experimenter's cue than either normals or institutionalized retardates. This finding led Green and Zigler to conclude that sensitivity to cues from the experimenter might be best understood in terms of prior history of success or failure, and not in terms of straight deprivation; thus it is the noninstitutionalized retardate who might be expected to be most sensitive to experimenter cues.

As Turnure and Zigler (1964) pointed out: "The institutionalized retardate lives in an environment adjusted to his intellectual shortcomings and should therefore experience less failure than the noninstitutionalized retardate. This latter type of child must continue to face the complexities with which he is ill-equipped to deal and should therefore manifest the greatest sensitivity to external cues" (p.428). And within the institution itself, as Edgerton and Sabagh (1962) pointed out, the retardate with less impairment will compare favourably with other residents, and should therefore be more confident.

A foundation study here is that of Turnure and Zigler (1964) who compared noninstitutionalized mentally retarded children with mental age-matched controls on two imitation tasks following either a success or a failure condition (Study I). Success in the experimental game was accompanied by verbal and nonverbal support

(smiling, nods of approval and four statements made in random order at predetermined times during the trial). "Failure" was accompanied by four disapproval statements (e.g. "You aren't getting any right") and no nodding, smiling, or other types of nonverbal support. Various measures of imitation were employed, including the Sticker Game, in which the subject made a design out of pieces of coloured paper immediately after the experimenter had made a design.

The retarded subjects were found to be more imitative of the experimenter than the normals, and failure produced more imitative behaviour than success, indicating, according to Turnure and Zigler, increased outer-directedness in the retarded subjects, expressed by oversensitivity to external models.

Experiments which seek to investigate the relationship between previous history of failure and the use of an outer-directed mode of problem solving sometimes employ a brief pre-test experimental failure or success manipulation as used by Turnure and Zigler (1964, Study I). Measures of outer-directedness vary, but the imitation index is a common one. Another index used, although less frequently, is attention to external cues, either relevant or irrelevant, sometimes expressed in off-task glancing behaviour, and sometimes as poor performance. Rewards are not always provided.

This second type of index was used in a second experiment by Turnure and Zigler (1964, Study II) in which the experimenter performed an additional task which, if attended to, could be presumed to interfere with subjects' behaviour on a first task and facilitate it on a second. As predicted, the presumably outer-

directed retarded children did worse than the normals on the first task but better on the next one. The retardates were also observed to glance more towards the experimenter. The authors suggested that the distractibility so frequently observed in retarded children may merely reflect a search for information. Further work (Turnure, 1970b, 1970c) confirmed these findings. Turnure (1970a) monitored normal subjects' visual orientation to the task under distraction, as a function of age. Younger children were more outer-directed, "....attending to a wide variety of stimuli in seeking solutions and guides to action" (p.120).

Turnure (1973) attempted to rectify the lack of a control condition in earlier work, which had not included a condition where the experimenter was absent while subjects performed the task. Sex differences were also investigated. In this study, the subjects were educable mentally retarded children who did the oddity learning task under one of three conditions: experimenter absent; experimenter present with relevant cues; or experimenter present with irrelevant cues. Failure was not manipulated. In the experimenter present relevant cue condition, the experimenter remained beside the subject and turned his head in the direction of the correct stimulus; in the experimenter present irrelevant cue condition, the experimenter lifted his head straight up with the presentation of each problem.

As expected, subjects showed more glancing when the experimenter was present, but the provision of irrelevant cues did not lead to the expected poorer performance in all subjects, only in boys, leading to the conclusion that mentally retarded girls are

less outer-directed than boys. Although Turnure (1973) did not monitor responsiveness to social reinforcement, he reported that the experimenter in this study commented on the interest of male subjects in prompting conversation and interaction on the way to the experiment. Since the boys' teachers had all been women, the suggestion is made that some form of social deprivation was operating here.

Turnure, Larsen and Thurlow (1976) followed up the experimenter present and experimenter absent factor in an investigation of sex of experimenter and subject as related to outer-directedness in educable mentally retarded children. Subjects ran in either an experimenter absent or experimenter present (relevant cue) condition, where once again, the experimenter turned his head to face the relevant cue. After 60 trials, there were 18 trials of reversal learning.

The glancing data again supported the finding that presence of an adult in the learning situation produced increments in non-task orienting often interpreted as "distractibility", even though learning (number of correct responses) was not impaired. The reversal task results were similar, supporting an outer-directedness explanation of reliance on external cues in retarded children.

Another demonstration of the greater outer-directedness of retardates comes from Sanders, Zigler and Butterfield (1968) who compared institutionalized retardates with mental age-matched controls, using attention to a cue from the experimenter as the index. Under a negative condition (i.e. the cue was wrong), the retarded subjects did register as significantly more outer-directed

than normals, making more errors on the 3-choice discrimination task. Under positive conditions (the cue was right), there was no difference between the two groups. On examining the influence of etiology, Sanders et al. found that familial retardates were less outer-directed in problem-solving than organically retarded children, a result which was interpreted to reflect the differing degrees of failure experienced by these two groups; Zigler (e.g. 1962), has commented that familial retardates generally come from more deprived lower-class backgrounds than the organically retarded.

A study by Carlson and MacMillan (1970) showed that retarded children were more susceptible to counter-suggestion than normals. After observing the experimenter propel a ball down a grooved board for 10 trials, subjects were asked to predict how far the ball would roll and to justify that prediction. The child's prediction was then challenged by the experimenter who made a counter suggestion. The child could then modify his prediction or maintain his original prediction. The groups did not differ on initial prediction, but the retarded subjects were more inclined to follow the experimenter's counter suggestion than the normal groups. These results were interpreted to support Zigler's outer-directedness position.

Yando and Zigler (1971) took up etiology as a factor in outer-directedness. The Sticker Game (e.g. Turnure & Zigler, 1964) was used to measure imitative behaviour, and attention to situational cues on a discrimination task was also recorded. In

this study, retarded subjects, both familial and organic, relied more on situational cues, and were more imitative than normals.

Institutionalization affected the two retarded groups differently; noninstitutionalized organic retardates were more outer-directed, whereas for familial retardates this difference was reversed, a finding in support of the contention (Sanders et al., 1968) that the noninstitutionalized organic retardate who remains at home experiences more failure due to parents' greater expectations. In the institutional environment, there is less chance of failure for this group. Also, noninstitutionalized normals were more outer-directed than institutionalized children of average intellect.

Balla, Styfco and Zigler (1971) also investigated attention to external cues in organic and familial retardates and normals. Again, organically retarded subjects were more outer-directed (relied more on external cues on a discrimination task) than familial retardates, as were the younger children in each group. Normal children were least likely to rely on misleading cues and also made less errors.

Zigler and Yando (1972) extended the findings of Yando and Zigler (1971) relating to institutionalization and attendant social deprivation in children of average intellect, using two types of task presentation. In one case, children were told that any responses were acceptable; in another condition, the task was described as having only one correct solution (although it was in fact insoluble). Zigler and Yando (1972) hypothesized that on the "non-problem" task, deprived institutionalized children would

be less imitative of adults than nondeprived children, due to their wariness of adults. In the second task setting, both deprived and nondeprived children should show a similar degree of outer-directedness, since all children were forced to use available cues.

The task was a colour-sorting one. As in the Yando and Zigler (1971) study, younger noninstitutionalized children were more imitative than younger institutionalized children, and in the nonproblem situation the younger noninstitutionalized children did imitate more than any other group. Also, as predicted, in the "problem" task setting, no institutionalization effect was found. Thus imitation is also affected by the nature of the task presentation.

Drotar (1972) investigated attention to an irrelevant cue (experimenter's activity) in noninstitutionalized retardates and normals. Drotar found that the presence of the experimenter assembling a puzzle did act to depress performance of the retarded children more than that of the normals, although the two groups did not differ in the no-cue condition (the experimenter did not assemble a puzzle).

Drotar (1974) tried to separate the effects of instructions and cue location on the problem-solving of a two-choice discrimination. Instructions either did or did not mention the relevant or irrelevant cue and the cue was either near the two stimuli or far from them. It was found that provision of an irrelevant light cue did lower performance of the retardates more

than that of the normals. When the cue was relevant, performance of the two groups was similar, suggesting that normals are better able to inhibit their response to an irrelevant cue while retardates continued to rely on irrelevant cues even when they lead to incorrect responses.

The introduction of failure or success treatments similar to those used by Turnure and Zigler (1964) was a feature of a study by MacMillan and Wright (1974) of outer-directedness in normal subjects only. Although the purpose of this study was to investigate age trends in outer-directedness, it is included here because it highlights the importance of the particular index used in the interpretation of results.

Success or failure involved a puzzle assembly which was either completed or not completed, accompanied by either positive or negative feedback. Next, the criterion tasks were another puzzle assembly and the Sticker Game used by Turnure and Zigler (1964). In this game, the experimenter demonstrated making a design out of some paper stickers, and the subject was invited to follow. The measure of outer-directedness was the ingenuity displayed by the subject in the colours used, the design made, and the name given. On the puzzle assembly, the dependent measure of outer-directedness was time to complete puzzles while the experimenter was assembling another one, plus the number of times the subject glanced at the experimenter or the experimenter's puzzle.

MacMillan and Wright (1974) reported that failure did increase outer-directedness as measured by glancing and time to complete the

puzzle, but not outer-directedness as measured by imitation on the Sticker Game. The similarity between the pre-training and experimental tasks is suggested as one reason for this finding. The very different measures used could well explain inconclusive findings in this area, and the point is similar to that raised in Chapter 3 where differing measures of responsiveness to social reinforcement on the MITH game have been demonstrated to cause different interpretations of results.

An unpublished study by MacMillan and Cauffiel (1973) related outer-directedness in normals to failure defined in terms of real-life academic history. The subjects were children who had had academic histories of failure ("underachievers") and children with "learning disabilities" and this study indicated that long-term failure is indeed related to outer-directedness in the experimental setting.

Another failure to find expected differences using imitation on the Sticker Game as an index is that of Maguire (1976). Maguire failed to replicate the early finding of Turnure and Zigler (1964) that a failure manipulation caused greater outer-directedness. Maguire replicated some of the failure experiences used by Turnure and Zigler, and suggested that it was those experiments which included the greatest number of negative comments from the experimenter that supported the failure-causality hypothesis of outer-directedness.

In a comparison of normals and noninstitutionalized retardates, task failure (failure to win games) was associated

either with positive or negative comments from the experimenter. Maguire (1976) reported that experimentally induced failure of either kind did not produce greater outer-directedness on this measure for either retarded or nonretarded children. She is at a loss to explain the failure to replicate.

Another attempt to clarify the effects of experimentally induced success or failure is that of MacMillan and Cauffiel (1977). Pointing out that the role of success or failure in determining outer-directedness has usually been investigated indirectly via comparisons of retarded versus nonretarded and institutionalized versus noninstitutionalized populations, MacMillan and Cauffiel used interpolated success or failure with educationally handicapped children of normal intelligence and with normal children. As in the MacMillan and Wright (1974) study, such manipulations were achieved via objective (completion/noncompletion of the task) and subjective (experimenter approval/disapproval) feedback. Also as before, three measures of outer-directedness were used: time on the puzzle assembly and glances at the experimenter, as well as imitation on the Sticker Game.

Although it might be predicted that educationally handicapped subjects would have experienced a good amount of failure, results were not clear-cut, and this time only imitation on the Sticker Game supported this prediction. On the failure manipulation hypothesis, the time to complete and glancing indices were the significant differentiators. The lack of any relationship between the various measures stresses the task-specific nature of the outer-directedness construct.

While methods of measuring it are less than optimal, outer-directedness has been related to other personality traits, e.g. field dependence in normals (Ruble & Nakamura, 1972), and in retardates (Massari & Mansfield, 1973), as well as to teachers' ratings of low expectation of success, low achievement, low self-confidence, lack of independence, high help seeking, and high persistence, all in normal subjects (Ruble & Nakamura, 1973).

In summary, while the concept of outer-directedness has much to offer, adequate means of measuring it are not yet available. Certainly outer-directedness is not restricted to the retarded, and it can be useful in some situations, but probably does inhibit spontaneity and creativity. Effective problem-solving requires use of both external cues and one's own cognitive resources, and frequent glancing away from the task in the attempt to obtain cues to solve the problem at hand should be discouraged. Glancing, in fact, may be an unsuitable index since it could be caused by the search for other things, such as general stimulation or social interaction.

4.5. CONCLUSION

This chapter has reviewed research in three areas of the personality functioning of the retardate. These areas are conceptually related, and have been dominated by the work of Zigler and his colleagues. This research represents a major attempt to tie life experiences of the retarded to personal and motivational outcomes.

From this literature review it would seem that retardates do show greater perseverance under conditions of social reinforcement than normals, and that institutionalization in a relatively depriving environment may augment this effect. Initial "wariness" of strangers in the laboratory setting is supported by greater perseveration of retardates on the second part of the two-part satiation games, in contradiction to the tendency of "nonwary" normal children to evidence fatigue effects on Part 2 even under social reinforcement. Distance measures provide some support for increased wariness on the part of retardates.

Finally, retardates do seem to look to an experimenter for cues in novel problem-solving situations, more frequently than normal children, or to imitate an experimenter's behaviour more often.

It can be noted here that there is some doubt about interpretations placed on findings by Zigler and his colleagues which should be borne in mind in evaluating the work. The interpretations presented are very far-reaching, given the limited empirical basis of the work. Conclusions, while in accord with the data, have not yet been subjected to critical tests. Thus, although this substantial area of research is promising, the work is still in early stages, and whether, for instance, frequent glances to an experimenter do in fact constitute "outer-directedness" or distractibility, the behaviour itself is of importance.

Zigler has used his findings to construct a "developmental" view of retardation which asserts that retardates are not

qualitatively different from normals, and that the performance differences observed are not due to cognitive defects but are due purely to motivational/emotional difficulties. While some types of retardation are not curable, familial retardates, at least, should not be treated as "different" from normals: "....it is not necessary to employ constructs other than those used to account for the behavior of intellectually average individuals in explaining the behavior of the familial retarded" (Zigler & Balla, 1976, p.377). Much of the behavioural deficiency manifested by retardates can be explained through their atypical social histories. Motivational and emotional difficulties, not intrinsic cognitive differences, are seen to be the source of many problems, and the mose useful way to help retardates and utilize their intellectual capacity is, according to Zigler, by tackling these problems: "An increase in knowledge concerning motivational and emotional factors and their ontogenesis holds considerable promise for alleviating much of the social ineffectiveness displayed by that rather sizeable group of persons who function at a relatively low intellectual level" (Zigler & Balla, 1976, p.394).

Limited implications of the research considered in this chapter for the optimal education of the mentally retarded, have been outlined by MacMillan (1971, 1977). The increased social deprivation experienced by retarded children means that certain affectional needs must be satisfied before retarded individuals can cope with problems in a manner similar to normals whose needs have been relatively satisfied.

Research into positive and negative reaction tendencies emphasizes the importance of acceptance and support by the teacher in the initial contact. Teachers should employ intense social reinforcement at the start; we should question the advice often given to beginning teachers that they should be firm at the start of the year or they will lose control; this tactic could "....tip the balance of the child in favor of the defensive negative reaction tendencies" (MacMillan, 1977, p.405). Since wariness of adults is a motivational characteristic which is amenable to short-term manipulation, teachers should be sure to provide some success experiences before going on to more cognitive tasks.

The need for success overlaps with implications from the outer-directedness findings. Outer-directedness may not just be distractibility; it could represent a search for information and may indicate that the task is too difficult. Careful selection of tasks at just the right level of difficulty is needed so that the task is challenging but quite possible.

One way of reducing outer-directedness is to challenge the child's answers (especially if they are correct) in order to teach him to depend on his own solutions; depending on others' solutions can be misleading. The technique of fading may also be useful wherein the teacher provides a substantial number of cues early on so as to enhance success. Later the cues are gradually reduced until the child eventually depends on his own cognitive resources for solving problems. MacMillan (1971) concluded that teachers need to deal with negative emotional-motivational factors before school success for retarded children is possible.

The following chapter moves to a review of experimentation regarding the effects of social reinforcement conducted in the real life setting of the classroom. Both normal and special classrooms are considered.

CHAPTER 5.

THE USE OF SOCIAL REINFORCEMENT FROM THE TEACHER TO PROMOTE WORKING BEHAVIOUR IN STUDENTS

5.1. INTRODUCTION

In recent years there has been a marked increase in the application of behaviour modification techniques to the classroom. Various behaviours have been treated, ranging from arithmetic performance (e.g. Walker & Buckley, 1972a) to disruptive "talking out" (e.g. Hall, Fox, Willard, Goldsmith, Emerson, Owens, Davis & Porcia, 1971) and aggressive assault (e.g. Hamblin & Buckholdt, 1967). These behaviours have been treated by a variety of techniques.

As noted earlier (Chapter 3, Section 3.3), Morris (1980) has commented on the weak and inconsistent effects of social reinforcement in the laboratory setting. Such is certainly not true of social reinforcement employed in natural settings, where powerful reinforcement effects are observed. The classroom studies reported in the present chapter provide ample illustration of the power and effectiveness of social reinforcement from the teacher.

Although the present series of experiments was conducted mainly within sheltered workshops, the considerable literature reported in this chapter is relevant because the techniques and procedures were first demonstrated in the classroom. Studies conducted in sheltered workshop settings are reviewed in Chapter 6.

The systematic use of reinforcement contingencies has been shown to be of help to newly qualified teachers in establishing classroom control without a trial-and-error learning period (Hall et al., 1971). In particular, the use of adult attention has

has been proven a potent manipulator of classroom behaviour (e.g. Hall, Lund & Jackson, 1968) and a highly sought-after reward (e.g. Buys, 1972). Its role in maintaining deviant behaviour has also been established (e.g. Gelfand, Gelfand & Dobson, 1967; Forness, 1970; Becker, Madsen, Arnold & Thomas, 1967).

"Social reinforcement" is generally interpreted to include both verbal and nonverbal reinforcement, although occasionally these aspects are separated (e.g. Clements & Tracy, 1977; Kazdin & Klock, 1973). In this chapter, studies to be reviewed are those employing teacher social reinforcement (either alone or in combination with other techniques) to modify working or work-related behaviour of individuals in the classroom (i.e. either attention or output; and sometimes both). Group contingencies are not reviewed. Other techniques unaccompanied by social reinforcement such as the use of feedback, self-monitoring, tokens, or preferred activities, will not be considered here. Likewise, the use of social reinforcement to modify specific undesired behaviour in children (whether or not these occur in the classroom) which are not directly related to working or output, such as cooperative play and social interaction, are outside the scope of this survey. Only those experiments which report on disruptive behaviour but then specify the results for study behaviour will be included, unless a clear inference is possible from the disruption data. Attempts to modify teachers' attending behaviours will be included only where the effect on student behavious is reported.

That classroom behaviour modification using social reinforcement is successful is evidenced by the variety in type of subject populations treated and comprehensiveness of the programmes. Subject

populations investigated in this context include economically deprived children (Hall, Lund & Jackson, 1968), emotionally disturbed children (Hewett, 1967), underachieving students (Chadwick & Day, 1971), deaf children (Craig & Holland, 1970), retarded students (Birnbrauer, Bijou, Wolf & Kidder, 1965), and conduct problem children (Quay, Werry, McQueen & Sprague, 1966), as well as the many studies using subjects with no described defective characteristics (e.g. Broden, Bruce, Mitchell, Carter & Hall, 1970; Brigham, Finfrock, Breunig & Bushell, 1972; Bushell, Wrobel & Michaelis, 1968).

Some studies have narrowed in on one subject (e.g. Sibley, Abbott & Cooper, 1969); others have looked at small groups (e.g. Hay, Hay & Nelson, 1977, had each teacher select the three students who displayed the most disruptive classroom behaviour), while larger efforts involved entire classes whose behaviour was modified (e.g. Hall *et al.*, 1971). Sometimes the whole class was influenced in several smaller runs (e.g. Thomas, Becker & Armstrong, 1968).

5.2. OVERVIEW OF CHAPTER 5

Firstly, studies using teacher social reinforcement to increase study in the "regular" classroom are surveyed (Section 5.3). The augmentation of attending behaviour through the use of social reinforcement can be achieved in several ways. Some investigators select a particular disruptive behaviour (or define categories of disruptive behaviour) and attempt to decrease these, while giving social reinforcement for low rates or absence. Where the effect on study behaviour is reported or can be clearly inferred, these studies

are included in the present review, along with studies which use social reinforcement to increase appropriate behaviour as well as some method to decrease inappropriate behaviour (Section 5.3.2).

However, the interpretation of the effect of such procedures on study behaviour is not always easy. An example of this sort of difficulty is provided in three experiments reported by Hall et al. (1971, Experiments 1, 2 and 4). The aim of these experiments was to extinguish disruptive behaviour and it is not possible to infer what the result of the procedures was for study behaviour, since the authors did not choose exhaustive behaviour categories. Perhaps the observed decline in disruptive behaviours was associated with an increase in some behaviour other than study.

Also, because of this problem, two separate operations are involved, and it is not possible to determine which one caused the experimental result. The authors state: "Whenever Mike began his assignment without arguing, the Teacher praised him with a positive statement" (p.142). Thus, although ignoring disruptive behaviour was the focus of the study, it is not the absence of disruptive behaviour which received reinforcement, but a sub-category of that remaining area. It is not clear to what extend a reduction in disruptive behaviour affected the reinforced behaviour.

Experiments 3 and 5 in this series are more clear-cut; here the teacher gave approval for low rates of disruptive behaviours, but it cannot be concluded that low rates, as such, mean better attention to work, and so these experiments are not reviewed in the present chapter. Likewise, in Experiment 6, both reward (including praise) for a desired behaviour and response cost for not performing

this behaviour (raising hands to get permission to talk) resulted in a decrease in speaking before getting permission to do so ("talk outs"). Reduction of this behaviour, however, need not be followed by increased study (although this is likely).

Similarly, the experiment by McAllister, Stachowiak, Baer & Conderman (1969), in which praise was given for the absence of one of two specified disruptive behaviours, is omitted from this review. While the absence of a particular disruptive behaviour might constitute appropriate classroom behaviour in some sense, the definition of study/attending is somewhat narrower.

The study of Deitz, Repp and Deitz (1976) using retarded students in public school classrooms provides another illustration of this difficulty. In DRI Experiments 1 and 2, attention was provided for the appropriate performance of academic work as the behaviour incompatible with the undesired behaviour - either sleeping or talking out. When this incompatible response was reinforced, the undesired behaviours did decrease in both instances, but we cannot infer the effect on study behaviour because the subjects could have been involved in some other third behaviour.

Where exhaustive behaviour categories are defined an inference may be possible; for example, if a list of all possible types of disruptive behaviour is provided and the rest is "relevant" behaviour, then a reduction in all forms of disruptive behaviour clearly means that the subject is working more. Thus, for instance, Becker et al. (1967) included in their "inappropriate" list: gross motor behaviours; disruptive noise with objects; disturbing others directly and aggression; orienting responses; blurting out;

commenting and vocal noise; talking; and other: additional behavioural categories were assigned individually for the three target subjects. Relevant behaviour (everything else) is described as time on task. Clearly, a reduction in inappropriate behaviours will have to be accompanied by an increase in relevant behaviour.

This type of behaviour categorization is also used frequently in those attempts which operate directly to increase desired behaviours. This second group of studies will be considered in Section 5.3.3. Hall, Panyan, Rabon and Broden (1968), for instance, provided a lengthy list of nonstudy behaviours, including playing with cards, fighting or poking a classmate, and tapping pencils on books. If not "nonstudy", then the behaviour is called "study". Obviously such a precise list would depend on the type of activities undertaken.

This approach to defining the target behaviour of stressing what the child should not be doing has been soundly criticised (Winett & Winkler, 1972; Winett & Roach, 1973). Harris and Kapche (1978) quoted a view expressed by Lindsley (1971) that "deadman" targets (behaviour that a dead man can do, such as sitting still in a chair) are inappropriate. Kirschenbaum, Stoffen and D'Orta (1978) also lamented the tendency to define by exclusion: "This focus on undesirable behavior may well increase teachers' and therapists' attention to behavioral difficulties rather than directing attention to behavioral competencies" (p.315).

A more direct approach is simply to define classes of appropriate behaviour; for instance, sitting and being appropriately

oriented. Kazdin and Klock (1973), in a special classroom study, defined attentive behaviour in the following way: the child had to be "....sitting in his seat, working on the assignment, and not talking to a neighbour without permission" (p.646). Not all definitions include a negative requirement. Hall, Lund and Jackson (1968) defined behaviour differently for different targets, but by and large orientation toward the appropriate object or person, as well as class participation when required, were the key factors. Similarly, Hay et al. (1977), who had teachers provide reinforcement both for attending and for output, defined "on-task" behaviour as attending to the task assigned by the teacher, writing on worksheets, raising one's hand to ask task-related questions, and looking at the teacher when instructions or task-related information were given to the class.

Direct training in attending behaviour was advocated by Skinner (1968), and many authors have followed this approach since attending is precurrent to learning. Such monitoring does, however, require continuous vigilance on the part of an observer. An alternative approach is to use output as the dependent variable in classroom behaviour modification studies. This obviates the need for continual observation and reinforcement can be provided for increases above, for instance, a baseline mean. Studies which provided social and other reinforcement for output will be considered after those where attending behaviour is the focus (Section 5.4). A third group of studies (reviewed in Section 5.5) provided reinforcement for both attending behaviour and output simultaneously.

Several classroom behaviour modification efforts have taken place in "special" classrooms. These studies are reviewed separately (Section 5.6). Once again, there can be a problem in deciding what constitutes a special classroom. A class of economically deprived students (Hall, Lund & Jackson, 1968), for instance, may well have a lower IQ and exhibit greater frequency of behaviour problems, but would probably not fall into this category. A class of deaf students (Craig & Holland, 1970) on the other hand, although not specified as a special classroom, almost certainly is. Some degree of interpretation is sometimes required in order to make this distinction.

Sometimes children are called "handicapped" but are still placed in a "regular" classroom. In the case of the three subjects used by McKenzie, Egner, Knight, Perelman, Schneider and Garvin (1970), for instance, the problem behaviours were disruptive behaviour, learning difficulties, and inconsistency in completing assignments. The only IQ that is supplied by these authors is that of Subject 1 (104, Stanford Binet). Thus it is concluded that these children do not differ significantly from normal students (despite the "handicap" label), and the relevant data is discussed in the section dealing with regular classrooms (Section 5.3.3).

5.3. TEACHER SOCIAL REINFORCEMENT FOR ATTENDING IN THE NORMAL CLASSROOM

1. Introduction

The systematic use of attention is an important classroom behaviour modification technique. Teacher attention in its various forms, both verbal and nonverbal, if made contingent upon a behaviour, tends to increase the frequency of that behaviour.

Several studies have illustrated that teacher social reinforcement is not given systematically and tends to follow undesirable behaviours (e.g. Madsen, Becker, Thomas, Koser & Plager, 1968; Madsen, Madsen, Saudargas, Hammond & Egan, 1970). Attempts merely to reschedule the same amount of teacher attention as is usually given can lead to improvements. Ward and Baker (1968) showed that increasing teacher attention directed toward task relevant behaviour, but not increasing the overall rate, was most successful. The study by Madsen et al. (1968) illustrated the effect of reprimands in maintaining behaviour: the more often the teacher told students to "sit down", the more often they stood up; only praise for sitting acted to increase sitting behaviour.

Natural rates of teacher approval have been reported in several observational studies. White (1975), for example, reported rates of teacher verbal approval and disapproval in 16 classrooms and found that disapproval was the technique most frequently used after Grades 1 and 2. White noted: "Teachers are not fully utilizing a very important tool of reinforcement, except perhaps at the primary grades" (p.370). Thomas, Presland, Grant and Glynn (1978) obtained similar results.

Teachers vary, too, in the focus of the social reinforcement they provide for girls and boys (Dweck, Davidson, Nelson & Enna, 1978); boys are more likely to receive positive evaluation for the specifically intellectual quality of their performance, whereas girls receive more positive evaluation for conduct or non-intellectual aspects. Also, high-expectation students tend to receive more praise.

A study by Cooper and Baron (1977) related teachers' delivery of praise to teacher expectation ratings of students. When teachers' praising behaviour in the classroom was observed and the number of praises the child received divided by the number of correct academic responses by the student (to control for the fact that high-expectation students would answer more questions correctly), Cooper and Baron found that high-expectation students did receive a greater proportion of praise. The socioeconomic class of students has also been related to frequency of reinforcement (nonverbal) (Friedman, 1976).

Low rates of teacher approval during baseline have been reported in several behaviour modification studies prior to experimental manipulation. Both Cossairt, Hall and Hopkins (1973) and Drabman and Lahey (1974) reported no teacher praise at all during baseline. Disapproval, however, is again at high frequency; for example, Chadwick and Day (1971) recorded 27 disapproving statements per hour (more than double the rate of praise statements for this teacher).

Whether disruptive or on-task behaviour is the focus of a study, topographic definitions of behaviour involve some substantial observational difficulties. Examples of difficulties and techniques

used are drawn from studies employing various sorts of reinforcement in both normal and special classrooms.

Inattentive/disruptive behaviour in the classroom is a major problem (Deno, 1980), and Rubin and Balow (1978) commented that it has become normal for a child to be identified at least once as a behaviour problem during elementary schooling. Methods of observation and documentation of disorderly classroom behaviour include behaviour checklists and rating scales. The use of such instruments, however, can be associated with a significant probability of bias (Foster, Ysseldyke & Reese, 1975; Ysseldyke & Foster, 1978). A preferable alternative is the use of direct observation and recording of behaviour (generally time-samples but occasionally frequency counts), in which the chance of bias is much reduced. Madle, Neisworth and Kurtz (1980), for instance, reported that biasing occurred when observers were told subjects were hyperkinetic and when they used a rating scale to assess hyperactivity. However, time-sampling observations were not biased by such knowledge, whether or not observers had been trained in time-sampling techniques.

By far the great majority of behaviour modification studies in classrooms use human observation together with simple recording through time-samples (although other techniques are possible, e.g., the use of stabilimetric cushions to determine attending levels; Edelson & Sprague, 1974). The assumption in the use of observers is that after a while they become "part of the wallpaper" (Ward, 1976) and do not affect the behaviours being observed. The question of reactivity to observers is an important one and is discussed in Chapter 9, Section 9.3.

The explanations used for the appearance of the non-participant observer vary. Buys (1972) used the rationale that observers were prospective student teachers. Another approach is to minimize their presence by telling them to "fade into the wall" (Becker et al., 1967), or making them wear dark glasses (Craig & Holland, 1970). Coleman and Blampied (1977), in a study of the effects of self-monitoring,tokens and different back-up reinforcers on on-task behaviour of retardates in a special classroom, had the observer hide behind the piano. Sometimes observers are put into the classroom well in advance of the experiment to allow for familiarization (O'Leary & Becker, 1967).

Unfortunately, it seems that not all observers are good at "fading into the background". Kuypers, Becker and O'Leary (1968) in a study of the effectiveness of tokens (unaccompanied by social reinforcement) in an adjustment class, reported that two of their observers were a real source of irritation to the teacher, chewing gum, talking and not being sufficiently surreptitious in making observations. An alternative method is to use the teacher as an observer. This may not be successful, however. Gitler and Gordon (1979) compared data recording from four different sources in the observation of a cerebral palsied child; the nonparticipant observer produced records yielding the greatest amount of material that could be coded, followed by the participating trained teacher and then by videotape recordings. The student teacher produced the least amount of usable data.

When time-sampling is the method used, ten seconds is the usual length of time intervals, although they can be as short as

five seconds (e.g. Broden, Bruce, Mitchell, Carter & Hall, 1970) or as long as twenty seconds (e.g. Ward & Baker, 1968). Sometimes extra time is allowed after the time interval to give the observer time to record his judgement (e.g. Becker et al., 1967, used a 20-second observe, 10-second record scheme). Generally, the target's behaviour is observed for the full time interval, but there are also instances of momentary time-sampling, where only behaviour at the end of the interval is recorded (an example of true time-sampling recording; Kelly, 1977), for example, Kirby and Shields (1972) who recorded attending while delivering reinforcement for output. Sessions are usually limited in length to forty minutes or less.

Where more than one subject is to be observed in a session, the observer may focus on one subject and observe for a number of time intervals before moving on to the next (e.g. Walker, Hops & Fiegenbaum, 1976), but it is more common to use a rotation method. The sequence of observations may be fixed or random. Auditory cues are often provided to help observers judge time intervals correctly. Some studies have used a less structured time scheme, for instance by moving on to the next target as soon as a "non-working" or "inappropriate" judgement is made (e.g. Craig & Holland, 1970), or by having observers sweep right across the array of targets in their own time every so often (e.g. Scott & Bushell, 1974).

When the whole of the time interval is used for behaviour ratings, criteria for a positive record vary. Lobitz and Burns (1977) and Marlowe,Madsen, Bowen, Reardon and Logue (1978) required subjects to manifest appropriate behaviour for the entire time

interval, as do many other investigators. In contrast, if one of the subjects in a study by Peters, Cox and Bijou (1971) did any attending during a 20-second interval he was regarded as "working". Sometimes small concessions are made, especially to "orienting" responses of limited duration (e.g. Becker et al., 1967; Madsen, Becker & Thomas, 1968).

2. Studies using reinforcement for attending in conjunction with techniques to decrease undesired behaviours

Withdrawal of teacher attention contingent upon the occurrence of an undesired behaviour tends to decrease the frequency of that behaviour. Withdrawal of attention is referred to as ignoring and is equivalent to an extinction condition. Ignoring inappropriate behaviour and praising appropriate behaviour are generally used in combination.

(a) Social reinforcement for desired behaviour plus extinction

Extinction combined with social reinforcement for either low rates of a disruptive behaviour or the performance of an incompatible behaviour often results in a change in attending/study behaviour.

Teacher social reinforcement for attending behaviour led to a decrease in activity changes in a hyperactive child in an experiment reported by Allen, Henke, Harris, Baer and Reynolds (1967). An observer recorded the subject's attending behaviour during 10-second time-samples, defined (unusually) as being engaged in one activity, including playing with a single type of material, such as blocks or paints, or being in a single location.

During the first treatment phase, the teacher gave social reinforcement when attending behaviour had been emitted for one unbroken minute (the observer cued the teacher when criterion for reinforcement had been met). Reinforcement was then maintained until the subject changed activities; then reinforcement ceased until one further minute of attending behaviour had been emitted. After a reversal (noncontingent attention) the reinforcement technique was reinstated, except that now the subject had to emit two minutes of unbroken "attending behaviour".

Allen et al. (1967) found that the number of activity changes decreased under the treatment procedure. We can assume that under this definition, therefore, attending behaviour increased. During the reversal teacher attention dropped to a lower level and the number of activity changes rose to near baseline levels. The authors concluded that: "....attending behavior is teachable in the sense that it can be shaped and maintained by teachers" (p.235).

Becker et al. (1967) reported the use of teacher attention in modifying behaviour problems in an elementary classroom, using 10 "deviant children" (problem children selected by teachers) in five classrooms. A comprehensive list of behaviours incompatible with learning, as well as a list of problem behaviours specific to some of the children, were devised and observers monitored the disruptive behaviour of each target child for 20 minutes each day. Observations were made during 20-second time-samples (all categories of behaviour which occurred were recorded) and the independent variable, then, was percentage of time intervals during which deviant behaviour was observed to occur.

During the experimental phase (an impressive nine weeks in length) teachers were instructed to ignore the specified deviant behaviours and to give praise and attention for "....behaviors which facilitate learning" (p.292). Such praise was to specify the praised behaviour and was to be varied and expressive.

The results indicated that such procedures caused a significant decline in deviant behaviour in comparison with the rather high baseline rate of 62.13%, although one hyperactive child did not show much improvement even when tokens (points) exchangeable for a variety of treats were introduced. The inability of another child to profit much from differential social reinforcement was alleviated by the introduction of tutoring sessions in reading; it appeared that this child had difficulties in performing the required behaviour and social reinforcement was not helping him to learn. Very low levels of deviant behaviour were observed when this situation was rectified.

This early study showed quite clearly that differential teacher attention could modify deviant behaviour and thereby cause an increase in relevant classroom behaviours, and the authors concluded that just ignoring disruptive behaviour is not useful: "The combination of ignoring deviant behavior and reinforcing an incompatible behavior seems critical" (p.307).

Madsen, Becker and Thomas (1968) followed up the concept of ignoral for inappropriate behaviour, introducing sequentially "rules" (specification of explicit rules of required classroom conduct), ignoral, and approval for appropriate behaviour. Separation of these two components (ignoral and praise) is unusual. Behaviour

categorization was similar to that used in the study above; a list of inappropriate behaviours (including gross motor, object noise, and verbalization) was completed, and everything else was "appropriate behaviour". The behaviour of the target children (two disruptive children in each of two classes) was observed by observers for 20 minutes per day using 10-second time-samples. To score "appropriate behaviour", the child had to be on-task for the whole 10 seconds, except for brief turning around responses, as noted in Section 5.3.1.

In the experimental phase, the teachers were first asked to specify several times each day rules of classroom behaviour which should be followed. The following phase involved ignoral for inappropriate behaviour, as well as "rules". Finally, approval was given for not manifesting any of the inappropriate behaviours. Praise statements were nonstandardized; nor was any optimal frequency suggested.

This study showed that while specifying rules and ignoring inappropriate behaviours were not useful teacher tactics, the combination of all three produced a significant decline in mean disruptive behaviours and the authors concluded: "Praise for appropriate behaviors was probably the key teacher behavior in achieving effective classroom management" (p.148). Drabman, Jarvie and Archbold (1976) also cautioned against the use of extinction, unaccompanied by other forms of behaviour control.

Ward and Baker (1968) investigated the effect of teacher comments (both negative and positive) on deviant behaviour in four target subjects and four nontreated peers in a first grade classroom.

Deviant behaviours (several categories) or relevant behaviours were rated during 20-second time-samples. During the experimental phase, the teachers were instructed to give immediate attention to task-relevant behaviours and to extinguish deviant behaviours by ignoring them. This procedure caused a significant reduction in deviant behaviours in the experimental subjects, but not in the controls. When signalling to the teacher on the occurrence of task-relevant behaviour was employed, the results were even better (reduction of deviant behaviour to approximately 18%).

O'Leary, Becker, Evans and Saudargas (1969) introduced various control techniques sequentially, investigating teacher praise and token reinforcement as well as rules and ignoring disruptive behaviour, so as to gauge their individual effectiveness. Several categories of disruptive behaviour were outlined, including disruptive noise, turning around,and aggressive behaviour. Observers recorded the disruptive behaviour of subjects (seven second-grade children) during 20-second time-samples.

The first experimental phase involved classroom rules (rules for classroom behaviour written on the blackboard). Next, educational structure was also used (structuring classroom activities). "Praise and ignore" (the teacher was asked to praise appropriate behaviour and to ignore disruptive behaviour "as much as possible" and to discontinue verbal threats; no schedule was suggested) was then used in combination with the previous two techniques. Finally, tokens (points) were also supplied.

The results of this study indicated that the first three techniques applied (rules, structure, and social reinforcement plus ignoring) were minimally effective in reducing disruptive behaviour and increasing appropriate behaviour. The introduction of tokens, however, did lead to significant improvements.

Cormier (1970) investigated contingent and noncontingent teacher social reinforcement with economically disadvantaged adolescents under both the long and short term. This study is also reported by Cormier and Wahler (1971). Subjects' behaviour was classified as either appropriate ("....answering questions orally which are lesson oriented, writing assignments or answering to questions when directed to do so by the teacher, reading a book or head oriented towards a book, hand raised in order to get the teacher's attention during a lesson, and following the teacher's instructions"; Cormier & Wahler, p.3); relevant (if behaviour did not fit into one of the above categories); or inappropriate.

Inappropriate behaviour included gross motor, disruptive noise, orienting responses, and talking or vocal noise, plus "....any other behavior that might be disruptive or incompatible with relevant or appropriate classroom behaviors" (p.4). The labels "relevant" and "appropriate" were reversed in the Cormier (1970) report. Each teacher identified three target adolescents who were either disruptive or not motivated to work; daily observations were made of the behaviour of these three targets as well as of three other nontarget class members; 10-second time-sampling was used by observers.

The first experimental phase following eight days of baseline involved ignoral of inappropriate behaviour. Next, teachers also paid attention to relevant behaviours; social reinforcement was nonstandardized. There was also a noncontingent social reinforcement condition. Each experimental condition lasted for either four or eight days.

Both short and long periods of contingent reinforcement led to increases in relevant behaviour, with the longer condition yielding the highest levels. Both contingent and noncontingent praise were effective and generalized to nontarget subjects. There were no differences between these two nontarget groups. The vicarious reinforcement aspects of this study are taken up again in Chapter 9.

Phillips (1971) quoted a study by Hemnon in which points and praise were delivered for on-task behaviour and ignoral of deviant behaviour, leading to a reduction in such behaviour and hence an increase in on-task behaviour, in comparison with baseline levels. Another study which combined attention for on-task behaviour and extinction for incompatible behaviour reported by Phillips (1971) is that of Paterson. Praise for "correct behaviour" (sitting still, with face forward, eyes on paper and completing the assigned task in a 6-year-old child) and ignoral for anything else, led to an immediate reduction in physical movement and an improvement in work habits.

Broden, Bruce, Mitchell, Carter & Hall (1970) investigated the effects of teacher attention on the appropriate attending behaviour of a target and of an adjacent peer. Although the IQs of the boys were very low (60 and 72), this study is included here

because the school was a "regular" one in an economically deprived area. Both boys were disruptive in class.

Attending behaviours "....included writing if writing had been assigned, looking toward pages in the appropriate book if reading had been assigned, looking toward the teacher if she was talking" (p.200). Nonattending behaviours were also defined by example, including "....other behavior incompatible with attending and assigned tasks" (p.200); an exhaustive behaviour categorization. An observer recorded the behaviour of one boy at the end of each 5-second time-sample for a 30-minute session each day. Teacher verbal attention was also recorded.

During the experimental phases, the teacher was asked to attend to and praise appropriate behaviour whenever a boy was attending appropriately in class, and to ignore all other behaviours. During each experimental phase one boy received social reinforcement and the other did not. Increasing teacher attention above the low baseline levels led to an increase in appropriate behaviours. The peer who did not receive reinforcement also maintained responding at a level above baseline in each case; a clear vicarious reinforcement effect occurred.

Scott and Bushell (1974) examined the effects of the teacher's social contact duration with a target child on the "off-task" behaviour of other children during a small-group teaching period. Scott and Bushell defined on-task behaviour as being in seat, looking directly at the text book or the teacher, with at least one hand on or above the desk. Everything else was considered off-task. The observation technique was different in this study: the observer

looked at all six subjects once every 15 seconds and recorded which subjects were off-task. Teacher-child contact duration during the observation session was also recorded.

During baseline, the average contact lasted 37.7 seconds and subjects spent 46.6% of time off-task. When the teacher was asked to hold the contacts for at least 50 seconds, the mean contact duration rose to 82.6 seconds and off-task behaviour rose also to 68.4%. With a reduction in length of teacher-child contact to 42.4 seconds, off-task behaviour dropped to a mean of 39.4%. Thus prolonging contact is not useful in the stimulating of required behaviour. One wonders how convincing a contact might be if artificially lengthened. The finding is similar to that of Mueller, Light and Reynolds (1971) who also reported a decline in academic performance when contact duration was increased. This approach has not been followed up.

Marlowe et al. (1978) compared behaviour modification and counselling approaches in an attempt to reduce disruptive behaviours ("off-task"). Teacher attention during several experimental phases was classified as either academic approval/disapproval or social approval/disapproval. Two additional categories were: mistake made by the teacher or inappropriate use of one of the above four; and no approval or disapproval observed. The 12 subjects were observed by observers using 10-second time-samples; individuals were categorized as off-task (or on-task). If a subject was off-task during any part of the time-sample, he was not classified as working. Off-task was not explicated at all. Teachers were observed simultaneously with subjects.

The first treatment condition involved counselling. Behavioural counselling was "....behavior modification techniques, such as approval for positive behavior, ignoring inappropriate behavior, and stating specific and measurable goals" (p.56). A second group received client-centred counselling which "....followed client-centred principles, such as development of a warm, friendly relationship, maintenance of respect for the students' ability to solve their own problems and acceptance of the students" (p.56).

In the following phase, teacher attention was introduced in conjunction with the particular form of counselling experienced. Teacher attention was given for following rules, with the teacher stressing rules of classroom conduct each day. While this addition would have been noticeable to those students who had received client-centred counselling, it is hard to see any real way in which it would have altered the behavioural counselling treatment. Following this phase, token reinforcement was also introduced (so that now three techniques were involved): "appropriate classroom behavior" was reinforced with a token (the schedule is not reported). A final experimental phase involved teacher attention and tokens, but no counselling.

While behavioural counselling resulted in a drop in inappropriate behaviour from 54.8% (baseline) to 48%, client-centred counselling was not so successful (59.2% off-task in baseline fell only to 57%). When teacher attention was added for this group, however, off-task behaviour dropped to 29.3%. Surprisingly, for the behaviour counselling group the superimposition of teacher attention led to a dramatic drop in off-task behaviour to 9.9%,

despite the seeming similarities in the treatments. Attention and tokens alone was also highly successful for this group, but was less so for the other one. During return-to-baseline conditions, off-task behaviour rose significantly. Unfortunately, teacher attention alone was not examined. Teacher rates of social approval were low in baseline and at their highest level when tokens were introduced, leading to the suggestion that tokens can be effective in reminding teachers to give approval.

(b) Social Reinforcement for attending plus aversive consequences

Ignoring is not the only effective complement for praise. Sometimes social reinforcement for desired behaviour is combined with some aversive consequence for undesired behaviour. Although social reinforcement for appropriate behaviour and ignoral of undesired behaviour is not really different from straight-out conditioning of desired behaviours, the addition of aversive consequences, including time-out, clearly is.

Thomas, Becker and Armstrong (1968) investigated the control of disruptive classroom behaviour through systematically varying teacher approval and disapproval. Ten children in an elementary classroom were subjects, and observers noted disruptive behaviour, other task behaviour, or relevant behaviour during 10-second time-samples.

Confining teacher interactions to disapproval only produced an increase in disruptive behaviour, and increasing the level of disapproval above that observed during baseline led to a further

increase. The importance of this study lies in the baseline rates of approval. When teacher approval was at its highest levels (between seven and 16 approving statements per 20-minute observation session), disruptive behaviour was at its lowest and relevant behaviour was at high levels (about 90% of time-samples contained some relevant behaviour).

Holmes (1966) described the use of social reinforcement to eliminate problem behaviour in an underachieving disruptive boy. Evaluations of the classroom situation indicated that the subject's disruptive behaviour was being maintained by teacher attention in the form of reprimands. Once differential social reinforcement was applied along with punishment (social isolation) for misbehaviours, the frequency of such behaviours gradually declined until limited to only one or two disruptions each day. However, systematic recording of the subject's behaviour was not carried out and the results are only anecdotal.

Thomas, Nielsen, Kuypers and Becker (1968) compared tutoring and social reinforcement in the elimination of a severe classroom behaviour problem in a disruptive low-achieving child. When the teacher began to praise relevant behaviour (on-task behaviour) and behaviour incompatible with disruptive behaviour (generally academic, pro-social, and rule following responses), and ignore disruptive behaviour (unless that behaviour involved hurting another child, in which case time-out was employed), the rate of disruptive behaviour dropped from the baseline mean of 87.6% (percent of time-sampling intervals in which disruptive behaviour was recorded by observers) to a mean of 69.1%. In another phase, the teacher

was instructed to further increase her rate of social reinforcement. A counting machine was used to remind the teacher to give approval and to provide feedback on her approval levels. This additional help further increased the teacher's approving rate and was accompanied by a further decline in disruptive behaviour to a mean of 51.1%. A subsequent phase involved reinforcement for output and hence is considered in Section 5.4.2.

Wasik, Senn, Welch and Cooper (1969) used teacher attention to increase appropriate classroom behaviours in two "culturally deprived" Negro girls in a demonstration school who showed high rates of disruptive behaviour. Behaviour was recorded by observers as either desirable, inappropriate or unacceptable. The difference between the two latter categories was that inappropriate behaviour was desirable but performed at the wrong time or place, while unacceptable behaviours were never desirable in the classroom. Behaviour was recorded as it occurred, using continuous observation. Teachers' verbal interactions were also recorded (positive, neutral, question re-direction, and negative).

In the experimental phases, the teachers were trained in behaviour modification principles and were instructed in the use of contingent social reinforcement, extinction, and time-out for inappropriate and aggressive/resistive behaviours.

Analysis of the teacher interaction data indicated that teachers did increase their social reinforcement rates when requested and also tended to increase their rates of "neutral" verbalizations. Such increased interaction, accompanied by extinction and time-out, was followed by increases in desirable behaviour in both students.

Thus the treatment was effective in establishing and maintaining appropriate classroom behaviours. Failure to return to baseline levels in a post-modification phase prompted the observation that the subjects were now receiving social reinforcement and warnings from their peers following appropriate and inappropriate behaviour.

Sibley, Abbott and Cooper (1969) recorded both appropriate and inappropriate behaviours and combined extinction for "inappropriate behavior" with social isolation for "unacceptable behavior" and teacher attention for "desirable" classroom behaviour in an economically disadvantaged kindergarten child. All three categories were defined and included several subcategories. Teacher interactions (verbal and nonverbal) were also recorded as neutral, positive, or negative. Subject behaviour was recorded on an event basis; time-sampling was not used.

When social reinforcement for appropriate behaviour was used in conjunction with ignoral for everything else, and time-out either for intolerable (extreme form of unacceptable) or for both inappropriate and unacceptable behaviours, there was an increase of desirable and decrease of inappropriate and unacceptable behaviours.

Kindall (1974) also combined praise for appropriate behaviours with reprimands for disruptive behaviours in a second condition, comparing this approach with the more common extinction and approval. While both approaches were effective, the inclusion of the "soft reprimands" was slightly more effective overall with these students, and also led to faster change. The teacher reported that she felt quite comfortable with either approach.

Walker et al. (1976, Experiment I) employed social and token reinforcement and cost contingency in their attempt to modify classroom behaviour in 10 disruptive school children. Behaviour was coded thus: "appropriate" behaviour included appropriate work, group activity, appropriate vocalization, positive physical contact, appropriate movement: "inappropriate" included inappropriate work (thus representing a stringency not usually employed - most teachers are happy to see any work occurring), not attending, inappropriate vocalization, negative physical contact, and inappropriate movements. Behaviour was recorded by observers during 15-second time intervals; more than one behaviour could be coded per interval.

Subjects were run in an "experimental classroom" in which teachers approximated the rates of praise and disapproval that subjects were used to receiving in their normal classrooms. In the first experimental phase, density of teacher social reinforcement was markedly increased to 30 reinforcements per day, contingent upon appropriate classroom behaviour. Next, tokens were superimposed on the social reinforcement. Then a cost-contingency was also imposed, with subjects losing earned tokens for specific deviant behaviours according to a predefined rate. A final phase saw fading of the tokens, in order to prepare children for the return to the regular classroom.

Increased rate of social reinforcement caused a rise in mean attending behaviour from 47% (baseline) to 59%. The introduction of tokens occasioned a further increase to 78%, and the employment of the cost contingency brought nearly perfect attending (96%). Fading of points had no deleterious effects.

In Experiment II the effects of the combined three techniques were examined over longer periods. Once again there was a great improvement in appropriate behaviour from 38% (baseline) to 96% over 45 days of treatment. The simultaneous application of all three techniques produced an immediate increase in desired behaviour.

3. Social Reinforcement to condition appropriate behaviour

Several studies directly aim to increase desired behaviours through teacher social reinforcement (alone or in combination with some other source of positive reinforcement).

(a) Social Reinforcement used alone

Teacher social reinforcement was the only form of intervention used in a now classic study by Hall, Lund and Jackson (1968), who recorded individual study rates in six pupils with high rates of disruptive or dawdling behaviour. Subject behaviour was recorded by observers during 10-second time-samples. Study behaviour was defined differently for each student, but was defined generally by orientation to the appropriate object or person. The observers usually cued the teacher to give reinforcement when the study behaviour criterion had been reached, but one teacher felt confident about reinforcing appropriate behaviour without cueing and so no signals were provided. Shaping was required for one subject whose initial study rates were too low to merit any reinforcement. During reversal phases, the teacher returned to her former pattern of attending to nonstudy behaviour. In one case, this reversal was cued.

This study showed clearly the effect of teacher social reinforcement in developing desirable classroom behaviour and has stimulated much subsequent research. The stress here is on providing attention systematically for desired behaviours, and such re-scheduling of attention did not interfere with teachers' ongoing duties. Correlated behaviour changes were reported by several of the teachers. Robbie's teacher, for example, reported that after the programme Robbie was better at completing assignments, did better on speech tests, and his disruptive behaviour had diminished. The fact that one teacher, however, had difficulty in carrying out the procedures indicates that more training may have been required.

Carnine, Becker, Thomas, Poe and Plager (1968) had the teacher praise three targets for on-task behaviour and not praise three other children. During the experimental phase, the direct reinforcement subjects increased their rate of on-task behaviour from 18.5% (baseline) to 59.2%. No vicarious reinforcement effects were observed. When the peers received direct reinforcement instead, they also improved in on-task behaviour, while the other subjects showed some decline, but did not return to baseline.

Coleman (1970a) investigated candy and feedback as reinforcers in an attempt to condition working behaviour in four "problem" children in an elementary school classroom. Teacher praise was used as a fading technique after the experiment proper. Behaviour recorded by observers during 10-second time-samples was talking aloud, out of seat, and working. Although these categories are not exhaustive the results are admissible here since working (defined as "looking at a book and/or writing, drawing, coloring, but

not doodling") was recorded. There were two experimental conditions. In CN1 working behaviour was rewarded with an audible "click" on a Variable Interval 10-second schedule. In CN2, the click was not used, but the subjects were told the experimenter would be keeping score. In both conditions the tangible reinforcement of candy was presented at the end of the session contingent on working behaviour and this candy was to be shared amongst other class members. Working behaviour as defined above increased significantly above baseline levels in all four subjects.

After control had been established, teacher praise was used to transfer control from the experimenter to the teacher. A timer flashed on a Variable Interval 3-minute schedule and on flashing the teacher was instructed to look at subjects and praise them if working. There was apparently some difficulty with this procedure: "Only one teacher was able consistently to follow instructions in terms of when and how to administer verbal praise" (p.297). It seems that teachers wanted to praise achievement rather than good behaviour. Data on this phase are not presented since the evidence was "insufficient " to determine whether the reinforcement was "an effective controller of student behavior" (an unusual reason for not reporting results). The difficulty these teachers had in praising behaviour rather than output has not been remarked upon by other investigators.

Presentation of teacher attention was the only source of reinforcement employed by Schutte and Hopkins (1970) in their study of children's instruction-following behaviour in a kindergarten

class. An observer recorded the frequency with which five target subjects followed 10 instructions provided by the teacher, such as "sit down", "fold your paper", and "be quiet". If subjects complied with the instruction within 15 seconds, they scored an "X". Instructions were presented every two minutes during 20 20-minute daily sessions.

During the treatment phases, the teacher praised every student who did comply; reinforcement was nonstandardized. Teachers were not cued by the observer. The delivery of such reinforcement was most effective in increasing the desired behaviour of instruction-following and the mean percentage of instructions followed increased from an initial baseline of 60% to a treatment mean of 81%.

McKenzie et al. (1970) described a programme designed to train student teachers in behaviour modification techniques to enable them to assist trainee teachers teaching "handicapped" children. As noted above (Section 5.2) these subjects do not really constitute a handicapped group as they were still in the normal classroom and their problems were not different from those generally encountered in the normal classroom; disruption and failure to complete assignments.

In this study, following baseline recordings of two disruptive behaviours (speaking without being called and being out of seat without permission), Subject 1 was treated by ignoral and teacher attention for the inverse of these two behaviours. Important for this review is the second phase of treatment in which the teacher monitored attending behaviour ("....facing instructional materials,

teacher, blackboard, instructional devices, or a reciting pupil - whichever was appropriate", p.139). The subject's behaviour at the expiration of each three minutes was scored. Attending behaviour was significantly increased by the teacher's supplying a greater frequency of social reinforcement for appropriate attention.

A third phase involved feedback for output (percentage of correct responses per day), but no stated social reinforcement. These treatment programmes were asserted by the subject's mother to have had a beneficial effect on the subject's attitude toward school and his homework. The teacher also reported a change for the better. The other relevant case studies reported by McKenzie et al. (1970) involved reinforcement for output and hence will be considered in Section 5.4.3.

Struble (1973) conditioned in-seat and ready-to-work behaviour, defined as all students "....in their seats, quiet, and with appropriate materials on their desks" (p.34), in a fourth-grade class. The dependent variable was the time taken from the moment the first child walked through the door each session until the last child was seated and had appropriate work out on his desk. During the experimental phase, the teacher told the class they would be timed, and provided praise to individual students who quickly got ready to work. After the first experimental session, a specific criterion for reinforcement was set; students had to be seated in less than 120 seconds to receive praise. Later, this criterion was reduced to 70 seconds. A subsequent modification also required students to be quiet, as well as seated and ready to work.

The baseline mean time to be ready to work reduced substantially under the reinforcement procedures. Resistance to extinction was low, however. Struble (1971) commented: "This study illustrates the ease with which minor problems of classroom order and discipline can be solved in a way that is inexpensive and pleasant for all concerned" (p.39).

Buys (1972) introduced the notion of public and private evaluative feedback in an examination of changes in attitude which accompany social reinforcement delivery. The behaviour of a "problem" target child and nine controls in three third-grade classrooms was observed by observers introduced as prospective student teachers. The categories of child classroom behaviour were disruptive verbal noise, disruptive nonverbal acts, aggressive physical acts, nonattending, disruptive noise, appropriate talking, appropriate studying, and appropriate attending; a full list of possible behaviours.

Teacher verbal reinforcements were recorded as well, after the three teachers had received two hours of training and discussion about the delivery of public and private reinforcement. The exact reinforcing phrases were not specified, except that the praise was not to be "qualified", i.e. it was not to be aimed at trying to "....exact or encourage continued social behavior" (p.280)

During the experimental phase, teachers were instructed to deliver to each target subject one to three public reinforcements (i.e. in front of the whole class), and one to three private reinforcements for appropriate behaviour. These techniques effectively reduced deviant behaviour in target subjects but not

in controls, although a transitory vicarious reinforcement effect was observed. The author noted: "For children who display deviant behaviors in a classroom situation, it appears that public and private verbal praise from the teacher is a highly sought-after reward" (p.281), although it is allowed that some children may be unreceptive to teacher praise.

Of tangential interest to this survey is the finding that the target children experienced significant attitude changes (not all for the better) on three scales. They perceived their teachers as liking them more; the showed a positive change in attitude toward their teacher; and they evaluated being good in class in a more negative manner. A concluding comment from Buys (1972) underlines the effects on morale that even modest amounts of social reinforcement can have. The problem children in this study were most receptive to teacher praise: "Most were nearly overwhelmed with joy" (p.287).

Cossairt et al. (1973) investigated the effects of instructions from an experimenter, feedback, and praise on teacher praise, as well as on student attending behaviour. Student attending was defined as head and eyes oriented toward the teacher for the duration of instruction; disruptive behaviours were any behaviours that interfered or competed with work on the assigned lesson or with attending to the teacher during instruction. Recordings were made only during the teacher's specific instructions, and four target subjects in each class were observed singly during any such brief instructional period. Teacher behaviour was recorded in the minute following the instruction periods; statements praising attending

behaviour and verbal attention for nonattending were recorded, as well as no verbal comment.

The different experimental phases involved different treatment for the teachers. During "Instructions", teachers were told of the benefits of contingent attention and given instructions to praise attending students. During the Feedback condition, teachers were given verbal feedback at the end of each session with respect to the praise levels. In a final condition, the experimenter also gave teachers social praise for their praising behaviour.

The results of particular interest to this survey are the effect of increased teacher attention on student working behaviour. The feedback plus social reinforcement from the experimenter condition was highly effective in producing increased praise to students; other conditions had virtually no effect. It was in this condition that student attending behaviour increased to very high levels (between 80 and 100%), in comparison with low baseline attending of about 30%.

Klein and Mechelli (1973) compared three reinforcement techniques in an effort to increase the on-task and task completion behaviours of a first-grade child. The chance of working in a carrell plus attention from the teacher for on-task behaviour acted to increase significantly on-task behaviour levels but did not affect the rate of task completion. A contingency contract (with teacher attention held constant) affected rate of task completion but not on-task behaviour.

Green (1974, Experiment 1) manipulated teacher attending/ praising behaviour via cueing. Six students' behaviour was

classified as either on-task or one or more categories of off-task. When teachers were cued to issue approval, students' on-task behaviour increased significantly above baseline levels and above conventional non-cued delivery. In Experiment 2, a feedback condition to teachers involved telling teachers when they had correctly responded to cues to reinforcement. This further improved student on-task behaviour.

Serbin, Geller and Geller (1977) used teacher social reinforcement to investigate the relationship between visual attending in the classroom and achievement in a disadvantaged pre-school population of 16 pre-school students. The behaviour of subjects was monitored by observers; attending behaviour during teacher's telling of stories was defined as eyes oriented towards the teacher and/or teaching materials (the teacher was holding pictures in front of her chest) for a full 5-second interval. Five-second time-samples were used. Recall of story material was also monitored. During the treatment phase, contingent social reinforcement was delivered to each child twice during each session.

Mean attending rates during the first experimental phase rose to 70% from a baseline mean of 63%. Control subjects (who received no teacher reinforcement) actually declined in attending. Recall also increased for the reinforced groups while control subjects again showed a decline, demonstrating a relationship between attending and achievement.

A study by Darch and Thorpe (1977) investigated attention from the principal contingent upon on-task performance in a

disruptive fourth-grade class. It is the baseline phases which are of particular interest. During these phases, the teacher was instructed to praise appropriate social and academic behaviour and to ignore inappropriate behaviour.

Although no frequency was suggested, the results show that such shaping procedures were not effective in producing on-task behaviour, with baseline attending at about 40%, in comparison with experimental treatment means of 75-80%. Failure to find social reinforcement effective during baseline is probably due to unsystematic application, being in conflict with other experimental findings.

A recent experiment by Marcy (1978) reported the effects of teacher praise on student attention to task as well as academic response rates in a laboratory setting. Three Variable Interval schedules (5 minutes, 1.67 minutes, and 1 minute) were compared with no praise. Attention was gauged via time-sampling, and academic response rate was the number of arithmetic problems correctly answered each 5-minute session. All subjects were instructed to do as many problems as they could possibly do in the observation session. The results showed that Variable Interval 1-minute was the most effective schedule for increasing attending behaviour, but no significant treatment effects for computation rates emerged; instead,all groups showed practice effects.

(b) Studies using Teacher Social Reinforcement to condition appropriate behaviour in combination with other techniques

Several studies have applied teacher social reinforcement concurrently with some other forms of positive reinforcement for desired behaviour. Although reinforcers such as tokens and feedback are unlikely to be unaccompanied by any form of social reinforcement, as noted by Salzberg, Wheeler, Devan and Hopkins (1971), such studies are included here only when social reinforcement is specified. Mandelker, Brigham and Bushell (1970) observed teacher rates of social contacts while delivering contingent or noncontingent tokens and found that under both conditions, the average number of teacher contacts per session per child was significantly higher than that observed under baseline conditions. The contingent delivery of tokens occasioned the highest rate of accompanying contacts, as recorded by an observer.

Hamblin and Buckholdt (1967) reported the use of tokens and social reinforcement for appropriate behaviour in the control of aggression in hyper-aggressive children. Attention level and class cooperation increased while hyperactive behaviour and destructive acts abated.

The question of teacher training was taken up by Hall, Panyan, Rabon and Broden (1968) in another attempt to increase study behaviour in the classrooms of three beginning teachers who were experiencing difficulties in controlling their classes. Observers recorded study/nonstudy behaviour of all children via 10-second time-samples. Nonstudy behaviour categories were provided and

study behaviour "....included writing the assignment, looking in the book, and answering the teacher's questions" (p.316). Teachers' verbal reinforcements were also recorded as positive (approval), or negative (reprimand).

After baseline, the principles of behaviour modification in the classroom were discussed with the teachers, and they were shown the baseline graph. They were instructed to increase rates of social reinforcement for appropriate study (no schedule suggested). Under this condition, mean student working behaviour increased from 47% to 66%. Two additional conditions were invoked, superimposed above increased teacher attention. Teacher 2 introduced a study game (7-Up), as a reinforcer for appropriate working. Teacher 3 employed response cost for disruptive behaviour (time deducted from the five-minute between-period break). Further increases ensued. The authors pointed out that the training procedures for these teachers were minimal and that such techniques could be a valuable aid to beginning teachers who have not yet learned the practical fundamentals of classroom control.

Bushell, Wrobel and Michaelis (1968) combined social and token reinforcement delivery in an investigation of the contingency of the reinforcement presentation. The subjects were 12 children enrolled in a summer school with no evidence of hyperactivity or previous disruptiveness. Four observers recorded study and nonstudy; the list of examples provided for each category indicates that some degree of subjective judgement would probably have been required on the part of the observers.

There was no baseline phase as such. All phases involved token and social reinforcement delivery contingent upon appropriate behaviour and in the first phase, tokens could be traded in for a "special event". Then, participation in the special event was made noncontingent but tokens and social reinforcement were still given. A third phase saw the return to the earlier contingency.

When the special event was not contingent upon token exchange, percent of study behaviour observed declined from 67% to 42%. Restoring the contingency led to a return to earlier levels. It is obviously not possible to gauge the contribution that teacher social reinforcement made in this study, but the authors do comment that relying solely on verbal praise and attention as reinforcers is difficult because constant monitoring of subjects' responding is necessary. Surely correct contingent token delivery as used here should be no different in this regard.

An early effort to condition attending behaviour in an underachieving boy was that of Walker and Buckley (1968) who used an auditory click to indicate to the teacher that the attending criterion had been reached and the subject should be rewarded with a point (160 points exchangeable for a model later on). Each reinforcement was accompanied by "....the administration of attention, praise and social approval from the teacher" (p.249). Behaviour was monitored by observers who recorded attending behaviour (looking at the assigned page, working problems and recording responses) and nonattending behaviours (those behaviours incompatible with task-related behaviour) using 10-second time-sampling. The criterial amount of attending required for reinforcement was an increasing

one (although the total amount of reinforcement delivered remained the same).

Walker and Buckley (1968) reported that such procedures did act to decrease the frequency and duration of nonattending in the subject; but once the reinforcement contingency was removed, duration of nonattending behaviour rose to a level in excess of that recorded during baseline. It should, however, be noted that this conditioning study took place outside of the subject's classroom, in another room.

Broden, Hall and Mitts (1971) combined teacher social reinforcement with self-monitoring in an attempt to increase the study behaviour of an eighth-grade girl (Experiment I). Both "study" and "nonstudy" were defined. "Study" was defined as attending appropriately to task and involved facing the teacher, writing down notes, facing a child who was responding to a teacher question, or reciting when called upon by the teacher. "Nonstudy" was equally detailed. These two categories probably are exhaustive. The observer recorded the subject's behaviour at the end of 10-second time-samples, and also recorded teacher attention.

The first experimental phase involved self-recording; the target was asked to record her study behaviour when she thought of it during history class each day; discussions clarified the nature of study behaviour. After baseline and a repetition of this phase, teacher social reinforcement was added to self-recording. The teacher was asked to attend to the subject "whenever he could" (noncontingent social reinforcement) and also to praise her for study whenever possible. Next, teacher praise only was in force.

Self-recording and praise together constituted the most effective tactic, but either praise or self-recording alone was not effective. Performance in the final baseline remained at an acceptable level for five days. The recording of teacher behaviour during all phases points to the difficulty in ensuring that social reinforcement is not present when other treatments are being evaluated. Teacher attention was at a high level on some days during the "self-recording alone" experimental phase.

Glynn (1972) described systematic application of social and token reinforcement in six "problem" and six nondisruptive children in a normal classroom. On-task behaviour involved looking at the teacher or the blackboard, taking part in oral discussions as directed, or writing. Any other behaviour was considered off-task by the observers. A first treatment phase involved re-scheduling of the teacher's attention to make it contingent upon on-task behaviour. This phase was unsuccessful because subjects' attending levels were so low. In a second phase, re-scheduled attention was accompanied by tokens (points) for being on-task. "Problem" children were more susceptible to this treatment procedure, showing larger increases in on-task behaviour than the nondisruptive children who had less room for improvement due to their initially higher attending levels.

Lobitz and Burns (1977) combined teacher attention with charting, public and private feedback from the teacher about subjects' concentration level, and feedback from the observer in an effort to decrease disruptive behaviour in a disruptive child. Off-task behaviour was defined as any behaviour that competed with

concentration on school work, and examples were given. Everything else was on-task. The observer monitored the behaviour of the target and of his peers via 15-second time-samples; if a student was off-task at any time during the interval, he was not scored as working.

The first manipulation involved the subject and other students indicating how well they had concentrated during a 35-minute session, as well as "How I feel about myself today"; thermometers were coloured in by the children for this purpose. Teacher attention (Phase 3) was fairly bland; at the beginning of each session the teacher told the subject "I am going to pay special attention to how well you are concentrating" and at the end of each session, she asked "How are you doing at concentrating?" The tone of voice used in presentation would obviously dictate the reinforcing potential of these sentences.

Next, a private feedback procedure involved the teacher informing the subject of her continued attention and her rating on a scale as to how well he was concentrating, and the observer also supplied information as to the subject's on-task behaviour. Public feedback involved an announcement from the teacher to the class each five minutes on how she had rated the subject's concentration.

Charting, as used in this study, was not effective in reducing off-task behaviour and thus improving classroom conduct and there was an increase in off-task behaviour during this phase. Teacher attention was quite effective on the first day, but the novelty wore off on day two, and unfortunately this condition did not obtain any longer. Private feedback caused a reduction in peer off-task

behaviour but was not successful with the target. Public feedback was more effective. A difficulty with this study is to decide whether the feedback procedures did also involve social reinforcement. Since the procedure at the beginning of each lesson was rather similar in the "attention" and feedback phases, it is concluded here that some form of limited social reinforcement was in fact in operation in the latter phases.

A more recent manipulation of teacher reinforcing behaviour is that by Lewis and Strain (1978), who compared timing of feedback from the experimenter and motivational content of such feedback on two teachers' delivery of social praise contingent on on-task behaviour in four "behavior problem" children. Student on-task behaviour was rigorously defined as "....in-seat where student is sitting at his desk with buttocks on the chair seat; with visual orientation to task including materials necessary to complete task; with pencil to paper on worksheets; when teacher gives instructions, visual orientation to teacher or related task materials; verbal responses to teacher upon request" (p.425). The observer recorded student on-task behaviour and teacher contingent praise statements during 10-second time-samples.

Following baseline, an immediate feedback condition occurred in which an auditory stimulus signalled to the teacher the delivery of a contingent praise statement to a target. Delayed feedback provided visual information of teacher reinforcement rates at the end of the observation session. A further intervention involved the addition of goal-setting to the above treatment; a goal for a specified rate of teacher attention was set of one praise statement per minute.

The effect of these three procedures on teacher praise is only incidental to present considerations, but what is important is that increasing rates of teacher attention contingent upon study behaviour were associated with increasing rates of student attending behaviour. The final treatment (delayed feedback plus goal-setting) caused an overall mean teacher attention rate of 16.5% (in comparison with the baseline mean of 7%) and an overall mean subject study rate of 83%, a significant increase above the baseline mean study rate of 60%. The authors concluded that the significant increase in students' on-task behaviour during the final experimental phase could act as a reinforcer to the teachers for their praising behaviour.

Sharp (1980) paired tokens and "specific verbal praise" for on-task behaviour in a slow-learning child. On-task behaviour was defined separately for two subject areas. In Language, on-task behaviour was "....writing answers and explanations to several tasks, reading books related to the topic, illustrating answers or work, discussing aspects of the topic with peers or teacher, and actively participating in appropriate activities, e.g. mime, drama" (p.9). On-task behaviour in Mathematics was also detailed.

The reinforcer was provided only in Language periods and the purpose of this study was to see whether gains in on-task behaviour would generalize to Mathematics periods. The provision of reinforcement led to an increase in on-task behaviour from a baseline mean of 12.5% to an experimental phase mean of 65.7%. However, there was virtually no generalization to Mathematics periods where on-task behaviour increased only by 2.5%. Return-to-baseline conditions saw a decline in the improvement, however,

to a level midway between baseline and the experimental phase. The observed improvement was accompanied by an increase in output, too, but only in Language classes.

5.4. TEACHER SOCIAL REINFORCEMENT FOR OUTPUT IN THE NORMAL CLASSROOM

1. Techniques - Overview

Given the problems involved in using topographical definitions of behaviour, it might seem more appropriate to reinforce output directly. However, there are also some problems here. Examples of methods used to overcome such problems are drawn from the general classroom behaviour modification literature.

Progress through a text is often spasmodic and it seems undesirable to keep all children at the same level. Chadwick and Day (1971) went ahead anyway, even though their statistic of rate of work output (number of units completed per session divided by the length of the session in minutes) was obtained over several different types of work. They also recorded accuracy and percent of work time. Brigham, Finfrock, Breunig and Bushell (1972) suggested that progress through a programmed text as the dependent variable would overcome this difficulty. Indirect measures of academic performance such as achievement gains have been used (e.g. Wolf, Giles & Hall, 1968). Sometimes more synthetic tasks are used. Walker and Buckley (1972a)in a study of the effects of feedback, positive reinforcement (points) and response cost on "academic response rate", had students attempt twenty division problems of equal difficulty each session; the dependent variable was number correct.

Salzberg et al. (1971) used number of correctly printed letters produced by their six kindergarten level subjects, while Hopkins, Schutte and Garton (1971) concurrently recorded two different measures; time to complete a spelling assignment (to the nearest fifteen seconds) as well as mean number of errors per unit output. The authors reported that while reinforcement (access to a playroom) did reliably increase speed, three out of twenty-four subjects were obviously sacrificing accuracy for speed and were turning in sub-standard work. An extra contingency was introduced (making more than 80% of the errors made on the last two days meant redoing some of the work) and soon put an end to this.

2. Social Reinforcement Alone to Increase Output

Relatively few studies have employed social reinforcement alone in this context.

Clark and Wahlberg (1969) asked teachers to distribute at least some praise every day. Then some teachers were asked (secretly) to double or triple the amount of praise given, and some were asked to "keep up the good work". Increased frequency of social reinforcement was associated with significantly higher scores on a standardized reading test.

Hasazi and Hasazi (1972) used teacher attention to increase the use of digit-reversals in an elementary school child. This subject had a tendency to write digits in reversed order when doing additions. During the experimental phase, the teacher responded to all correct (nonreversed) response forms with a smile, a pat on the back, and a brief comment. This procedure resulted

in a significant increase in correct responding above baseline conditions of feedback for correctness and "extra help" for incorrect responses.

Kincaid and Weizberg (1978) used accuracy alone in their study of teacher social reinforcement for correct answers as a technique to train students to recognise alphabet letters. The subjects, economically disadvantaged preschool children, had earned tokens for a variety of academic behaviours, and had to learn to discriminate the alphabet letters inscribed on the token chips before exchanging them for back-up reinforcers. During the token exchange periods, alphabet letter recognition was gauged by questions and reinforced as described above. Evaluations indicated that students had improved in alphabet recognition, and also that alphabetic labelling had been facilitated, although not explicitly trained.

Woolfolk (1978) investigated nonverbal as well as verbal teacher evaluation in her experimental analogue of classroom interactions. Four teachers presented each of four possible evaluative combinations: verbally and nonverbally positive; verbally positive and nonverbally negative; verbally negative and nonverbally positive; and verbally and nonverbally negative. The subjects were sixth grade students whose task was to use words in interesting and original sentences. After each 2-minute session the teacher evaluated each student's performance using the various combinations described above. The dependent measure was the number of sentences written by each subject in eight 2-minute sentence writing periods.

Woolfolk found that for three of the four teachers, positive verbal statements were associated with greater performance than negative verbal statements. However, for non-verbal behaviour the result was in the opposite direction; students who experienced teacher negative nonverbal behaviour wrote significantly more sentences than those in the positive non-verbal conditions. The optimal combination for producing more sentences was the positive verbal/negative nonverbal evaluation, suggesting, according to Woolfolk, the operationalization of the "firm but fair teacher". The opposite combination was the least effective: perhaps this condition evoked the "timid, anxious, fearful, not confident, or unassertive" teacher who is not to be taken seriously. There was little difference in effectiveness between the two conditions in which verbal and nonverbal components were in keeping with each other.

Social reinforcement from the teacher is not always successful in encouraging output. Hall, Cristler, Cranston and Tucker (1970) reported incidentally the failure of one teacher to increase quiz performance in high school students of French through "....contingent verbal praise.... as well as writing 'good' or other remarks (in French) on their test papers" (p.250). This teacher also used social reinforcement to reinforce correct oral responses. Such an approach had been unsuccessful and further behaviour modification techniques were sought. As in the Darch and Thorpe (1977) study reported in Section 5.3.3. above, application was probably unsystematic in the baseline phase.

Further validation of the effect of social reinforcement on output in the classroom comes from observational studies within

the general educational research literature. Here, analyses of teacher-child interactions in a broad sense catalogue the whole range of teacher behaviour in various ways, but often include teacher praise. The aim of such observation is generally to relate various classroom interaction styles to children's achievement. It should be noted that "achievement" is often defined quite differently from definitions used in the approaches outlined above; output is usually represented by some overall ability factor as measured by achievement tests.

Some studies have found that positive verbal evaluation from the teacher is related to student achievement. Wright and Nuthall (1970) analysed teacher behaviour in several categories, of which one, teacher reaction to pupil response, contained a sub-section "thanks and praise". It was this variable which showed the highest relationship with student achievement as measured by scores on a test related to material covered in lessons. The authors found that "....saying 'good' and thanking the pupil were most clearly related to achievement" (p.487). Unfortunately, approval and thanking were not separated. This finding was in accordance with an earlier report by Rosenshine (cited in Wright & Nuthall, 1970), in which once again teacher use of approval and criticism were significantly related to pupil achievement.

An observational study by Cantrell, Stenner and Katzenmeyer (1977) sought to specify teacher correlates of student achievement. Classroom observations of teacher verbalizations, target child responses, and consequences were made using 10-second time-samples for 30 minutes, twice monthly for one year. Student achievement

was measured via a variety of intelligence and achievement tests.

Cantrell et al. reported that those first-grade teachers with substantial knowledge of behavioural principles were more verbally positive with their classes and produced significantly more achievement gains for low (IQ range, 50-89) and middle (IQ range, 90-104) pupils than did teachers who were not knowledgeable. The effective teacher of children in these IQ ranges was, as well as knowledgeable regarding behaviour theory, also more positive, supportive and comfortable with pupils than authoritarian (using the Minnesota Teacher Attitude Inventory; Cook, Leeds & Callis, 1951). In addition, and of interest to this review, the effective teacher was more likely to "....use a higher rate of praise or encouragement statements while still being moderately directive in the classroom" (p.178).

3. Social Reinforcement Applied in Conjunction with Other Control Techniques for Output

A later experimental phase employed in the study by Thomas, Nielsen, Kuypers and Becker (1968) involved provision of points and social reinforcement for output (correct responses) during a remedial tutoring programme. The effect on output is not reported, but the procedure was most effective in altering disruptive behaviour, leading to a decline in such behaviour well below the baseline mean of 87.6% to a low 33.4% in this previously disruptive student.

McKenzie et al. (1970) reported a case study where teacher attention (along with feedback) was provided contingent upon output.

Since the feedback was quite specific (the teacher gave the subject a bar graph which showed number of correct answers and told the subject to colour it in), this experiment is considered here to represent a "joint approach".

The dependent variable was the number of correctly solved addition problems on a worksheet during a 2-minute session containing 50 simple problems. During the experimental phase, the teacher gave the subject (a "learning disability" child) the bar graph of his results every day; teacher praise was given only for days in which performance was better than the previous day (i.e. only one praise statement each session). These procedures did not lead to increased responding.

Next, the teacher gave the subject the bar graph to colour in only if the number done was equal to or more than the previous day's output; teacher praise occurred as before. This added contingency was sufficient to improve output, and mean number of correct responses per session rose from 24 in the previous phase to 42. An additional benefit was the subject's increased interest in arithmetic at home, as reported by his parents.

Brigham et al. (1972) chose performance rate on a programmed text as the dependent variable in their investigation of the effects of tokens plus praise (either contingently or noncontingently delivered) on output in six kindergarten children. The task involved a self-paced handwriting programme. At the start of each day, the children were given the day's material in a packet containing eight sheets of symbols to trace. Each sheet was graded at the end of the daily session, and children had to

complete at least one sheet at 80% accuracy in order to advance to the next step (next session). Grading was checked for reliability.

During contingent token delivery, tokens were given by the teacher for "correct" responses as they worked. The teacher was asked to monitor behaviour and to deliver a token, accompanied by praise, for every fourth or fifth response that met the appropriate criterion. Correct responses were ticked as well. A "row" contingency was imposed later, whereby the teacher checked performance row by row, and if three out of five responses on a row were correct, one token was given. If all responses were correct, two tokens were given. Again, each token delivery was accompanied by "....some form of praise for the child's good work, e.g. 'That's very good writing, Sallie. See if you can do the next two just as well' " (p.180).

In the noncontingent token delivery phase, each child was given 10 tokens at the beginning of each session, but praise continued on a contingent basis, in that the teacher was asked to "....praise all the children equally for their attention and correct responding during the session" (p.180). No doubt the contingency of social reinforcement delivery was somewhat looser in this phase.

Mean percent accuracy under the contingent treatments varied from the baseline level. However, noncontingent token delivery caused accuracy rates lower than baseline levels, although when overall (correct and incorrect) responses were analysed, it appeared that children had nearly doubled their output rates under noncontingent token delivery. Hence "contingent" social

reinforcement did not act to maintain high-level accuracy in this study.

Output was also the target behaviour in a study by Kirby and Shields (1972). The subject was a seventh grade student whose attending behaviour and arithmetic marks were both poor. The dependent variable was number of correct arithmetic problems solved per minute during a 20-minute session. An observer also monitored the subject's attending behaviour, recording behaviour at the expiration of every tenth second. Attending behaviour was defined by example; all else was classed "nonattending".

The treatments involved an adjusting Fixed Ratio schedule of teacher praise and correctness feedback. Initially, praise and feedback was given for two problems completed, then the criterion increased to four, eight, and finally, 16. It should be noted that it was the experimenter, not the teacher, who supplied the reinforcement, but this experiment is included here because it was conducted in the classroom. During a reversal phase, feedback was given only at the end of the session and was unaccompanied by praise.

Kirby and Shields (1972) found that the treatment was successful in improving output in this subject; mean output rose from 0.47 per minute (baseline) to 1.36 per minute under reinforcement. Collateral changes in attending behaviour also occurred. Introduction of the reversal phase was not associated with a decline to baseline levels in either variable.

Hughes (1973, Experiment III) used teacher reaction as the reinforcer in a study of student participation and achievement.

Teacher reaction involved frequent praise for correct answers upon questioning during a lesson as well as support after incorrect answers and mild reproof "when the situation warranted it". Students who received this treatment were compared with others in a nonreaction group who received feedback only ("minimal teacher reaction").

The dependent variable was increase in knowledge of the lesson material; residual achievement scores were calculated for each student by subtracting predicted scores (calculated from the regression of several pre-test measures) from obtained post-test scores. The results of this experiment showed that teacher reactions did facilitate achievement. Hughes concluded: "....it appears that teachers should increase their use of appropriate positive reactions and decrease the use of the minimal reactions which they commonly employ...." (p.36).

Garcia, Almaguer, Sánchez, Martinez, Lambréton and Lambréton (1974) used social reinforcement in conjunction with feedback as well as both techniques separately to maintain arithmetic response rate previously obtained using a token economy. The subjects were five elementary school children classified as slow learners by their teachers. For three of the five subjects, verbal praise, in particular, was associated with increased arithmetic efficiency, while one subject did not show any such relationship. A fifth subject showed practice effects only.

Taffel, O'Leary and Armel (1974, Experiment 1) compared the effects of reasons for doing arithmetic, praise, and both together

on the maintenance of arithmetic performance. The subjects were second grade children. All were required to work through a booklet of arithmetic problems and were told they could work as long as they wished; all subjects were terminated after 45 minutes if they had not stopped voluntarily. Although this study was conducted in an experimental room, the task was very similar to those employed in classroom settings.

One group was given four reasons for doing arithmetic during an initial 5-minute period, including, e.g. "It's important to learn arithmetic so that you will know how much change you should get back when you buy something at the store. That way you won't get cheated" (p.293). A second group received nonstandardized social reinforcement at 1-minute intervals during the session as well as praise in the initial five minutes. Praise and reasons together were given to a third group of subjects. Control subjects performed with neither praise nor reasons. The dependent variables were time spent on the arithmetic problems and number correctly completed.

The authors reported that each of the three experimental conditions was similarly effective in producing longer performances than the control condition, but there was no experimental effect for number of problems completed correctly.

In Experiment 2, the initial 5-minute instruction period was altered for the experimental subjects (the combination group was omitted in this experiment). Praise or reasons were given following completion of each of four sheets of five easy problems, not at 1-minute intervals. Another difference involved the experimenter leaving the room (in Experiment 1 he had merely worked

at his desk). Dependent variables were the same as before.

This time both praise and reasons gave higher output scores than the control condition (with reasoning being superior to praise). On the length of working data, praise did not lead to a significantly longer working time than the control condition, while reasoning did lead to greater persistence.

Check marks for correct responses (exchangeable for free time activities) response cost, or a mixture of the two, were superimposed above a baseline condition, including social reinforcement for correctly worked problems and valueless check marks, in the study by Broughton and Lahey (1978). The aim of the study was to investigate the effects of such procedures on levels of on-task behaviour as well as on rates of correct responses. Subjects were 33 pupils in remedial mathematics classes who worked on a subtraction worksheet of 20 problems for 10 minutes at the start of each daily lesson. Thereafter there was a 25-minute instruction period, and the final 10 minutes were available for preferred activities.

The collateral measure of effectiveness (percentage of on-task behaviour) was assessed by observers using 5-second time-samples, and behaviour was rated at the moment of the beginning of the time-sample as either on- or off-task. On-task behaviour meant the pupil was at his desk, writing on or looking at this paper, counting to himself or talking with the teacher. Off-task behaviour included being away from the desk, talking to peers, calling out, working on unscheduled activities, looking at another's work, sitting without working, or hitting, poking or pushing another pupil or his materials. Teacher behaviour was rated at the same

instant as either not interacting with any pupil, providing attention or answering a question (recorded as one category), or providing negative attention.

During baseline the teacher was instructed to circulate around the room and place check marks by correctly worked problems as well as crossing incorrect problems. She was also required to "....respond to correctly worked problems with a positive comment such as 'good' or 'right' and make no comment concerning incorrect responses" (p.129). Off-task behaviour was to be ignored.

The first experimental group received "positive reinforcement": the teacher continued to provide social reinforcement as before, but now the check marks were each worth one point, and subjects were told that the activities available during the free time at the end of each session would depend on the number of points they earned during the 10-minute work session. Treatment for a second group involved the loss of points for each incorrect problem; children were given 20 points at the start of each session. Social reinforcement continued as before. A third group received a mixed contingency in which children earned points for correct responses and lost them for incorrect ones. Finally, there was also a control group (no additional reinforcement).

Broughton and Lahey (1978) reported that the main dependent variable, percent correct, increased significantly for all groups including the control group. Neither was there any decline when baseline conditions were reinstated. There was no significant difference between the experimental groups during the treatment phase and all three groups were superior to the control group.

However, the 'on-task' data revealed somewhat different patterns. Only the experimental groups showed an increase during the treatment phase, whereas the control group actually declined in on-task behaviour. The improved behaviour showed by the three treatment groups was maintained in the return-to-baseline phase.

5.5. TEACHER SOCIAL REINFORCEMENT FOR BOTH OUTPUT AND ATTENTION IN THE NORMAL CLASSROOM

Sometimes reinforcement is given consequent upon appropriate behaviour and increased performance concurrently.

VarnaGaris and Becker (1969) compared extra tutoring sessions, points for completion of assigned work, and instructions to teachers in increasing their praise rate on pupils' on-task behaviour in second-grade children. While tutoring alone produced only a minor improvement in on-task behaviour and only for one of the five subjects, and points produced improvements for only two subjects, increased rates of teacher social reinforcement (presumably for both output and attention, although this is not specified) led to large declines in off-task behaviour and increases in desired on-task behaviour in three subjects and moderate increases in the other two. There was an indication that one of the two teachers observed had some difficulty in increasing her level of social reinforcement, shadowing the comment made by Hall, Lund and Jackson (1968).

Social reinforcement was combined with points in a study by Chadwick and Day (1971) in which there were two output measures: number of problems solved or units of work completed, and accuracy (percent correct answers over different subject areas). Percent

of work time was also recorded. The 25 target subjects were under-achieving students participating in a full-time summer education programme.

During baseline the teacher and aides were instructed to respond to the children "....as they saw fit, using the 'normal classroom' as a model" (p.312), including praise, disapproval, threats, removal, and physical punishment. The treatment programme initially involved contingent social attention from the teacher and aides, given in conjunction with points exchangeable for food for lunch, items from the school store, and field trips. The tangible reinforcement for output was given upon assessment of accuracy (most important), and speed and completion (worth less points).

Classroom behaviour was reinforced in the following fashion: getting down to work quickly, and working continuously for 10 to 20 minutes, were each worth 20 points; continuing to work while there was a fight or loud noises nearby gained 10 points; and raising hand for attention and obtaining permission to leave one's desk were worth five points. Since there is no mention of the observer recording such student behaviours, the teacher and aides must have been very observant in this study. Response cost (loss of between 10 and 50 points) followed continued inappropriate behaviour after a warning. Social isolation occurred following two sets of points for continued disruption.

During this phase (Treatment I), social reinforcement was given "systematically" for study behaviour at the same time as points, and disapproval was delivered for misbehaviour. An

observer recorded staff social reinforcement in three classes; approving, disapproving, and instructional (requests, commands, or rules). The method used was a frequency count. During a second experimental phase (Treatment II) the points reinforcement was discontinued and the backup reinforcers given noncontingently as in the baseline phase. Social reinforcement (praise and disapproval) continued.

During Treatment I, there was an increase in staff rate of approval from 13 statements/hour (baseline) to 47, and a decline in disapproving statements from 27 to seven per hour. Instructional behaviour declined greatly too, indicating that there was an overall decline in child-staff interaction of these three types. Percent of work time increased immediately during this "points plus social reinforcement" treatment, indicating that students were spending more of their time actually working (this variable was self-assessed). Number of problems completed per minute also increased during this phase, for all subject areas, and accuracy of problem solving improved too.

Analysis of staff behaviour in Treatment II revealed that approval levels dropped significantly and disapproval rate increased only from seven to nine per hour, while instructional behaviour remained unchanged. Under these conditions of teacher interaction, and with the removal of the points system, the students maintained their high level of accuracy and improved their overall rate of work, but declined in time spent at work, leading Chadwick and Day (1971) to conclude that accuracy and efficiency can be maintained without tangible reward because of the strengthening of the secondary

reinforcing effect of praise due to pairing in Treatment I. Also, the work may have become self-reinforcing. They also suggested that problem children might do better if taken out of their normal classroom and treated in separate settings with interesting subject matter and tangible reinforcers which can later be faded to more symbolic and social reinforcement.

Hewett (1967) described an "engineered classroom" for emotionally disturbed children where a variety of reinforcers including attention and tangible rewards were available for work accomplished and efficiency. Time-out and suspension for the rest of the day were also employed. Although no data are reported, Hewett noted: "Preliminary observations suggest that changes in work efficiency and academic behavior occur quickly" (p.466).

A recent trend in the classroom behaviour modification literature involves the use of parental social reinforcement via teacher-supplied praise notes. Imber, Imber and Rothstein (1979) examined the effect of praise notes on the academic performance of three slow-learning children. The dependent variable was the percentage of correctly completed items. Following baseline, Intervention 1 involved a private conference between teacher and subjects "....to praise the student for behavior that was already appropriate" (p.219) (presumably attending and output), as well as to explain the praise note system which required a criterion of 80% completion of assigned work and the provision of such notes. A second intervention involved teacher-parent contact by telephone as well. The parents' response to the praise note involved praise being delivered as soon as possible, in front of other family members, and hanging the teacher's note in a visible place.

The first intervention is of particular interest to the present review. When teacher social reinforcement was introduced along with the praise note system, mean percent of items correctly completed rose from 46% (baseline) to 75%. The telephone contact led to a further increment. The authors concluded that "....consistent written teacher praise can produce a marked and enduring improvement in academic performance" (p.220).

Hickey, Imber and Ruggiero (1979) extended the study by Imber et al. (1979), showing that interventions used similar to those in the earlier study were accompanied by considerable gains in report card grades, as well as by increased output in the discrete sessions observed.

Some experimenters have applied reinforcement for output and attention sequentially. Hay et al. (1977) compared the efficacy of on-task and behaviour contingencies in five school students. Classroom behaviour was monitored by observers using 10-second time-sampling in which behaviour at the moment of the expiration of the time-sample was recorded as either on-task or off-task. On-task behaviour was defined as attending to the assigned task, including looking at the text, writing on worksheets, raising the hand to ask relevant questions, and looking at the teacher when appropriate. Off-task behaviour was anything else. Two output measures were also recorded; rate (total number of problems attempted as a proportion of number assigned), and accuracy (percentage correct of problems attempted).

The on-task contingency involved reinforcement for appropriate classroom behaviour; the teacher gave stars and praise five times

during each 30-minute session, "....when the student was exhibiting appropriate classroom behavior" (p.434). Praise consisted of one of five standardized statements, presented in random order. During the academic contingency, subjects received reinforcement for any problems correctly completed; once again, praise and a star were delivered five times during the session.

Hay et al. found that reinforcement for on-task behaviour was successful in increasing that behaviour, but that when used as the first treatment condition, academic performance remained unchanged under this contingency. When reinforcement for on-task behaviour followed reinforcement for performance, there was not even a significant increase in on-task behaviour, while improvement in the output measures was maintained. However, reinforcing academic performance led to a significant increase in both on-task behaviour and performance. Hay et al. concluded that: "....the more parsimonious classroom intervention strategy was the explicit reinforcement of academic performance" (p.438).

Walker and Hops (1976) also compared reinforcement for academic behaviours and output as well as a combined contingency on achievement (broadly defined) and levels of appropriate behaviour in primary schoolchildren. Control subjects worked in their normal classrooms; experimental subjects (three groups) participated in an experimental classroom nearby. Observers rated children's classroom behaviours using 6-second time-sampling. The behaviour codes and definitions used are not supplied. Academic achievement was measured by two achievement tests (scores for reading and mathematics, the focal subjects of the intervention, were combined).

Group 1 subjects received reinforcement for classroom behaviours. Specifically, there were several appropriate classroom behaviours, including appropriate talking with the teacher and interaction with peers, as well as three classroom behaviours identified by Cobb (1972) as being significantly correlated with academic achievement; attend, volunteer, and compliance. Praise used was highly descriptive and specific. Points were also given for appropriate behaviour. The target behaviour for Group 2 subjects was academic performance; reinforcement was given for correct academic responding, e.g. finishing papers, completing problems, and passing tests. Group 3 subjects received reinforcement for both classroom behaviour and performance.

Walker and Hops (1976) found that both achievement gains and appropriate classroom behaviour increased for all three experimental groups, but not for the controls. There was no difference between the three treatment groups. They concluded that reinforcing either response class increases the target behaviour and has a facilitative effect on the other behaviour.

5.6. SOCIAL REINFORCEMENT IN SPECIAL CLASSROOMS

1. Introduction

The success of behaviour modification programmes with the retarded has been well documented (e.g. Gardner, 1969, 1971; Kazdin & Bootzin, 1972). In particular, the behaviouristic approach has been widely applied to exceptional children in special classroom settings (Forness, 1970), including emotionally disturbed, autistic, delinquent, hyperactive, deaf, and learning disabled children, as well as retarded students. Such classes are typically small in size (usually only five to 10 students) and the teacher often has an aide to help. However, despite smaller student numbers, teachers still experience control problems due to the low attending levels typically displayed by handicapped children; and the problem of attention to work is prominent in research dealing with handicapped groups, including the retarded.

The views of Zigler and co-workers regarding the personality of the retardate do have implications for the optimal operation of classrooms for retarded populations. In particular, the formulation of outer-directedness, which posits greater reliance on external cues, would predict a greater proportion of time spent off-task amongst retarded pupils than normals. Hamerlynck, Martin and Rolland (1968) found that the average on-task figures for retarded children were indeed quite low. Hamerlynck *et al*. determined the amount of time spent on task by four target children (whose level of retardation was not specified). Task oriented behaviour consisted either of focussing on the teacher, reading the text or working on a product.

Observations were taken during various subject periods over 15 days. Seventeen teachers (in four teams) observed their target during 10-minute sessions twice each day and recorded changes in task orientation. No reliability ratings were reported. These retarded students spent an average of only 44.3% of their time on task.

Hamerlynck et al. found the nontask oriented behaviours were generally not disruptive to other students, an observation consistent with that of Coleman and Blampied (1977) that the most frequent off-task behaviour they observed was staring, followed by fiddling, gross motor movement, and then excess noise. Ebner (1967) also recorded very high rates of nonattending behaviour in several classrooms of retarded children.

Of course, the precise method of assessing time on-task makes a big difference to the final figure and many authors working with normals have also found low baseline attending levels. In a direct comparison of the off-task glancing or normals and retarded children in the classroom, Krupski (1979) found that the normals spent more time off-task. This report is at odds with an observational study by Bryan (1979) who found that learning disabled children consistently spent more time off-task than academically successful children when observed in a normal classroom.

Whatever the figures, short attention span and high distractibility are frequently observed in the retarded and this deficit is an appropriate target for behaviour modification efforts. Studies which applied social reinforcement for appropriate working behaviour in special classrooms are reviewed in Section 5.6, 2 and 3. Some researchers have preferred to focus on output in the special classroom and these studies are reviewed in Section 5.6.4.

The use of social reinforcement in such settings is to be encouraged. Forness and MacMillan (1972) warned investigators that the "....blanket use of check marks, tokens, and other forms of tangible reinforcement for mildly retarded children in public schools ....may well represent reinforcement overkill...." (p.222). MacMillan and Forness (1970, 1973) also cautioned against the use of too "primitive" a reinforcer when natural reinforcers like praise and task mastery will suffice. The view that contrived reinforcers are only appropriate if natural reinforcers fail, and that they should be replaced with natural reinforcers as soon as possible, is widely held (e.g. Moore, 1975; Matson & Martin, 1979).

Unsystematic use of teacher social reinforcement has been observed in the special classroom. Evidence that social reinforcement is often given indiscriminately in special classrooms comes from Paris and Cairns (1972, Experiment 2), who observed teacher-student interactions in six special classrooms for educable mentally retarded children. As mentioned in Chapter 3 (Section 3.2.7), Paris and Cairns found that positive evaluative comments occurred eight times more often than negative statements, but were in fact used indiscriminately, occurring independently of children's behaviour nearly 40 percent of the time.

2. Social Reinforcement for Appropriate Behaviour and some Penalty for Disruptive/Inappropriate Behaviour

This approach is used less frequently with students in special classrooms than with normals. As noted in Section 5.3.2(b), there is some difficulty in separating conceptually experiments which use extinction of social reinforcement for inappropriate behaviours from

those that merely reinforce appropriate behaviours. Experiments are reviewed exactly as they are reported; if extinction/ignoral is mentioned as part of the teacher's ambit, they are reviewed within the present section.

Zimmerman and Zimmerman (1962, Case II) reported the use of teacher attention for desired behaviour and ignoral of tantrums and other associated disruptive behaviours. Observations before the manipulation indicated that the presence and attention of staff members was maintaining the frequent bad behaviour. When the teacher ignored tantrums and attended to tantrum-free behaviours, tantrums in the classroom gradually disappeared entirely and desired behaviour increased. Irrelevant verbal behaviour and "baby talk" were extinguished in a similar manner.

Birnbrauer, Bijou, Wolf and Kidder (1965) also used social reinforcement to increase performance in programmed instruction work with eight retarded boys. Ignoral of tantrums and attending only after appropriate classroom behaviour was successful in producing desired quiet individual working.

Broden, Hall, Dunlap and Clark (1970, Experiment 1) had the teacher employ social reinforcement for studying and ignore all non-studying as an initial treatment with a special education class of 13 subjects who exhibited various deficits, including slow learning combined with incoherent speech, emotional instability, or acts of delinquency. None of the subjects were mentally retarded.

An observer recorded student behaviours using 5-second time-sampling. Behaviour was recorded at the expiration of the fifth second. "Studying" was recorded for the student observed if he

were attending to or oriented toward the appropriate book when he had been assigned reading to do, if he were attending to the teacher or another pupil who was speaking during class discussions, if he were writing spelling words during spelling period, or if he were otherwise engaged in a "Teacher assigned task". All else was "nonstudy" or "out of seat".

Following baseline observations of study behaviour, the first treatment phase began. Now the teacher applied social reinforcement for study behaviour only, ignoring nonstudy behaviour. This procedure resulted in a rise in level of studying from the mean baseline of 29% to 57%. A further intervention involved use of a kitchen timer which went off at random intervals, and students who were seated and quiet at those times received a check mark which entitled them to one minute of extra time at lunch. A further increment in studying ensued.

Craig and Holland (1970, Experiment III) also had the teacher ignore nonstudy behaviour and give social reinforcement for visual attending behaviour in a class of seven deaf children. "Attending" was defined as being seated and having eyes directly oriented toward the relevant teaching stimulus for a full time-sampling interval of 10 seconds. Each student in the classroom had a small box in front of him; a light was flashed contingent upon attending during the experimental phases.

In the first experimental phase, the teacher gave social reinforcement alone for attending, "....smiling at those students who were attending and ignoring those who were not" (p.104); a very loose contingency. The teacher also provided comments for good

behaviour. An observer recorded the frequency of directed smiling by the teacher, but the figure of 62 directed smiles was actually lower than the baseline rate of 101. Craig and Holland commented that the overall behaviour of the teacher seemed to be more positively reinforcing in this first experimental phase than during baseline and that the observer had difficulty discriminating generalized and directed smiling. It seems odd that no record was taken of teacher verbal reinforcement. A subsequent phase involved tangible reinforcement (cereal bits) for attending (supplied at the end of the daily session) as well as social reinforcement.

Despite the inadequacy of both the delivery and recording techniques associated with teacher social reinforcement, such reinforcement did lead to increased percent of attending behaviour in these students. Use of tangible reinforcement, too, led to further increases.

Peters, Cox and Bijou (1971, Experiment 1) combined teacher social reinforcement for attending with stars for increased output in two nonretarded students in a special classroom for retarded children and children with learning disabilities. An observer recorded the subjects' working behaviour during daily 1-hour sessions using 20-second time-sampling (working had to be exhibited for the entire interval to be counted as such). Several categories of working behaviour were defined, and not working was defined as "....looking around the room, engaging in irrelevant talk, playing with others, guessing an answer, going to the washroom, sharpening pencils, scribbling or doodling, and asking irrelevant questions" (p.493).

Baseline included noncontingent teacher praise. During the reinforcement periods, the teacher maintained her level of attention but rescheduled her social reinforcement so as to be contingent upon working (cueing was not used). Nonworking behaviours were ignored. Also, after several sessions, a gold star was given for each page of work completed. Such techniques operated to increase the rate of working behaviour from 32.5% to 80.5% during contingent teacher attention. Inclusion of the gold star rewards led to further increments.

Pelechano and Vinagre (1976) reported a single case-study in which the classroom behaviour of a disruptive mentally retarded girl was improved via social reinforcement plus promise of admission to preferred activities for appropriate behaviour, as well as reprimands and elimination of privileges for disruptive behaviours. These techniques led to a decrease in disruptive behaviour and an increase in inappropriate behaviour. Generalization to output was also reported.

3. Social Reinforcement (either alone or combined with other reinforcers) to Condition Appropriate Behaviour in the Special Classroom

Hill (1976) studied special classroom students grouped in with normal students for a social studies period, investigating the effects of teacher social reinforcement on the on-task behaviours of those students who were mildly mentally retarded. When these students

received social reinforcement contingent on on-task behaviour, such behaviour increased above that observed in a control group whose on-task behaviour was ignored.

Nonverbal teacher attention was a focal point of an investigation by Kazdin and Klock (1973) of attentive behaviour in 32 moderately retarded children in a special classroom. Kazdin and Klock commented that: "....nonverbal teacher behaviors alone may provide an important source of reinforcement in the classroom" (p.643), lamenting the paucity of data to that date on such reinforcers.

An observer recorded student behaviour as attentive (sitting in seat, working, and not talking to a neighbour without permission), or inattentive, using 15-second time-samples; subjects had to be attentive for the entire interval to score a "+". Teacher behaviour was also recorded. Nonverbal behaviour categories recorded were smiling and physical contact; the recording of verbal approval was qualified by the accompaniment (or not) of one of these forms of nonverbal behaviour.

During the first experimental phase, the teacher was instructed to increase her level of contingent nonverbal approval following attentive subject behaviour. Cueing was employed for the first two days and thereafter feedback enabled the teacher to correct her nonverbal reinforcement levels. Increased levels of contingent verbal approval were repeated in a second experimental phase, following a reversal.

The teacher reinforcement data indicated that increases in nonverbal reinforcement did in fact occur in the second experimental phase. Verbal behaviours (all three categories) remained stable or

decreased during these phases. The increased nonverbal reinforcement alone, then, accounted for the observed increase in child attentive behaviour from 50.2% (baseline) to 78.7% (the two experimental phases).

Kazdin (1973b) aimed to investigate the effect of social reinforcement to target subjects on the attending behaviour of nonreinforced mentally retarded peers in a special classroom. The vicarious reinforcement aspects of this study, and of the two that follow, are reviewed in Chapter 9. For this chapter, the important result is that social reinforcement given by the observer (not the teacher) did act to increase working behaviour in the target subjects. Praise for inattentive behaviour, on the other hand, was not successful.

Kazdin, Silverman and Sittler (1975) investigated nonverbal approval from the teacher or aide ("....physical contact in the form of patting approvingly"; p.279) on attentive behaviour of targets and peers in a special classroom. Again nonverbal approval alone was effective in modifying the attentive behaviour in both mentally retarded target subjects.

Kazdin (1977) again investigated vicarious social reinforcement in a special classroom for retarded children. Verbal approval given by the teacher was one of five approving statements, including "Good, I like what you're doing", and "Good, you're doing nicely!", always preceded by the target subject's name. The target subjects received reinforcement either for inattentive behaviour or for attending. Only reinforcement for attending behaviour (social

reinforcement after each 30 seconds of uninterrupted attentive behaviour) caused an improved performance in the target.

Clements and Tracy (1977) investigated the effects of verbal and/or nonverbal social reinforcement on attention to task and accuracy of performance in solving arithmetic problems in a classroom of 10 emotionally disturbed boys. The nonverbal reinforcer was firm hand pressure applied to both shoulders by the teacher; either verbal or nonverbal reinforcement or both were given approximately at 4-minute intervals during each 20-minute work session while the subject was attending to his arithmetic worksheet. An observer recorded on-task behaviour during 15-second time-samples. Arithmetic performance (percent correct responses) was also recorded.

These authors found that verbal and nonverbal social reinforcement in combination was no better than nonverbal reinforcement alone and that both were superior to verbal reinforcement alone. Verbal reinforcement alone, however, did produce significantly greater attention to task than no reinforcement. Arithmetic performance also increased under reinforcement.

Hill and Strain (1977) investigated the effects of teacher social reinforcement on the task-persistent (on-task) behaviour of mentally retarded children in a special education class. A control group did not receive reinforcement. On-task behaviour was defined as either: listening to the teacher or a student during discussion; raising hand; reading assignments; completing written assignment; compliance with teacher directions; or

ignoring other students engaged in inappropriate behaviour. An observer recorded target children's task-persistent behaviour during 5-second time-samples as well as recording the teacher's socially reinforcing behaviours.

During the experimental phases, the teachers were instructed to "....deliver social praise and attention to the designated subjects" (p.209); the frequency of such reinforcement was not suggested. They were also to ignore on-task behaviour in non-target children. Such reinforcement acted to increase on-task behaviour from a low baseline mean of 32% to 67% under intervention. Control subjects showed no such improvement.

Strain and Pierce (1977) monitored the effects of teacher attention on the attending behaviour of reinforced and nonreinforced mentally retarded preschool boys. Observers recorded attending behaviour using 10-second time-samples. The two subjects receiving direct social reinforcement significantly increased their attending behaviour during treatment phases. The effect on the two non-reinforced vicarious subjects is discussed in Chapter 9.

4. Social Reinforcement (alone or combined with other techniques) to Increase Output in Special Classroom Students

Zimmerman, Zimmerman and Russell (1969) used instruction-following as the focal appropriate behaviour in a study involving seven target boys displaying various degrees of mental retardation. During 30-minute sessions compliant behaviour immediately following verbal instructions from the teacher was reinforced by tokens accompanied by edible reinforcers in the experimental phase.

Praise ('very good' plus student's name) contingent upon appropriate instruction-following behaviour was a feature of control conditions. The authors reported that the token/candy procedure was more effective than contingent praise for only four of the seven targets.

The observers' impressions indicated that targets who were most affected by the token treatment were less "hyperactive" and disruptive during the experimental phase; a possible conclusion is that the "attentional deficit" label earned by so-called hyperactive children may be due merely to a failure to follow instructions. Another interesting impression reported by observers involved the emergence of "helping behaviour" during the treatment phase. Several subjects tended to help their peers earn reinforcement by, for example, bringing objects needed to follow instructions, thus establishing a different climate than had prevailed during the pre-experimental phase.

An earlier experiment using behaviour modification techniques in the special classroom was that of Zimmerman and Zimmerman (1962). Social reinforcement from the teacher was the sole method used to increase correct spelling behaviour in one emotionally disturbed boy (Case 1). Evaluation of the status quo suggested that the instructor was unknowingly maintaining error behaviour by attending to it. When the experimenter restricted her attention to correct spelling and ignored mis-spelling, the frequency of bizarre spelling responses and other undesirable responses fell to almost zero after a month.

Hart and Risley (1968) reported a failure with social reinforcement. They used access to desired reinforcers to increase output of descriptive adjectives in disadvantaged, mildly retarded Negro students. Observers recorded verbal output of the 15 subjects in daily samples of 15 minutes in length during four periods of free-play sessions. The aim of the study was to increase the rates of usage of adjective-noun combinations in everyday language during free-play settings.

During baseline, teacher attention and approval was given for use of descriptive adjectives during free play, but the rates of use remained low. When the children had to use a descriptive adjective in a request for an object before that object was provided, the rate of usage increased significantly (praise continued during this stage). Usage remained elevated when this contingency was discontinued. Thus normal teaching practices, including the use of social reinforcement, had been ineffective in modifying the target aspect of the children's spontaneous speech.

Coleman (1970b) applied candy and praise in an attempt to train counting skills in an 8-year old trainable mentally retarded/hyperactive disruptive boy. During 10-minute training sessions, the experimenter gave candy reinforcement on each successful counting trial (counting number of blocks held by the experimenter). Later on, in each 10-minute session, not every success was rewarded. Praise accompanied successful trials sometimes too, but since no data were recorded, we are not sure

as to the specific schedule of praise employed. This combination technique led to a gradual increase above pre-treatment levels in counting ability, and post-tests indicated that number recognition and number concept had improved generally in this subject. Coleman stressed the usefulness of this short daily indirect training approach in teaching academic tasks to the trainable mentally retarded.

Haubrich and Shores (1976) investigated the use of study cubicles and contingent social reinforcement for academic production in a class of five emotionally disturbed children. Attending was defined as: "(a) the child in his/her seat with eyes on work and (b) appropriate response involvement with teacher/hand raised, etc." (p.337). Academic performance was percent correct of comprehension questions relevant to the story read by the subjects during the observation period.

Both the use of study cubicles and the application of teacher social reinforcement were associated with increases in attending behaviour over baseline levels, and social reinforcement was the superior treatment. Social reinforcement also produced increments in output.

Autistic and retarded pre-school children were the subjects in an experiment by Frankel and Graham (1976) which compared social reinforcement alone with social reinforcement plus food for correct responses in six different tasks. Attending to teacher or task and nonattending behaviour as well as maladaptive behaviour (tantrums, aggression, or stereotyped behaviour) were also

recorded by two observers.

The retarded subjects did more and got more responses correct than the autistic subjects, as well as spending more time attending to the teacher and the task than autistic subjects. The inclusion of the food did not lead to better performance overall; in some instances, food had a deleterious effect on behaviour, although food reinforcement was associated with increased attention to the teacher.

Swanson (1977) investigated the effect of food reinforcement (candy) and social praise on the academic accuracy of an 8-year old partially sighted girl in a special classroom. The two tasks assessed were matching of objects and pictures and verbal counting of objects. After baseline, reinforcement was provided for non-cued responses by the teacher placing one candy on the subject's desk for each correct response. A following session involved the use of "public" praise, as well as candy; after each session the subject was "....praised in front of the class for using her sight" (p.74).

The dependent variable (percent of correct responses during each daily session) increased significantly above baseline with the introduction of the candy reinforcer and showed a further increment when the fairly abbreviated form of social reinforcement was used as well. Both tasks were similarly influenced by the experimental manipulations. Swanson concluded that "Pairing primary reinforcement with social praise (e.g. announcing to the class Georgia was making good use of her sight) had the most pronounced effect upon academic behavior" (p.75).

5. Social Reinforcement to increase both Output and Attending/Appropriate Behaviour in the Special Classroom

Tokens, social reinforcement, ignoral and time-out were applied concurrently during the baseline phases of a study by Birnbrauer et al. (1965). The token economy had been established during the preceding year. During the experimental phase, tokens were not delivered but the teacher continued to deliver social reinforcement for correct responses to instructional material and for cooperative behaviour (schedule not specified). Also, ignoral followed incorrect responses and inappropriate behaviour (not defined); and social isolation followed disruptive behaviour or refusal to comply with instructions. The subjects were 17 retarded children in a special classroom.

Tokens (check marks) were provided for every correct response to an item in programmed learning units. Ten bonus marks were given if an assignment were error-free plus "....a few marks for being especially cooperative or doing something extra" (p.223). Social reinforcement was given simultaneously with token delivery in the baseline phase; either at the end of a lesson (if the child was working independently) or as each item was passed correctly (if the teacher was working with the child).

During the experimental phase, tokens were discontinued but the other consequences continued as before. The dependent variables were number of items completed and percent of errors. The discontinuation of the tokens caused a variety of pupil

responses. Five of the 17 subjects were not affected on either index; six subjects showed a greater error rate but did the same number of items, and four subjects made more errors and did less items, as well as presenting serious discipline problems. Data were not presented for appropriate behaviour.

Valett (1966) used a most unusual definition of social reinforcement. In this study, social reinforcement included awards of various kinds, including Star Awards and Citizen Honour Awards, as well as eligibility to be on a student council. Valett described a classroom management system based on social reinforcement of this type, combined with poker chips for being ready to work and other good behaviour, and, for each assignment completed, access to preferred activities. He concluded that such a system was "....most effective when clearly understood by the pupil and his parents" (p.189), since parents can give support for the system, and that "....experimental programs of social reinforcement systems should be teacher devised and applied in public school classes for exceptional children with behavior disorders" (p.189).

Clark and Wahlberg (1969, Study 2) used teacher praise for output on test papers and homework. It is not clear whether praise was also given for attending, but this seems likely. The increased praise regime for half of two classes of mildly retarded children lasted for four weeks; at the end of this time the "higher-praised" children showed significantly greater gain in a post-treatment achievement test.

In Study 4 (Clark & Wahlberg, 1969), increased praise was again administered but the contingency is unclear. The main dependent variable was performance on a word-making list in which subjects were asked to form as many words as possible from each of a given set of longer words, and the experimental subjects did significantly improve their scores on this task in relation to the controls.

A third relevant experiment (Study 7) studied the effect of asking teachers of experimental groups of children in remedial classes to "double or triple the number of rewards" (social praise), while the teachers of control subjects were asked to "keep up the good work". Again, the target behaviour for social reinforcement is not specified, but it is likely the teachers praised both behaviour and output.

The experimental groups who had received increased levels of praise manifested a significantly greater mean score on an achievement test, and these pupils also showed more favourable attitudes towards their teachers than those in the control groups. Clark and Wahlberg, in reporting this study, commented that: "....(1) the use of a systematic distribution of praise apparently will not lead to a classroom atmosphere devoid of enthusiasm, and (2) increased, distributed praise leads to increased achievement" (p.302). No data or comments are reported in relation to classroom behaviour.

A recent relevant literature is that arising from attempts to evaluate drug treatment for hyperactive children. Drug

therapy has been used to increase the effectiveness of conditioning techniques in reducing seat activity (measured using stabilimetric cushions) in emotionally disturbed students; the drug methylphenidate had an additive effect when given concurrently with contingent reinforcement (Christensen & Sprague, 1973). Also, Sprague and Werry (1971) suggested that drugs in conjunction with behaviour modification procedures might be a more efficient treatment approach to hyperactivity control than either technique used singly.

Some studies have attempted to compare the relative effectiveness of behaviour modification alone, drug treatment alone, and both used in combination, in the control of hyperactivity; and in these studies social reinforcement is occasionally represented as one of the variety of sources of behaviour control.

Christensen (1975) studied 16 hyperactive mentally retarded institutionalized children with the view to comparing the effects of methylphenidate (a stimulant) and a token reinforcement programme in controlling classroom behaviour. The subjects were referred to the study on the basis of teacher ratings on four factors: conduct problem; inattentive-passive; tension-anxiety; hyperactivity. The experimental observations and interactions occurred daily during a 50-minute arithmetic class. Baseline conditions included frequent verbal discipline and time-out for breaking class rules consistently.

Various measures of classroom behaviour were collected. Seat activity was measured via stabilimetric cushions attached to subjects' chairs. Seat activity was sampled over 40 one-minute time-samples during each class period. Also, twice-weekly ratings of children's behaviour were obtained. Observers recorded specific behaviour categories using 10-second time-samples and each subject was observed for three 10-minute intervals each week. Behaviours observed were: out-of-seat; disturbing others directly (e.g. hitting); audible noise; isolation (time-out); vocalization; gross motor behaviour (e.g. head-swaying); playing; orienting response (head turning), and miscellaneous (any deviant behaviours not covered above, e.g. staring into space); attending; irrelevant (off-task behaviour for more than 3 seconds); and nondeviant.

Records were also kept of academic performance. Academic productivity (number of items of assigned material done each day divided by total number of items assigned), and academic accuracy (number of items done correctly divided by total number attempted) were the two performance dependent variables.

The experimental procedure involved behaviour modification techniques alone directly after baseline. The programme was similar to that used by O'Leary et al. (1969), and consisted of points, rules, and teacher attention. The teacher was instructed to deliver praise and attention whenever she delivered points and "....to be generous with her positive comments in-between point

deliveries" (p.269). She was also told to ignore disruptive behaviour as much as possible. Points were given for paying attention, working hard when required, completing assigned work, and getting work right, plus specific behaviours to be reinforced for various target subjects.

Each subject ran under the behaviour modification programme alone and in combination with medication; the order of treatments varied. During the drug segments, subjects received methylphenidate instead of a placebo once each day, about 1.5 hours before the beginning of the class period observed.

Christensen (1975) found that on-task behaviour increased markedly during all stages when the behaviour modification programme was in operation; supplementing the programme with drug therapy did not lead to further increases as found in the earlier (Christensen & Sprague, 1973) study. Measures of academic productivity also yielded a significant treatment effect. Thus the classroom management programme described was highly effective in controlling hyperactive behaviour in the classroom, and the addition of stimulant medication produced little significant enhancement. Christensen concluded that behaviour modification may be a viable alternative to drug therapy in this situation.

Bugental, Whalen and Henker (1977) reported trends showing an advantage for contingent social reinforcement with medicated (methylphenidate) children. In this study, social reinforcement from a tutor was compared with self-control training in 36

hyperactive boys. The subjects, who were either medicated (were receiving the stimulant drug for behaviour problems), or nonmedicated (but rated as hyperactive by their teachers) performed on the Porteus Mazes under one of the above treatment conditions. Self reinforcement training involved "....as little social reinforcement as possible" (p.878), and in this condition the tutor modeled self-controlling speech and self-reinforcement on various tasks. This proved to be a difficult condition to implement. Social reinforcement was given for "....appropriate and effective task attention" (p.878) in the second group of subjects. The tutor also ignored inattentive or inappropriate behaviour. Dependent variables were error scores on the Porteus Mazes and changes in teacher ratings of inattentive and impulsive behaviour, using the Conners Abbreviated Teacher Rating Scale.

A main effect for medication occurred when the Porteus Mazes data were analysed; medicated subjects made fewer errors under social reinforcement than under self-control, while non-medicated subjects did poorest under social reinforcement. The explanation given for this finding was in terms of attribution theory. Children who are taking medication are thought to be learning to attribute their behavioural improvement to causes beyond their personal control, and when external input such as social reinforcement is provided, improvement is more likely to occur than when responsibility for change is given to the child. Since the interpretation of this test is not clear it may have

been better to use some other measure of impulsiveness and carelessness. Unfortunately, the teacher rating data did not yield any effects or interactions. Again, observers' ratings of hyperactivity might have done so, considering that the intervention lasted for 12 one-hourly sessions.

A follow-up study by Bugental, Collins, Collins and Chaney (1978) investigated long-term effects of the self-monitoring and social reinforcement treatments, predicting that self-control would cause some stable behaviour changes, being independent of external maintenance. This technique was also expected to lead to increased feelings of perceived control. The subjects were 20 of the same hyperactive boys examined in the earlier study.

As hypothesized, the self-control intervention did produce greater perception of personal control. Medication was not a significant effect in this analysis. Again, no behavioural data are reported, but teachers' ratings of hyperactivity indicated that the social reinforcement treatment produced significantly greater benefits in terms of hyperactivity control. Children who experienced the self-control treatment remained roughly as hyperactive as at their pre-treatment scores.

Some studies have applied contingencies for attention and output sequentially. Richardson (1976) compared the efficiency of three types of reinforcement: tokens delivered alone with no back-ups; tokens with praise preceding token delivery but no back-ups; and tokens with praise and back-ups. Delivery was contingent either on output or on attention. Generalization

to other behaviours was also monitored. The subjects in this study were four girls resident at a centre for disturbed children. Attending behaviour was the inverse of "motor behaviour" and "not-looking behaviour"; output was measured via number of correct answers per minute and percent questions answered correctly. Data were collected during the same lesson each day. Richardson found that the combination reinforcement was more effective than either tokens alone or tokens with praise in changing both target behaviours, and that high frequencies of motor behaviour did not necessarily interfere with high output.

Marholin, Steinman, McInnes and Heads (1975) investigated the effect of noncontingent reinforcement, on-task reinforcement, and output reinforcement in six emotionally disturbed conduct-problem residents; in each condition, the teacher was either present or absent for a portion of each observation session. Marholin et al. were concerned to explore the discriminative stimulus properties acquired by the teacher, stating that in classrooms where behaviour modification is in progress, the teacher is particularly likely to acquire such properties since the teacher's presence is often necessary to monitor and to reinforce behaviour. Thus children may learn to respond appropriately only when the teacher is present. The authors stated: "....the presence or absence of the monitoring system (whether human or mechanical) is likely to have a profound effect on the behavior emitted" (p.13). Studies in which some ongoing

behaviour can be monitored later on would not be subject to such limitations.

In each observation session, the teacher and aide were present for the first and last 10 minutes but were sometimes absent during an intervening six minutes. On-task and disruptive behaviour were monitored by two observers through a one-way screen. On-task behaviour was defined as "....actions or orientations indicating that the child was engaged appropriately in the assigned tasks" (p.17); to be scored as "on-task", the child had to manifest such behaviour for at least six seconds of each 10-second interval. The occurrence of any disruptive behaviour (three categories; motor, verbal, and nonword sounds such as tapping, humming, and whistling) meant a "disruptive score" for the interval concerned.

In Phase 1, reinforcement, tokens (marks) and social reinforcement were given noncontingently; in this experiment "noncontingent" meant at the beginning of the session. Phase 2 involved contingent reinforcement for on-task behaviour; the reinforcement was provided "....when the child was observed to be appropriately engaged in his academic work" (p.18). The timing of reinforcement delivery was left up to the teacher or aide, but the frequency was pre-defined. Output was the target for reinforcement in Phase 3; reinforcement was delivered contingent upon the correct completion of the academic work assigned (either mathematics, English, reading comprehension, or spelling).

Reinforcement was delivered at the end of the first and last ten minutes of the session.

The teacher's presence or absence did significantly affect on-task and disruptive behaviour, as predicted. Similar results were obtained in a follow-up study by Marholin and Steinman (1977), who compared reinforcement for being on-task with reinforcement for accuracy and rate of mathematical problems solved in eight children placed in a special classroom because of "....academic and behavioral problems experienced in their regular classrooms" (p.467). These subjects were disruptive slow learners who exhibited a variety of inappropriate social behaviours such as "....talking out, throwing objects, defying the teacher, nonattending, walking aimlessly around the room, and slamming desks" (p.467). Teacher's presence or absence was also examined.

On-task behaviour was recorded by observers and was defined as subject's actions or orientations indicating appropriate engagement in the assigned task. Disruptive behaviour was also defined in three categories: motor disruptive; verbal disruptive; and noise. A pupil had to be on-task for nine out of ten seconds of each 10-second time-sample. Behaviour could also be neither disruptive nor on-task, but neutral.

During the first experimental phase, the teacher and aides gave a mark (exchangeable for a 30-minute free time activity after each daily session) and a positive comment for appropriate academic behaviour. Reinforcement was delivered on a Variable

Interval schedule; the interval was determined by the child's baseline on-task level, so that children who were seldom on-task had a "richer" schedule. Failure to gain enough marks to gain access to the free time period meant going to an adjacent classroom to keep working on the assigned mathematics material.

During a following phase, reinforcement was contingent on successful completion of academic work, rather than on appropriate behaviour. Both rate and accuracy were reinforced; the density of reinforcement was scheduled so as to approximate that received in the preceding phase.

The authors reported again that the teacher's presence was crucial to the success of either contingency system. When the teacher was absent, disruptive behaviour increased and on-task behaviour and academic response rate decreased. Both systems (with teacher present) were successful in increasing on-task behaviour, and there was no differential effect for on-task behaviour. Output, however, was more effectively increased through the rate/accuracy contingency.

5.7. CONCLUSION

The studies reviewed in this chapter present a rather more encouraging picture of the efficacy of social reinforcement than studies conducted in the laboratory setting, as reported in Chapters 3 and 4. Although there are some exceptions (e.g. O'Leary et al., 1969; Broden et al., 1971), social reinforcement

from the teacher is generally a fruitful technique within the classroom whatever the details of its delivery, and improvements in working behaviour or output can be impressive. Even noncontingent social reinforcement can be effective (e.g. Cormier, 1970).

An important question in social reinforcement studies is durability of the reinforcer. Behaviour modification treatments are often effective for quite long periods (e.g. Walker et al., 1976, reported their combination procedure employing social reinforcement, tokens, and response cost, to be still effective after an impressive 45 days). Social reinforcement alone has been shown to possess fair durability in the classroom setting.

The use of teacher social reinforcement is particularly susceptible to cooperation on the part of the teacher. Providing adequate reinforcement to the teachers for maintaining their reinforcement delivery may be necessary, especially since programmes are often lengthy. Cossairt et al. (1973) showed that social reinforcement and feedback to the teachers were important, and Brown, Montgomery and Barclay (1969) suggested that without some reinforcement, the teacher's behaviour may not be maintained. The teacher's reinforcing behaviour was very much under the control of the psychologist's reinforcing behaviour in this study.

Another important question is that of teacher training; the success of any social reinforcement manipulation is dependent on

the teacher being able to respond consistently as required. The problem of training teachers in behaviour modification principles is tackled in various ways. While there are many reports of studies successfully using naive teachers to deliver social reinforcement (e.g. Hall, Panyan, Rabon & Broden, 1968), some teachers have the benefit of maximal involvement through frequent conferences with the experimenter who gives feedback on their performance and praise (e.g. McAllister et al., 1969), Madsen, Becker and Thomas (1968) devised a sophisticated set of rules for teachers. Having teachers record their own praise rate is another possibility (Thomas, 1971; Saudargas, 1972).

Feedback alone can be effective. Cooper, Thomson and Baer (1970) gave two naive teachers information regarding their frequencies of attention and failure to attend to appropriate child responses. This feedback did result in increased appropriate attending. Other procedures used have included showing a training film (Krumboltz & Goodwin, 1966) and social modeling (Levin, 1974). Dowrick and Johns (1976) combined feedback from videotape recordings and social reinforcement from the experimenter in their successful attempt to train supervisors to give attention for on-task behaviour in disturbed children.

However, most teachers probably can develop this skill with experience, although Becker et al. (1967) mentioned that they found teachers' initial attempts to be "stilted" and "stereotyped". Some teachers do need intensive training procedures to help them

learn to deliver praise (e.g. Hall, Lund & Jackson, 1968). Coleman (1970a), too, noted that one teacher out of the four involved refused to give praise. Coleman commented: "In general, the teacher's concern for academic excellence seemed to preclude praising just 'good behavior' " (p.297). Jenson (1978) argued that teachers need to be trained in behaviour modification technology: "If the business of education is learning then it is a mistake not to train teachers in a technology which is based on learning" (p.242).

The usefulness of social reinforcement in the classroom is paralleled to some degree in behaviour modification studies of social reinforcement from the supervisor in improving working behaviour in mentally retarded sheltered workshop clients. Chapter 6 reviews this area of research.

CHAPTER 6.

SOCIAL REINFORCEMENT TO INCREASE ATTENTION OR OUTPUT IN RETARDED SUBJECTS IN THE SHELTERED WORKSHOP

6.1. INTRODUCTION

Behaviour modification techniques have been successful in generating work related behaviours in retarded clients employed in sheltered workshops and social reinforcement has been investigated in this context.

In this chapter, studies to be reviewed include those where attention from the supervisor is used to improve behaviour or productivity in retarded clients in the sheltered workshop/ rehabilitation centre. The use of social reinforcement in the acquisition of new behaviours, as exemplified by the work of Gold (e.g. 1968, 1972, 1973), is not reviewed.

While retarded clients may well be slow in the acquisition stage, performance of a learned response can be greatly improved under optimal conditions, and levels of productivity which can be expected of this population are increasing (e.g. Huddle, 1967). Clark and Hermelin stated as early as 1955 that: "....to take the imbecile at face value is to ignore his potentialities" (p.339).

Once again studies are only included when social reinforcement is specified. Thus, although Zimmerman, Stuckey, Garlick and Miller (1969) referred to the importance of "token-exchange activities per se" (p.40), they did not refer to any evaluative action by the token agent, and hence the study cannot be included in the present chapter. Some studies are conducted in a simulated

or pre-vocational workshop setting, using special classroom students as subjects. These are also included.

The number of studies which report the use of supervisor social reinforcement is not large, and of these, the majority focus on output. These studies are considered in Section 6.3. There are a small number of studies where the target of reinforcement is a behavioural one, and these studies are reviewed in Section 6.2. Section 6.4 is concerned with studies which employ social reinforcement to improve both output and working behaviour. Section 6.5 presents studies in which social reinforcement supply represents a baseline condition.

6.2. SOCIAL REINFORCEMENT FOLLOWING APPROPRIATE BEHAVIOUR IN THE SHELTERED WORKSHOP

A specific "appropriate working behaviour" (returning promptly from recreation breaks) was the target of a study by Szarto, Carlson, Hellige and Salyers (1976). Social reinforcement alone was used to fade out a token system in emotionally disturbed retarded and physically handicapped adults, employed in a sheltered workshop. Tokens were provided for returning promptly from recreation breaks; praise was not given concurrently. When the tokens were faded, praise "....of a descriptive nature, followed by an explanation of what behavior the client exhibited to earn the praise" (p.107), was given. The authors reported that the social reinforcement was effective in maintaining improved promptness in clients.

Baroff and Tate (1966) described a demonstration sheltered workshop for 26 mildly and moderately retarded residents where the task involved making relay panels; a rather more complicated task than the simple tasks usually observed. Initially, payment at the end of the week plus, after six months, tokens on a Fixed Interval 30-minutes schedule for working behaviour and "frequent verbal praise" functioned as the controlling system. After a month of the token system, delivery was altered to a Variable Interval schedule; clients received a token if they were working at the time observed. While data were not presented, the supervisor felt that the work rate was steadier and there was less friction among the few more antagonistic workers. Another control was the provision of tokens for detection of faulty parts and for being at work on time and well groomed.

The use of increased levels of social reinforcement with a severely and profoundly retarded client was investigated by Bellamy, Peterson and Close (1975). Following training on the assembly task, the supervisor was instructed to praise the subject an average of every two minutes for engaging in behaviours "....specifically required for task completion" (p.182). An alternative treatment phase involved the supervisor reminding the subject to return to work when he was engaged in off-task behaviours. Next, praise and reminders were combined.

The introduction of increased praise alone led to a rise in production, as did the use of reminders. The combination treatment was not more successful than reminders alone. Bellamy *et al*.

stressed that poor performance in the retardate may well be a function of a deficit in the environmental contingencies, rather than in the individual.

Matson and Martin (1979) commented that relying on tokens which are difficult to fade out or on the use of expensive video-tape playback and other equipment is not the most appropriate tactic. Instead, vocational training should use reinforcers such as social praise which are more likely to be used in normal work settings. They reported a study of seven severely retarded adult inpatients who worked at a sheltered workshop. Several behaviours were recorded unobtrusively by observers; inadequate work skills, chin wiping and inappropriate touching were recorded by frequency of occurrence, and eyes off-task was recorded using time-sampling (a spot check every 30 seconds).

During the first treatment phase, supervisors praised subjects for specific appropriate target behaviour exhibited the day before; for example, "You do not mix up the knobs and latches and that is a good way to do the work" (p.12). Also, peer praise and clapping were prompted by the staff, and staff provided feedback as to money earned (pay was provided as during baseline, on a piece-rate basis). A second experimental phase involved staff modeling of the appropriate behaviour using manual guidance and verbal prompts (social reinforcement). The addition of the modeling technique is not treated separately in the data presentation.

Improvements in all target behaviours resulted from the experimental treatment. Of particular interest to this report is

the significant improvement in work skills, and the authors also commented that the programme "...cut down on the number and frequency of undesirable modes of behavior that interfered with work such as talking loudly or at inappropriate times" (p.14).

6.3. SOCIAL REINFORCEMENT USED TO STIMULATE PRODUCTIVITY

Whitehead (1979) identified one of the critical needs for the 1980's of research in sheltered workshops as development of techniques for improving productivity of retarded clients, especially the severely retarded, for whom "....sheltered workshops remain the principal, and frequently the only, source of long-term employment" (p.71). Being able to do the tasks is not enough; handicapped clients must be able to perform at acceptable rates to be able to work even in sheltered workshops (Bellamy, 1976).

Several studies have used social reinforcement, generally as part of a combination procedure, with the aim of increasing output. The use of social reinforcement alone to increase output is rare.

Vicarious reinforcement was introduced as a variable in a study by Kazdin (1973a) who investigated the effects of praise from the supervisor on the performance (output) of a target and of an adjacent unreinforced peer, in two pairs of moderately retarded adults employed on two simple tasks in a sheltered workshop. Initially the target received reinforcement for producing one or two more than his/her baseline mean. In a later phase, reinforcement was given (in one case to the target and in a second to the previously nonreinforced peer) for producing one or two units less than his/her baseline mean. Contingent social

reinforcement (attention or praise in the form 'That's very good') did lead to an increase or decrease in output of the nonreinforced subjects as expected. The vicarious reinforcement aspects of this study are considered in Chapter 9.

Logan, Kinsinger, Shelton and Brown (1971) had the supervisor give praise that was specific to the amount of output increase shown; for instance, an increase of 20% above the client's baseline mean warranted "That's a little better" (and a blue star), while a similarly sized decrease occasioned a suitable negative comment (and a black X). Social reinforcement was combined with charting of performance (output). This social reinforcement condition seemed to have a slight edge over another treatment, money reinforcement, although the rate of pay may have been too low to allow a meaningful comparison. Money reinforcement involved the receipt of differently coloured tokens exchangeable for money, for increments of 10% or 20% above baseline output. Charting was not employed. The authors commented that: "....there is little evidence concerning the effectiveness of social reinforcers with retardates in sheltered workshop settings" (p.3).

Brown, Johnson, Gadberry and Fenrick (1971) compared social reinforcement plus feedback with a combination of social reinforcement and tokens (exchangeable for food) in the increasing of production rates in six trainable students in a classroom simulation of a workshop. Individual and assembly line (group contingency) production arrangements were also compared.

The subjects were involved in envelope stuffing. In the

first experimental phase, social reinforcement was given frequently during the sessions and also at the end of each session when feedback of output was provided. Next, exceeding previous performance levels was accompanied by a tag which could be exchanged for components of a banana split after each 15-minute session. Unfortunately, there was no baseline condition. Under both individual and group contingencies, performance was significantly elevated when the tokens were also introduced. Noncontingent social reinforcement ("intermittently dispensed") and feedback were only minimally effective in this study. The individual reinforcement contingency was by far the most effective arrangement under both treatments.

Brown, Van Deventer, Perlmutter, Jones and Sontag (1972) combined praise, charting and money in their attempt to increase the production rates of 18 emotionally disturbed retarded children in a simulated workshop setting involved in a simple collating task. Although the authors stated that social praise was used, its delivery in terms of phases is not clear. It is assumed that praise was given during all experimental phases.

Following baseline, charting was introduced by presentation of graphs of daily production rates. A further experimental phase saw money reinforcement (for exceeding previous best levels) superimposed on charting. Charting caused a performance increase for all subjects, although the size of increase varied. Error rates declined in those subjects who had made many errors during baseline. Money reinforcement caused further increases in 14 out of 18 subjects.

Moore (1975) compared tokens, behavioural charting, social reinforcement, and various combinations of the above in an attempt to increase production rates of sheltered workshop clients. The dependent variable was the number of packages completed on a simple packing task during half-hourly sessions. The best technique in terms of improved productivity was charting combined with social reinforcement, but either of these methods alone were only slightly less effective. All modes of reinforcement improved productivity over baseline conditions. The fact that social reinforcement alone was superior to token reinforcement was thought by Moore to underline the importance of the social reinforcement operating in token programmes. Again, the suggestion is made that "....simpler and more readily available forms of reinforcement" (p.6105b) should be investigated as preferred techniques in rehabilitation settings.

A combination of verbal praise and feedback of earnings was the intervention employed in the study by Daniels and Hansen (1976). The subjects were 12 retardates engaged in a ball-bearing sorting task in a sheltered workshop; pay was on a piece-rate basis. When amount of pay earned was posted at the end of each hour, accompanied by praise for increases over baseline levels, work productivity increased significantly above that of a control group.

Flexer, Martin and Friedenberg (1977) employed goal-setting and social praise for improvement over the previous day's performance as well as money reinforcement. This study was

extended by Flexer, Newbery and Martin (1979) who examined in greater detail the effects of a monetary bonus, long-range goal setting, and contingent social praise in increasing output in 14 severely retarded employees. The task was assembly of an 8-piece ballpoint pen, and subjects had been trained to a criterion of nine out of ten correctly assembled pens before baseline began. During baseline, subjects were told that they would be paid one cent for each correctly assembled pen.

Next, subjects were assigned to one of four groups; control subjects worked under standard sheltered workshop conditions. A second treatment was "long-range goal", in which subjects chose an item they would buy with money earned after four weeks, and a photo was taken of the item. Feedback was provided about progress toward the goal. The third group of subjects had a long-range goal but also daily production goals, rewarded by social praise. The fourth group received, instead of social praise, a monetary bonus for achieving session goals, as well as the long-range goal treatment.

Contingent praise in conjunction with the long-range goal was most effective in improving output above baseline rates. The contingent bonus was associated with a lower effectiveness than the long-range goal alone, but was still superior to the control condition. Flexer _et al_. commented on the difficulty in maintaining performance levels on repetitive tasks and the utility of goal setting in countering this difficulty. It is unfortunate that praise was not used alone as a reinforcer.

6.4. SOCIAL REINFORCEMENT AS PART OF A COMBINED TECHNIQUE TO INFLUENCE OUTPUT AND APPROPRIATE BEHAVIOUR

In several studies, social reinforcement followed appropriate behaviour while some other reinforcement followed output.

An example of this approach is the study of Brown and Pearce (1970) who used praise and knowledge of results to increase the production rates of five emotionally disturbed retarded clients in a simulated workshop environment within a special classroom. The task was envelope stuffing. In Part One of the programme, the teacher/supervisor told subjects to fill as many envelopes as they could, and gave nonspecific praise for performance when seated at their work station and performing their task. At the end of each 20-minute session, subjects were told how many items they had completed. During this phase, output gradually increased, but as Brown and Pearce noted, it is not possible to tell whether the increment was due to practice, the experimental variables, or some other variable "not readily apparent".

In a second study (Part Two), the five subjects used previously now acted as models for three further retarded clients. This time baseline performance was recorded. In a modeling phase, the three new targets were seated at the table with the models, and also told to work as fast as they could. The models continued to receive social reinforcement and feedback. A final phase involved social reinforcement and feedback to the targets as well as the models. The three targets were differentially affected by modeling in terms of their output, but the inclusion of direct praise and feedback always produced elevated performances.

Another example of social reinforcement for attention and other reinforcement for output is provided by a comprehensive study by Trybus and Lacks (1972), who recorded output as well as inappropriate behaviour in five moderately-to-severely retarded clients in a simulated workshop. All 19 clients working in the shop were chosen specifically because they exhibited severe behavioural problems which had hitherto prevented their employment, even in a sheltered workshop. Inappropriate behaviours chosen for modification were tailored to each client and included, for instance, number of items dropped on the floor, number of trips to the toilet, and instances of burping. Such behaviours were recorded using 10-minute time-samples distributed randomly across the day. It is interesting to note that there was a high reliability between two observers for recording these delineated behaviours, but that reliability for recording all activities occurring within a specified period was so poor in this experiment that the attempt was abandoned. Such procedures are commonly used in classroom studies of a similar type with no apparent difficulty.

Tokens were used as reinforcers for increases in production on a variety of representative workshop tasks, and also for appropriate behaviour (individual criteria as well as a Variable Interval 10-minute schedule). Withdrawal of supervisor attention "....clearly a powerful reinforcer for many of the subjects" (p.260) for undesired behaviours, was another feature of the programme. Attention was supplied as soon as the subject resumed appropriate work activities. Yellow cueing lights also accompanied appropriate

behaviours, while inappropriate behaviours occasioned a red light and buzzer. Very occasionally, punishment was necessary.

These techniques did lead to an increase in production and a decrease in the target undesired behaviours, but resistance to extinction was not high for some subjects. Since the various methods were applied in concert it is not possible to assess individual effects.

While positive results are not rare in this literature, follow-ups are. Trybus and Lacks (1972) did follow up all 19 subjects observed by their Behavior Training Unit at four weeks. Nine were placed in sheltered workshops where they were producing at rates typical of their shops and not exhibiting any unmanageable problem behaviours; seven had returned to home or hospital; and three were not traceable. Behavioural and production improvements were indeed transferred outside of the operant environment by at least some clients, although for many "....it appears that the type of environment established through the use of these operant methods must be maintained in order to maintain the improved behavior" (p.265). Generalization of improvements in behaviour is frequently a problem in both classroom and workshop studies.

Martin, Pallotta-Cornick, Johnstone and Goyos (1980) described a "multicomponent strategy" aimed at increasing the productivity of institutionalized retardates in a sheltered workshop. The task was preparing airline coffee packs and involved inserting a napkin, sugar bag and stir stick in a plastic bag. Following on from work by Martin and Pallotta-Cornick (1979),

and Martin, Leonhart, Pallotta-Cornick, Yu, Suthons and Quinn (1978), Martin et al. (1980) outlined the modified production supervision strategy (P.S.S.) which included reduction of disruption through use of screening, instructions to look at picture prompts provided and to make as many coffee packs as possible in order to earn pay, and a reinforcement system for productivity.

Whereas during baseline, clients were paid (one cent for each pack made) at the end of the week, during the P.S.S. payment was given during each day following the completion of a fixed number of items. Feedback was also provided in the form of a frequency bar graph of earnings. Social approval was given for being on-task. Clients were praised approximately on a Variable Interval 5-minute schedule: "Typically, the experimenter [who supervised the workshop during the study] circulated around the production tables praising clients who were on task and commenting on the fact that they were working hard; and that they were doing a good job" (p.186). On-task behaviour was not defined.

The introduction of the P.S.S. was associated with significant increases in coffee pack output in all experimental subjects. The mean increase in hourly production was 55% above baseline under the P.S.S. Error rates were low throughout and were unaffected by the intervention. Given the low generalization of the improvement when baseline conditions were reinstated, the authors suggested that a strategy similar to the one they employed might usefully become a regular feature of sheltered workshops. The success of this particular programme is all the more notable, given the low staff/client ratio of 1 to 16.

Pallotta-Cornick and Martin (1980) described further evaluation of the P.S.S. when implemented by workshop staff themselves via reference to a self-instruction manual. Substantial increases in productivity were reported, and the overall mean increase was 68% above baseline means over 80 clients of varying degrees of retardation. As in earlier studies, reversal conditions were accompanied by significant decreases in production, even when the various components were faded separately.

Rusch (1979) recently investigated the relationship between attention to task and output in six moderately mentally retarded sheltered workshop clients. In this important study, reinforcement, including social reinforcement, was given either for attending (or not attending), or for producing (or "producing slow"), following up the suggestion by Cohen and Close (1975) that low productivity in the sheltered workshop is primarily due to less time spent attending to task.

The task was cleaning and wiping tables; all subjects were capable of doing this task prior to the experimental intervention. Reinforcement was tokens (exchangeable for television viewing time) and social reinforcement (from the experimenter). During the reinforcement for slow output treatment, subjects were informed that they would be praised and would receive a poker chip for producing slowly, and such behaviour was demonstrated by the experimenter. It must have been difficult to think of suitable social reinforcement phrases in this treatment, as in the Kazdin (1973a) study reported in Section 6.3. When fast work was

reinforced, the experimenter made nonstandardized statements like "You are really working quickly" and tokens were delivered for reaching an adjustable criterion of output.

An alternative contingency involved reinforcement for not attending. As before, subjects were informed of the contingency, and the required behaviour demonstrated by the experimenter. Next, reinforcement was given for time spent attending, and praise statements specific to this behaviour were delivered along with the tokens. Observers recorded the time spent attending ("....any observal physical activity which was job-related"; p.403), if it occurred during the entire 30-second time-sample. Absence of job-related behaviour at any time during a time-sample was coded as not attending. Speed of task completion was also recorded, as were experimenter praise statements and prompts.

Rusch (1979) found that providing reinforcement for "producing slow" did indeed result in slow performance. Unexpectedly, mean time spent attending actually increased for two of the three subjects during this phase, and the third subject showed a trend in this direction after the first four days of the phase. Reinforcement contingent upon increased output led to increased efficiency and time spent attending in all subjects.

Reinforcing not attending was most effective, and produced no attending whatsoever in all three subjects, with the result that no output items were completed. Kazdin (1973a) also reported a decline in both targets when reinforced for reduced attending; the mean decrease below baseline for both subjects was 13.5%. Similarly, in Kazdin's (1977) study, reported in Chapter 5

(Section 5.6), attending behaviour for the target fell from 44.9% (baseline) to 35% under this condition. Rusch found that reinforcement for attending behaviour (interpreted to mean subjects continuing to attend from the time they started a table through till the time they started the next table; an unusual attending contingency) led to a mean attending level of about 97%, accompanied by greater speed in working.

Thus Rusch has demonstrated a dependence between output and attending in the situation studied, except when reinforcement was given for "producing slow". Given the equivalence of the two contingencies, Rusch concluded that reinforcement for attending to the task would be the "....least restrictive and most economical supervisory system" (p.140).

6.5. SOCIAL REINFORCEMENT DURING BASELINE

Some studies have observed social reinforcement from the supervisor during baseline and superimposed further controlling systems to augment output and attention.

Huddle (1967), noting that "Social approval plays a very important part in work performance of trainable retarded individuals" (p.198), investigated the effects of monetary reward obtained via competition or cooperation in institutionalized subjects. Monetary reward was compared with no reward. All conditions operated above a background of verbal encouragement from attendants, but the target behaviour of social reinforcement was not specified.

The task was the assembling of television rectifier components, a fairly complex task involving 17 steps. After a two-week training period, subjects were split into groups who worked either alone, in competition with another peer, or in cooperation with another peer; each condition operated with or without money rewards. The inclusion of the money reward had a significant effect on production rates under all conditions. Cooperation or completion were not significantly superior to individual work, in keeping with the findings of Brown et al. (1971) that a group contingency was not more effective than an individual one. Error rates were low throughout.

Karen, Eisner and Endres (1974) reinforced "generalized work behaviour" as well as "task-specific behaviour" in ten severely retarded clients in a sheltered workshop. Generalized work behaviour was recorded using six 2-minute behaviour samples each day (twice a week in experimental phases) for each client. Subjects scored -1 (not working) each time they had to be prompted when they looked away from their work (one of five tasks in a job coverting food tins into nursery specimen cans - all subjects did all tasks) for more than five seconds. Indulging in other inappropriate/disruptive behaviours for longer than five seconds, or making an error which occasioned a verbal correction, also earned clients -1.

In two baseline phases (initial and terminal) "ordinary instructional procedures", including unsystematic social reinforcement and time-out, were used. In the initial experimental phase, tokens were introduced for entering the classroom and being seated, as well as for the occurrence of task-specific behaviour (presumably a task

completion,although this is unclear) and of generalized work behaviour. It was estimated that token delivery occurred approximately on a Variable Interval 5-minute schedule. During this phase, reinforcement for generalized work behaviour was faded out. Although this phase and the second experimental one are labelled "training" phases, the output graph indicates that the task was either familiar or extremely simple and for this reason, this study is included here.

After terminal baseline, the second experimental phase used the procedures described above. In a fifth phase, follow-up (not a conventional follow-up since treatment was still involved), token reinforcement was given on a Fixed Interval 15-minute schedule and screens which had concealed from subjects' eyes the rest of the workshop were removed.

Using two performance measures (number done and number of errors per observation), substantial intra-subject and inter-task variability were observed in all phases. Production did not alter until the follow-up phase when it increased dramatically for all subjects. Number of errors declined steadily throughout the experiment with a tendency to increase again during the follow-up, although this increase was related to two of the five tasks. Inattending and other inappropriate behaviours declined in the token phases, demonstrating the efficacy of tokens in addition to normal workshop procedures. It seems that even unsystematic social reinforcement was moderately successful at maintaining productivity levels in this study, but less successful in controlling errors and

visual attendance. The change in token presentation schedule and the removal of the screens in the workshop caused the only observed increase in output. Unfortunately these aspects were not examined separately so it is not possible to gauge the importance to subjects of seeing other clients engaged in work.

6.6. CONCLUSION

Gold (1973), in his comprehensive statement regarding the position of research into vocational rehabilitation, concluded his article with recommendations for future research directions. Within the area of research into increasing rates of existing behaviours, he proposed that a fuller understanding of the reinforcers affecting client productivity is needed, stating that: "....the operant literature does seem to have the necessary basic set of rules for such an accomplishment" (p.130). Understanding of the reinforcers that can be used to eliminate inappropriate behaviour needs also to be extended.

Research has attempted to extend understanding of the operation and usefulness of social reinforcement within the sheltered workshop setting since Gold presented his review. In general, social reinforcement has been shown to be a useful adjunct to other techniques in the promotion of efficient working behaviour or improved output.

Social reinforcement is usually not evaluated on its own, although Kazdin (1973a) found such reinforcement delivered contingently to be effective in increasing output. Unsystematic social reinforcement, however, is often less successful (e.g.

Huddle, 1967; Brown et al., 1971; Karen et al., 1974).

Studies undertaken in the sheltered workshop are subject to various difficulties. As well as maintaining a workable alliance with staff and access to a supervisor who will, if necessary, cooperate with the delivery of social reinforcement, the researcher faces additional problems peculiar to the setting. Often the stress on keeping productivity high operates at the expense of habilitation and research, and studies which use a simulated setting are less affected by this pressure. Gold (1972) also commented on the conflict between production and habilitation, noting that "....good habilitation procedures will facilitate good production" (p.133).

There are also other difficulties. Trybus and Lacks (1972) commented in their article on the problems of lack of funds causing withdrawal of clients at vital stages, and expiry of work contracts in the middle of experimental phases, so that subjects had to move onto unfamiliar jobs. Karen et al. (1974) also reported that a job contract ran out before the end of the study, as did Zimmerman, Overpeck, Eisenberg and Garlick (1969). A further vexing problem in this latter study was the receipt of a supply of faulty parts during another phase which was subsequently labelled "Chaos".

The following chapter reports three experiments carried out in a sheltered workshop setting, using supervisor social reinforcement to elevate client attending levels.

CHAPTER 7.

SOCIAL REINFORCEMENT OF THE WORKING BEHAVIOUR OF RETARDATES IN A REHABILITATION CENTRE: EXPERIMENTS* 1, 2 AND 3

7.1. INTRODUCTION

The experimental work on social reinforcement as reviewed in Chapters 3 and 4 showed that social reinforcement can function as a reward in laboratory settings. The balance of studies reviewed in Chapter 5 indicated that classroom behaviour may be modified through the use of social reinforcement from the teacher.

The more limited findings regarding the use of supervisor social reinforcement in the sheltered workshop (Chapter 6) were also generally supportive of the efficacy of this type of reinforcement. Of particular note is the statement by Trybus and Lacks (1972) that: "....personal attention, one of the most powerful of reinforcers, is usually in short supply in a sheltered workshop and is typically given to clients when they 'act out', rather than when they are behaving appropriately" (p.265). This study, it will be recalled, used a combination approach and included tokens for increasing productivity and controlling specific problems, in conjunction with attention for work-oriented activities and withdrawal of supervisor attention following undesired behaviours.

Trybus and Lacks used subjects whose retardation was moderate or severe and whose tasks were simple and repetitive. In the present series of studies, subjects were only mildly

---

*Published in Australian Journal of Psychology (Waters, 1979).

retarded and already engaged in work of a comparatively high level of sophistication. The major focus of the investigations concerned the feasibility of social reinforcement as the only method of control, uncombined with other techniques. The social reinforcement was delivered by the supervisor contingent upon the occurrence of "working behaviour". It was hypothesized that the introduction of social reinforcement contingent upon working behaviour would increase the rate of that behaviour. It was also expected that increasing the amount of reinforcement available would lead to additional performance improvements.

A further hypothesis concerned the time of day of the reinforcement sessions; it was predicted that time of day would interact with reinforcement efficacy in controlling work behaviour. Evidence from the ergonomics literature suggests that human work performance is better at some times of day than others, although findings conflict (Murrell, 1971). A decrement in performance in the middle of the day (e.g. Kleitman, 1963; Murrell, 1965) has been attributed to digestion of the midday meal, although Colquhoun (1971) questioned this explanation: "Whether this 'let-down' is due to digestion of the meal itself is by no means clear" (p.49). Given that work performance may vary during work sessions, any reinforcement technique may also vary with regard to efficacy.

The three experiments reported in this chapter were conducted at Bedford Industries Vocational Rehabilitation Association, Incorporated, a rehabilitation centre in South Australia. In all three studies, subjects were mildly mentally handicapped females employed in the clothing section of the centre.

7.2. EXPERIMENT 1

METHOD

Subjects. There were 18 subjects with a mean age of 22 years and mean IQ of 73 assessed using the Weschler Adult Intelligence Scale (WAIS). These subjects were split into three groups of six subjects each, matched as groups on the basis of age, IQ, and working behaviour.

Observation Procedures. The dependent variable (in all three experiments) was time spent exhibiting "working behaviour", but as this is difficult to specify, "working" was defined by exclusion. The definitions of inappropriate behaviour used were similar to those employed by Ayllon and Roberts (1974) and included: (1) Out of seat; (2) Verbalization (allowed if talking to supervisor); (3) Turning around (turning head or head and body away from work). When subjects were not exhibiting any of these inappropriate behaviours during an observation interval, they were classified as "working".

It would seem desirable to have a second measure in terms of productivity, but there are many difficulties with this. Since subjects were involved in making many different kinds of articles it was not feasible to have any general measure of production.

Subjects' working behaviour was monitored by an observer seated on a raised platform behind the sewing floor, not visible to subjects unless they turned right around (see Plate 7.1). Three target subjects were observed during each 20-minute session. Within each session, 10-second time-samples of behaviour were taken for each of the three subjects in rotation, thus giving 40

PLATE 7.1. Experimental Setting for Experiments 1, 2 and 3, showing Observer.

time-samples for each subject in each session. The behaviour of each target subject was classified by the observer as "working" or "not working" and coded on a recording sheet. Subjects were always observed in the same groups of three and at the same time each day.

Reinforcement. Social reinforcement (again in all three experiments) was given in the following way: when a subject's behaviour had been classified as "working" in ten time-samples, the observer signalled to the female supervisor of the clothing section by hanging a coloured square of cloth over a rail where it could be seen by the supervisor but not by the subjects. The supervisor then delivered reinforcement in the form of verbal approval to the client, when she was working.

Reinforcement was not formalized beyond instructing the supervisor to go to the client and using the client's name, to make an approving comment, focused on attention to work, rather than on productivity. Standardized reinforcement phrases were not given since such reinforcers have qualities rather different from those of normal speech, but reinforcement was generally of the form "That's very good work", or "Keep up the good work", followed by the client's name. These verbalizations were accompanied by appropriate nonverbal gestures.

Reliability. Reliability ratings were taken four times during Experiment 1 by having a second person make a simultaneous observation record. Reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements. This is a standard method for calculating

reliabilities in both classroom and workshop studies. Over the four checks the percentage of agreement for working behaviour ranged between 82.5% and 95%.

Design and Procedure. During two weeks of baseline (BL1), rates of working behaviour were obtained for each of the 18 subjects. There were three reinforcement phases each of two weeks duration. The two experimental groups (A and B) differed in their treatment only in that subjects in Group A were observed and first received their reinforcement in the morning, and those in Group B were observed and first received reinforcement in the afternoon. This design was used in order to investigate any possible interaction of reinforcement effectiveness with time of day. Control subjects were equally represented in morning and afternoon sessions.

In the first experimental phase (E1), Group A subjects were observed and received contingent social reinforcement once each day in the morning, and Group B subjects received contingent reinforcement in the afternoon. In the second experimental phase (E2) the possible amount of reinforcement was doubled for both groups. Group A subjects were now receiving reinforcement in the afternoon as well, and Group B subjects were now also reinforced in the morning. These two reinforcement phases are denoted E2(i) and E2(ii); together they constitute Phase E2. In the third experimental phase (E3) one reinforcement session was deleted for both groups so that subjects could potentially receive the same amount of reinforcement as they had received in E1. Finally,

baseline conditions were reinstated (BL2) and rates of working behaviour obtained for all subjects. Group C subjects (controls) were observed at the same time each day for the whole of the experiment, but received no reinforcement.

Analysis of Results. Because of the complicated experimental design in terms of number of phases, as well as the inclusion of two experimental groups, it was decided to supplement the initial analysis of variance with orthogonal particular comparisons related to the experimental hypotheses, rather than to rely only on overall significance levels. This form of analysis was used also for Experiments 2 and 3. Computations were undertaken using the MANOVA subprogram of SPSS (Cohen & Burns, 1976). Two-tailed tests were applied unless otherwise specified in this and other experiments.

RESULTS

Statistical evaluation was conducted on the mean percentage of intervals in which "working behaviour" was scored for each subject in each phase. Since in this experiment (as in the two studies which follow) mean baseline performances for each group were very similar, analysis was made on raw data rather than on percentage baseline figures as is common in operant experiments of this type. Figure 7.1 plots the Groups x Phases interaction.

In this series of experiments analysis of variance was completed for Groups by Phases by Subjects, using the conventional repeated measures design. E2(i) and E2(ii) were treated as separate phases and means are plotted separately in all figures. As part of the design for experimental groups, Phase E2 was divided

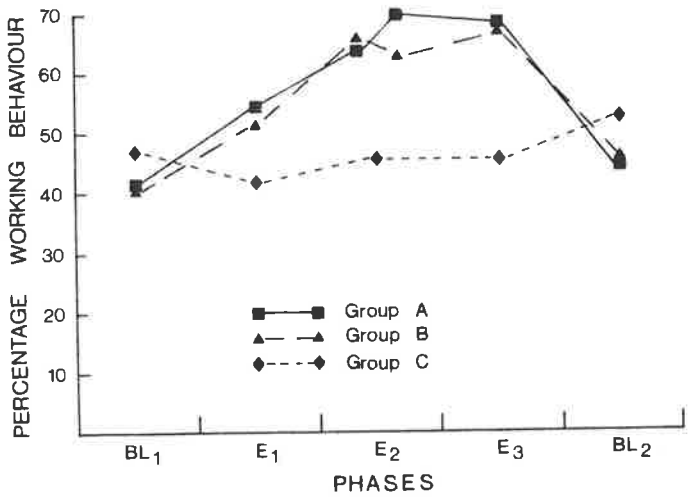


FIGURE 7.1. Mean percentage of time spent working by each group in each phase in Experiment 1.

into two subphases, E2(i) and E2(ii). This does not apply to control subjects and for the purpose of the analysis, Group C data for Phase E2 was recorded as the same for both E2(i) and E2(ii). Analysis of variance revealed a significant Phases effect ($F = 30.36$, $df = 5,75$, $p < .001$), and a significant Groups x Phases interaction ($F = 11.37$, $df = 10,75$, $p < .001$).

A number of particular comparisons were examined. Within the significant Phases effect a comparison between BL1 and BL2 gave a significant difference in favour of BL2 ($t = 2.71$, $df = 75$, $p < .01$); thus baseline recovery was incomplete. Within the significant interaction, Groups A and B were significantly superior in performance to Group C contrasting Phases E1, E2 and E3 with baseline

phases ($t = 9.81$, $df = 75$, $p < .01$), showing clearly the effectiveness of social reinforcement. There was no significant difference between Groups A and B on this comparison ($t = .07$, n.s.); thus the hypothesis that time of day might interact with efficiency of the treatment was not supported here.

A significant comparison between Groups A and B over Phases E2(i) and E2(ii) ($t = 2.47$, $df = 75$, $p < .05$) is problematic. On examination of Figure 7.1 it can be seen that Group A continues to rise at this point, whereas Group B shows a slight decline. Since for Group A subjects E2(ii) represents afternoon reinforcement as opposed to morning reinforcement for Group B, this result is at odds with the above interpretation that time of day is not important.

Groups A and B were superior to Group C contrasting Phase E1 with Phase E3 ($t = 3.03$, $df = 75$, $p < .01$). Thus the continuing rise in the experimental groups through Phases E1 and E2 did not fall away immediately in Phase E3 with a reduction in the amount of reinforcement (see Figure 7.1). However, on examination of individual subjects' daily performance in Phase E3, a downward trend in responding over the ten days is apparent. Table 7.1 presents the means for each subject over the first and second halves (i.e. mean performance on days 1-5 and days 6-10). Using a related samples t test, performance in the second week was significantly lower than that in the first ($t = 5.76$, $df = 11$, $p < .01$). Control subjects show no such decline.

TABLE 7.1. Mean percentage of intervals spent working by each subject in each week of Phase E3 in Experiment 1.

	Days 1-5	Days 6-10
Group A	72.50	66.00
	75.50	63.00
	78.50	67.50
	74.38	62.50
	64.00	55.00
	67.50	68.75
Group B	70.83	62.00
	79.38	73.00
	76.00	67.00
	54.00	55.00
	83.13	76.50
	62.00	51.50

DISCUSSION

Clearly the social reinforcement provided by the supervisor did effectively control the working behaviour of these subjects and attending levels were improved during each of the three treatment phases. Thus the usefulness of social reinforcement in this setting was established. The hypothesis that time of day during which observations were taken might affect working behaviour was not in general supported, as there was no overall difference between the two experimental groups on comparing experimental phases with baseline phases.

Increasing the amount of reinforcement available caused a further increment in performance of experimental groups, and attending levels were still higher in the third experimental phase. However, a

significant trend downward for experimental subjects within this phase indicated some attenuation of the treatment at this stage. This finding was unexpected and was further investigated in Experiment 3.

7.3. EXPERIMENT 2

Having established the overall effectiveness of the reinforcement procedure it was now necessary to investigate whether the reinforcement contingency was important in the behavioural control. This was particularly necessary in this study because of the looseness of the contingency due to the necessary delay between response and reinforcement.

Noncontingent reinforcement has been examined in classroom settings and has been shown to be effective. Evaluation of experimental findings regarding noncontingent reinforcement, however, are complicated by the fact that in many cases the specification of "noncontingent" delivery of reinforcement leaves much to be desired. For instance, Hart, Reynolds, Baer, Brawley and Harris (1968) described as noncontingent, reinforcement given at random intervals of time without regard to subjects' behaviour; the definition is reasonable enough, but specification of "random" is required. Noncontingent delivery of tokens meant ten tokens at the start of the lesson to Brigham, Finfrock, Breumig and Bushell (1972). An even more inappropriate definition is that of Bushell, Wrobel and Michaelis (1968) where tokens given contingently but with reduced purchasing power were deemed "noncontingent".

In the study by Hart et al. (1968), noncontingent teacher social reinforcement combined with desired tangible reinforcers was found to be ineffective in controlling desired behaviour (cooperative play) in an obnoxious child. In the noncontingent treatment phase cooperative play remained at less than 5%. However, rescheduling reinforcement directly to follow cooperative behaviour and ignoring obnoxious behaviours caused a rise in the desired behaviour to 40%. Other examples of the improvement in behaviour which follow rescheduling of attention, and attest to the reduced effectiveness of noncontingent social reinforcement were mentioned in Chapter 5.

Noncontingent social reinforcement is, however, often quite effective in naturalistic settings. Kazdin and Forsberg (1974) compared the effectiveness of contingent and noncontingent delivery of tokens upon the appropriate classroom behaviour of target educable retarded students observed serially. There was not much difference between the two (although it should be noted that the contingent delivery took the form of a group contingency).

Marholin et al. (1975) also reported that "noncontingent" delivery of tokens and social reinforcement (at the end of each session) was highly successful in maintaining on-task behaviour.

Cormier (1970), as reported in Chapter 5, Section 5.3.2(a), included a noncontingent reinforcement phase in his study of teacher social reinforcement with disadvantaged adolescent high school students. He reported that although noncontingent social reinforcement, when teachers were instructed to give praise ".... without regard to what behavior might be occurring at those times" (p.22) was less successful than contingently delivered social

reinforcement, it was nonetheless effective.

The purpose of this study (Experiment 2) was the investigation of the importance of contingency in mediating the efficacy of supervisor social reinforcement in the sheltered workshop. It was hypothesized that social reinforcement delivered "noncontingently"* would not be as effective in controlling behaviour as such reinforcement given contingently.

METHOD

Subjects. The subjects chosen for observation were 18 females with an average age of 23 years and average IQ of 72 (WAIS). These subjects were split into three groups of six subjects, matched on the basis of age, IQ, and work rate.

Reliability. Inter-observer agreement obtained from simultaneous work ratings ranged between 77.5% and 90% over four checks.

Design and Procedure. Subjects were observed and reinforced following the method used in Experiment 1. During the two weeks of baseline observations (BL1), individual rates of working were obtained. There were three reinforcement phases each two

---

* "Noncontingent reinforcement" as used here and elsewhere in the experimental work reported in this thesis, refers to a condition where the degree of contingency between target behaviour and reinforcement may be rather higher than that arising from mere chance occurrence. In naturalistic settings, strict noncontingency is difficult to produce, and this matter is discussed in Chapter 13 (Section 13.2).

weeks long, during which experimental subjects received social reinforcement on three days per week, Monday, Wednesday and Friday. This deviation from previous practice of reinforcement on five days per week was necessitated by administrative problems. Treatment of the two experimental groups differed only in that Group B received contingent reinforcement while Group A subjects were individually yoked to subjects in Group B and received their social reinforcement noncontingently at the same relative time in the observation period as their Group B counterparts. In Phase E1, experimental subjects were observed for a 20-minute session once each reinforcement day. In Phase E2 there were two reinforcement sessions, E2(i) and E2(ii) on each reinforcement day. In Phase E3, one reinforcement session was deleted. On Tuesday and Thursday, baseline observations were made during the 20-minute observation time slot. Finally, extinction lasted for two weeks (BL2). Control subjects (Group C) were observed each day for the whole ten weeks, with an additional daily observation in Phase E2.

RESULTS

Statistical analysis was conducted on the mean percentage of intervals in which "working behaviour" was recorded in each phase for each subject. Means for reinforcement phases did not include nonreinforcement days. Figure 7.2 plots the Groups x Phases interaction.

An analysis of variance revealed a significant Phases effect ($F = 73.65$, $df = 5,75$, $p < .001$), a significant Groups effect ($F = 42.54$, $df = 2,15$, $p < .001$), and a significant Phases x Groups interaction ($F = 23.85$, $df = 10,75$, $p < .001$).

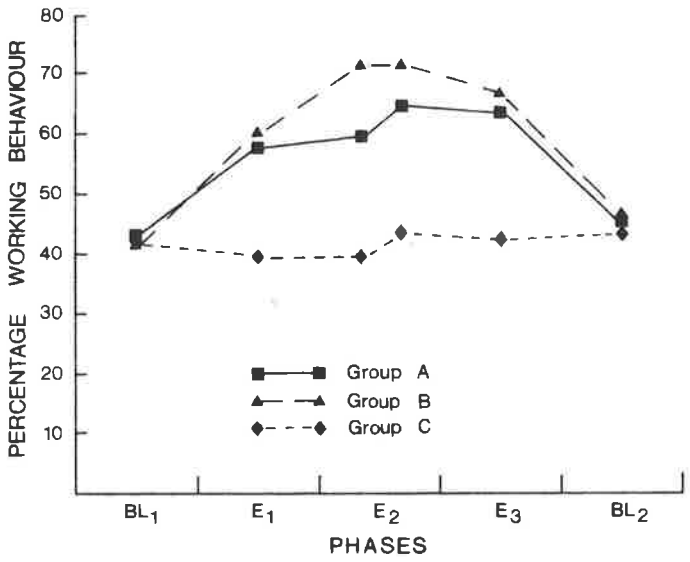


FIGURE 7.2. Mean percentage time spent working by each group in each phase in Experiment 2.

Return to baseline was again incomplete, as shown by a particular comparison within the Phases effect between BL1 and BL2 ($t = 2.91$, $df = 75$, $p < .01$). Performance of Groups A and B was significantly higher than that of Group C ($t = 9.05$, $df = 15$, $p < .01$), showing the effectiveness of the treatment. There was no overall difference between Groups A and B ($t = 1.80$, n.s.). However, in examining particular comparisons within the significant interaction, it was found that Group B was significantly superior in performance to Group A contrasting Phase E2 with Phases E1 and E3 ($t = 3.31$, $df = 75$, $p < .01$). This suggests that the effect of contingency (versus noncontingent reinforcement) may only be

important under conditions with extensive periods of reinforcement such as occurred within Phase E2.

A comparison between E2(i) and E2(ii) within the Phases effect was significant ($t = 2.53$, $df = 75$, $p < .05$); but the superiority of E2(ii) was not significantly different on examining the interactional comparison between Groups A and B ($t = 1.23$, n.s.). Hence this finding cannot be related to time of day or contingency of the reinforcement. Perhaps the effect is due to novelty.

A particular comparison within the interaction showed the superiority of Phase E2 over Phases E1 and E3 when Groups A and B were compared with Group C ($t = 2.77$, $df = 75$, $p < .01$). Thus increasing the amount of reinforcement available led to a further increase in responding. A return to reinforcement once per day was accompanied by a more immediate decline than that observed in Experiment 1.

DISCUSSION

Both noncontingent and contingent social reinforcement were effective in controlling subjects' working behaviour and there was no overall difference between the two, in keeping with the findings of Kazdin and Forsberg (1974) concerning noncontingent and contingent token reinforcement.

Increasing the amount of reinforcement available by introducing a second daily reinforcement session led to further improvements in both treatment groups, and this improvement was especially marked for the contingent reinforcement group where a significant interactional comparison favoured contingent

reinforcement over noncontingent reinforcement during the phase when reinforcement was available twice daily.

7.4. EXPERIMENT 3

Although there was no significant decline within phases at other stages of the experiment, an interesting facet of the results of Experiment 1 was the unexpected steady decline in time spent working when the possible amount of reinforcement was reduced during Phase E3. It had been expected that frustration might enhance performance at this point, due to increased motivation. Perhaps the decline is a reinforcement contrast effect; or the drop may be congruent with the proposal of Baumeister (1968) that retardates are able to reach a high level of performance but find that level difficult to maintain due to spontaneous intra-subject variability.

A further possibility is that subjects may habituate to verbal approval after such a long period of reinforcement; applied research has sometimes cast doubt on the durability of such reinforcement. This possibility was investigated in the present experiment, where it was hypothesized that the above-mentioned decline was not due to habituation. In order to test this hypothesis, two groups had the same reinforcement possibilities over different time spans.

METHOD

Subjects. There were 12 subjects with an average age of 20 years and an average IQ of 66 (WAIS). Subjects were divided into two groups, A and B, matched on the basis of age, IQ, and working behaviour.

Reliability. Inter-observer agreement obtained from simultaneous work ratings ranged between 87.5% and 92.5% over three checks.

Design and Procedure. Following two weeks of baseline observations (BL1), Group A subjects had three reinforcement phases each of two weeks duration. Reinforcement was given on five days per week. In Phase E1 subjects received reinforcement once per day. In Phase E2 there were two reinforcement sessions each day, E2(i) and E2(ii). In Phase E3 there was only one reinforcement session each day. Finally, extinction lasted for two weeks (BL2). Thus the experiment lasted for ten weeks for Group A subjects. Treatment for Group B subjects differed only in that instead of two reinforcement sessions each day for two weeks, subjects received their reinforcement once a day over four weeks. The experiment lasted for twelve weeks for Group B subjects, and the potential amount of reinforcement available for them was similar to that available for Group A subjects, although it was spread over a longer time period. During Phase E3, three subjects (one from Group A and two from Group B), left the rehabilitation centre.

RESULTS

Statistical evaluation was again conducted on the mean percentage of intervals in which "working behaviour" was scored for each subject in each phase. Analysis of variance revealed a significant Phases effect ($F = 28.56$, $df = 5,46$, $p < .001$). Figure 7.3 shows the nature of the Phases effect.

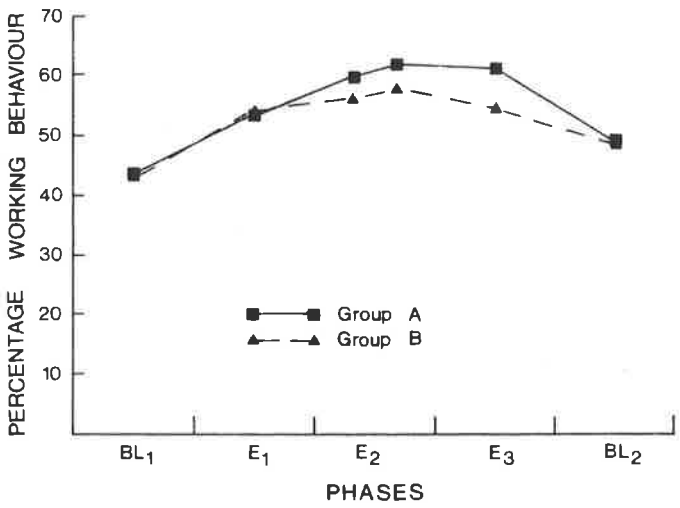


FIGURE 7.3. Mean percentage time spent working by both groups in each phase in Experiment 3.

A particular comparison of Phases E1, E2, and E3 with BL1 and BL2 showed again the effectiveness of social reinforcement ($t = 10.59$, $df = 46$, $p < .01$). The effect of the reinforcement was still present in Phase E3, as shown by Figure 7.3, but a significant interactional comparison between Groups A and B over these phases ($t = 2.09$, $df = 46$, $p < .05$) gives partial confirmation to the hypothesis that weakening of the effect may occur after a period as long as eight weeks. Performance in Phase E3 was greater than that in Phase E1 ($t = 2.58$, $df = 46$, $p < .05$), but a significant interactional comparison between Groups A and B ($t = 2.02$, $df = 46$, $p < .05$) was due to the much smaller increase for Group B, as shown.

Phase E2 was significantly superior to E1 and E3 for both groups ($t = 2.33$, $df = 46$, $p < .05$). It would seem that the effect of reinforcement, whether delivered once or twice daily, reached a maximum level during Phase E2. A comparison between BL1 and BL2 revealed that baseline recovery was again incomplete ($t = 2.86$, $df = 46$, $p < .01$).

Inspection of individual performances in Phase E3 gave further support to the finding in Experiment 1 of an unexpected decline during this phase. Table 7.2 gives the mean weekly performance for each subject during E3. Using related samples t tests, Group A subjects showed a significant decline in performance ($t = 3.96$, $df = 4$, $p < .05$) while Group B subjects did not.

TABLE 7.2. Mean percentage of intervals spent working by each subject in each week of Phase E3 in Experiment 3.

	Days 1-5	*Days 6-10*
Group A	*71.25*	*66.00*
	62.50	*56.00*
	71.00	*63.00*
	51.88	*- **
	65.00	*56.50*
	51.25	*50.83*
Group B	*48.13*	*52.00*
	50.63	*60.50*
	56.00	*53.00*
	53.75	*- **
	63.33	*55.50*
	*- **	*- **

* *Missing data caused by the departure of 3 subjects from the Centre before completion of the experiment.*

DISCUSSION

The results of this experiment show that over the eight week period studied, habituation was not sufficient to remove the effectiveness of the reinforcement procedure, with working in experimental phases being superior to that in baseline phases in both experimental groups. However, there was some suggestion of a decline in efficiency in the significant interactional comparison, supporting the inferiority of the group which had received the extended reinforcement period, when reinforcement periods were compared with baseline phases. Also, a significant trend downward in responding in the third experimental phase for Group A was in keeping with the earlier reported results, and strongly suggests a reinforcement contrast effect.

7.5. GENERAL DISCUSSION OF EXPERIMENTS 1, 2 AND 3

It is clear from this series of experiments that social reinforcement alone was an effective controller of working behaviour for the mildly retarded subjects observed. Experiment 2 showed that contingent social reinforcement was more effective than noncontingent reinforcement when reinforcement was available twice daily. Experiment 3 showed that contingent social reinforcement was effective over a period as long as eight weeks, although there were some signs of a decline in efficiency. However, in consideration of both the extended time over which reinforcement was studied and the steepness of the decline found in Phase E3 of Experiment 1, it is unlikely that habituation alone can account for the observed decline.

Overall, the findings are in accord with the recent comment by Morris (1980) regarding "....the potency and durability that social reinforcers evidence in natural settings...." (p.13).

The signalling device aroused no comments from subjects and the presence of the observer was soon ignored. At the end of Experiment 1, subjects were asked who they thought the observer was, and their answers indicated that they were not aware of having been the personal target of any experimental observations.

Baseline levels of attending by the retarded workers observed in these experiments were between 40% and 50%; in keeping with levels observed by others in both normal and special classrooms. For example, Hall, Panyan, Rabon and Broden (1968) recorded a mean baseline attending level of 47.3% across three classrooms for normal children of various ages. Other investigators report lower attention levels; Broden, Hall, Dunlap and Clark (1970) reported mean study levels of 29% and 30% in their two experiments using as subjects 13 retarded students in a special education class.

The monitoring of attending behaviour in the sheltered workshop is not common, but Karen, Eisner and Endres (1974) reported high levels of verbal prompts occasioned by visual non-attendance to work for periods of greater than five seconds. The overall mean of 0.42 prompts per two-minute observation session had reduced substantially to 0.14 in the follow-up phase. Similarly, Matson and Martin (1979) reported high levels of "eyes off task" (recorded via time-sampling) and other inappropriate behaviours such as chin wiping and inappropriate touching in their severely retarded workers. Rusch's (1979) baseline data indicate

somewhat higher attending levels with a mean over six subjects of 72.4%. These high attending rates are impressive, given the stringent requirement that subjects be attending for the entirety of any 30-second interval.

The effect of the supervisor's social reinforcement on attending was also in line with results reported by other authors. In the Hall, Panyan, Rabon and Broden (1968) study, for instance, increasing teacher social reinforcement following appropriate study behaviour led to a mean increase in that behaviour to 66.3%. It should be noted that, unlike the present work, teachers in that study were not cued as to the fulfilment of the reinforcement criterion. Hall, Lund and Jackson (1968) did use cueing to the teacher. When subjects had reached their particular reinforcement criterion, the observer held up coloured squares of paper to indicate to the teacher that reinforcement was due. This cueing procedure had a marked effect, increasing study behaviour from a baseline mean over five subjects of 34% to a reinforcement mean of 72.6%.

Increases in attending observed in retarded subjects following social reinforcement vary. Kazdin's special classroom studies (1973b and 1977) gave mean increases over initial baseline figures in percentage attending of 45.4% and 19.1%, respectively. Rusch's (1979) subjects showed a mean increase of 15.13% in attending when reinforced for attending behaviour; a large increase, given the high baseline performance of these subjects.

Noncontingent reinforcement was quite effective in Experiment 2, in keeping with the conclusion of Cormier (1970) that "Teacher noncontingent praise is effective in increasing the relevant behavior of all students" (p.58). The hypothesis that noncontingent social reinforcement would be less effective than contingent social reinforcement was supported only during extensive periods of reinforcement. The finding of relative effectiveness of noncontingent reinforcement in school and workshop settings is a useful one and warrants further investigation. Experiments 6 and 9B (reported in Chapters 9 and 12) explore the efficacy of noncontingent reinforcement respectively in a school and workshop setting.

In all three studies reported in this chapter, results show that the environment established through the use of social reinforcement should be maintained if there is to be continued improvement in performance.

Lack of resistance to extinction is also frequently reported in the literature. Walker and Buckley (1968), for instance, found that providing feedback, points and praise for attending worked well at the time of administration, but that gains in attending behaviour dropped off rapidly in extinction. Similarly, Broden, Hall, Dunlap and Clark (1970) in their examination of teacher social reinforcement alone to condition attending behaviour found low resistance to extinction, as did Trybus and Lacks (1972), Kazdin (1973b), and Kazdin, Silverman and Sittler (1975).

The reinforcement supplied in the present experiments was nonstandardized. This procedure is frequently used in an effort to ensure that the praise seems genuine and realistic. Sometimes, however, standardized phrases are supplied; for example, Hay et al. (1977) had teachers use five praise statements. With each usage the teacher checked the statement off a list.

In the present series of experiments, the supervisor was instructed to focus on attending to work, and not on productivity, in her approval statements. Horton (1975) wanted his teachers to deliver "behavior-specific praise", and not just general approval statements, and used a training programme to this end. Rusch (1979) had the experimenter deliver praise statements "limited to the quantity of work" in the output contingency, and praise statements aimed at appropriate behaviour in the attending contingency. It has been shown that specifying the behaviour praised is advantageous. Bernhardt and Forehand (1975) and Bernhardt, Fredericks and Forbach (1978), both showed that "labeled praise" was significantly superior to "unlabeled praise" in improving marble-dropping performance in children. "Labeled praise" specified the correct behaviour in each case, for example, "Good boy, you put the marble in the correct hole"; "unlabeled praise" was "nice" or "good" etc.

In the experiments reported herein the definition of working behaviour selected was a topographical one. When such a definition is employed there will always be some parts of true working behaviour (for example, inspection) which are missed

and some behaviours included which should not be. As Krupski (1980) commented about the use of topographical definitions of attending: "A serious problem with this convention is that there is no way of knowing whether a child who is making eye contact with appropriate academic materials is, in fact, involved in the task or is engaged in subtle task-irrelevant behaviors such as daydreaming. In the same vein, looking away from the task could indicate distraction as well as thoughtful contemplation of a task-related idea" (p.124). In spite of these difficulties, a large number of behaviour modification studies in classrooms adopt this practice.

If the behaviours classified "working" truly are work, an increase in this behaviour should be accompanied by an increase in production. Unfortunately, however, it is often not possible to quantify individual output in sheltered workshops since clients are usually engaged in many different tasks. Experiments 7A, 7B and 9B (reported in Chapters 10 and 12) will clarify the relationship between "working behaviour" and production in the working situation.

Many studies have pointed to the relationship between effectiveness of social reinforcement and the reduction of anxiety in mentally retarded subjects. As noted in Chapter 4, it is widely accepted that the mentally retarded child frequently encounters more rejection, frustration and failure than does the normal child. Thus it would be reasonable to expect that in a learning situation the retarded child will value very highly the interaction with and attention of the experimenter, teacher or

supervisor, perhaps even more than the satisfaction derived from doing the work.

The extensive work of Zigler, as reviewed in Chapter 4, provides abundant evidence of the responsivity of retardates to social reinforcement from an adult in the learning situations investigated. Extending this notion to the working situation, it is quite likely that working has been consistently associated with failure for retarded subjects and so has become aversive in itself. Hence approval will act to relieve failure-induced anxiety. Similarly, the supervisory figure may well be associated with criticism in the history of individual retarded subjects, so encouragement from a supervisor may be especially helpful in reducing anxiety, quite apart from the positive effects accruing from having reinforcement delivered by a prestigeful and admired figure. It can reasonably be suggested that social reinforcement in this situation may not be operating just as positive reinforcement, but might act to alleviate anxiety. The low degree of attenuation found in Experiment 3 lends support to this possibility.

Experiments 4 and 5 (presented in Chapter 8) investigate the generality of the present findings to subjects of high intelligence who were anxious in the specific area of mathematical learning; a normal part of the behaviour of high IQ individuals, but one which, for these subjects, had a history of punishment similar to that experienced by retardates on all tasks.

CHAPTER 8.

EXPERIMENTS 4 AND 5 : SOCIAL REINFORCEMENT IN A LABORATORY SETTING USING A COGNITIVE TASK

8.1. INTRODUCTION

Following on from initial research at Bedford Industries which showed that social reinforcement from a supervisor (whether contingent or noncontingent) was effective in controlling attending behaviour in target clients, it was hypothesized that one possible source for the demonstrated efficacy of social reinforcement may arise from the association between work and frequent failure in the life history of mentally retarded persons.

Generality of these earlier findings was investigated by extending consideration to subjects of higher intellectual capacity engaged in a more cognitive task about which they nonetheless felt some degree of anxiety. Panda and Lynch (1972) commented on the lack of such generality in the social reinforcement literature: "A surprising deficiency in the current research on social reinforcement effects is the failure to use more complex cognitive tasks" (p.119).

Psychology students frequently complain of fear of statistics, which is a compulsory subject in many Psychology courses. Even students with demonstrated ability in other course areas, may be anxious about statistics. Thus, generalization of previous findings to first-year Psychology students who had failed their statistics course and also expressed anxiety about statistics, was attempted. Working through a programmed statistics text was felt

to offer a suitable comparison for tertiary students to the sewing tasks investigated at Bedford Industries. Progress through a programmed learning text has an obvious attraction in increased potential for precision of measurement, and this index has been used as the dependent variable in classroom behaviour modification studies (e.g. Brigham, Finfrock, Breunig & Bushell, 1972; Brigham, Graubard & Stans, 1972). Similarly, the use of mathematics or arithmetic performance facilitates the monitoring of output.

Programmed instruction seems a particularly suitable medium for the learning of mathematical skills for individuals who exhibit anxiety in this area. Skemp (1960) has suggested that anxiety resulting from past failure experiences may act to suppress mathematics ability; that is, anxiety-induced blockages might occur. If such blockages do inhibit mathematics ability, then verbal encouragement might decrease anxiety and facilitate performance. Likewise, the following of a programme allowing frequent success experiences might help to overcome students' fear of calculations.

Skinner (1954) noted that many students failed to achieve a standard of mathematical competence in which automatic reinforcement occurred: "The glimpse of a column of figures, not to say an algebraic symbol or an integral sign, is likely to set off - not mathematical behavior - but a reaction of anxiety, guilt and fear" (p.92). Skinner's comments on automated teaching give some indication of his confidence in mechanization in education. He stated: "There is a simple job to be done. The task can be

stated in concrete terms. The necessary techniques are known. The equipment needed can be easily provided. Nothing stands in the way but cultural inertia" (p.97).

Skinner (1958) restated his earlier proposal that, with learning processes better understood, increased sophistication in teaching machine technology would result. Certainly we should not return to the use of aversive consequences in schools; punishment, disapproval and failure, he said, are out of keeping with the modern approach to education and with Western culture as a whole, and ".... a school system must be called a failure if it cannot induce students to learn except by threatening them for not learning" (p.977).

Skinner (1968) stressed the importance of the reinforcement value of being correct. These automatic natural reinforcers need to be channelled to optimize learning: "Programmed instruction is primarily a scheme for making effective use of reinforcers, not only in shaping new kinds of behavior but in maintaining behavior in strength" (p.156). Skinner commented on the fact that much opposition to programmed instruction is based on the seeming lack of the personal touch; that being told you are correct by a book or machine is in no way similar to receiving the same information from a teacher.

Certainly the lack of any personal interaction might be one of the reasons why progressing through a programmed course is very tedious. Crist (1966) for instance, noted that children quickly become bored when programmed instruction is used. This comment is equally true of instruction by teaching machines or by computers.

On the other hand, there may be some situations where such lack of face-to-face confrontation with a teacher might be a benefit. In subject areas where inhibiting anxiety is a problem, such lack of interaction, and therefore of possible negative evaluation, might outweigh the boredom generated by studying alone. Rickard, Clements and Willis (1970) commented that programmed material is useful for maintaining performance in individuals who have suffered academic failure for this reason.

The introduction of extrinsic reinforcement (both tangible and nontangible) when students are involved in programmed learning has been investigated by several authors. Preferred activities are favoured as reinforcers in this context (e.g. Addison & Homme, 1965; Clements & McKee, 1968; Holt, 1971). Free time has been used as a reinforcer for increased speed of progress (Rickard, Taylor & Libb, 1973), or for accuracy on a test of programmed material (Lovitt, Guppy & Blattner, 1969). Tokens are also used as extrinsic reinforcers to boost programme progress (Clark, Lachowicz & Wolf, 1968; Rickard et al., 1970; Cohen & Filipczak, 1971; McKee & Clements, 1971; Cohen, Rubin & Heinen, 1979).

The interaction of social reinforcement and rate of work on programmed instruction material has received little attention. Smith, Brethower and Cabot (1969, Experiment 3), found praise from the teacher to be ineffective in increasing rate of work of retarded students in their classroom study. Social reinforcement given for completion of individual work contracts

led to work rates which were "slightly higher" than those produced in baseline, but "....work behavior was not well maintained" (p.53), and children spent much of the time engaged in task-irrelevant activities. However, when money was made contingent on productivity (Experiment 2), all six subjects showed accelerating work rates over 20-odd daily 45-minute sessions.

The greatest improvement in work rates occurred when progress plotting was introduced while subjects received money for completion of work contracts. Another highly successful venture was the provision of feedback alone for output via charting; the authors stated that "Information feedback in the form of 'points' is fully as effective as the monetary consequence in maintaining task behavior" (p.60). These points, it should be remembered, were not exchangeable for back-up reinforcers, but merely functioned to provide feedback on daily output.

Another study which underlined the inadequacy of intrinsic reinforcement in the programmed learning setting for mentally retarded learners is that of Birnbauer, Wolf, Kidder and Tague (1965). It will be recalled (Chapter 5, Section 5.6.5) that these investigators imposed a token system with accompanying social reinforcement on a programmed learning environment. The subjects were 17 retarded students and they worked through a variety of programmes for one to two hours each day. Tokens accompanied by social reinforcement were given in the initial stages of the study, either when pupils finished a unit of work or, if the teacher were present, as each item was correctly completed.

The removal of the token-social reinforcement system produced confusing results. Five of the 17 subjects showed no adverse

effects when the reinforcers were removed, but six subjects made more errors while maintaining output, and four subjects made more errors as well as producing less. These latter subjects also became "serious disciplinary problems". A resumption of the token-social reinforcement regime caused a return to better behaviour in most subjects. The authors stressed the amount of disruption caused by the removal of the tokens. Although the results of this study are less clear-cut the assumption that extrinsic reinforcement may be necessary for retarded learners is still justified.

Maggs and Stirling (1976) combined preferred activities and social reinforcement in an effort to facilitate students' progress through a programmed reading course. During daily lessons of 35 minutes duration, social reinforcement was given for each correct response, and access to a variety of reinforcers was available if subjects achieved 90% correct on exercises at the end of the lesson. In addition, students kept records of their speed and accuracy throughout the experiment. In the experimental phase, rate correct rose dramatically above baseline performance, and students improved their group reading achievement mean from 8.0 years to 10.0 years as a result of this programme.

Thus it has been shown that motivation to work through a programmed instruction course can be improved through the use of additional reinforcement. The purpose of the experiments reported in the present chapter is to examine the use of contingent and noncontingent social reinforcement from an experimenter in this

context (Experiment 4), and to relate the efficiency of contingent social reinforcement to the subject's specific anxiety level (Experiment 5).

8.2. EXPERIMENT 4

In this experiment, progress through a programmed statistics text was monitored under conditions of contingent and noncontingent social reinforcement, experimenter presence, and a control condition, with the aim of investigating the use of social reinforcement in alleviating anxiety and in improving performance.

METHOD

Subjects. The subjects were 24 female students chosen from among the 101 University students who had failed the Statistics unit in a first-year Psychology course. In addition to their failure in the Statistics course, subjects also had to meet a criterion involving high anxiety levels as indicated in their responses to a Maths Anxiety Questionnaire. Subjects were divided into four groups matched on the basis of their questionnaire responses and their performance on a pre-test involving basic statistical concepts. Four of the original 24 subjects failed to complete the experiment and had to be replaced.

Apparatus. A "Maths Anxiety Questionnaire" was compiled using some of the items from a scale devised by Holly, Purl, Dawson and Michael (1973), and incorporating some new items (see Appendix 8.1). Subjects were asked to rate their responses to 16 items on a 5-point scale, from 1 ("in complete accordance with the way you

feel"), through to 5 ("does not apply to you at all"). All students chosen as subjects had rated at least two items at the extreme end indicating anxiety.

A "General Test" was devised, consisting of ten basic statistics questions with which most first-year Psychology students could be expected to be familiar. A second "Programme Test" consisted of ten items involving concepts which should be learned as the subjects followed the programmed material (two items from the test at the end of each of the first six chapters of the programme were modified for use in this test). Details of the General and Programme Tests are given in Appendix 8.2.

The Programme. A nonbranching programmed introduction to Statistics (Elzey, 1966), served as material for subjects to work through individually, but under the supervision of the experimenter. Exercises at the end of each chapter enabled progress checks to be made.

Reinforcement. Contingent social reinforcement was given in the following way: each time a page of the text was turned, the experimenter made an approving comment, sometimes incorporating the subject's name. The exact words used were varied so as to make the situation seem as realistic as possible.

Design and Procedure. Before the first session all subjects attempted the General and Programme Tests. Subjects worked through the programmed text for five individual weekly sessions of 40 minutes duration. Groups A and B were experimental subjects,

while Groups C and D were controls. Group A received social reinforcement contingent upon working as described above. Group B subjects received noncontingent social reinforcement; each subject was yoked to a subject in Group A and received reinforcement at the same relative time in each experimental session. Figure 8.1 presents a simulation photograph of the experimental setting for Groups A and B.

FIGURE 8.1. Simulated photograph of the experimental setting for Groups A and B in Experiment 4.

Control subjects followed the programme in the same way as experimental subjects, but received no reinforcement from the experimenter. For Group C subjects, the experimenter was present during sessions, working at her desk several feet behind the subject. Group D subjects followed the programme on their own in another room, but their working behaviour was monitored unobtrusively by an observer. Through

the use of 10-second time-samples (1 per minute) during which the behaviour of subjects in Group D was classified as working or not working, the percentage of time spent on-task in each session was calculated. The criterion used for not working was similar to that used in previous studies (see Experiment 1, Chapter 7) although it was subsequently found that two of the three "not working" categories were irrelevant in this laboratory setting since subjects never left their seats and only on one occasion did one subject utter a verbalization. Thus looking away from the text constituted the "not working" behaviour.

After the fifth session, subjects again filled out the Maths Anxiety Questionnaire and attempted the General and Programme Tests.

RESULTS

The major dependent variable was "output" in terms of the number of questions completed each session. Table 8.1 gives the mean number of questions completed per session by each subject in each group.

TABLE 8.1. Mean number of questions completed per session by each subject in each group in Experiment 4.

	Group A	*Group B*	*Group C*	*Group D*
	35.8	*42.4*	*35.0*	*31.2*
	42.0	*32.8*	*32.4*	*38.4*
	32.0	*34.4*	*34.2*	*34.0*
	41.8	*32.4*	*32.6*	*32.6*
	32.8	*32.0*	*28.8*	*34.8*
	42.8	*33.8*	*32.4*	*39.6*
Mean	*37.9*	*34.6*	*32.6*	*35.1*

Initial data analysis comprised a Pearson's r, correlating this major variable with anxiety scores before and after treatment; subjects' scores on the General and Programme Tests before and after treatment; and percentage correct of the test questions concluding each chapter. From this analysis the following significant correlations emerged: number of questions completed per session with anxiety before treatment ($r = -.37$); with anxiety after treatment ($r = -.36$); and with scores on the General Test before treatment ($r = .38$). Thus, as might be expected, the students who progressed most slowly in the learning task were those who were most anxious and incompetent.

A one-way analysis of variance was performed across the four groups, using number of questions completed per session as the major dependent variable and including the following three co-variates: anxiety before treatment, and performance on both of the pre-treatment ability tests. The inclusion of these covariates reduced variation due to individual differences in the groups. There was no significant Groups effect ($F = 1.97$, $df = 3,17$, n.s.). In addition, the particular comparison between Group D (experimenter absent), and the other three groups was not significant ($t = 0.52$, $df = 17$, n.s.). Despite the generally small and nonsignificant differences, there was a significant particular comparison between contingent reinforcement (Group A) and noncontingent reinforcement (Group B) in favour of contingent reinforcement ($t = 2.19$, $df = 17$, $p < .05$).

Despite the relatively slow performance in Group B subjects, it was this group who showed the greatest change in anxiety as revealed

by differences in pre-treatment and post-treatment responding on the Anxiety Questionnaire (see Table 8.2). In fact, only four subjects in total gave higher anxiety scores after treatment and six subjects gave no change. Single sample t tests on the difference scores on anxiety for each group revealed a significant improvement for Group B subjects ($t = 2.08$, $df = 5$, $p < .05$, one-tailed test). There were no significant improvements in the remaining three groups.

TABLE 8.2. Differences between pre- and post-treatment scores in number of items rated at the anxious extreme for each subject in Experiment 4 (a positive score indicates reduced anxiety in the post-treatment session).

	Group A	*Group B*	*Group C*	*Group D*
	-1	*3*	*0*	*1*
	4	*4*	*0*	*0*
	4	*-2*	*2*	*-1*
	0	*1*	*0*	*1*
	3	*6*	*0*	*3*
	-1	*2*	*3*	*4*
Mean	*1.5*	*2.3*	*0.8*	*1.3*

The hypothesis that contingent social reinforcement always operates by alleviating inhibiting anxiety received no support from these results, in that Group A showed faster learning but less decrease in anxiety, compared with Group B. According to Skemp's (1960) conception, the more anxious a subject is initially, the more she should be helped by contingent social reinforcement.

However, the Pearson's correlation between mean number of questions completed each session and pre-treatment anxiety for subjects receiving contingent social reinforcement was -0.70, which, although on the borderline of significance, is in the opposite direction to Skemp's hypothesis.

Analysis of variance of the change in performance following treatment on the General Test gave a significant Groups effect ($F = 4.15$, $df = 3,20$, $p < .05$). Further particular comparisons showed no difference on this measure between contingent and non-contingent reinforcement ($t = 0.46$, $df = 20$, n.s.). However, both reinforcement groups were inferior to Group C ($t = 3.48$, $df = 20$, $p < .01$). Clearly the groups were not adequately matched by the "pre-test", since Group C subjects scored significantly lower than subjects in the other three groups on the initial General Test ($t = 5.34$, $df = 22$, $p < .01$, one-tailed test). Group C subjects thus had greater scope for improvement.

Change in performance on the Programme Test also yielded a significant Groups effect ($F = 3.54$, $df = 3,20$, $p < .05$). In this case, contingent reinforcement was superior to noncontingent reinforcement (see Table 8.3), using a particular comparison ($t = 2.95$, $df = 20$, $p < .01$), a result which is in keeping with the faster progress through the text for these subjects. Despite this effect of contingency, the comparison between the reinforced groups and Group C was not significant ($t = 0.66$, $df = 20$, n.s.). Again this effect is parallel to that observed with the measure of progress during learning (number of questions completed), and requires no further comment.

TABLE 8.3. Mean number of questions answered correctly by each group in the pre- and post-treatment General and Programme tests in Experiment 4.

	Ability Test	*Group A*	*Group B*	*Group C*	*Group D*
Pre-Test	*General*	*5.92*	*7.92*	*2.67*	*6.25*
	Programme	*0.75*	*2.67*	*0.58*	*1.08*
Post-Test	*General*	*6.17*	*7.50*	*6.92*	*7.17*
	Programme	*6.92*	*5.58*	*4.50*	*4.33*
Mean Improvement	*General*	*0.25*	*-0.42*	*4.25*	*0.92*
	Programme	*6.17*	*2.91*	*3.92*	*3.25*

DISCUSSION

Contingent social reinforcement was more effective than non-contingent reinforcement in this experiment, upon examining output and improvements in performance on the specific Programme Test.

The superiority of contingent reinforcement over noncontingent reinforcement in improved rate of progress found in this experiment is in keeping with results reported by Rickard et al. (1970) in which tokens given noncontingently (at the end of each session) led to a significant decline in rate of progress in comparison with performance under contingent delivery. Using five emotionally disturbed boys as subjects, Rickard et al. examined progress (speed) through a programmed mathematics course under baseline, contingent reinforcement, and noncontingent reinforcement conditions. It was found that the introduction of tokens contingent upon output (number of frames completed each daily one and a half hour session)

led to an immediate gain in output. When tokens were delivered noncontingently, production declined to very low levels. When the contingency was reinstated, performance improved again but never reached the high levels attained in the first experimental phase. Since contingent token delivery was related to performance on tests, it is clear that subjects were not merely going faster but were also understanding the material covered.

In the present experiment it seems likely that noncontingent social reinforcement served to distract subjects. This interpretation is borne out by subjects' responses when quizzed at the end of Day five about their reactions to the experiment; while for Group A subjects there were three positive reactions (e.g. "Your encouragement helped me a lot to keep up speed"), Group B subjects gave no positive comments. In fact, one subject reported: "You disturbed my concentration by interrupting". In general, subjects' comments were neutral in character and concerned the usefulness of the programmed material.

The hypothesis that anxiety is positively related to social reinforcement responsiveness was not supported. The only group which showed a significant improvement in anxiety after the experiment was the noncontingent reinforcement group who showed the least output improvement; and within the contingent reinforcement group, pre-treatment anxiety correlated negatively with output.

The superiority of Group C (no treatment, experimenter present) in relation to change in performance on the nonspecific General Test was unexpected. This finding showed that there was

little generalization from the concepts learned in the programme to more general questions. The result also suggests the inadequacy of the pre-test used for matching purposes, again perhaps suggesting the specificity of the different content areas involved.

The lack of any significant inferiority on any of the indices for Group D who ran in the "E absent" condition is in keeping with the often reported finding of high performance on repetitive tasks in the "laboratory" setting (e.g. Orne, 1962), and is in accord with the findings of Experiment 5A (reported in Appendix 8.3).

8.3. EXPERIMENT 5

In this experiment, the relationship between subjects' anxiety levels and responsiveness to contingent social reinforcement was further investigated, using the same task as before. Further research was considered necessary in view of the unexpected negative relationship between initial anxiety and progress found in Experiment 4.

METHOD

Subjects. The subjects were 24 females chosen from the population of University students who had failed the compulsory Statistics unit in a first-year Psychology course. They did not overlap with subjects in Experiment 4. Twelve subjects who checked more than two items on the extremely anxious end of the Maths Anxiety Questionnaire, and 12 subjects who checked either none, or one item at the extreme end, constituted the High and Low anxiety groups, respectively. These groups were further randomly subdivided into

Experimental and Control groups. No subjects dropped out before completion of the experiment. It is of interest to note that of this cohort of students who failed Statistics, 81 checked more than two items on the extreme end of the Maths Anxiety Questionnaire, and of these, 61 were female. Only 19 students who failed fell into the nonanxious category: 7 males and 12 females.

Design and Procedure. All subjects completed the General and Programme Tests as in the previous experiment. Similarly, subjects completed individually five weekly programmed learning sessions of 40-minutes duration. Groups A and B were Experimental subjects (High and Low anxiety, respectively), and received contingent social reinforcement as in Experiment 4. Groups C and D (High and Low anxiety, respectively) were control subjects who received no social reinforcement. The experimenter was always present for the Control condition in this experiment.

At the end of the treatment, subjects completed the Maths Anxiety Questionnaire and re-attempted the General and Programme Tests. One-tailed tests were used for this experiment, since the experimental predictions examined were supported by previous experimentation.

RESULTS

The number of questions completed each session was the major dependent variable. Table 8.4 gives the mean number of questions completed per session by each subject in each group.

TABLE 8.4. Mean number of questions completed per session by each subject in each group in Experiment 5.

	Group A	*Group B*	*Group C*	*Group D*
	43.0	*42.8*	*35.8*	*30.8*
	40.6	*35.4*	*32.4*	*32.4*
	43.4	*29.2*	*39.0*	*39.8*
	43.0	*44.8*	*33.0*	*30.6*
	28.6	*32.4*	*22.0*	*34.6*
	27.6	*42.4*	*38.4*	*32.4*
Mean	*37.7*	*37.8*	*33.4*	*33.7*

The data were analysed using two-way analysis of variance with particular comparisons, with pre-experimental scores on the General and Programme Tests used as covariates. There was no significant effect of anxiety ($t = 0.42$, $df = 1$, n.s.), and no significant interaction between anxiety level and reinforcement ($t = 0.24$, $df = 1$, n.s.). However, there was a significant effect of reinforcement ($t = 1.78$, $df = 18$, $p < .05$, one-tailed test), in keeping with other findings that progress can be enhanced with extrinsic reinforcement.

Groups A and C, containing those subjects with high initial anxiety, showed the greatest reduction in anxiety as a result of the programme (see Table 8.5). Only four subjects out of the total 24 gave increased anxiety in the post-treatment session, and seven subjects gave no change. Single sample t tests on the difference scores for anxiety in each group revealed a significant improvement for Group A subjects ($t = 2.63$, $df = 5$, $p < .05$, one-tailed test).

There was no significant improvement in the remaining three groups.

TABLE 8.5. Differences between pre- and post-treatment anxiety scores for all subjects in Experiment 5 (a positive score indicates reduced anxiety in the post-treatment session).

	Group A	*Group B*	*Group C*	*Group D*
	4	*-1*	*1*	*0*
	0	*1*	*0*	*-2*
	6	*0*	*3*	*0*
	2	*0*	*0*	*1*
	3	*0*	*1*	*-2*
	0	*-1*	*6*	*0*
Mean	*2.5*	*-0.2*	*1.8*	*-0.5*

A two-way analysis of variance on the anxiety difference-scores (post-anxiety minus pre-anxiety) gave a significant effect ($F = 11.60$, $df = 1,20$, $p < .01$). This reflected the obvious point that only high anxiety groups could improve their scores on this scale. The reinforcement effect was not significant ($F = 0.46$, $df = 1,20$, n.s.).

Two-way analyses of variance on the performance difference-scores ('post' minus 'pre' scores) for the General Test and the Programme Test reflected no significant effects. Thus although contingent reinforcement did lead to greater progress, this was not accompanied by significantly greater gain in comprehension of the material tested in either the General or the Programme Test, compared with nonreinforced groups (see Table 8.6, which presents

the mean number of items correct for each group on both the General and Programme Tests). This finding thus does not confirm results reported by other investigators; inspection of Table 8.6 shows that for both tests the mean improvement was greatest in Group A (reinforced anxious subjects), so that at least the "trend" in the present results does not conflict with earlier work.

TABLE 8.6. Mean number of items correct on pre- and post-treatment General and Programme Tests for all groups in Experiment 5.

	Ability Test	*Group A*	*Group B*	*Group C*	*Group D*
Pre-Test	*General*	*4.00*	*6.33*	*5.08*	*5.33*
	Programme	*0.25*	*0.58*	*0.58*	*0.33*
Post-Test	*General*	*7.58*	*8.33*	*7.00*	*6.50*
	Programme	*5.67*	*4.83*	*5.75*	*4.33*
Mean Improvement	*General*	*3.58*	*2.00*	*1.92*	*1.27*
	Programme	*5.42*	*4.25*	*5.17*	*4.00*

DISCUSSION

This experiment gave little support to the hypothesis that responsiveness to contingent social reinforcement is strongly related to anxiety level in this kind of learning situation, with neither a significant anxiety effect nor a significant anxiety x reinforcement interaction emerging in the analyses of performance measures. The absence of effect of anxiety level may reflect the type of learning occurring under programmed instruction. Thompson (1979) commented:

"It may be argued that where quality of instruction is highest, the input from Affective characteristics will be minimised, if not eliminated" (p.183).

Subject anxiety level was mentioned in Chapter 3 (Section 3.2.5) where the Incentive-Anxiety Formulation was presented. According to this theory, social reinforcement should have the same effect on subjects of high and low anxiety in a novel experimental situation. Low and high anxiety are both associated with high motivation for social approval, whereas at medium levels of anxiety, fear of evaluation becomes dominant and ameliorates the motivation for social reinforcement. In the present experiment, Group A, with high initial anxiety, showed the largest, and significant, drop in anxiety as a result of the learning programme with social reinforcement. However, High and Low anxiety groups were similar in making rapid progress when given reinforcement and a significant reinforcement effect occurred on examination of the number of questions completed, in keeping with the Incentive-Anxiety view.

All groups, whether given social reinforcement or not, gained about the same amount on the General and Programme ability test improvement scores. Thus enhancing speed of progress through the use of extrinsic reinforcement may not always result in an improvement in knowledge.

8.4. CONCLUSIONS FROM EXPERIMENTS 4 AND 5

Despite the small experimental effects in Experiment 4, contingency of reinforcement did have an effect on two of the performance measures. In Experiment 5, social reinforcement was

found to affect rate of learning progress for both High and Low anxiety groups, although the final improvement in knowledge was not influenced significantly.

Results of these two experiments indicated that it would be worthwhile pursuing this line of research using a similar task, but monitoring ongoing attending behaviour instead of output. An attempt was made to generalize these findings to a situation in which attending behaviour was the dependent variable. This experiment (Experiment 5A, reported in Appendix 8.3) investigated attending to a task involving calculation of percentages using a calculating machine. The lack of success in producing a distraction effect, which would reduce attending behaviour below 100% and enable some effect of reinforcement to be demonstrated, negated the utility of this experimental situation.

Following this failure to produce a useful experimental situation in the laboratory setting, a more "realistic" setting where levels of nonattendance are often quite high, seemed appropriate. In Experiment 6, reported in the following chapter, an investigation was undertaken of the effects of contingent and noncontingent social reinforcement in a school classroom.

CHAPTER 9.

SOCIAL AND VICARIOUS REINFORCEMENT EFFECTS IN A SCHOOL SETTING

9.1. INTRODUCTION

Following on from the findings of Experiments 4 and 5 that contingent social reinforcement was an effective reward for students engaged in a cognitive task, and that contingent reinforcement was more effective than noncontingent reinforcement, generalization was now sought to a classroom setting.

A secondary school was approached with a view to investigating the effect of social reinforcement on attending behaviour in people of normal intelligence engaged in a cognitive task. In order not to deviate too far from the tasks used in Experiments 4, 5 and 5A, behaviour during Mathematics lessons was considered an appropriate dependent variable. It was possible also to gauge Mathematics anxiety levels, thus providing a further link with the previous experiments.

One question which seems particularly relevant to naturalistic settings is the effect on other people of a particular subject receiving reinforcement. The observation of other persons receiving praise was not included as a variable in the earlier work and represents an additional factor in the present experiment.

9.2. REVIEW OF VICARIOUS EFFECTS OF SOCIAL REINFORCEMENT IN NATURALISTIC SETTINGS

The viewing of the receipt of reinforcement by another person, so-called "vicarious reinforcement", is an important

issue in classroom and workshop management. In naturalistic settings, reinforcement typically occurs within a social context, and people continually observe the behaviour of others and the occasions on which that behaviour is rewarded, ignored, or punished. Observed rewards and punishments can play an influential role in regulating behaviour. Vicarious reinforcement has obvious implications in reinforcement programmes in applied settings, since the inadvertent effects of direct reinforcement to a "target" subject may well alter behaviour in nonreinforced individuals ("nontargets").

Since both vicarious and direct reinforcement inevitably occur together in everyday life, their interactive effects must also be considered. The influence of direct reinforcement administered under social conditions cannot be fully understood without considering the effects of vicarious reinforcement, since social comparison variables may alter the reinforcing value of a given outcome in complex ways. For instance, if a student sees someone else receive reinforcement frequently while his reinforcement is only occasional, the value of the reinforcement will be deflated, through the creation of expectations based on his observations.

Laboratory investigations of vicarious reinforcement will not be considered here. Explanations of the finding of increased imitation in an observer who has seen a model receive reinforcement rely heavily on the discriminative stimulus value of the reinforcement; a theme which is taken up in attempts to explain

changes in behaviour observed in nonreinforced peers in the classroom and the workshop.

Kounin and Gump (1958) coined the term "ripple effect" to refer to the efficient use of discipline in the classroom whereby the effects of punishment to a target may spread to other class members. The spillover of positive reinforcement effects is specifically recommended in behaviour modification manuals for teachers (e.g. Buckley & Walker, 1970; Becker, Engelmann & Thomas, 1971; Ackerman, 1972), in the hope that the behaviour of the nonreinforced observer will also improve. As Altman and Linton (1971) commented of the efficacy of teacher social reinforcement when its vicarious effects are also considered: "Even if it does turn out that the effect occurs only when backed up by occasional contingent attention, the economy of the technique might still be a productive one" (p.283).

Anecdotal reports of such generalization suggest that behaviour changes may be reflected in the observers of the reinforcement delivery. Hall, Lund and Jackson (1968) noted in passing that the attending behaviour of nontarget children also increased when the teacher gave social reinforcement for attending to various target children. However, they suggested that the increase may have been due to an accompanying increase in teacher attention to the nontarget children. Whitman, Mercurio and Caponigri (1970) reported similar anecdotal evidence in an experiment designed to increase the social behaviour of retarded isolates through the use of reinforcement. Surratt, Ulrich and

Hawkins (1969) also noted a change in the behaviour of non-reinforced subjects in the same direction as that of target subjects. Similarly, Bolstad and Johnson (1972) reported a marked decline in disruptive behaviour in control subjects when targets received points (with back-up reinforcers) for low levels of disruption. They commented: "Indeed, it is possible that the whole social system in the classroom is affected by intervention with selected children" (p.453), although they allow that lower general levels of disruptive behaviour could be due to spread of effect (that is, less opportunity for interaction), rather than the reinforcement _per se_.

Experimental data support the view that social reinforcement may have effects above and beyond those produced in the recipient of the reinforcement. Drabman and Lahey (1974) reported the effect on the behaviour of other class members when one target child received feedback from the teacher about her behaviour, ranging from "very poor" through to "good". During the experimental sessions, a timer was set to ring every ten minutes during the 45-minute session to cue the teacher for feedback delivery; only the target was informed of the significance of the timer. Time-sampling revealed a reduction in disruptive behaviours in both the target and the 12 classmates.

However, Carnine _et al_. (1968) failed to find a vicarious reinforcement effect in their investigation of the effects of socially reinforcing the appropriate behaviour of one student in a classroom upon the frequency of such behaviour in other adjacent

students. During the experimental phase, the teacher delivered approval for appropriate behaviour and ignored inappropriate behaviour in one group of students. This procedure led to a reduction in disruptive behaviour only in the target subjects.

Repucci and Reiss (1970) used a wide variety of reinforcers including stars, praise and attention, and tokens. Disruptive behaviour was followed by an immediate withdrawal of rewards as well as isolation or reduction in free time. In this experiment there were three groups of subjects; disruptive-target, disruptive-nontarget, and nondisruptive-nontarget. The experimental procedure produced a definite "ripple effect" with a decrease in disruption and an increase in task-relevant responses in all three groups. The authors commented that rather than teachers being wary about possible adverse side effects of behaviour modification programmes on nonreinforced students, such efforts may have a "major beneficial effect" on the other children.

Broden, Bruce, Mitchell, Carter and Hall (1970) focused their investigation into the effects on a nonreinforced peer in the clearly very different situation of two students at adjacent desks. In this instance, when the target subject was socially reinforced for attending behaviour, the partner also showed a significant increase in attending. The findings of this experiment were different from those of Sechrest (1963) who investigated performance of pairs of subjects engaged in the same task and reported that praise to a target subject acted as an

"implicit negative" reinforcer, i.e. caused reduced responding in the nonreinforced peer. Why positive reinforcement in the Broden et al. study did not operate as implicit negative reinforcement seems unclear. Perhaps the nature of the task may be the cause. In Sechrest's work, speed at completing two jigsaw puzzles was the dependent variable and information/reinforcement was given after completion of the first task. Sechrest concluded that his was a competitive situation, whereas working on routine schoolwork in familiar surroundings where task completion is less obvious may not be.

Broden et al. offered four explanations for their finding of improved performance in nonreinforced subjects: the first is in terms of "spillover" of the direct reinforcing effect per se of the teacher's proximity. Next, they proposed that teacher proximity operates as a discriminative stimulus for attending on the peer, since some form of teacher response to his behaviour is likely. Alternatively, a decrease in disruptive behaviour in the nontarget subject could occur because there is less opportunity to interact with the target of social reinforcement if he is now working more consistently. Finally the observer may model the behaviour which was followed by reinforcement.

Brown and Pearce (1970) included a vicarious phase in their investigation of reinforcement for output in three retarded students engaged in a simple repetitive task. Exposure to models (emotionally disturbed children) who received approving comments from the teacher was associated with a significant increase in output in two of the three subjects, although such effects were

short-lived in one case. The inclusion of direct reinforcement as well, however, was a superior treatment.

Cormier (1970) and Cormier and Wahler (1971) also reported vicarious reinforcement effects in their study of disadvantaged adolescents. The effects of teacher social reinforcement generalized significantly to nonreinforced peers, and appropriate behaviour levels improved in nontargets who were paired with subjects receiving contingent or noncontingent reinforcement. The authors adopted a modeling interpretation of this generalization effect, proposing that target students might be models for the nontargets: "The behavior of models possibly functions as discriminative stimuli in facilitating the expression by others of similar behaviours" (Cormier, 1970, p.11).

Proximity of seating was investigated in a study by Okovita and Bucher (1976) using tokens for attending as reinforcement to a target child. In the first two phases of the experiment (Baseline I and Reinforcement I), the target subject sat in between the two nonreinforced subjects; in subsequent phases the target sat at the end and the other two alternated in the middle desk. Appropriate behaviour was observed using time-sampling.

As predicted, the token reinforcement led to a significant increase in appropriate behaviour in the rewarded child, and this increase was accompanied by some degree of improved performance in both of the nontarget subjects. Of especial interest is the fact that the vicarious reinforcement effect was greatest when the peer sat adjacent to the target child. Okovita and Bucher

commented that this finding supports a modeling interpretation, since imitation would be greatest for a child sitting between two others; or perhaps, reduction in peer interaction could be the cause, although higher attending levels in nontargets when seated in the middle versus end desks is not in line with distraction predictions. Either way the vicarious reinforcement effect was transient and small.

Another study which included tangible reinforcement is that of Christy (1975). Observers used time-sampling to monitor the in-seat, aggressive and disruptive behaviour of 11 behaviour problem children, as well as monitoring teacher attention. Six children were target subjects at various stages in the experiment and received edible and social reinforcement for sitting in the seat when a whistle sounded on a Variable Ratio schedule. Once again, reinforcement to target subjects produced improved behaviour in the observing nonreinforced children.

Strain, Shores and Kerr (1976) were concerned to find ways of enhancing this useful "spillover" effect in a classroom for 10 behaviourally handicapped pre-school children. Motor-gestural and vocal-verbal behaviour of subjects was recorded in a continuous fashion, not via time-sampling. Social reinforcement combined with verbal and physical prompts constituted the intervention procedure, and once again significant vicarious reinforcement effects were observed in nonreinforced class members; the effect was magnified when two subjects, instead of one, received direct reinforcement.

Strain and Pierce (1977) investigated the durability of vicarious reinforcement effects using four pre-school retardates as subjects, seated in pairs. Social reinforcement was delivered by the student teacher for attentive behaviour during two consecutive 10-second intervals; the reinforcement phrase was standardized (student's name, followed by "you're working nicely"). At the end of each experimental phase, 20 days in length, there was clear evidence of a decline in the vicarious reinforcement effect. The authors commented: "....accelerated performance by non-reinforced subjects will diminish in the prolonged absence of reinforcement" (p.352).

Hill and Strain (1977) also investigated the effects of teacher-delivered social reinforcement in seven target mentally retarded children and seven nonreinforced mentally retarded peers. Attention to task was again the dependent variable, monitored during 5-second time-samples. Task relevant behaviour, initially at a very low level (32%), rose dramatically for subjects receiving direct reinforcement over the long 20-day experimental phase. Attentive behaviour of nonreinforced subjects did not alter, however; there was no sign of a vicarious reinforcement effect. Nor was there an improvement for these subjects during a second experimental phase. One possible reason for this lack of effect may have been a reduction below normal levels of attention to nonreinforced subjects.

Several investigations by Kazdin into vicarious reinforcement effects in retardates in classrooms (normal and special), and a sheltered workshop, also reported improved behaviour in the

observing peer. Kazdin (1973b) attempted a more rigorous replication of the Broden et al. (1970) study referred to above, since Broden et al. admitted that contingent reinforcement to the nontarget had occasionally occurred in error, and sinze Kazdin felt that those authors had used insufficient controls for teacher/reinforcer proximity.

In Kazdin's experiment, the attentive behaviour of two pairs of mildly-to-moderately retarded children was recorded. In an experimental phase, the observer who sat immediately behind the pair also delivered reinforcement, thus making a qualitative change to the previous reinforcement situations. Now the emitter of reinforcement was equidistant from both subjects, who must have been keenly aware of being observed. Using time-sampling to observe the attentive/inattentive behaviour of both subjects at once, contingent social reinforcement of a non-specified kind was delivered to the target subject contingent upon him having worked for the whole of five 5-second time-sampling intervals (i.e. 25 seconds of work, not necessarily continuous). The earlier reported finding that both target and nontarget subjects showed increases in the reinforced behaviour was replicated here.

Kazdin, Silverman and Sittler (1975) extended investigations into the effect of nonverbal attention. Using four mildly retarded subjects, again grouped into two pairs engaged in assigned "seat work" in a special classroom, an observer rated attentive/inattentive behaviour of both subjects during 10-second time-samples. After 30 consecutive seconds of continued attending behaviour, the target was given nonverbal approval (physical

contact, smiles and nods) by a teacher or teacher-aide, cued through a bug-in-the-ear device. In one condition, nonverbal approval was always preceded by a verbal prompt. Kazdin et al. (1975) found that nonverbal approval did not give rise to vicarious reinforcement effects in the adjacent peer unless accompanied by the verbal prompt. The authors concluded that the prompts served as discriminative stimuli to nontargets that approval might follow their attentive behaviour, although it also seems possible that the subjects may have missed the reinforcing event without the prompt.

An important aspect of Kazdin's work is the inclusion of "differential reinforcement for other behaviour" treatments for direct reinforcement subjects. In an attempt to explain the operation of vicarious reinforcement, Kazdin (1973b) introduced differential reinforcement for other behaviours: for target subjects, reinforcement was now delivered after five intervals of nonattending behaviour (subjects needed only to exhibit some nonattending behaviour during the interval). Interestingly, while the target subjects decreased their attending, both nontargets maintained previously achieved high attending levels.

This finding is clearly in favour of the "discriminative stimulus" explanation of Broden et al. (1970) wherein the appearance of the agent of reinforcement elicits working behaviour in the nonreinforced peer regardless of the behaviour manifested by the target subject at the time of reinforcement. Reduction in peer interaction could also be occurring.

In another experiment in a rehabilitation setting, Kazdin (1973a) showed again that the model's behaviour is irrelevant to the behaviour change observed in the nonreinforced partner. When targets were reinforced either for fast work or for slow work (number of units produced per 10-minute period in comparison with baseline means), the nonreinforced partner showed an increase over baseline output. Kazdin concluded: "Rather than responding to a peer's behavior, the nontarget subject is responding to the cue value of the reinforcing stimulus" (p.10), i.e. the behaviour of the target subject is incidental. If that is the case, he argued, reinforcement to the target would have occasionally to be paired with reinforcement to the nontarget, or extinction would occur.

It could be argued that the consistent improved behaviour in the nonreinforced subjects was due to the ordering of the contingencies in each of the above-mentioned studies, that is, that always providing reinforcement for attending/working behaviour first and then for inattentive behaviour slow producing last, was contributing to the results.

Kazdin (1977) investigated the ordering of the contingencies, again using mentally retarded subjects. This time, 10-second time-samples were used, and subjects had to be working for the entire time-sample to be scored as "attentive". A variation to the 1973b study involved the use of three standardized reinforcing phrases. Reinforcement was delivered by the teacher who was cued by the observer via a bug-in-the-ear device.

The first experimental phase involved social reinforcement to the target after each 30 seconds of inattentive behaviour (i.e. some lapse in attention during each of the three time-samples). In the second experimental phase, reinforcement was given after 30 seconds of uninterrupted attending behaviour. Since both subjects were observed simultaneously, with only two seconds for recording between each observation period, attending behaviour had to be virtually continuous in this phase for reinforcement to occur.

As predicted, reinforcement for inattentive behaviour led to a decline in responding in the target subject, but an improvement in the nontarget; reinforcement for attentive behaviour was associated with an improvement in both subjects. This study provides further support in a realistic setting for the discriminative stimulus explanation of vicarious reinforcement operation. The lack of any sign of extinction in Kazdin's data may have been due to reinforcement pairings at other times of the day.

From these studies of vicarious reinforcement in the classroom and workshop, it would seem reasonable to conclude: (a) that vicarious reinforcement is likely to occur in a working environment, especially if peers are seated in close proximity to targets; (b) that such effects can initially be quite dramatic, but may not be very durable in the absence of occasional pairing with direct reinforcement; (c) that the reinforced subjects' actual behaviour may be incidental to the nonreinforced subjects' vicarious response, at least with retarded subjects.

9.3. EXPERIMENT 6

Experiment 6 investigated social reinforcement with a normal population engaged in a cognitively demanding task in a naturalistic setting. The issue of vicarious reinforcement represented an additional factor. Reinforcement from the teacher provided a close analogy to earlier experimental situations where the supervisor or experimenter acted as the agent.

METHOD

Subjects. The subjects were 16 male third-year students with a mean age of 14.5 years and a mean IQ (measured by the Australian Council for Educational Research Intermediate Test D) of 112. In each of two third-year classes (Class 1 and Class 2), four pairs of subjects, who sat in established pairs and who could easily be seen by an observer seated at the rear of the classroom, were selected for observation. In each class, one of the four pairs was selected at random to be a Control pair, while the remaining three pairs were to receive reinforcement (Experimental subjects). Within each of the six experimental pairs, one subject was chosen at random to be the target for direct social reinforcement, and his partner designated the vicarious reinforcement subject. In Class 1, reinforcement to the target was delivered contingently, and in Class 2, reinforcement was delivered noncontingently. When one subject left the school after ten observation sessions, a further pair of subjects were introduced as a replacement. Table 9.1 outlines the experimental design.

TABLE 9.1. Design of Experiment 6.

GROUP	*SCHOOL CLASS*	*N*
Control	*1 and 2*	*4*
Contingent direct	*1*	*3*
Contingent vicarious	*1*	*3*
Noncontingent direct	*2*	*3*
Noncontingent vicarious	*2*	*3*

Setting. The experiment took place at St.Ignatius College, a (private) Catholic secondary school in Adelaide, South Australia. The two third-year classes chosen for observation were considered by their teacher to be equivalent in overall Mathematics performance and ability, as supported by their mean scores on the examination at the end of the previous term of 72% and 76% for Classes 1 and 2 respectively.

The teacher was in his mid-20s, and had two years of teaching experience. Typically his Mathematics classes were taught on an informal basis with movement around the room and task-oriented conversation permitted. Only when noise reached an unacceptable level did the teacher intervene. He spent most of his time moving around the class helping individuals or pairs.

Task. Progress through a textbook by solution of problems was the task assigned. After about five minutes of formal instruction at the start of a period, students were free to work at their own pace.

Reinforcement. Contingent reinforcement was delivered by the teacher twice during the observation period at a time determined by him; the target subject had to be working at the time. Thus the contingency was of a 'looser' kind than that employed in Experiments 1, 2, and 3, but is a method frequently employed in classroom studies (e.g. Becker et al., 1967). The decision not to use cueing to the teacher was made since it was feared that astute class members might notice the observer's cueing actions. Noncontingent reinforcement subjects were yoked individually to contingent reinforcement subjects and received their reinforcement at the same relative time in the observation period, whether or not they were working. The format of the reinforcing phrase was not specified, but was generally something like "That's very good work (student's name)". The use of nonstandardized reinforcement was intentional, given that verbal reinforcers are not normally stereotyped. Appropriate nonverbal gestures accompanied each reinforcing phrase.

Assessment of Anxiety about Mathematics. The Maths Anxiety Questionnaire used in Experiments 4 and 5 was adapted for use in this experiment. All class members were asked to rate 13 items on a 5-point scale from "in complete accordance with the way you feel" to "does not apply to you at all". A copy of the questionnaire is given in Appendix 9.1.

Observation. Subjects were observed individually by the author on a rotating basis using 10-second time-samples. Their behaviour was classified as attending or not attending at the end

of the time-sample and not during the entire 10 seconds, since it was felt that continuous observation over such a time would be readily noted by observant class members.

The criterion for "not working" differed from that used in the earlier experiments in this series, since in this informal situation, movement and conversation were allowed. Thus "out-of-seat" and "verbalization" did not necessarily constitute "not working". Finer discriminations were now required since conversations had to be judged as to their content; task-oriented discussions tended to be focused on subjects' exercise books, while interchanges of a more social nature were generally accompanied by humour and enthusiasm.

Reliability. A second observer rated behaviour simultaneously with the principal observer on four occasions during the experiment; reliability between the two observers' ratings (number of agreements/ total number of observations x 100) ranged from 82.5% to 90%.

Design and Procedure. One week before the observer entered the classroom, all students in both classes filled out the Maths Anxiety Questionnaire. The observer was present for two days before recording began to allow familiarization to occur. Observations were taken during Mathematics periods on Monday, Wednesday, and Friday afternoons. Despite lack of support in earlier work for the contention that time of day is related to performance, it was decided to keep time of observations as similar as possible; hence in Mathematics classes scheduled for Tuesday and Thursday mornings, no observations were taken or reinforcement delivered. Eight subjects in each class were observed over 25 time-samples of 10 seconds duration, during

each lesson observed, with the observations occupying 33.33 minutes of the 40-minute period.

Baseline observations (BL1) were taken over two weeks (six sessions). An experimental phase (E),lasted for four weeks (12 sessions); target subjects in Class 1 received contingent reinforcement and targets in Class 2 received noncontingent reinforcement as described above. Finally, there was a return to baseline for two weeks (BL2).

At the conclusion of the experiment, all students again completed the Maths Anxiety Questionnaire. In addition to this measure, subjects' results on the end-of-term Mathematics examinations immediately prior to and following the experiment, were obtained.

RESULTS

Percentage of intervals classified as "working" each day constituted the dependent variable. Table 9.2 presents the mean percentage attending rates for each group in each phase. The computer programme used to analyse these results was GENSTAT (Alvey *et al.*, 1977). Analyses of variance, using as co-variates pre-experimental Mathematics Anxiety, IQ, and pre-experimental Mathematics examination performance, were performed on each of the three phases separately to determine: (a) whether the covariates had any significant effect; and (b) whether there were significant differences amongst the five groups in each phase.

It was expected that there would be significant differences amongst groups only for the experimental phase and not for the two

baseline phases. Table 9.3 summarises the results and shows that this expectation was fulfilled. Groups were significantly different in the experimental phase; there was no significant Groups effect in either BL1 or BL2. The covariates had a significant effect only in BL2.

TABLE 9.2. Mean percentage attending rates for each group in each phase in Experiment 6.

GROUP	N	BL1	E	BL2
Control	4	48.4	58.3	64.7
Contingent direct	3	67.6	81.1	73.2
Contingent vicarious	3	63.3	77.3	75.3
Noncontingent direct	3	50.1	68.3	72.7
Noncontingent vicarious	3	56.5	60.7	63.6

TABLE 9.3. Summary of results for three initial analyses of variance for each phase separately to determine whether the three covariates and the overall group effects were significant.

Phase	Combined Effects of the three covariates			Overall group effect		
	Mean Sq.	F(3,8)	p	Mean Sq.	F(4,8)	p
BL1	79.20	0.37	n.s.	204.60	0.96	n.s.
E	96.66	1.98	n.s.	304.53	6.23	.05*
BL2	191.26	4.09	.05*	175.19	3.75	n.s.

*The only significant effects were the group effect during the experimental phase and the effect of the covariates during BL2.

Analysis of variance of the E phase without the covariates similarly gave a significant Groups effect ($F = 5.29$, $df = 4,11$, $p < .05$). Further analysis of this phase using particular comparisons revealed the clear effect of reinforcement (all Experimental groups) compared to nonreinforcement (the Control group), ($F = 8.96$, $df = 1,11$, $p < .05$); and the superiority of contingent reinforcement over noncontingent reinforcement ($F = 10.47$, $df = 1,11$, $p < .01$).

Direct reinforcement was not significantly better than vicarious reinforcement ($F = 1.56$, $df = 1,11$, n.s.), and both groups of subjects showed similar increases in attending. The interaction was not significant ($F = 0.18$, $df = 1,11$, n.s.). The continued finding of a superiority for contingent reinforcement over noncontingent reinforcement supports findings reported in Experiments 2 and 4 (reported in Chapters 7 and 8 respectively). However, the fact that contingent reinforcement was superior for vicarious as well as direct reinforcement groups appears to contradict Kazdin's theory that the behaviour change of the target subject is irrelevant to the change produced in the observer, and the results are more in line with a modeling interpretation.

Although there were no significant differences between groups during initial baseline, there was an overall effect of some interest. Within this phase, there was an increase in attending, presumably as an effect of experimenter presence *per se*. This trend was analysed by means of polynomial weights applied to data for the six sessions. The computer programme allowed for the repeated measures and blocks in the design; and because the

Control group had more subjects than the Experimental groups, the design was artificially balanced by estimation of values (GENSTAT, manual 4.01, Chapter 6 7, part 1). As a result, degrees of freedom for error terms were correspondingly reduced.

The linear trend in the BL1 phase was significant ($F = 12.94$, $df = 1,45$, $p < .01$), as was the quadratic trend ($F = 16.33$, $df = 1,45$, $p < .01$). There was a slight differential effect in trend amongst the five groups ($F = 2.01$, $df = 18,45$, $p < .05$). Neither the linear nor the quadratic components of this interaction were significant. Figure 9.1 shows the mean percentage working behaviour over all subjects for the six baseline sessions. It is clear that the trend components identified by the analysis reflect an increase in attending for the last two sessions of BL1. Thus the phenomenon was not one of an immediate response to the observer's presence, but rather a delayed response after four initial baseline sessions. This suggests that the pupils may have gradually realised from the observer's repeated appearances that they were indeed being observed systematically.

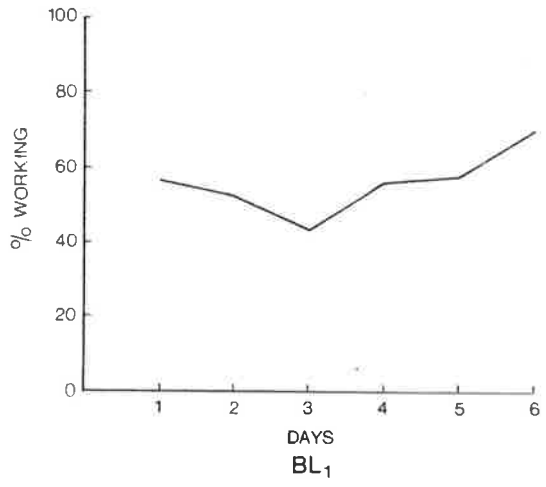


FIGURE 9.1. Mean percentage of time spent working by all subjects on each day of the Baseline phase in Experiment 6.

Initial scores on the Maths Anxiety Questionnaire indicated low levels of anxiety. The mean number of items rated in the extreme of the anxious direction was only 1.88. Such lack of anxiety is in keeping with the high intelligence of these students. Changes in anxiety from pre- to post-experimental responses were small too; there was a slight overall improvement to a mean of 1.76. Table 9.4 gives mean pre- and post-experimental anxiety scores for all groups.

TABLE 9.4. Mean number of responses at the extremely anxious end of the Maths Anxiety Questionnaire before and after treatment for each group in Experiment 6.

GROUP	*PRE-TREATMENT SCORE*	*POST-TREATMENT SCORE*
Control	*1.5*	*1.25*
Contingent direct	*1.3*	*0.7*
Contingent vicarious	*2.0*	*3.3*
Noncontingent direct	*2.7*	*1.0*
Noncontingent vicarious	*1.7*	*1.0*

Differences in scores on the end-of-term examinations prior to and following the experiment were also calculated. Table 9.5 gives the results. While Class 1 subjects showed a slight overall decline in Term II performance, six out of the eight subjects in Class 2 improved their performance in Term II, and one subject receiving noncontingent direct reinforcement showed a very

large improvement from 74% to 92%. However, a one-way analysis of variance of the difference scores did not yield a significant Groups effect ($F = 3.02$, $df = 4,11$, n.s.). Indeed, it was not expected in this experiment that examination results would be much affected by the experimental intervention, bearing in mind the relatively brief period of intervention for each experimental subject in relation to the duration of the term's teaching programme.

TABLE 9.5. Mean end-of-term examination performance (percentages) for each group prior to and following Experiment 6.

GROUP	TERM I	TERM II	DIFFERENCE
	%	%	%
Control	64.0	59.7	-4.3
Contingent direct	72.3	70.0	-2.3
Contingent vicarious	78.0	72.0	-6.0
Noncontingent direct	65.7	75.7	+10.0
Noncontingent vicarious	87.7	87.7	0.0

Note: There was no significant difference between groups on mean difference-scores ($F = 3.02$, $df = 4,11$, n.s.).

DISCUSSION

Social reinforcement did operate to increase significantly the working behaviour of the students observed in this study, although the increases in attending rates observed were somewhat less than those reported in the workshop setting.

After the post-experimental questionnaire had been administered, introspections were obtained from all class members

as to the purpose of the experiment. Comments were focused mainly on the questionnaire itself, and working habits in relation to it. A spontaneous comment from the teacher indicated that he felt somewhat embarrassed about giving reinforcement in the latter stages of the experiment, since some of the cleverer boys had guessed they were targets for encouragement, despite the nonstandardized nature of the reinforcement and "loose" reinforcement delivery scheme used in this experiment.

The superiority of contingent reinforcement (both vicarious and direct) is also supported by results of Experiment 2 where contingent reinforcement was superior in Phase 2 (with two reinforcement sessions per day), and the superiority is noteworthy considering the looseness of the reinforcement contingency where the actual timing of reinforcement was left to the teacher.

Allowing the teacher to specify exact timing of the reinforcement represented a departure from the cueing procedure employed in Experiments 1, 2, and 3. Such techniques are standard in the literature. Often the number of reinforcements to be dispensed per session is stated, but their timing is left to the teacher's discretion; for example, Ferritor, Buckholdt, Hamblin and Smith (1972) told teachers to deliver between 12 and 16 tokens per 20-minute session to 14 target subjects. Similarly, Hay et al. (1977) had teachers deliver five praise statements to each target in each session "for appropriate classroom behavior". Van Houten and Sullivan (1975) used randomly presented auditory signals to remind teachers to choose someone who was working and praise that student.

Sometimes neither timing nor amount is specified. Barrish, Saunders and Wolf (1969); Broden, et al. (1971); and Skiba, Pettigrew and Alden (1971) successfully employed very loose schedules with neither timing nor amount of reinforcement specified. Experiments 7A and 7B (reported in Chapter 10) examine further the looseness of the reinforcement contingency.

Vicarious reinforcement was just as effective as direct reinforcement. The size of the vicarious reinforcement effect is in keeping with results reported by Kazdin (1973b). In this experiment, vicarious reinforcement subjects increased their attending behaviour by a mean of 24.35% when adjacently seated students received social reinforcement for attending. Other increases are larger: the nonreinforced peer in the Kazdin, Silverman and Sittler (1975) experiment increased his attending level by 44.5% when his partner first received a combination of verbal and nonverbal approval for attending. The vicarious reinforcement subject in Kazdin's (1977) experiment showed an increase of 34.5% over initial baseline in the same circumstances. Vicarious reinforcement may indeed be an economical intervention technique.

The difference in effectiveness of contingent and non-contingent vicarious reinforcement was unexpected. According to the "discriminative stimulus" explanation of vicarious reinforcement effects, the appearance of the teacher to deliver social reinforcement should elicit working behaviour in a peer regardless of the contingency of the direct reinforcement.

The modeling alternative seems most appropriate as an explanation for the difference between the two vicarious reinforcement groups. Distraction effects may also contribute to the difference.

The finding of a gradual increase in attending to work during initial baseline raises the issue of reactivity to the presence of the observer; a question which has been experimentally investigated. The mere appearance of the observer has been shown to influence results, although findings in this area are conflicting. Dubey, Kent, O'Leary, Broderick and O'Leary (1977) found that introducing and withdrawing an observer had little effect on eight out of nine categories of disruptive behaviour displayed by target students as observed from behind a one-way mirror, although off-task behaviour did increase somewhat in two out of the three experiments reported. Nor did teacher behaviour vary greatly under the two conditions of observer presence or absence.

This overall lack of "reactivity" is in agreement with the findings of a study by Surratt et al. (1969) where a post-check using concealed video equipment revealed some slight decrease in on-task behaviour, immediately rectified with the re-introduction of the observer. An unfortunate confounding variable here was that tokens were delivered by the observer, and not by the teacher as is usual. Nelson, Kapust and Dorsey (1978) also reported minimal effects.

Kent, Fisher and O'Leary (1974) compared the rates of disruptive behaviour in a class of emotionally disturbed

children when the observer was in the room and when he worked from behind a one-way mirror. Nonattending behaviour in particular was significantly reduced by the presence of the observer during treatment. Ward (1976) has also produced evidence indicating that the pupils' behaviour can be influenced markedly by the observer's appearance. Johnson and Bolstad (1973) reviewed the effects of an observer's presence on the behaviour of the subjects being observed, looking at a wide range of settings including the home environment. They concluded that such reactivity can represent a significant problem.

The teacher's behaviour may also be affected by the observer's presence. Mercatoris and Craighead (1974) found a significant increase in the total number of teacher-pupil interactions when an observer was introduced into a class of institutionalized female retardates: appropriate student behaviour was not affected. Hursh, Baer & Rowbury (1974) showed that teachers displayed more of the behaviours deemed appropriate when observers were in the room than when they viewed from behind a one-way mirror. Samph (1976) also found that teacher verbal behaviour, including praise, altered as a function of the observer's presence or absence in the classroom setting.

An initial observer-induced effect would seem to be expected, but behaviour modification studies often last for many weeks and it is doubtful that students or teachers would be particularly concerned with an observer beyond the first few days.

9.4. CONCLUSION

This study of social reinforcement in a normal classroom setting showed that individually applied social reinforcement by the teacher can effectively increase pupils' attention to academic work in the classroom. Attention was increased most by contingent reinforcement.

An incidental finding was that the mere presence of an adult observer may, after a while, effect an increase in working activity in the classroom (as shown by trends during BL1).

The observed effectiveness of vicarious reinforcement in this school classroom warranted further investigation in a naturalistic setting. A following experiment (Experiment 7B) examines such reinforcement in the sheltered workshop. The question of generalization of the reinforcement effect observed in Experiments 1, 2, 3, and 6, to another performance measure was also investigated in the two experiments described in Chapter 10.

CHAPTER 10.

SOCIAL AND VICARIOUS REINFORCEMENT IN A SHELTERED WORKSHOP : OUTPUT AND ATTENTION MONITORED CONCURRENTLY

10.1. INTRODUCTION

An important question concerns the generalization of behaviour changes produced through social reinforcement; in particular, does increasing attending lead to an increase in output? Krupski (1980), reported in Chapter 7, Section 7.5, expressed some concern about the use of topographical "working behaviour" definitions. This issue has been addressed by several investigators, primarily within the classroom. Incidental comments by teachers reported in classroom behaviour modification studies do indicate that collateral changes can be expected (e.g. Hall, Lund & Jackson, 1968; Surratt et al., 1969; Medland & Stachnik, 1972). Surratt et al. commented: "The 'working' behaviors modified in the present experiments are assumed to be correlated with the actual accomplishment of assigned work and ultimately with academic achievement" (p.91).

A number of investigators have also reported significant relationships between observations of children's classroom behaviour and academic achievement (Lahaderne, 1968; Bolstad & Johnson, 1972; Cobb, 1972; Samuels & Turnure, 1974; McKinney, Mason, Perkerson & Clifford, 1975). McKinney et al. (1975) reported that several categories of classroom behaviour correlated significantly with achievement, vindicating behaviour

modification efforts that focus on overt behaviour. Forness, Silverstein and Guthrie (1979) investigated the relationship between these measures with mildly retarded students, and found the correlations to be less than those reported in studies with normal subjects.

Some studies which monitored both output and attention under reinforcement of various kinds have been less promising. Studies in which topographical behaviours such as being seated, looking at the text, etc., were reinforced with tokens, have not always been successful in demonstrating generalization to academic performance improvements (e.g. Homme, de Baca, Devine, Steinhorst & Rickert, 1963; Hall, Panyan, Rabon & Broden, 1968; Barrish et al., 1969). Scott and Bushell (1974) likewise found no change in rate or accuracy of progress through a programmed mathematics textbook when on-task behaviour increased as a consequence of differential teacher attention. Other failures to find generalization to work accomplished when reinforcement is provided for attending are studies by Ferritor, Buckholdt, Hamblin and Smith (1972), McLaughlin, Brown, Malaby and Dolliver (1977), and March (1978).

However, not all experimental attempts have been unsuccessful. Kaufman and O'Leary (1972) showed that reinforcing appropriate classroom behaviour did lead to an increase in reading work as well as a decrease in disruption. Cobb and Hops (1973), Haubrich and Shores (1976), Clements and Tracy (1977), White-Blackburn, Semb and Semb (1977), Cohen et al.

(1979), and Sharp (1980) also demonstrated a functional relationship. Further encouraging results come from Cossairt et al. (1973) who also recorded "permanent product data" when students' attending levels increased under high levels of teacher attention. Although correlations are not reported, these authors did comment that individual output means generally increased across experimental conditions, in keeping with the attention data. Serbin et al. (1977) also showed a concurrent change in academic performance (auditory and visual recall of stories by pre-schoolers) when attending to the teacher increased due to teacher social reinforcement; the correlation between attending and recall was significant at the .01 level for all subjects. These two studies were reviewed in Chapter 5, Section 5.3.

Reinforcing output has also produced concurrent behavioural changes. Hewett, Taylor and Artuso (1969) extended the "engineered classroom" for emotionally disturbed children (outlined by Hewett, 1967) in which awarding checkmarks for starting and working on academic tasks was followed (upon removal of the token system) by a concurrent increase in both percentage attending behaviour and arithmetic scores. Kirby and Shields (1972) found that reinforcement for increasing units of arithmetic work did generalize to percentage attending behaviour; and Ayllon and Roberts (1974) reported that reinforcement for percentage of answers correct in daily reading tasks did lead to a decrease in disruptive behaviour. Winett and Roach (1973) obtained

similar results. Ayllon, Layman and Burke (1972) also reported collateral increases in appropriate classroom behaviour after imposition of an academic contingency, as did Ayllon, Layman and Kandel (1975).

Broughton and Lahey (1978, reported earlier in Chapter 5, Section 5.4) investigated token reinforcement and response cost as contingencies for correct academic responses, and measured the effects of these techniques (singly and in combination) on both attention to task and output (number of correct responses). All three approaches did increase behaviour as measured by both indices, and the correlation between the two variables was moderate but significant throughout the study. However, Felixbrod and O'Leary (1973) had only partial success, in that points for arithmetic work did lead to increases in both attending and number of arithmetic problems completed, but not in accuracy.

Some studies have compared academic and behavioural contingencies, with less than clearcut conclusions. Sulzer, Hunt, Ashby, Koniarski and Krams (1971) found that reinforcing academic work increased both productivity and appropriate behaviour, whereas reinforcing appropriate behaviour itself was less successful on both measures. Hay et al. (1977) found that reinforcing on-task behaviour did not affect academic performance, but reinforcing academic performance did affect both output and attention. The authors concluded that reinforcing academic performance is the most useful approach

except perhaps for subjects who present severe management problems. This result is similar to that of Hundert, Bucher and Henderson (1976) in which reinforcing arithmetic performance increased both correct work and appropriate behaviour, while reinforcing appropriate behaviour produced little increase in arithmetic performance.

While the experiments of Ferritor et al. (1972) suggest a complete disjunction between the two measures, both the work of Chadwick and Day (1971) and of Drabman, Spitalnik and O'Leary (1973) reported collateral changes in measures. Chadwick and Day (see Chapter 5, Section 5.5) used points and social reinforcement to reinforce both appropriate behaviour and amount of academic work completed per unit of time. Accuracy of work was also monitored. All three measures varied, but when points were discontinued, attention declined to near-baseline rates, leading the authors to speculate on the "efficiency" of work under the different conditions. Drabman et al. (1973) had teachers give tokens both for completion of assignments and for appropriate behaviour; both disruptive and academic behaviours were influenced. Walker and Hops (1976) also found collateral variation in both achievement (learning gains) and appropriate behaviour when either one or both were reinforced (praise plus points were used as reinforcers; see Chapter 5, Section 5.5).

Two sheltered workshop studies are particularly relevant here. Costello (1974) used tokens for attentive behaviour in eight mentally retarded adult clients and monitored productivity

at the same time. Tokens supplied contingent upon "ready-to-work" behaviours led to an increase in just these behaviours, but no concomitant increase in productivity (number of packages correctly packed) was observed. The study by Rusch (1979) was reported in Chapter 6 (Section 6.4). Rusch applied reinforcement (tokens and praise) for attending and output separately in sheltered workshop clients and obtained collateral changes in both measures.

From this review it can be seen that the literature provides instances of no relationship between attending and output as well as partial relationships and occasionally complete dependence between the two indices. No general conclusions can yet be drawn from this clearly important area of investigation.

The link between output and attention and the effect of vicarious reinforcement on both of these indices were the major goals of the experimental work reported in this chapter. In particular, Experiment 7A investigated concurrent attention to work and output in a group of retarded clients in a sheltered workshop, with a view to determining whether predicted increases in attending as a result of social reinforcement from the supervisor are accompanied by increases in output. Experiment 7B investigated whether any vicarious reinforcement effect is specific to the actual behaviour reinforced, or whether direct reinforcement to a partner seated nearby produces increases in both working and output in the client viewing the reinforcing event.

10.2. EXPERIMENT 7A

METHOD

Subjects. Subjects in this experiment were six male retarded rehabilitation workers with an average IQ of 42.5 (assessed using Raven's Coloured Progressive Matrices) and an average age of 26.7 years. These subjects were split into two groups of three subjects each, Group A and Group B. The three subjects who were to receive reinforcement sat along one side of a large work table. The three nonreinforcement control subjects were also seated along one side of a table, but at a distance of approximately 25 feet from the experimental subjects.

Setting. This experiment was conducted at Horizon Industries, a facility of Minda Home, South Australia. Horizon Industries is an activity centre which provides both therapeutic work and contract work for approximately 80 clients, most of whom reside at nearby Minda Home. The workshop caters for clients with a wide range of IQs.

Observational Procedures. One dependent variable was time spent working; the criteria for attending were similar to those used in Experiments 1, 2 and 3. Three subjects were observed serially in the 20-minute observation session; 10-second time-sampling was employed. The two groups of subjects were always observed once at about the same time each day. Reliability ratings of attending behaviour were taken by having a second observer rate behaviour concurrently with the first; reliability ranged between 90% and 97.5% over three checks.

A second dependent variable used in this experiment was output. Due to the homogeneity of tasks in the work section observed, it was possible to monitor output levels as well and this was used as a second dependent variable. The six subjects were engaged in the assembly of plastic clothes pegs. The assembly operation involved picking up the two peg halves as well as a metal fastener, placing the halves in a wooden keep, and then using a driving tool to force the fastener into position. This was an easy task, even for retardates at this level of IQ, and very few errors were made.

A subsidiary task involved packing the completed pegs into bags. As many retardates cannot count, this was achieved through provision of a masonite board on which 40 nails were positioned in four rows of ten, with a coloured model permanently fixed at the top. Clients were required to fill each row of ten gaps with ten pegs of the designated colour. This task was also relatively easy and few mistakes were detected due to the well planned apparatus.

Because a small proportion of subjects' time was spent packing bags in addition to the main peg assembly task, a special procedure was required to measure output on a commensurate scale. The number of pegs constructed, or the number of bags packed (to the nearest quarter) at the end of each observation session, was counted. Equivalence of these two measures was approximately achieved by timing the supervisor on both tasks on four occasions.

Taking the mean of these performances, it was found that a peg took 8.6 seconds to complete, while a bag took 155 seconds. Therefore all daily output figures were multiplied by the appropriate constants to yield a "working-time" output measure. It should be noted that the packing task was an infrequent job during the course of these observations, occurring on only 16 subject-observations out of a total of 144. Hence the above approximate method used to obtain an equivalent output measure for those few occasions is judged sufficient.

Reinforcement. A loose contingency, similar to that used in Experiment 6, was employed. The supervisor was instructed to deliver nonstandardized social reinforcement focused on attention to work, rather than output, twice during each 20-minute session when the target subject was working. The supervisor, who was well known to clients and well liked, was enthusiastic in his manner and delivered the reinforcement phrases with an appropriate nonverbal accompaniment.

Procedure. During eight days of baseline (BL1), rates of working behaviour and daily output were obtained for each of the six subjects. The next phase (E) was ten days in length; reinforcement from the supervisor was provided twice each day for subjects in Group A. Group B subjects received no reinforcement. A final phase (BL2) represented a return to baseline conditions.

RESULTS

1. Correlational Analysis

To determine whether initial levels of output and attention were correlated across individual subjects, each subject's mean attending and output scores during BL1 were considered. Correlations were calculated using a programmable Canola calculator with a programme written by Dr. P.S. Delin of the Psychology Department, the University of Adelaide. Because the number of subjects is small in this case, the correlation between the two measures was calculated counting scores for individual days. This gave 48 data pairs derived from eight days with six subjects. These output and attending scores correlated moderately ($r = 0.27$, $N = 48$, $p < .05$). Thus the assumption that output is partly due to attention is justified.

The two measures were also examined for the experimental phase. To investigate whether relative changes in performance as a result of reinforcement were reflected concurrently in both performance measures, each subject's mean percentage-change scores during the experimental phase were considered. Again, because the number of subjects is small, the calculations included scores for individual daily performance. For direct reinforcement subjects, this calculation involved data arising from 10 days with three subjects; there were four missing data points due to a subject's absence from work, giving 26 data pairs. For control subjects, only 24 data pairs were available due to the frequent absence of one subject.

For those experimental subjects who received reinforcement, changes in the two performance measures were highly correlated ($r = 0.63$, $N = 26$, $p < .01$). Changes in attention and output were also significantly correlated for the control subjects ($r = 0.48$, $N = 24$, $p < .05$). Although the relationship was somewhat greater when change was encouraged by the experimental introduction of additional social reinforcement, the two correlation values were not significantly different (using Fisher's normalizing transformation, $z = 0.76$, n.s.). It is clear that output is, to some extent, a function of attending behaviour, whether or not experimental intervention occurs (in the form of direct social reinforcement).

This finding of a systematic relationship in the control subjects is of interest, given that there was no experimentally controlled intervention for these subjects. It may be that control subjects in this experiment were, however, influenced by unintended "effects" such as vicarious reinforcement. This possibility is discussed below in connection with the analysis of mean scores.

It is also possible that day-to-day variation in the two performance measures would be correlated even under more strict "control" conditions. Both these possibilities are explored further in the following experiment, 7B.

2. Analysis of Variance

Statistical evaluation was conducted on both the mean percentage of intervals in which each subject was observed working

in each phase and the mean output for each subject in each phase. Figures 10.1 and 10.2 give the mean results for attending behaviour and output respectively, and show the day by day variability which is rather high. Mean values for each phase are given in Table 10.1.

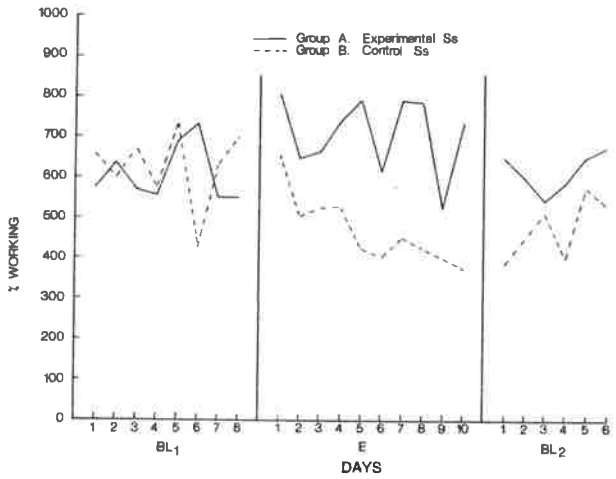


FIGURE 10.1. Mean percentage of time spent attending by both groups in each phase in Experiment 7A.

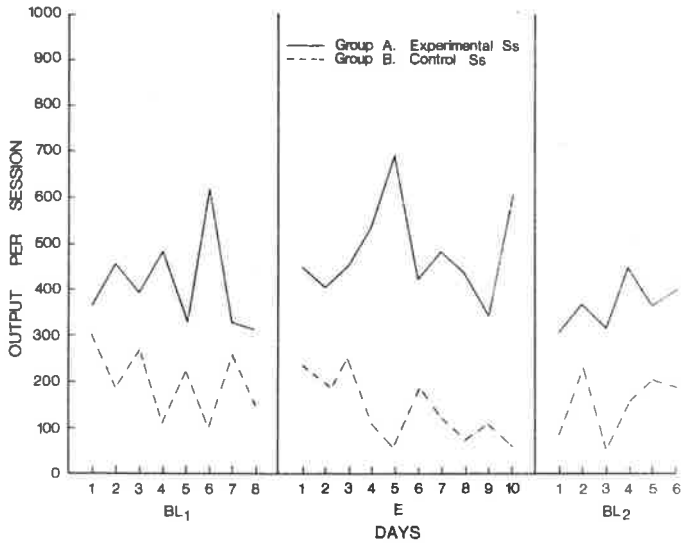


FIGURE 10.2. Mean output of both groups in each phase in Experiment 7A.

TABLE 10.1. Mean percentage attending and mean output scores for each subject in each phase in Experiment 7A.

	BL1	*E*	*BL2*
	Mean percentage attending		
Group A	*60.7*	*70.3*	*58.3*
Group B	*62.4*	*50.8*	*48.3*
	Mean output (as "effective working time" in seconds)		
Group A	*411*	*477*	*339*
Group B	*200*	*216*	*188*

When attending behaviour was analysed using a two-way repeated measures analysis of variance, a significant Phases effect emerged ($F = 5.00$, $df = 2,8$, $p < .05$). The overall Groups effect was not significant; however, the Groups x Phases interaction was significant ($F = 6.64$, $df = 2,8$, $p < .05$).

It is apparent from Table 10.1 that the significant effects were predominantly due to increased attending of the reinforced group during the experimental (reinforcement) phase, as expected. This interpretation was confirmed by the relevant particular comparison. Within the significant interaction, Group A was superior to Group B in contrasting Phase E with Phases BL1 and BL2 ($t = 3.05$, $df = 8$, $p < .05$).

Social reinforcement was thus clearly effective in changing attending behaviour. The question remains as to the similarity of the effect on output. Table 10.1 shows that output did increase in the experimental phase, but some increase was also found in the control group. To elucidate the degree of reliability of these effects, a two-way repeated measures analysis of variance was performed on the output data. The Phases effect was significant ($F = 5.61$, $df = 2,8$, $p < .05$) but neither the Groups effect nor the Phases x Groups interaction were significant. A significant particular comparison was obtained by contrasting Phase E with Phases BL1 and BL2 ($t = 2.89$, $df = 8$, $p < .05$); apparently the combined Groups A and B significantly increased their mean outputs during the reinforcement phase.

Thus it can be seen that although social reinforcement resulted in an increase in attending behaviour in the target subjects (Group A) only, the output data present a less clear-cut picture, with evidence of improved performance in both reinforced and nonreinforced subjects.

DISCUSSION

It may be concluded from this small study that output is related to attending; but that output is not determined solely by attending behaviour as a mediating construct, since baseline correlations were only moderate. The introduction of social reinforcement was accompanied by a somewhat stronger correlation between the two measures.

Social reinforcement operated to improve attending in reinforced subjects. Baseline attending rates were somewhat higher than those observed at Bedford Industries, and this no doubt contributed to the reduced effect of social reinforcement, with a mean increase under reinforcement of only 9.6%.

In keeping with the results of Rusch (1979), providing reinforcement for attending did lead to an improvement in speed of task completion. However, nonreinforced subjects also improved their output during the experimental phase. This unexpected result raises the possibility that even these "control" subjects improved as a result of witnessing their peers' social reinforcement, and justifies the further investigation of vicarious reinforcement in this setting.

10.3. EXPERIMENT 7B

The rather loose contingency of reinforcement delivery employed in Experiment 7A produced improvements in both attending and output in experimental subjects. This experiment, also conducted at Horizon Industries, investigated the use of a tighter contingency in order to explore further the correlation between the two measures.

An additional aspect of this study involved investigation of the generalization of any vicarious reinforcement effect to the output data. Failure to find such generalization would clearly be in conflict with Kazdin's discriminative stimulus explanation of the vicarious reinforcement effect in which the appearance of the agent of reinforcement elicits a working response in non-reinforced peers.

METHOD

Subjects. Eight male clients with a mean age of 24.4 years and a mean IQ of 45 (Raven's Coloured Progressive Matrices) were divided into two groups of three subjects (Group A and Group C) and one group of two subjects (Group B). Group A subjects received social reinforcement and sat along one side of a workbench facing Group B subjects who thus received "vicarious reinforcement". Group C subjects sat at another table facing away from the first, and thus did not receive any experience of experimental reinforcement.

Observational Procedures. The first dependent variable was time spent working, monitored as in Experiment 7A, except that now three observation sessions were needed to cater for the three

groups. When Group B was observed, one 10-second interval was unused since there were only two subjects. Since all subjects in this experiment were engaged in the peg-making task, output data (the second dependent variable) are presented simply in terms of the number of pegs produced during each daily 20-minute observation session. All subjects were observed at about the same time each day.

Reliability ratings of the attention monitoring were taken three times during this experiment, and agreement between two observers ranged between 87.5% and 95%. As a further test, two borderline-retarded observers were used for two additional reliability ratings; agreement between these "clients/observers" and the main observer was 85% in each case. Obviously these retardates were also able to discern working and nonworking behaviour with consistency in their peers. This finding indicates that work, like play, is a response which is easily recognized even if it is difficult to define.

Reinforcement. The reinforcement delivered by the supervisor was similar to that employed before, but now cueing from the observer was used as a means of tightening the contingency of presentation. When any one of the three target subjects had been attending for 10 time-samples, the observer indicated this to the supervisor by means of hand signals. These signals were not observed by the clients and did not therefore become discriminative stimuli for reinforcement.

Procedure. Following 14 days of baseline observations during which attention and output were monitored for all subjects (BL1), there was an experimental phase 12 days in length (E),

during which only Group A subjects received social reinforcement from the supervisor contingent upon attending behaviour. Finally, baseline conditions were reinstated for all subjects for eight days (BL2).

Method of Analysis. The results of Experiment 7A suggested the appropriateness of planned comparisons in a small-scale experiment of this type, where specific predictions have been made. In view of the use of two experimental groups (plus a control group) in this study, the effects were separated into orthogonal components corresponding with particular experimental hypotheses for attending and for output measures.

RESULTS

1. Correlational Analysis

Pearson's correlations between the two performance measures were calculated using each subject's daily scores for attention and output during BL1. This gave 102 data pairs derived from 14 days over eight subjects, with nine missing pairs of scores due to absence, and one additional missing output score due to one subject's peg box being emptied by mistake before counting. As in Experiment 7A, these two measures were significantly correlated ($r = 0.75$, $N = 102$, $p < .01$). The correlation, confirmed in the two experiments reported in this chapter, is sufficiently reliable to justify consideration of multivariate analysis of variance in a subsequent study, Experiment 9B (reported in Chapter 12). However, since the attentional component of performance may vary from task to task, the degree of relationship between attention

and output needs to be found empirically in each case.

Next, investigation of changes in performance as a result of reinforcement was undertaken by expressing each subject's daily Phase E scores for both attending and output as a percentage of his individual mean initial baseline performance. For Group A subjects, this calculation involved 35 data pairs (one missing pair of scores due to absence); for Group B subjects, 22 data pairs were available (two missing due to absence); and for Group C subjects, only 27 data pairs were available (due primarily to the frequent absence of two of the three subjects).

Changes in the two performance measures were significantly correlated for all three groups, as in Experiment 7A. For Group A subjects, $r = 0.64$, $N = 35$, $p < .01$; for Group B subjects, $r = 0.63$, $N = 22$, $p < .01$; for Group C subjects, $r = 0.72$, $N = 27$, $p < .01$. Thus it is clear that the day-to-day relationship between attention and output is maintained even under strict "control" conditions.

2. Analysis of Variance

As in Experiment 7A, statistical evaluation was conducted by means of two-way repeated measures separately, using mean figures for each subject in each phase. The mean values are given in Table 10.2. There was quite wide day-to-day variation within each phase, as shown in Figures 10.3 and 10.4.

TABLE 10.2. Mean percentage attending and mean output scores for each subject in each phase in Experiment 7B.

	BL1	E	BL2
	Mean percentage attending		
Group A	*55.53*	*74.44*	*57.60*
Group B	*34.17*	*42.95*	*32.35*
Group C	*67.92*	*62.78*	*63.75*
	Mean output (number of pegs produced per session)		
Group A	*38.54*	*54.68*	*46.06*
Group B	*18.77*	*32.55*	*20.69*
Group C	*44.69*	*44.74*	*41.33*

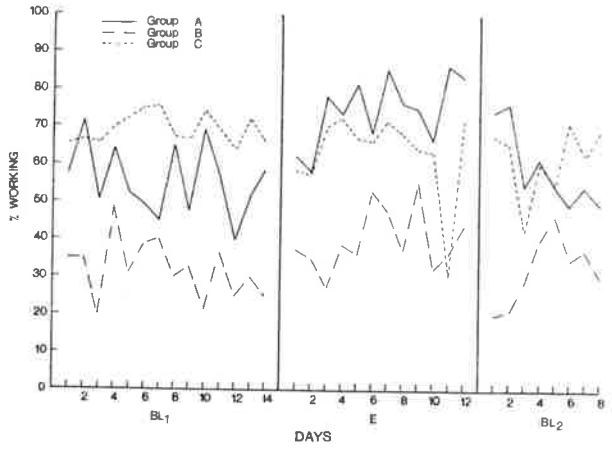


FIGURE 10.3. Mean percentage attending behaviour for each group in each phase in Experiment 7B.

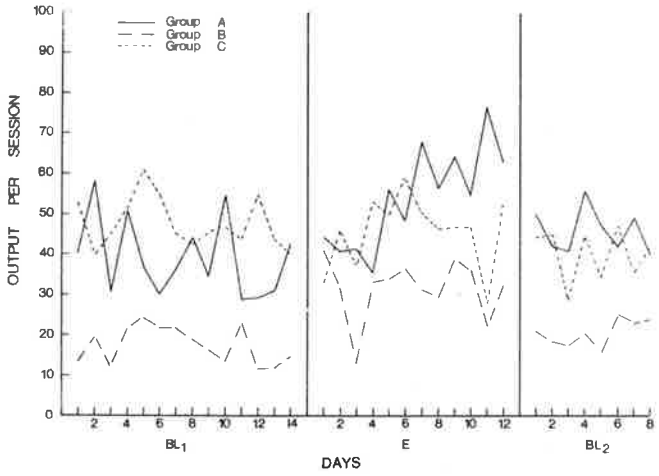


FIGURE 10.4. Mean output for each group in each phase in Experiment 7B.

Separation of the experimental phase into orthogonal components for the attending measure gave a significant interactional comparison between performance in reinforcement and baseline phases for experimental versus control groups ($t = 3.24$, $df = 10$, $p < .01$). Thus the reinforcement effect is specifically related to the combination of the reinforcement phase and being in a reinforcement group.

The nature of the interaction can be further clarified by examining the experimental effect specifically to see (1) if the experimental groups performed better than the control group, and (2) if direct reinforcement was more effective than vicarious reinforcement during Phase E. For this analysis, the data for Phase E were expressed as a percentage of individual mean baseline

(BL1) performance. Although the three groups were treated as though subjects had been randomly allocated, in fact the experimenter had no influence in selecting the groups and they had to be taken as they were sitting at the work table. This problem also applies somewhat to Experiment 9B. The method of using percentage baseline data was adopted in order to overcome the attendant variation in initial performance between groups. Groups A and B were significantly superior to Group C in Phase E, but only marginally using a one-tailed test ($t = 2.005$, $df = 5$, $p \simeq .05$). However, there was no significant difference between direct reinforcement (Group A) and vicarious reinforcement (Group B) ($t = 0.22$, $df = 5$, n.s.).

When the output measure was analysed by separation into orthogonal components, a significant interactional comparison showed that the performance of the experimental groups differed from that of the control group in contrasting Phase E with the two baseline phases ($t = 2.33$, $df = 10$, $p < .05$).

Specific examination of the experimental phase, again using percentage baseline data, revealed that the two experimental groups were superior to the control group on the output measure ($t = 3.42$, $df = 5$, $p < .05$). Once again, there was no significant difference between direct and vicarious reinforcement subjects ($t = 1.37$, $df = 5$, n.s.). Thus, as in Experiment 7A, providing social reinforcement led to an increase in attending behaviour which was accompanied by an increase in output. In this experiment, vicarious reinforcement was also followed by concurrent increases in both indices.

DISCUSSION

The baseline correlation between output and attention was somewhat higher than that observed in Experiment 7A. Under social reinforcement, this high degree of correlation was maintained for all groups whether reinforced or not. From this finding it seems clear that with tasks of a simple repetitive type, a moderate component of the variance in output is due to variability in attending behaviour.

Attention for both vicarious and reinforced subjects increased under social reinforcement. The increase observed for the contingent social reinforcement group (Group A) was greater than that observed in Experiment 7A and this difference may reflect the increased effectiveness of the tighter contingency employed. Further investigation of the contingency of social reinforcement in this setting is reported in Experiment 9B (Chapter 12).

The output data were in line with the attention results; both experimental groups were superior to the control group. On both attention and output, vicarious reinforcement was as effective as direct reinforcement. It seems that vicarious reinforcement and direct reinforcement subjects were similarly affected. This finding confirms the impressions from Experiment 7A that with human subjects (even if they are retarded), social reinforcement cannot be treated as though it were only being applied to the target subjects.

The generalization of improvements in attending to improvements in output with vicarious reinforcement subjects would, of course, be expected from the discriminative stimulus explanation. However,

such generalization may also occur with modeling, "spillover", or distraction. Further investigation of the operation of vicarious reinforcement is necessary and is undertaken in Experiment 9B, Chapter 12.

10.4. CONCLUSIONS FROM EXPERIMENTS 7A AND 7B

The results from these two experiments indicate that social reinforcement affects both output and attention in the situation investigated.

In addition, there is enough evidence that, although conceptually distinct, these two performance measures are moderately correlated. They have been analysed separately in the present chapter because of the small amount of prior evidence regarding the relationship, and because they appeared to be not altogether similar in their reaction to the experimental effects (despite the correlations overall). Nonetheless, multivariate analysis of variance may be justified, given an increased number of subjects, when this would usefully add to the univariate analysis of variance.

As well as direct effects on the performance of the target subjects, other nearby subjects who witnessed the social reinforcement delivery were also affected to some degree by vicarious reinforcement.

Examination of the precise nature of the reinforcing stimulus is the focus of experimentation in Experiment 8, reported in Chapter 11.

CHAPTER 11.

COMPARISON OF DIFFERENT TYPES OF SOCIAL REINFORCEMENT

11.1. INTRODUCTION

The question of standardization of the reinforcing phrase has already been raised; experiments reported in this series always used nonstandardized reinforcing phrases in the attempt to retain some degree of spontaneity. The "style" of delivery in terms of intonation and warmth is another important but generally ignored factor which may influence results. Some investigators have attempted to control variability in the type of reinforcing stimuli employed; efforts aimed at reducing the variability inherent in style of delivery of social reinforcement have included that of Hildum and Brown (1956) who used a trained linguist as reinforcing agent; he is reported to have verbalized "Mm-hmmm" in a neutrally toned rising inflection. Newmark and Finch (1973) solved this problem by using a standardized video-taped presentation of the experimenter. In this way they overcame problems of intonation and facial expression, behaviours which are difficult for the "live" experimenter to control. Miller and Kirschenbaum (1979) also used a tape-recorded voice to deliver "good". Baer's (1962) well-known experiments with children represent another successful attempt at standardization using a puppet.

In most studies, however, no details are given as to the warmth of the agent's delivery; it is assumed that the agent reinforces in a consistently warm and interested manner. However, there is evidence to suggest that different experimenters vary

widely in their friendliness and warmth, and that this variation is associated with differing efficiency.

The experiment by Leventhal and Fischer (1970) was reported in Chapter 3 (Section 3.2.4). These authors noted a wide variation in amount of smiling, "activation", task orientation, and pleasantness among their four male experimenters, in spite of pre-experimental training. Experimenter differences emerged strongly even before the introduction of social reinforcement; and the most effective experimenter showed a combination of task and social orientation while the most social experimenter (highest on smiling, pleasantness, etc., as rated by three judges), was the least effective.

Leventhal and Fischer pointed to the subtleties involved in the experimental situation; there are many cues present which are usually overlooked. Eliminating the effects of expressive behaviour, experimenters will continue to have task and social orientations regardless of what efforts are made to standardize the presentation. It would be better to focus on expressive acts, especially on consideration of how such acts are interpreted in different contexts: "Studies varying both acts and contexts can further illuminate the nature of interpersonal communications which lead to effective performance" (p.94). Stevenson and Allen (1964) also reported significant differences in reinforcer effectiveness within their 16 experimenters.

Allen, Spear and Johnson (1969) investigated warmth of reinforcement and also commented on the inconsistency in the experimenter's efficiency despite standardized training and

procedures. In their study, eight experimenters played either a warm or a cold role when interacting with different subjects. Five criteria used to differentiate between the two roles were: smiling, physical proximity, voice inflection, eye contact, and apparent involvement in the task. The 256 subjects played a marble sorting game, and after baseline measures had been taken, verbal reinforcement was delivered once every 20 seconds for six minutes. Responding was at a higher level (that is, a greater increment over baseline responding) under warm experimenter reinforcement, and this effect was particularly pronounced when the experimenter was of opposite sex to the subject.

The investigation of experimenter warmth by Danielson (1979) was reported in Chapter 3 (Section 3.2.4). In this experiment, children playing the Marble-in-the-Hole game were reinforced socially by an experimenter playing either a "warm" or a "cool" role. Subjects who received "warm" social reinforcement played faster and more accurately than subjects receiving "cool" social reinforcement. The lack of a cross-sex effect was interpreted in the light of the Valence Theory, in which an experimenter's reinforcing potential is influenced by the warmth of previous (or in this case, ongoing) interaction with that experimenter. Danielson concluded of repetitive tasks: (....affect, which is a product of cultural determination, may prove to be one of the most important variables in determining the effectiveness of similar interactions between adults and children" (p.1454).

Experimentation with retardates also indicates that warmth of delivery may be an important factor in the effectiveness of social reinforcement. Gayton and Bassett (1972) compared "maximum" and "minimum" social reinforcement in their study of vocabulary acquisition in institutionalized retardates. Again, the "maximum" version, characterized by nonstandardized "enthusiastic verbal reinforcement" and physical contact was more effective than "minimum" social reinforcement ('good') which was more effective that nonsocial reinforcement (a bell ringing).

However, another study including retarded subjects failed to find such a difference. Wargo and Meek (1971) compared "warm" feedback (frequent smiling, eye contact, etc.), with "cold" feedback (no eye contact, cold tone of voice), and mechanical feedback (lights). The experimenter was restricted in his verbalization to either "right" and "wrong" (cold condition) or "That's right" or "That's wrong" (warm condition). There was no overall differential response to the different types of feedback among either the resident retardates or the sample of resident rehabilitation clients. Instead, the high-level retardates made more errors on the first two trials when they received warm feedback. Wargo and Meek suggested that the warm personal communication from the experimenter acted as a distraction for those subjects engaged in the rather complex concept identification task.

The aim of the study reported in this chapter was to investigate the efficiency of different types of social reinforcement using retardates as subjects. The use of standardized versus nonstandardized and warm versus cold dichotomies gave four

stimulus possibilities. The effects of these reinforcers on the working behaviour of retardates on a simple laboratory-type task was the focus of Experiment 8.

11.2. PRE-EXPERIMENTAL VALIDATION OF REINFORCING STIMULI

Four different types of social reinforcement were employed in this experiment: warm standardized (WS); warm nonstandardized (WNS); cold standardized (CS); and cold nonstandardized (CNS). A videotape of ten reinforcement samples, including examples of each type described above, was created (see Appendix 11.1).

Normals. Five university students were asked to categorize these ten reinforcers according to the types described above, in order to establish that the reinforcing stimuli were differentiable. Of the five students, three attained 100% accuracy, while two made one error in judging a WNS reinforcer to be WS. This error was clearly a memory lapse, and all students were able to judge correctly the warm/cold dimension. Thus the four types of reinforcement were differentiable to these raters.

Retardates. Validation of the stimuli with retarded clients was less successful. To simplify the task, ten retardates were asked only to identify the warmth/coldness of a statement using the experimenter's apparent degree of happiness as the key. Using the videotape described above, subjects were asked after each reinforcement sample: "Am I sad or am I happy?". Nine out of ten retardates chose "happy" consistently for all statements of all four types. It is suggested that "happy" is a more common

word and that familiarity accounts for it being a preferred choice with retardates.

A supplementary videotape was made of ten negative comments such as "That's not fast enough", and "You should do better than that". Even if these comments were made in a cold manner, they still elicited the "happy" response in eight out of ten retarded subjects. The two subjects who did identify such statements as "sad" were only mildly retarded. As a further check, five retardates were asked "Am I happy?", or "Am I sad?", after each reinforcement sample. Three subjects consistently acquiesced with "Yes" in response to all questions. Of the remaining two, one falsely identified all warm statements as happy, while statements uttered in a cold, unenthusiastic manner were seen as sad, regardless of their positive or negative content.

In summary, the retardates tested were in the main quite unable to make the required judgements correctly, or at least were unable to express their judgements. This is consonant with Cromwell's (1963) view that: "The retardate tends to use his language to please or as wish fulfillment rather than to describe what reality is" (p.47).

11.3. EXPERIMENT 8.

The purpose of this experiment was to compare the effects of different types of social reinforcement from the experimenter on rate of performance on a repetitive task in retarded subjects.

METHOD

Subjects. Eighty retarded clients attending Horizon Industries served as subjects. These eighty subjects were divided into eight groups of ten subjects each (five females and five males), matched on the basis of age and IQ, as assessed using Raven's Coloured Progressive Matrices. The mean age of subjects was 25.9 years; mean IQ was 49.5. One colour-blind subject was rejected from the sample.

The Task. Subjects were required to do a routine packing task involving the selection of three plastic counters of three different colours from a box and the placing of these counters in an envelope. Filled envelopes were then placed in a box to one side. Subjects were able to do this task, as indicated by the few errors displayed. Plate 11.1 shows a client working at the experimental task.

Reinforcement. Four different types of social reinforcement were employed, as described above: WS, WNS, CS, and CNS. Each of the eight groups received only one type of reinforcement, which was delivered by the experimenter during the reinforcement phases, after every second envelope was placed in the box. Phrases were chosen randomly from a list of 25 utterances (see Appendix 11.2). It was predicted that retarded clients' behaviour would be differentially affected by these four types of reinforcement; in particular, that warmth and nonstandardization would be associated with larger increments.

PLATE 11.1. Retarded client working on the packing task used in Experiment 8.

Dependent Variables. The number of envelopes completed by each subject and his attending behaviour were recorded during each phase of the experimental run. Attending behaviour was assessed by post hoc viewing of session videotapes. The experimenter rated subjects' behaviour at the end of each 10 seconds, as attending or not attending, using the criteria described previously in this series of experiments. Inter-observer reliability over four checks was 100%. In addition to these observations, the number of errors made was also recorded.

Design. All 80 subjects performed the experimental task for one 20-minute session. Each session was subdivided into four 5-minute phases: for four of the groups (Groups 1-4), social reinforcement was delivered during the two middle phases; for the other four groups (Groups 5-8), reinforcement was delivered only during the first and final phases. This design was used to control for practice and fatigue effects. Within each phase, each of the four groups received only one type of social reinforcement.

For the purpose of data analysis, therefore, a difference score (experimental minus control phases) was obtained for each subject. The four factors represented in the balanced factorial design, each at two levels, were: order (Groups 1-4 versus 5-8); sex; warmth of reinforcement; and standardization of reinforcement.

Procedure. Subjects were seated at a desk opposite the experimenter's chair. The videotape equipment was behind the door, and was not noticed by most subjects; those who did notice it were not distracted. Standard instructions, including a demonstration by the experimenter, were presented using a 'neutral'

tone of voice. Following two correct practice runs, subjects were told to continue the task, without talking, until told to stop. Most subjects internalized these instructions adequately. Verbal initiations by subjects during the experiment were ignored.

RESULTS

Analysis was conducted on the differences between mean output during reinforcement phases and mean output during nonreinforcement phases. Table 11.1 presents the mean output during reinforcement and nonreinforcement phases for female and male subjects under each type of reinforcement.

TABLE 11.1. Mean output during reinforcement and nonreinforcement phases for female and male subjects in Experiment 8.

Type of Reinforcement	*Sex*	*Nonreinforcement*	*Reinforcement*	*Reinforcement minus Nonreinforcement*
WS	*Female*	*11.35*	*14.75*	*3.40*
	Male	*9.30*	*11.35*	*2.05*
CS	*Female*	*10.75*	*12.15*	*1.40*
	Male	*9.65*	*11.20*	*1.55*
WNS	*Female*	*10.70*	*14.65*	*3.95*
	Male	*11.60*	*14.90*	*3.30*
CNS	*Female*	*12.90*	*14.60*	*1.70*
	Male	*9.70*	*10.40*	*0.70*

It can be seen from Table 11.1 that social reinforcement had a marked overall effect on performance, in that all difference-scores are in the expected positive direction. It is not necessary to undertake any parametric statistical test to demonstrate the reliability of the overall effect, since it is significant over the eight groups using the sign test ($p < .01$).

Analysis of variance conducted on the output difference-scores yielded a significant effect for warmth of the reinforcer ($F = 17.71$, $df = 1,65$, $p < .05$). Thus subjects who received warm reinforcement did increase their output more. The order of presentation of the reinforcement (middle or outside phases) did not have a significant effect ($F = .14$, $df = 1,65$, n.s.); nor did sex ($F = 2.66$, $df = 1,65$, n.s.). The standardization of the reinforcer did not yield the expected significant effect ($F = .51$, $df = 1,65$, n.s.). It is highly unlikely that the use of standardized reinforcement would be as efficient as nonstandardized reinforcement under naturalistic circumstances. The number of errors made on the packing task was small and unrelated to experimental group.

The difference between mean attending levels during reinforcement and nonreinforcement phases was similarly analysed. Table 11.2 presents mean attending levels for female and male subjects in each group during reinforcement and nonreinforcement phases. Again, social reinforcement had an overall effect on attention, in that all difference-scores are in the positive direction.

TABLE 11.2. Mean percentage attending behaviour during reinforcement and nonreinforcement phases for female and male subjects in Experiment 8.

Type of Reinforcement	*Sex*	*Nonreinforcement*	*Reinforcement*	*Reinforcement minus Non-Reinforcement*
WS	*Female*	*82.7*	*86.1*	*3.4*
	Male	*80.3*	*87.5*	*7.2*
CS	*Female*	*83.6*	*90.8*	*7.2*
	Male	*85.9*	*91.4*	*5.3*
WNS	*Female*	*87.2*	*91.9*	*4.6*
	Male	*84.9*	*87.4*	*2.5*
CNS	*Female*	*87.5*	*92.9*	*5.4*
	Male	*76.7*	*81.0*	*4.3*

Analysis of variance was conducted on the mean difference-scores for attending behaviour: the warmth of the reinforcing stimulus did not yield a significant effect on this measure ($F = 1.05$, $df = 1,65$, n.s.). Hence subjects who received "warm" reinforcement succeeded in doing more without spending more time attending. Nor was the standardization effect significant ($F = 2.08$, $df = 1,65$, n.s.). Once again, neither the main effects of ordering of the reinforcement and nonreinforcement phases, nor sex of subject, gave significant effects. There was an anomalous interaction effect of Order x Sex ($F = 4.70$, $df = 1,65$, $p < .05$). However, this effect was neither predicted nor interpretable, and is not considered further.

The basic correlation between output and attention was examined when no reinforcement intervention had been instigated. The 40 subjects who received the control phase first were used, and their first-phase data considered. In this case, output and

attending behaviour were positively correlated ($r = .53$, $N = 40$, $p < .01$).

In addition, the degree of association for these two variables on the variation in the subjects' scores was investigated by correlating the difference-scores on both measures. The correlation was near zero ($r = -.06$, $N = 80$, n.s.). Thus although individuals differ systematically in their baseline output and attention, these two variables may be somewhat independent in their reaction to social reinforcement interventions in the laboratory setting investigated in this study. However, this result may be atypical since there was little scope for improvement in attention in this experiment in that scores were already rather high during baseline.

DISCUSSION

The finding that the retardates tested in this experiment were quite responsive to social reinforcement from an adult experimenter is in keeping with the majority of studies reported in Chapter 4 which used similar laboratory-type tasks. While output of all four groups increased, warm reinforcement (both standardized and nonstandardized) was more effective, although the retarded subjects who assessed the different types of reinforcing stimuli in the pre-experimental validation were generally unable to make differentiations on this factor.

Reinforcing output did lead to an increment in attending; there was no evidence of a distracting inhibiting effect of the warm social reinforcement used on this simple task, as was reported by Wargo and Meek (1971) using a more complex cognitive

task. This generalization of the reinforcement effect lends support to the findings of several investigators who monitored generalization in the classroom setting, as reported in Chapter 10.

However, the generalization was limited. Although there was an overall reinforcement effect on the attention index, there was no difference between the different types of reinforcement and, in particular, the superiority of "warmth" in the output data was not mirrored here. Subjects who received warm reinforcement seem therefore to be using their time more efficiently; or perhaps the lack of differential effectiveness for "warm" reinforcement is due to the high level of attention for all reinforcement conditions (the overall mean percentage attending behaviour during reinforcement phases was 88.69%), leaving little room for "warm" reinforcement to improve attention even more.

Neither the standardization of the reinforcing phrase nor sex of subject was a significant factor in either output or attention change-scores. Previous experimentation has frequently established that sex of subject in relation to sex of experimenter may be an important variable in laboratory investigations (e.g. Allen et al., 1969). It must be noted, however, that the experimenter in the present study was familiar to the subjects. Valence of the experimenter has been widely investigated in laboratory settings using similar tasks to the one employed in the present study. The review of such experimentation, reported in Chapters 3 and 4, indicates that prior exposure to an experimenter can increase the social reinforcing capacities of that experimenter. In the

present study, subjects had been exposed daily to the experimenter over a period of several weeks. Perhaps, therefore, individual interaction styles between the experimenter and particular subjects had been established which were not influenced by sex effects or the standardization of the verbal stimuli. Failure to find standardization or sex effects might have been due to this extensive interaction.

11.4. CONCLUSION

Experiment 8 showed that social reinforcement from an experimenter did act to increase output in the retarded subjects studied, and that "warm" reinforcement, whether standardized or nonstandardized, was significantly superior to "cold" reinforcement in increasing the output of the subjects. Attending behaviour, however, was not differentially related to the different types of reinforcement.

Further investigation of the link between output and attention was undertaken in the sheltered workshop itself and is reported in Chapter 12.

CHAPTER 12

EXAMINATION OF OUTPUT AND ATTENTION IN DIRECTLY AND VICARIOUSLY REINFORCED SHELTERED WORKSHOP CLIENTS

12.1. INTRODUCTION

Currently there is an increasing trend in the behaviour modification literature towards the use of multiple indices when examining the effects of a treatment (Ward, 1976). Systematic observation of more than one measure is economic and provides useful data relating to the generalization of modified behaviours.

In the case of vicarious reinforcement, the breadth or specificity of the behaviour change in the nonreinforced peer is important in assessing the mechanisms underlying the change. The contingency of the reinforcement to the directly reinforced subject (or model) is a critical component in most definitions of vicarious reinforcement. For example, Hamilton, Thompson and White (1970), found that only subjects who were aware of the reinforcement contingency increased their imitative behaviour. As noted in Chapter 9, however, working from Kazdin's formulation (e.g. 1973a) of the operation of vicarious reinforcement, the mere appearance of the agent of reinforcement elicits working behaviour. In this case, even noncontingent delivery of reinforcement to the target subject should still result in improved behaviour in the observing nontarget subject. Output and attention alike should be influenced under vicarious reinforcement, according to Kazdin's theory.

Measurement of output is often problematic in realistic settings. In the classroom, investigators who wish to monitor output need to choose as observation lessons those subject areas in which some ongoing measure is feasible, such as mathematics "problems-solution rate" (or accuracy), or the rate of coverage of programmed-learning material. In the sheltered workshop, task completion may be countable but workers may be engaged in a variety of jobs. There may also be intra-subject changes over the course of an investigation, as reported in Experiment 7A. Where heterogenous tasks are performed, it may be possible to convert subjects' performances into a percentage of normal worker capacity. Trybus and Lacks (1972) used this approach to overcome such difficulties by having normal workers do each task for several 10- or 15-minute periods to establish a "normal standard", and then transforming clients' production rates to a percentage of these figures.

In previous chapters, investigations of the effects of contingency of reinforcement, vicarious reinforcement, and the relationship between output and attention, have been reported. The purpose of experimentation reported in this chapter is to examine all of these variables in the same experimental setting, by extending investigation of the relationship between output and attention in a sheltered workshop under both contingent and non-contingent social reinforcement and under both direct and vicarious reinforcement conditions. To achieve this aim, a setting was required in which several subjects were engaged in a sensori-motor task for which output could be monitored, over an extended

period of time. Two experiments were undertaken. In the event, Experiment 9A served as a pilot investigation leading to the main study, Experiment 9B.

12.2. EXPERIMENT 9A

This investigation at Horizon Industries was designed to examine vicarious reinforcement effects in retarded sheltered workshop employees through the use of parallel measures of attention and output. Direct reinforcement to target subjects in the form of contingent or noncontingent social reinforcement was to be employed. This experiment was not completed due to administrative difficulties, but an outline of its design and the results obtained are presented.

PROCEDURE

The behaviour of three groups of six retarded subjects all doing the same task was to be monitored during several two-week phases; subjects were observed in pairs during 5-second time-samples. A subject had to be working for the entire interval to obtain a "working" score. After each 5-second observation a 5-second interval was allowed for recording. This procedure is identical to that used by Kazdin (1973b). Three pairs of subjects were observed in rotation: thus individual subjects were observed during 40 time-samples over a 20-minute period.

Following baseline for all groups, three subjects (Group A) were to receive either contingent social reinforcement following production of working behaviour for 10 "working" time-samples, or noncontingent reinforcement computed through individual yoking

(Group B). The vicarious reinforcement subjects (three in each of the experimental groups) were seated opposite the direct reinforcement subjects. Group C consisted of six control subjects. Specific seating arrangements are given in Figure 12.1, and were dictated by the normal pattern for these workers. Direct

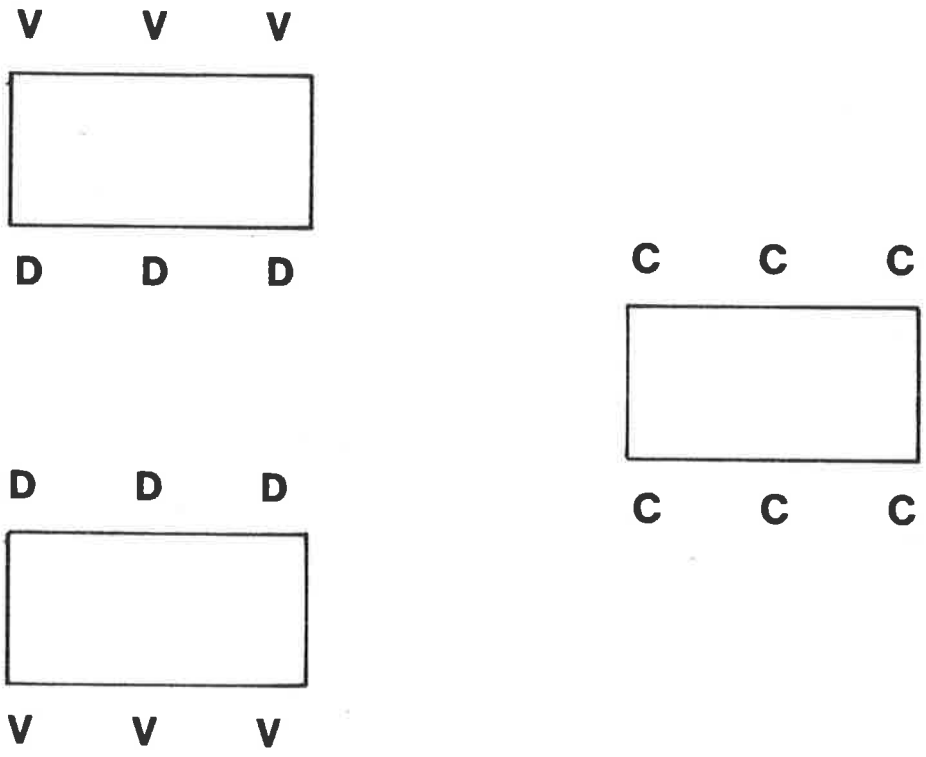


FIGURE 12.1. Seating plan for subjects in Experiment 9A.

reinforcement subjects occupied the inner flanking positions, as shown, so as to reduce vicarious effects for them. Vicarious reinforcement subjects, on the other hand, would have every opportunity to observe reinforcement delivery in the subjects sitting opposite. Control subjects sat about six metres away from the other two groups.

Following two weeks of social reinforcement to direct reinforcement subjects, a return-to-baseline phase was planned. In a second experimental phase, those subjects who had received contingent reinforcement would now have reinforcement delivered noncontingently and vice versa. Finally, two further weeks of baseline observations were planned.

The task involved sticking labels on medicinal jars, and output was assessed by the number of jars successfully completed. All subjects were familiar with the job and initially made few errors.

This experiment did not proceed past the baseline phase due to an increase in error rate in some subjects. Since this task represented an important source of income for the workshop, any increase in errors was not tolerable. In the opinion of the supervisor, clients were interpreting the presence of the observer as a cue for competition and were sacrificing accuracy for speed. This is an instance of reactivity to an observer's presence which surpasses that generally reported in the literature. Part of the reason for this reactivity may have been that the supervisor was new and therefore the workers were easily upset by

outside intervention. In other experiments in this series, subjects were working under a supervisor with whom they had a long-established relationship. The difficulty encountered in Experiment 9A illustrates the importance of the ambient social situation, as well as any additional social reinforcement.

The experiment was discontinued after Day 12. On the day following discontinuation, clients' reactions to the observations were elicited. In all cases, they appeared quite happy about being observed, but were well aware of the counting of completed labels and had tried to go faster.

RESULTS OF BASELINE PHASE

In this experiment, clients were allocated to the three experimental groups according to their pre-established seating arrangements, and not under the experimenter's control. It was not possible to shift subjects so as to balance groups. As a result, there was wide variation in performance between groups. Mean output (number of jars completed per session) and attention over the 12 observation days are given in Table 12.1.

TABLE 12.1. Mean output and attention scores (and Standard Deviations) for each group in Experiment 9A.

	Percentage time attending		*Output (No. of Jars completed)*	
	Mean	*S.D.*	*Mean*	*S.D.*
GROUP A	*61.22%*	*6.65*	*85.82*	*13.42*
GROUP B	*44.52%*	*20.75*	*80.09*	*29.35*
GROUP C	*54.94%*	*13.07*	*90.34*	*18.08*

Wide individual variation was also observed in both attention and output, as indicated by standard deviations. Daily output figures did not indicate that there was any systematic increase over the observation phase, despite the attempts by subjects to work harder.

12.3. EXPERIMENT 9B: A MODIFIED VERSION OF EXPERIMENT 9A

An experiment using different tasks was designed, to overcome the problems mentioned above. Subjects were observed as they sat in individual pairs, and pairs were allocated to experimental groups by the experimenter in a systematic fashion. As before, the focus of this experiment was the investigation of vicarious reinforcement (contingent and noncontingent) as it influenced the two dependent variables of output and attention. Apart from equating groups, a further advantage of using individual pairs of workers (rather than whole groups around tables) was that pairs could be observed at different times, making the observer less obtrusive.

METHOD

Subjects. Subjects were 18 mentally retarded male clients with a mean age of 25 years and mean IQ of 48 (assessed by Raven's Coloured Progressive Matrices). The 18 clients were divided into three groups of six subjects each (Groups A, B, and C). Since the number of clients in the workshop working in established pairs was not much larger than the number required for the experiment, the possibility of matching groups was restricted. Nevertheless, as far as possible, groups were matched for age and IQ. Within each

pair, one subject was chosen at random to be the target for direct social reinforcement, and the partner was designated the "vicarious reinforcement" subject.

Design. There were five phases, each two weeks in length. Following baseline, Group A subjects received contingent reinforcement initially and Group B subjects received noncontingent reinforcement (E1). Group C subjects were controls. Following a return-to-baseline phase (RBL), Group A subjects now received reinforcement noncontingently, while for Group B subjects reinforcement was contingent upon working (E2). Finally, subjects were observed during two further weeks of baseline (FBL).

Tasks. Four different tasks were performed by the pairs of experimental subjects. Two pairs of subjects were employed in screwing nuts onto flexibars (components of a car bumper bar); two pairs of subjects threaded pieces of string through paper labels and tied knots; one pair of subjects placed folded pieces of paper into envelopes and stuck down the flap; and one pair of subjects tied lengths of string into loops. Output on each of these tasks was easily counted. The three pairs of control subjects worked in a different area and were involved in the decoration of wrapping paper. Two pairs used a sponge to apply the base ink layer and one pair followed with sponges to apply a feathered finish in contrasting colours. Output for these control subjects was estimated by drawing squares on the table surface; daily output was the number of squares completely covered by the workers. Because six different tasks were involved, all scores analysed in this experiment were expressed as percentages of the individual's

baseline performance. Plate 12.1 shows clients working at two of the experimental tasks.

PLATE 12.1. Clients working at two of the experimental tasks in Experiment 9B.

Observations. In this experiment, rotation of observation was not used; rather, pairs were observed at separate times. Time-samples of five seconds in length, during which behaviour of both pair-members was observed, were followed by a five-second interval for recording. In this way, 40 observations were recorded during observation sessions lasting six minutes and forty seconds. Each pair was observed for one session per day at approximately the same time of day. Subjects were required to work for the entire time-sample to achieve an "attending" score of 1 unit; criteria used were similar to those previously employed in this series of experiments.

Reinforcement. On a cue from the observer, the supervisor moved to the target subject and gave nonstandardized social reinforcement. The supervisor was by this time much experienced in the delivery of reinforcement, since he had been the agent in Experiments 7A and 7B. The cueing system used, as in Experiment 7B, consisted of brief hand signals which were not obvious to clients. As planned in Experiment 9A, subjects who received contingent reinforcement were required to work for 10 time-samples, and noncontingent reinforcement was computed by yoking each subject to a particular contingently reinforced subject's record.

Reliability. Reliability ratings were taken three times during the experiment by having a second person make a simultaneous observation record. Reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements. Over the three reliability checks the percentage of agreement for working (attending) behaviour ranged between 87.5% and 95%.

Methods of Analysis

1. Correlational Analysis. Pearson's correlations were computed between the two dependent variables to check that they were in fact interrelated. However, correlations between output and attention in the initial baseline phase could not be used, since tasks were not standard for all subjects. Thus correlations considered changes in performance: each subject's mean scores for attention and output for the phases following initial baseline were expressed as percentages of initial baseline means. Correlations were then calculated as described in Chapter 10.

2. Analyses of Variance including Control Group. For each of the dependent variables, analysis of variance was conducted with both experimental and control groups included. Code letters are used to represent each variable in the following discussion. 'G' refers to the three groups (two experimental and one control); 'R' refers to the two types of phase with respect to reinforcement (reinforcement versus nonreinforcement); 'D' refers to the type of reinforcement condition (direct versus vicarious reinforcement); and 'C' refers to the nature of reinforcement (contingent versus noncontingent). The variables are illustrated in Table 12.2.

For the analysis, each subject's initial baseline was used as a control, and the data were expressed as percentages of individual baseline means (so that "no improvement" would give a score of 100%). This practice was justified by the complexity of the experiment and also by the heterogeneous tasks undertaken by subjects, which invalidated direct comparisons on raw data.

TABLE 12.2. Design for the analysis of variance including Control Group in Experiment 9B.

Variable	*Code Letter*	*No. of Levels*	*Meaning of Levels*
Group	*G*	*3*	*Control vs E1 vs E2 Pairs*
Direct/Vicarious	*D*	*2*	*Direct vs Vicarious Reinforcement Ss*
Reinforcement	*R*	*2*	*Reinforcement vs Nonreinforcement Phases*
Contingent/ Noncontingent	*C*	*2*	*Contingent vs Noncontingent Phases*

In summary, the design involved four experimental factors, G x D x R x C, with repeated measures on C and R. Calculations were undertaken using a Control Data Cyber 173 computer, with the MANOVA subprogram (Cohen & Burns, 1976) from the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). Appropriate error terms involving the "Subjects" factor were used to calculate F ratios.

In addition, multivariate analysis of variance was planned to examine performance over both dependent variables together (output and attention), given that the correlational analysis appeared to justify that course. The design was similar to that above, except that both dependent variables were considered as a combined "performance" canonical variate.

3. Analysis of Variance of Experimental Groups only. A second, "reduced", analysis of variance was performed in order to examine in detail effects within the experimental groups. This analysis was similar to that described above, except that factor 'G' consisted of two levels differentiating the two experimental groups which received treatments in different orders of presentation. The analysis is required because the detailed effects of experimental procedures (D, R and C) are only relevant within the experimental groups. The reduced design is illustrated in Table 12.3.

TABLE 12.3. Design for the analysis of variance of Experimental Groups only in Experiment 9B.

Variable	*Code Letter*	*No. of Levels*	*Meaning of Levels*
Group	*G*	*2*	*E1 vs E2 Pairs*
Direct/Vicarious	*D*	*2*	*Direct vs Vicarious Reinforcement Ss*
Reinforcement	*R*	*2*	*Reinforcement vs Nonreinforcement Phases*
Contingent/ Noncontingent	*C*	*2*	*Contingent vs Noncontingent Phases*

RESULTS

1. Correlational Analysis. To determine whether any changes in performance as a result of reinforcement were reflected concurrently in both attention and output, each subject's mean percentage-change scores during each of the two experimental phases were considered (see Appendix 12.1). Changes in attention and output were significantly and fairly highly correlated. For the vicarious reinforcement subjects, $r = 0.57$ (12 data pairs, $p < .05$); and for the direct reinforcement subjects, $r = 0.84$ (12 data pairs, $p < .01$). These two correlation values were not significantly different from one another using Fisher's Zeta normalizing conversion ($z = 0.91$, n.s.). Thus both types of reinforcement affected output and attention concurrently, and the degree of association between the two aspects of performance was fairly high in both cases.

No corresponding correlation was found for control subjects (using all four phases following the initial phase): $r = -0.13$ ($N = 24$, n.s.). Appendix 12.1 gives details of raw data. This finding was not surprising, given that there were no systematic, experimentally induced changes for these subjects. Nevertheless, it is necessary to consider further the correlation between output and attention in the control group, since in Experiment 7B, day-to-day attention and output variations were significantly correlated even in the strict "control" group ($r = 0.72$, $N = 27$, $p < .01$). In order to investigate whether there was a correlation in the day-to-day variability in the control group of the present

experiment, the data in this case were sufficient (i.e. 40 data pairs) to obtain a correlation separately for each control subject between output and attention. All correlations within each subject's data were positive, and the mean correlation obtained (by applying Fisher's Zeta normalizing conversion) was 0.32 ($p < .01$). Thus even when there were no systematic experimental effects, there was some relationship between the two measures in terms of day-to-day variability.

The two correlations for experimental groups with experimental-phase data (0.57 and 0.84 given above) were significantly greater that the equivalently calculated value for the control group (-0.13) using "change" scores: for the vicarious group, $z = 1.75$, $p < .05$; and for the direct group, $z = 3.38$, $p < .0001$ (using Fisher's Zeta).

The correlations for experimental subjects during the experimental phases were sufficiently high to support the assumption that continuing attention was important for high output on the tasks involved. Moreover, the use of multivariate analysis of variance was supported. However, the two performance measures should also be examined separately in relation to the experimental effects, particularly since only approximate estimates of significance levels are available for multivariate tests.

2. Analysis of Variance including the Control Group. Multivariate analysis of variance was performed using all three groups to determine whether there was a significant experimental (versus control) difference overall, a significant reinforcement effect, and an interaction effect, as expected. Detailed results of the multivariate analysis are given in Appendix 12.2.

The performance variate (the combination of output and attention which stems from the multivariate analysis) gave a significant G effect (Pillai's criterion = 0.72, approx. $F = 3.38$, $df = 4,24$, $p < .05$). The analysis also gave rise to a significant main R effect (Pillai's criterion = 0.59, approx. $F = 7.99$, $df = 2,11$, $p < .01$). Since this effect is, strictly speaking, only relevant to consideration of the experimental groups, comment on this finding is deferred to the following Section (3).

The R x G interaction was unexpectedly not significant at the 5% level (Pillai's criterion = 0.72, approx. $F = 2.30$, $df = 4,24$, n.s.). However, this nonsignificance did not imply that there was no significant "group by reinforcement" effect: rather, the effect was limited to the output variable, as shown by the univariate analyses presented below. The C x R x D interaction was significant (Pillai's criterion = 0.57, approx. $F = 7.38$, $df = 2,11$, $p < .01$). Thus the effect of contingency of reinforcement depended on whether reinforcement was direct or vicarious. Again, more detailed interpretation is more appropriately given in relation to univariate analyses.

Despite the correlation between output and attention, the two variables were somewhat differently affected by the independent variables. For this reason, separate univariate analyses were conducted, and these were the primary focus for inspection and interpretation of the data. Table 12.4(a) presents results for significance tests on the "output" variable, and Table 12.4(b) gives means corresponding to significant effects. In this analysis

there were significant G and R main effects, and a significant R x G interaction effect. Examination of the means in Table 12.4(b) reveals that both experimental groups gave higher output than the control group; that reinforcement was associated with higher output than nonreinforcement; and that within both experimental groups, but not the control group, the reinforcement phases were associated with higher output. All these effects were strong and as predicted. It is important to note that neither directness nor contingency of reinforcement affected output. The implications of these findings are discussed below.

Table 12.5(a) presents results of the analysis of attending behaviour, and Table 12.5(b) gives means for the significant effects. The R effect was significant here, showing that reinforcement was associated with more continuous attending than nonreinforcement, as expected. In addition, there was a significant C x D x R effect for attending. As can be seen from the means given in Table 12.5(b), the improvement in attending resulting from contingent reinforcement was particularly marked for the direct reinforcement group. Since this effect is meaningful only in relation to the experimental groups, further interpretation and comment is deferred to Section 3 which deals with the analysis of the experimental groups only.

TABLE 12.4. Univariate analysis for Output (including Control Group) for Experiment 9B.

(a) Significance of experimental effects

Source	F	df	p =
R	6.18	1,12	0.03*
G	4.86	2,12	0.03*
C	1.34	1,12	0.26
D	0.11	1,12	0.75
RxG	4.45	2,12	0.04*
RxD	0.98	1,12	0.34
CxG	0.43	2,12	0.66
CxD	0.89	1,12	0.36
GxD	1.20	2,12	0.33
CxR	0.56	1,12	0.47
RxGxD	0.73	2,12	0.50
CxGxD	0.18	2,12	0.84
CxRxG	0.77	2,12	0.48
CxRxD	0.47	1,12	0.51
CxRxDxG	0.35	2,12	0.71

**Significant effects using α = .05*

(b) Means for significant effects

	Control (Group C)	Experimental 1 (Group A)	Experimental 2 (Group B)
G	$\bar{X}$ = 79.71	$\bar{X}$ = 126.84	$\bar{X}$ = 123.13

	Reinforcement	Nonreinforcement
R#	$\bar{X}$ = 111.03	$\bar{X}$ = 99.70

		Reinforcement	Nonreinforcement
RxG	Control	79.41	80.01
	Experimental 1	115.45	111.05
	Experimental 2	138.23	108.03

#*Since these values include the Control Group, they are not the most appropriate for purposes of interpretation. The means for experimental groups only are given in Section 3, Table 12.6(b).*

TABLE 12.5. Univariate analysis for attending (including Control Group) for Experiment 9B.

(a) Significance of experimental effects

Source	F	df	p =
R	15.20	1,12	0.002*
G	2.61	2,12	0.11
C	4.19	1,12	0.06
D	1.43	1,12	0.25
RxG	3.28	2,12	0.07
RxD	1.23	1,12	0.29
CxG	2.52	2,12	0.12
CxD	2.93	1,12	0.11
GxD	0.00	2,12	-
CxR	2.24	1,12	0.16
RxGxD	0.04	2,12	0.96
CxGxD	0.55	2,12	0.59
CxRxG	1.58	2,12	0.25
CxRxD	6.82	1,12	0.02*
CxRxDxG	2.18	2,12	0.16

*Significant effects using $\alpha = .05$

(b) Means for significant effects[#]

	Reinforcement	Nonreinforcement
R	$\bar{X}$ = 115.28	$\bar{X}$ = 102.41

		Contingent		Noncontingent	
		Direct	Vicarious	Direct	Vicarious
CxDxR	Reinforcement	133.43	107.70	110.38	109.59
	Nonreinforcement	106.35	101.36	104.42	97.48

[#]*Since these values include the Control Group, they are not the most appropriate for purposes of interpretation. The means for experimental groups only are given in Section 3, Table 12.7(b).*

3. Analysis of Variance for Experimental Groups only. In order to examine the experimental groups in more detail, a multivariate analysis of variance was conducted on the two experimental groups only (see Appendix 12.3). The main G effect, which within experimental groups merely represents the two different orders of presentation of conditions, was not significant (Pillai's criterion = 0.28, approx. $F = 1.34$, $df = 2,7$, n.s.). R was a significant effect within the experimental groups (Pillai's criterion = 0.69, approx. $F = 7.63$, $df = 2,7$, $p < .05$). The C x D x R effect was again significant (Pillai's criterion = 0.78, approx. $F = 12.65$, $df = 2,7$, $p < .01$).

The D effect comparing direct and vicarious reinforcement was not significant (Pillai's criterion = 0.11, approx. $F = 0.45$, $df = 2,7$, n.s.), suggesting that vicarious reinforcement was generally as effective as direct reinforcement. The C effect comparing contingent and noncontingent reinforcement was also nonsignificant (Pillai's criterion = 0.45, approx. $F = 2.82$, $df = 2,7$, n.s.): however, this was not so with the univariate analysis of attention discussed below.

Separate univariate analyses for output and attention with experimental groups only were conducted. As a preliminary check, the effect of reinforcement on experimental subjects during experimental phases was compared against the initial baseline level (100). The effect of reinforcement (of whatever type) was marked. The mean percentage-change score for output was 126.84, which was a significant improvement over initial baseline ($t = 2.92$, $df = 23$, $p < .01$, one-tailed test). Attention was similarly improved

during experimental phases: the mean improvement for experimental groups during the two experimental phases was 121.23, which is again significantly higher than initial baseline ($t = 3.43$, $df = 23$, $p < .01$, one-tailed test).

Table 12.6(a) presents the results of the analysis of variance for output. There was only one significant effect; reinforcement was associated with higher output than nonreinforcement, as can be seen from Table 12.6(b). As in the multivariate analysis, neither directness nor contingency influenced output, and similar increases on this variable occurred under all reinforcement conditions.

Table 12.7(a) gives the results of the univariate analysis for attending, for experimental groups only. A significant main R effect agreed with the finding of the efficacy of reinforcement with respect to output. In addition, however, the main effect of contingency was significant in the analysis of attention: contingent reinforcement (whether direct or vicarious) was associated with higher levels of attending, but not of output. The significant C x D x R effect indicated that this contingency effect was especially marked when the reinforcement was direct rather than vicarious. Table 12.7(b) gives the means for these three significant effects. As can be seen from this table, the condition where direct, contingent reinforcement was given gave the highest mean attention (144.78), which contrasts with the lowest score in the absence of these conditions (96.15). The subjects receiving direct, contingent reinforcement were attending at an even higher

TABLE 12.6. Univariate analysis for Output (Experimental Groups only) for Experiment 9B.

(a) Significance of experimental effects

Source	F	df	p =
R	7.01	1,8	0.03*
G	0.36	1,8	0.57
C	1.44	1,8	0.26
D	1.01	1,8	0.35
RxG	3.85	1,8	0.09
RxD	1.56	1,8	0.25
CxG	0.17	1,8	0.69
CxD	0.90	1,8	0.37
GxD	0.04	1,8	0.85
CxR	0.20	1,8	0.66
RxGxD	0.11	1,8	0.75
CxGxD	0.00	1,8	-
CxRxG	1.32	1,8	0.28
CxRxD	0.90	1,8	0.37
CxRxDxG	0.08	1,8	0.79

**Significant effect using $\alpha = .05$*

(b) Means for significant effect

R	Reinforcement $\overline{X} = 126.84$	Nonreinforcement $\overline{X} = 109.54$

TABLE 12.7. Univariate analysis for Attention (Experimental Groups only) for Experiment 9B.

(a) Significance of experimental effects

Source	F	df	p =
R	14.25	1,8	0.005*
G	2.66	1,8	0.14
C	5.95	1,8	0.04*
D	0.61	1,8	0.46
RxG	1,10	1,8	0.32
RxD	0.65	1,8	0.44
CxG	1.90	1,8	0.21
CxD	3.43	1,8	0.10
GxD	0.00	1,8	-
CxR	1.82	1,8	0.21
RxGxD	0.05	1,8	0.83
CxGxD	0.00	1,8	-
CxRxG	2.70	1,8	0.14
CxRxD	9.63	1,8	0.01*
CxRxDxG	0.31	1,8	0.59

*Significant effect using $\alpha = .05$

(b) Means for significant effects

	Reinforcement	Nonreinforcement
R	$\bar{X}$ = 121.23	$\bar{X}$ = 103.10

	Contingent	Noncontingent
C	$\bar{X}$ = 117.55	$\bar{X}$ = 106.78

		Contingent		Noncontingent	
		Direct	Vicarious	Direct	Vicarious
CxDxR	Reinforcement	144.78	113.02	110.84	116.27
	Nonreinforcement	107.74	104.66	103.87	96.15

level than those who received vicarious contingent reinforcement (113.02). This suggests that social reinforcement was particularly potent for the target subjects in this experiment.

The complete breakdown of percentage baseline means for each combination of conditions is shown in Appendix 12.4; the corresponding breakdown for the output variable is given in Appendix 12.5.

DISCUSSION

The results of Experiment 9B confirmed the usefulness of a supervisor presenting social reinforcement in a sheltered workshop setting. Reinforcement, whether contingent or noncontingent, was associated with increased output and attention in experimental subjects. The effect was pronounced whether comparison was made with control subjects (Section 2 above) or with control phases (Section 3 above).

The superiority of contingent over noncontingent reinforcement only appeared in the analysis of attention. Thus, while contingent reinforcement caused a greater increment in attending to work, output was not similarly affected. This is understandable, given that the "contingency" was directed towards attending behaviour, and not output itself. The superiority of contingent reinforcement over noncontingent reinforcement reflects the earlier finding of Experiment 6 (conducted in a classroom setting) with regard to attending behaviour, where again a significant effect for contingency was found.

Other authors have noted the usefulness of noncontingent social reinforcement in improving attention to work in naturalistic settings. Cormier (1970), for instance, found noncontingent reinforcement from a school teacher to be only slightly inferior in maintaining improved behaviour to similar reinforcement delivered contingently. The efficacy of noncontingent reinforcement for the output data supports the notion that this may be an easy and efficient form of intervention.

Vicarious reinforcement was equally as effective as direct reinforcement on examining the multivariate analysis of experimental groups. This overall effect indicates that reinforcement has a general effect, additional to the effect on the targets. Direct reinforcement was not superior to vicarious reinforcement in improving either output or attention within the univariate analyses, again reflecting the findings of Experiment 6.

A significant interaction between contingency and directness of reinforcement appeared in the analyses of the attending data only. In this particular case, contingent reinforcement had a much stronger effect on the target subjects than it did on the vicarious subjects. This particular interaction effect does not always occur (see Experiment 6 where an overall significant contingency effect was obtained). The finding of a "contingency" effect even in vicarious reinforcement subjects in the earlier experiment was unexpected and appeared to disagree with Kazdin's findings and the "discriminative stimulus" formulation. In this formulation, contingency of presentation of reinforcement

should not affect the behaviour of the nontarget subjects, since their improved behaviour is elicited solely by the appearance of the agent of reinforcement. Rather, modeling of the reinforced behaviour may have occurred. Possibly the modeling effect is stronger when subjects are of above average intelligence, rather than retarded; if this is so, it may be important with retarded subjects to aim for greater contingency in direct reinforcement, for optimum results in improving attention to work.

Despite this finding, there was no particular advantage in direct reinforcement as far as output was concerned, and therefore in terms of cost-effectiveness the contingency would be less crucial.

Vicarious reinforcement may provide a useful supplementary benefit in classroom and workshop situations, since improvements were equivalent to those produced by direct reinforcement in the analysis of output (as in Experiment 7B). Within the analysis of attending behaviour, vicarious and direct reinforcement were equally useful to those subjects receiving noncontingent reinforcement. The impressive effect of vicarious reinforcement in this experiment was in keeping with the findings of Experiments 6 and 7B.

The present finding of an interaction between contingency and directness in the attending data was more in accord with Kazdin's formulation. While there was an overall contingency effect, this was particularly pronounced for those subjects receiving direct reinforcement. Therefore, the assertion that

vicarious reinforcement in naturalistic settings operates directly via the eliciting potential of the agent of reinforcement, cannot be rejected on the basis of the present findings. The interaction did not generalize to the output data. This failure to generalize would not be predicted from the "discriminative stimulus" explanation and suggests that other mechanisms should also be considered.

The three alternative explanations of the vicarious reinforcement effect offered by Broden, Bruce, Mitchell, Carter and Hall (1970), were outlined in Chapter 9. It is possible that modeling of the reinforced behaviour could also be occurring here, although the above-mentioned interaction suggests that this is not the only mechanism underlying the vicarious effect observed. Secondly, the possibility that some "spillover" of agent reinforcement may occur would also be in line with the present findings. Whether the reinforcement delivered is contingent or noncontingent, the agent's mere presence may be reinforcing to the nontarget subject and may thus operate to reinforce working behaviour directly.

A final explanation concerns the distracting potential of the target subject. If the target has constituted a significant source of distraction for the nontarget and is now working more consistently (due to direct reinforcement), then the nonreinforced peer will have less opportunities for distracting social interaction and may also work harder.

Once again, the "contingency by directness" interaction suggests that this account may only be part of the explanation.

Vicarious reinforcement was still effective in the second experimental phase. Kazdin has also reported considerable durability of the effect, even in the absence of any pairing with direct reinforcement. Other investigators, however, (e.g. Strain & Pierce, 1977) have found reduced effectiveness over an extended period. The present findings of continued effectiveness of up to four weeks are not in accord, for instance, with the conclusion of Carnine et al. (1968): "It is our best guess at this point that praising Tommy serves as a discriminative stimulus for Johnny to behave in a similar way, but that unless some direct reinforcing consequence follows Johnny's improved behavior it will not be maintained" (cited in Altman & Linton, 1971, p.283). Even longer exposure to vicarious reinforcement alone may induce a decline in effectiveness of this technique.

Maintenance of observed increments in behaviour in the absence of reinforcement (during return-to-baseline phases) was only moderate. This finding is in accord with those of earlier workshop experiments reported in this series, and provides support for the contention of Trybus and Lacks (1972, already noted in Chapter 6, Section 6.4) that "....it appears that the type of environment established through the use of these operant methods must be maintained in order to maintain the improved behavior" (p.265).

In general, there was a fairly high degree of association between the two dependent variables under conditions of social reinforcement, either direct or vicarious. This result is an important vindication of the usefulness of operant principles. It would be of little use to impose reinforcement contingencies for attending behaviour if such behavioural improvements as occurred were not also accompanied by some increased productivity. The well known criticism of Winett and Winkler (1972) that reinforcing the behaviour of being still, quiet and docile may be "anathema" to learning, receives little support from the present work.

CHAPTER 13.

GENERAL DISCUSSION

In this chapter, the findings of the experimentation are reviewed. Following this, issues arising from these findings are discussed. Finally, the relationship between work and social reinforcement in "post-industrial" society is considered, in the light of the foregoing discussion.

13.1. THE EFFECTS OF SOCIAL REINFORCEMENT ON WORKING BEHAVIOUR

Six experiments (1, 2, 3, 7A, 7B and 9B) involved intellectually retarded clients as subjects for the receipt of social reinforcement within various sheltered workshop settings. All confirmed the usefulness of social reinforcement from the supervisor as a technique for improving attending behaviour in mildly and moderately retarded groups. However, the effectiveness of this technique did not generalize beyond the periods during which reinforcement was provided; and baseline levels of responding were rapidly recovered in the "return-to-baseline" conditions.

Within the series of studies in sheltered workshops, noncontingent reinforcement was used as well as contingent reinforcement in Experiments 2 and 9B, and was clearly effective in both cases. In Experiment 2, contingent reinforcement was superior only when additional reinforcement sessions were included; and in Experiment 9B, contingent reinforcement was superior only with respect to attending behaviour, and not with the output measure of performance. The findings in relation to noncontingent reinforcement are further discussed in Section 13.2.

Vicarious reinforcement was examined in two sheltered workshop studies, Experiments 7B and 9B. In each case, vicarious reinforcement was a highly effective technique of behavioural control. In Experiment 7B, contingent vicarious reinforcement was as effective as contingent direct reinforcement in improving the attending levels of clients. In Experiment 9B, direct reinforcement resulted in greater attending than vicarious reinforcement only when it was contingent; and there was no difference between direct and vicarious reinforcement in regard to the improvements in output which ensued from the reinforcement.

The relationship between output and attention was considered in three experiments in a sheltered workshop (Experiments 7A, 7B and 9B). In both Experiments 7A and 7B, significant relationships in day-to-day variability between these two indices were obtained both during initial baseline and during experimental intervention. In Experiment 9B, the significant correlation for experimental groups between measures was confirmed when mean percentage-change scores were used. In this experiment, the data for control subjects did not support previous findings of significant correlations between changes in output and attention using mean scores for phases, but analysis of the daily scores for each control subject revealed a significant correlation in day-to-day variability. Thus attention generally makes a contribution to performance with retarded persons, a finding in keeping with the relevance of their attentional deficits frequently reported (e.g. Zeaman & House, 1963).

Retarded adults served as subjects in one further study, Experiment 8, which extended the investigation to a laboratory setting. The effectiveness of social reinforcement was confirmed, in this case from an experimenter rather than a familiar supervisor. Social reinforcement contingent upon output produced increments in both output and attending behaviour. "Warm" reinforcement was found to be superior to "cold" reinforcement in output improvement only. A significant correlation between output and attention was found during baseline phases. However, changes in these two performance measures upon intervention during reinforcement phases were not significantly correlated in this experiment, due partly to the high baseline attending levels of subjects in the laboratory setting.

Three studies (Experiments 4, 5, and 6) investigated social reinforcement with subjects who were intellectually normal or of high intelligence engaged in mathematical tasks. Within a laboratory setting, noncontingent reinforcement was relatively ineffective (Experiment 4), but social reinforcement contingent upon output did serve to heighten performance in tertiary students (Experiments 4 & 5). Within the naturalistic setting of a classroom, Experiment 6 demonstrated the usefulness of social reinforcement and the superiority of contingent reinforcement over noncontingent reinforcement in improving students' attention to their work. This finding was in accord with that of Experiment 9B for attending behaviour. As in Experiment 7B, vicarious reinforcement was equally as effective as direct reinforcement in the classroom

setting. The findings regarding vicarious reinforcement are discussed further in relation to Kazdin's "discriminative stimulus" theory in Section 13.3.

Social reinforcement was effective to some degree in each of the experiments reported in this series. The efficacy of such reinforcement is in keeping with the results of the majority of previous laboratory studies reported in Chapters 3 and 4, and previous studies conducted in realistic settings reported in Chapters 5 and 6.

Durability of the reinforcement effect, for the periods of the experimental intervention, was considerable in each of the "naturalistic" experiments, with social reinforcement maintaining its reinforcing power over several weeks. The finding that social reinforcement (unpaired with any primary reinforcer) continued to act as a reinforcer over extended periods of time would be in accord with ethological conceptions suggesting a degree of innateness, as presaged in Chapter 2.

Overall, the findings of efficacy of social reinforcement in various settings stands in sharp contrast to the assertion made recently by Katz and Kahn (1978) that reliance on social reinforcement as a motivator at work is not feasible, because the high supervisor/worker ratios needed would be unpopular with workers as noted in Chapter 1 (Section 1.3.3). In fact, the groups in the present studies were characterized by a fair degree of reliance on supervision. The presence of an additional "supervisory" person (the author) only acted as an interference in one of the situations studied (Experiment 9A), and reports from

other supervisors (Experiments 1, 2, 3, 7A, 7B, 9B), and the teacher (Experiment 6), indicated that workers did not object to this additional observation.

Difficulties arising from any increases in supervisory personnel associated with behavioural interventions might be due to the extra cost of providing such personnel, rather than complaints from workers. This assertion does, of course, assume that the additional supervisors are seen as legitimate and congenial by the workers, just as the present findings would be limited to those situations where the supervisor's praise is perceived as rewarding.

The use of social reinforcement is widespread in many work situations, including classrooms, as noted in Chapter 1. Indeed, the results of the present series of experiments extend the comment of Ward (1976, p.262): "It is the writer's contention that, in many ways, North American usage devalues the power of social reinforcement and in this country, used contingently, it can produce even more striking results". The findings of the studies conducted in naturalistic settings in the present work suggest that this statement could meaningfully be extended to include Australian usage.

It would seem from the above review that amongst the major topics for further discussion are: (1) noncontingent reinforcement; (2) vicarious reinforcement; and (3) comparisons between intellectually retarded adults and normals. These questions are addressed in the following sections.

13.2. NONCONTINGENT REINFORCEMENT

Noncontingent social reinforcement was clearly an effective intervention technique in Experiments 2, 6, and 9B. In fact, strictly noncontingent reinforcement is not easily produced in naturalistic settings, and it is likely that the "noncontingent reinforcement" employed in the present work was not truly non-contingent.

As Rescorla (1968) pointed out, there is always some degree of contingency present in the noncontingent situation, due to chance pairing. In behaviour modification studies of classrooms and sheltered workshops, however, the degree of contingency is likely to be increased above that normally present in other "noncontingent" situations. This increased proportion of reinforcement which is contingent upon the reinforced behaviour arises because of the discriminative stimuli which operate within familiar settings. Being in the working situation (be it classroom or workshop) is itself a strong discriminative stimulus likely to elicit working behaviour. The presence or approach of the usual agent of reinforcement is a further discriminative stimulus for the production of appropriate behaviour, in order to receive reinforcement. For example, when the teacher approaches, the student stops talking and attends to his book. Thus strictly noncontingent reinforcement (as examined in laboratory settings) is difficult to produce in natural settings, and noncontingent reinforcement is likely to allow a relatively greater occurrence of unavoidable contingency.

The function of the teacher/supervisor as a general discriminative stimulus for appropriate working behaviour in

real life settings has been little researched, as noted by Marholin, Steinman, McInnes and Heads (1975), and Marholin and Steinman (1977). These authors found that students' on-task behaviour declined markedly when the teacher was absent. This occurred whether reinforcement had been given noncontingently, or contingent either upon on-task behaviour or upon number or accuracy of problems completed. Cormier (1970) commented: "If a student has received some positive social stimuli for some relevant classroom behavior, it is probable that a teacher could acquire positive discriminative cue properties under conditions in which praise and attention were administered noncontingently" (p.52).

The discriminative stimulus effect of the supervisor in the sheltered workshop should operate similarly, and this mechanism may account in part for the observed usefulness of noncontingent reinforcement in this setting. Of course, it should be noted that the closer approach of the discriminative stimulus himself is contingent upon working only in the case of contingent presentation. In addition, the reinforcement situation may be complicated if there are any aversive properties possessed by the agent of reinforcement.

Because of the degree of contingency present in "non-contingent" reinforcement in realistic settings, as well as the frequently very loose versions of contingent reinforcement typically employed in those settings, it is not surprising that the difference in effect between the two types of delivery is rather less than that observed in the laboratory. An implication of this difference is that noncontingency may not be an effective baseline against which to judge the contingency of reinforcement in these settings, although it is frequently used in laboratory experiments.

A further process used to account for the relative effectiveness of noncontingent reinforcement in realistic settings, is that of verbal mediation in humans. As Kling and Schrier (1971) commented of this human ability to bridge delays between response and reinforcement: "Delays of reinforcement are, of course, of trivial importance if a human subject can verbalize the important characteristics of the situation and later reinstate the essential features through the use of language" (p.688). Thus language interacts with a nonlinguistic reinforcing stimulus by reducing the need for close response-reinforcer contingencies, and strict contingency is not essential to maintain behaviour, since the behaviour is under verbal control. Praise is received roughly in proportion to working behaviour, although its temporal relationship to the behaviour is various. Here the eliciting stimuli are words, rather than the agent of reinforcement as in the above discussion, and the reinforcement contingency is verbalized.

Work with animals suggests that noncontingent schedules do support behaviour (presumably without language mediation), but only to a slight extent. Use of truly random presentation of CS and UCS was reported by Rescorla (e.g. 1968, 1969) to produce a behaviourally neutral treatment. Rescorla (1968) commented: "Independent of the overall probability of shock, there was little or no suppression if shock came with equal probability in the presence and absence of CS" (p.64).

Generally, however, truly random procedures produce some conditioning. Kremer and Kamin (1971) for instance, reported

some excitatory conditioning during post-testing, after random pairing of CS and UCS. Similarly, Benedict and Ayres (1972) and Ayres, Benedict and Witcher (1975) found evidence of conditioning, although behaviour was at a much lower level than that produced by contingent reinforcement. As Wasserman, Deich, Hunter and Nagamatsu (1977) commented with regard to the conditioning of chickens: "....key pecking increases much more slowly when CS and US are presented independently of one another than when the stimuli are serially paired" (p.483).

Even in nonlinguistic organisms, then, noncontingent reinforcement does not have the same effect as the absence of reinforcement or extinction. Kling and Schrier (1971) commented of the difficulties caused by delay of reinforcement: "As might be expected, young children can tolerate longer delays than completely nonverbal organisms, but children are significantly hindered by delay intervals.... which adults would probably find quite inconsequential" (p.688). It is highly likely that, with human subjects, language contributes to the efficacy of non-contingent and loosely contingent reinforcement operations.

The relative efficacy of noncontingent social reinforcement found in studies conducted in natural settings also stands in contrast to experimental findings regarding noncontingent reinforcement in novel experimental situations with human subjects, as reviewed in Chapter 3 (Section 3.2.7). Indiscriminate use of social reinforcement (e.g. Warren & Cairns, 1972) or noncontingent presentation (e.g. Babad & Weisz, 1977) generally leads to reduced

effectiveness in the experimental situation later on. The conclusion which may be drawn is that the information conveyed to the subject about the behaviour required is ambiguous under these conditions. In the everyday working situation, however, contingency becomes less important as a means of supplying information to subjects about the type of behaviour that is likely to receive reinforcement, since they are well aware of what behaviour is required in that familiar situation.

Further research regarding noncontingent reinforcement could profitably explore the degree of contingency present in "noncontingent" deliveries within naturalistic settings.

13.3. VICARIOUS REINFORCEMENT

Whilst it is conventional in operant work to look at individual organisms, this is clearly inappropriate when considering work. Work is habitually performed in social situations, especially of the types sampled in the present investigations, educational and factory work. In such cases, the delivery of reinforcement is often apparent to other workers.

Previous experiments have frequently reported that vicarious reinforcement is an effective intervention in applied settings. The results of Experiments 6, 7B and 9B within the present series confirmed these findings. An unexpected result of particular interest concerned the superiority of contingent vicarious reinforcement in Experiment 6. This superiority was supported in the attention findings of Experiment 9B, although there was no difference between contingent and noncontingent

vicarious reinforcement in the analysis of output in the latter experiment.

In considering possible reasons for these findings, it will be useful to re-examine the definition of social reinforcement, discussed in Chapter 2. It was accepted that social reinforcement must involve a communicative gesture on the part of another organism. There is some difficulty in deciding whether reinforcement directed at another person should properly be included as "social reinforcement". If this definition is not qualified to include only the intended target of the gesture, then the "nonreinforced" vicarious subjects in the present experiments were in fact receiving reinforcement either contingently or noncontingently. On the other hand, if it is accepted that to qualify as social reinforcement, the communicative gesture on the part of another organism must be directed at the recipient, then direct reinforcement cannot be involved unless the nontarget subjects misinterpret the aim of the reinforcement.

Such misinterpretation is unlikely, given that human beings tend to direct their gestures more than other species. Human beings do not have many "general" communicative gestures unlike, for instance, other primates, which show a rich series of general communicative behaviour, especially vocalizations (e.g. Marler, 1968). Their calls (and other behaviours, too) are emitted as signals which may control group behaviour but are often not directed to any one particular animal. Given that most of human communication activities are of the directed kind, and also that the social reinforcement used in the present experiments was

fairly specific (and included the name of the recipient), then misunderstanding of its intention seems unlikely, even with retarded persons.

It seems sensible for present purposes to consider that "social reinforcement" should not be limited to include only the intended target of the reinforcement. Thus reinforcement directed at another person could be classified as "social". A decision that social reinforcement must be directed at the intended target would raise a semantic problem in that "vicarious social reinforcement" would then be a self-contradiction. Under the present definition, there is no such difficulty.

Whatever label is employed, the effect is clear enough, in that observing another person receive reinforcement has a marked influence on the observer. The four mechanisms suggested to explain the occurrence of behaviour changes in nontarget subjects were outlined in Chapter 9 (Section 9.2); the relevance of these formulations for the present results will now be discussed.

The discriminative stimulus explanation of the effects observed in nontarget subjects of the reinforcement process states that the behaviour of the reinforced subject should be independent of the changes produced in the observer, since it is the presence of the agent of reinforcement which elicits the working response. This view is only partly supported in the present work. The results of Experiment 6, in which a contingency effect appeared even in the vicarious reinforcement subjects, are clearly not supportive of this explanation. On the other hand, with the output data from Experiment 9B,

improvements in output with vicarious reinforcement were not influenced by contingency, which does give some indirect support to the discriminative stimulus explanation. In the same experiment, contingency did differentially affect the target subjects' attending giving rise to the C x D x R interaction effect. Such an interaction did not occur with the measure of output, so that overall the findings must be regarded as equivocal.

An alternative mechanism, "spillover" of the reinforcing properties of the agent's mere presence has also been suggested as an explanation for the improved performance in observing subjects. Proximity of the reinforcing adult may be reinforcing in itself (and this may qualify as an instance of social reinforcement, depending on the definition adopted). It seems somewhat unlikely that this mechanism alone could account for the impressive and durable vicarious reinforcement effects frequently observed, although it would be in accord with the above mentioned interaction.

Modeling may also occur. Studies of observational learning with animals suggest that modeling is an important determinant in the facilitation effects produced when an animal observes a conspecific performing a response which is subsequently to be learned. Groesbeck and Duerfeldt (1971) examined the relevance and importance of three factors: the information conveyed, modeling processes, and vicarious reinforcement (seeing another

organism receive reinforcement). Observing the response to be performed was found to be the most important variable and "vicarious reinforcement" had little effect. Similarly, Zentall and Hogan (1976) showed that observation of another pigeon pecking (but not eating) produced facilitation which was comparable to observation of another pigeon both pecking and eating; thus "vicarious reinforcement" was of minor importance.

A modeling explanation would be in accord with the present findings of differential performance by contingent and non-contingent vicarious reinforcement subjects in Experiment 6, given that direct reinforcement subjects also responded differently to these treatments. The fact that the overall contingency effect was not reproduced in Experiment 9B is somewhat puzzling, but it may be that the high IQ subjects of Experiment 6 were more able to detect the contingency or noncontingency of reinforcement and that their modeling was thus more precise. For retarded subjects, however, perhaps the noncontingent reinforcement appeared to be contingent. Modeling seems a feasible explanation of vicarious reinforcement findings in the case of retarded subjects, given the success of modeling procedures in training a variety of behavioural responses with such clients (Litrownik, Franzini & Turner, 1976).

A final explanation of the "vicarious effect" involves the reduced possibilities for distraction when the target receives reinforcement. If a major cause of nonattention is activity with a working partner, and if that partner is now working more, then there is less scope for joint interfering activity.

It is probable that several processes are operating simultaneously to produce improvements in nontarget subjects. The appearance of a teacher or supervisor is likely to produce some working behaviour, and modeling of the behaviour which produced the reinforcement may also occur. Both of these explanations receive some support from the present findings. It is also likely that proximity of the reinforcing agent per se and reduced distraction possibilities may account in part for the improvements noted.

Future research on vicarious reinforcement in naturalistic settings could usefully investigate in detail the relationship between the target subject's behaviour and the vicarious effect, in order to test further the discriminative stimulus explanation. Kazdin's tests involved Differential Reinforcement for Other behaviour treatments in which target subjects received reinforcement after some lapses in attention. A more stringent condition, for instance reinforcement for sitting idle, may produce very little behaviour in the vicarious reinforcement subject if modeling and distraction are predominant.

13.4. COMPARISONS BETWEEN PERSONS WITH GENERAL AND SPECIFIC BEHAVIOURAL DEFICITS

There are many difficulties in comparing species, due to their widely differing natural behavioural repertoires and environmental settings. Sidman (1960) stressed these difficulties when he stated: "Any experiment in which species is the variable of major concern will also involve differences in other important variables linked with the species continuum.... Because of the difficulty in equating such factors, differences

among species might easily result from them rather than from species classification per se" (p.55). Comparisons between retarded and nonretarded populations are hampered in a similar way, to some degree. Zeaman (1965) stated: "Length of institutionalization, home environments, previous schooling, tender-loving-care, and socioeconomic status are factors likely to be different for retardates and normals" (p.108).

Despite the large number of differences involved, some broad comparisons are appropriate: in particular, the focus on behavioural deficits exhibited by the two groups leads to a consideration of similarities between them. Some current definitions of mental retardation stress such behavioural deficits rather than any structural deficits: "Mental retardation has come to be defined as a set of behavioral/social deficits, rather than as an entity that necessarily inheres in the individual" (Haywood, 1977, p.12).

There is no doubt that retarded persons manifest wide and significant behavioural inadequacies, whether these are deemed to be due to motivational deficits, notably by Zigler (e.g. Zigler & Balla, 1976), or to the interaction between such deficits and contemporary independent variables. As Ellis (1978) commented: "Few processes seem 'normal' in the retarded. Indeed studies that find normal functioning in any task are suspect" (p.52).

Retardation can be viewed from a societal perspective which includes consideration of the characteristics and

demands of the society. Maloney and Ward (1979) see low intelligence as "....a problem because of the demands and expectations of the society" (p.161). Mental retardation can only be fully understood, according to these authors, by appreciating the significance of the problems experienced by retardates within a societal context.

Intellectually normal persons may also exhibit specific deficits because they lack particular necessary skills. For instance, the behaviour studied in relation to normals in the present work, the learning of mathematical skills, represents an area of common "behavioural deficit" for normals (even those of high intelligence) and thus can be seen as an area of potential specific "retardation" for normals. Mathematics ability is a very difficult skill to acquire, in comparison with other subject areas (although intersubject comparisons are difficult), and tends to attract the more academically able students (Forrest, Smith & Brown, 1970; Duckworth & Entwistle, 1974; McVey, 1978). Nonetheless, such skill is currently required by society in many circumstances, and inadequacy represents a source of considerable frustration.

Barton (1980) stressed the importance of mathematics skills in educating students, so as not to restrict the job options available to them: "In many cases students' options are severely restricted because maths is not encouraged at the Year 12 level at their school.... They are unable to pursue preferred career streams...." (p.2).

Thus retardates and normals can be viewed comparatively as groups occupying various positions along a "behavioural deficit" dimension, in terms of behaviours that are required by society. While retarded persons manifest broad generalized areas of behavioural incompetence, a situation which is accompanied by wide ranging negative attitudes and apprehension in relation to learning new tasks, normals may suffer from specific deficits which lead to limited feelings of incompetence. This view, of course, does not propose that behavioural deficits are the only symptoms manifested by retarded persons, and structural deficiencies as well as motivational ones no doubt contribute to their poor performance.

The effectiveness of social reinforcement demonstrated in the present series of experiments, with behavioural improvements in people of varying degrees of deficit, establishes generality of this reinforcer. Social reinforcement was clearly effective both with people suffering from generalized deficits and with those manifesting specific societal deficits.

The manifestation of some degree of "retardation" by normal people may be exacerbated by the accelerating requirements for successful performance in a society which is increasingly complex and technological. Considerable numbers of people who are not generally retarded, but who do have serious difficulties in adapting to the increasing demands of modern society in various areas, manifest "adaptive deficits". For example, "Even

freeway systems and printed bus schedules are so complex that they confuse persons of even average or above-average intelligence" (Maloney & Ward, 1979, p.318).

Robinson and Robinson (1976) drew attention to the difficulties experienced by the mentally retarded by using the analogy that being retarded in our society is comparable to being a traveller in a foreign country where a different language is spoken. This analogy can be extended to include increasing numbers of normal people in our complex society. Thus normals may become increasingly "retarded", in terms of the skills they lack, and additional training and reinforcement may be indicated. In particular, difficulties with producing adequate mathematical behaviour may become an even greater source of frustration in a society which is increasingly mathematically and "computer" oriented.

13.5. THE USE OF SOCIAL REINFORCEMENT IN "POST-INDUSTRIAL" SOCIETY

Increasing pervasiveness and sophistication of automation brings a change in both the character and the concept of work. The precise nature of the changes produced are as yet unclear. Hackman's view (1979) noted in Chapter 1 (Section 1.2.4), represents a rather pessimistic outlook, which predicts decreasing potential for work satisfaction and unfulfilling work experiences as the norm in the future. While this conclusion may be valid for some jobs and some workers, other "technology assessments" are more positive. The Myer Committee of Inquiry into

Technological Change in Australia (1980), for instance, forecasts several possibilities for improvement in the working environment, including "....enhancement of the quality of working life and job satisfaction through attention to factors such as organisation of work and patterns of work time" (p.176).

The effect of increasing levels of automation on the possibilities for social interaction at work are relevant to the present thesis. Dubin (1976) asked: "If man is a sociable creature and requires constant interaction with fellow men who are.... 'significant others', then how are work situations to be designed so that there is natural opportunity while working to engage fellow men in social interaction?" (p.8). Thus not only is social reinforcement important in the enhancement of an individual's attention to the job and his efficacy, but it may also be important for the person's general well-being. Mechanization, with its inherent constraints, does seem to reduce the level of communication observed in workers. The literature concerning the effects of automation on alienation at work (including social alienation), however, is conflicting (Shepard, 1977), and the impact of technological change on human relations at work is difficult to assess. Automation may not always lead to a reduction in possibilities for interaction with other people. Vamplew (1973) for instance, commented: "Automated process technology demands highly co-ordinated work groups in order to operate. To a considerable extent, and unlike the assembly line, it precludes the isolation of the individual

carrying out discrete tasks without reference to the requirements of the total process" (p.422).

While possibilities for social interaction with peers at work need not be reduced by increasing the automation level, it does seem clear that the nature of worker-supervisor interactions may change. In particular, the need for supervisory feedback per se may diminish, given that such communication is often "routinely accomplished in built-in feedback devices" (Meissner, 1976, p.223). Mechanically controlled feedback is obviously of a more impersonal kind. This is particularly relevant once criterial performance has been reached and the worker is competent to continue independently. Any consequent reduction in supervisory feedback is also influenced by the higher skill levels of workers, the increase in professionalism, and the delegation of decision-making which tend to be associated with higher levels of technology and education. A decrease in human feedback is also likely to accompany automated instruction in the classroom.

The question arises as to the potential influence of this impersonalised form of feedback as reinforcement for working, or whether additional forms of reinforcement may be needed to enhance its power. It is possible that no additional reinforcement need be provided, and we can rely on Skinner's (1968) assumption that "being right" will be sufficient reinforcement to keep a worker motivated. In some cases, machine feedback of a more "objective" nature may even be preferable by itself.

However, some evidence suggests that feedback alone may not be reinforcring for workers. A recent film, "Now the chips are down" (Goldwyn, 1978) showed that mechanically delivered feedback to supermarket checkout operators was not positively reinforcing, but rather was actually aversive. The reason for this effect is unclear: perhaps the "objectiveness" of the information, or the use to which it may be put, was the problem; or perhaps such feedback may be seen as too impersonal and might have been preferable if it had originated from the supervisor. Although this example is a dramatic one, even less intense levels of feedback may be, if not aversive, then insufficient to motivate workers. Such information if delivered by the supervisor may be more palatable (depending, of course, on the supervisor).

It does seem that the introduction of automation operates to emphasize the interpersonal aspects of the supervisory role. Recent contributions suggest that automation changes the supervisor's tasks. Mann and Hoffman (1960) assessed the effects of increasing levels of automation on the organization of work and on the work life of workers. They noted the increased importance of the supervisor's interpersonal skills in the comparison of an old mechanized plant with a newer automated setting. The authors commented: "....we found that the men in the new plant looked to their supervisors for their interpersonal qualities rather than for their technical skills" (pp.208-209). Although Mann and Hoffman suggested that this

change in role was largely due to the greater time available to workers involved in automated processes, an alternative explanation is based on the feelings of anxiety generated by change in work settings. The supervisor can be perceived as a means of allaying this anxiety.

Perhaps supervisory consideration may increase because work itself becomes more impersonal. Schriesheim and Murphy (1976) noted that increasing structure in work tends to be associated with increasing level of supervisor consideration. Thus the supervisor may be viewed as providing a desirable extension of reinforcement (in this case, social reinforcement) to augment the machine feedback provided by the automated process. His role shifts from one involving provision of feedback towards a focus on provision of encouragement and interpersonal interaction.

The importance of "affiliative motivation" (Argyle, 1972) as a reward for working behaviour was discussed in Chapter 1 (Section 1.3.3). Among the destructive psychological effects of chronic unemployment is the deprivation of the opportunity to interact with other people at work, a significant feature of work life. Hill (1978) spoke of "....the direct loss of the work place as a source of conversation and social contact...." (p.120) as a major outcome of unemployment.

The question of the linkage between working behaviour and social reinforcement was addressed in Chapter 1. If this linkage is of a "biological" nature, then the present supervisory

role of providing social reinforcement would need to continue. If this linkage is one involving social, not biological determination, then other forms of reinforcement might be equally effective as a reward for working behaviour. Either the supervisor could be employed in providing alternative modes of reinforcement to accompany the feedback, or some suitable reinforcement could perhaps be supplied via the process itself, and the supervisor's role may diminish.

In Chapter 1 it was concluded that the linkage between work and consequential praise as a reward for work is more likely to be socially, and not biologically, determined, in which case some change in the supervisory role may occur in the future. This thesis has shown that within present industrial society, the role of the supervisor or teacher in working and training situations is a very powerful and important one.

LIST OF APPENDICES

		Page
8.1.	MATHS ANXIETY QUESTIONNAIRE USED IN EXPERIMENTS 4 AND 5	427
8.2.	GENERAL AND PROGRAMME TESTS USED IN EXPERIMENTS 4 AND 5	428
8.3.	EXPERIMENT 5A	431
9.1.	MATHS ANXIETY QUESTIONNAIRE USED IN EXPERIMENT 6	435
11.1.	VALIDATION REINFORCEMENT SAMPLES (EXPERIMENT 8)	436
11.2.	REINFORCEMENT PHRASES USED IN EXPERIMENT 8	437
12.1.	INDIVIDUAL SUBJECTS' SCORES FOR EXPERIMENT 9B	438
12.2.	MULTIVARIATE ANALYSIS (INCLUDING CONTROL GROUP) FOR EXPERIMENT 9B	439
12.3.	MULTIVARIATE ANALYSIS (NOT INCLUDING CONTROL GROUP) FOR EXPERIMENT 9B	440
12.4.	MEAN ATTENDING FOR DIRECT AND VICARIOUS REINFORCEMENT SUBJECTS IN EXPERIMENT 9B	441
12.5.	MEAN OUTPUT FOR DIRECT AND VICARIOUS REINFORCEMENT SUBJECTS IN EXPERIMENT 9B	442

APPENDIX 8.1.

MATHS ANXIETY QUESTIONNAIRE USED IN EXPERIMENTS 4 AND 5

In this questionnaire you are asked to indicate your response to the following statements. If the statement is in complete accordance with the way you feel, please tick "1"; if the statement does not apply to you at all, tick "5". Use the intermediate ratings for statements which are only partially true of the way you feel.

1 2 3 4 5

1. My heart-beat rate increases when I am doing Maths.
2. When working a Maths problem I get "butterflies" in my stomach.
3. Brain teasers intrigue me.
4. I feel anxious if I have to do some calculations.
5. I would tend to worry about the results of a Maths test because I thought I had done badly.
6. I usually feel as though I'm doing very well while doing a Maths problem.
7. If I knew Maths was involved, I would hesitate to enrol in a particular course.
8. Maths is an interesting and challenging subject.
9. The subject matter in Maths is too repetitious.
10. When I hear Maths being discussed I get a slightly sick feeling.
11. I feel happy and confident when someone asks me to work out a Maths problem.
12. Maths makes me feel insecure.
13. I always have feelings of inadequacy when doing Maths.
14. I always liked my Maths teachers at school.
15. Correctly working out the answer of a problem gives me a great feeling of satisfaction.
16. At school I always felt worried before a Maths lesson.

APPENDIX 8.2.

GENERAL AND PROGRAMME TESTS USED IN EXPERIMENTS 4 AND 5

General test

1. Give an example of a discontinuous scale;

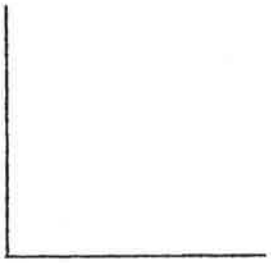
   _____

2. If you add together all the scores of a group of Ss and divide by the number of SS, you obtain the _____, represented by the symbol _____.

3. ΣX means _____.

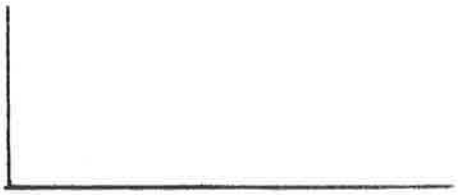
4. Graph the following information;

Score	frequency
3	11
4	1111
5	1
6	~~1111~~ 1
7	1111



5. In a normal distribution, the percentage of scores lying above the mean is _____%.

6. Draw a skewed curve



7. If two measures have a high negative correlation and a person has a high score on one measure, his score on the other should be _____

8. If the probability of occurrence of an event is one, that event _____.

9. What is the mode of the following scores?

3
4
5
5
8
7
11
9
5
14
7

Mode = _____

10. What is the median of the above scores? _____

APPENDIX 8.2. (continued)

Programme Test

11. What are the real lower limits for the following raw scores?

1	102	12 - 14	4 - 9
_____	_____	_____	_____

12. Prepare an frequency distribution for the following raw scores, grouping them into class intervals with i = 3.

10	6	15	8
11	11	12	9
8	9	7	1
5	2	5	

13. What do the following symbols represent?

Σf_b _____

f_w _____

14. Locate the modal interval and median in the following frequency distribution:

Interval	f
91 - 94	5
87 - 90	9
83 - 86	10
79 - 82	6
75 - 78	3

Modal interval = _____

Median = _____

15. Calculate the mean of the following frequency distribution;

X	f
59	3
58	5
57	7
56	1
55	2

$\bar{X}$ = _____

16. Calculate the mean of this frequency distribution;

Interval	f
57 - 60	3
53 - 56	6
49 - 52	9
45 - 48	2
41 - 44	4

$\bar{X}$ = _____

17. If Fred has a Maths score at the 80th percentile, how can you interpret his score in relation to the total group?

_____

_____

18. Determine the score values lying at the 40th percentil, at Q_3, and at D_6, for the following distribution, using this formula;

$$Mdn = l\,l + \left(\frac{.5N - \Sigma fb}{fw}\right) i$$

Interval	f
13 - 15	4
10 - 12	9
7 - 9	6
4 - 6	3
1 - 3	2

Score at 40th percentile = _____

Score at Q_3 = _____

Score at D_6 = _____

19. Which measure of central tendency is most affected by the degree of skewness in a frequency distribution?

_____

Which is least affected ? _____

20. Draw a frequency polygon for the following frequency distribution:

i	f
36 - 40	6
31 - 35	8
26 - 30	4
21 - 25	3
16 - 20	5
11 - 15	11
6 - 10	9

How can this distribution be described ? _____

_____

APPENDIX 8.3.

EXPERIMENT 5A

This section outlines several unsuccessful attempts to find a complex task for use with students which would give only moderate, rather than high, levels of attending to the task.

Following the finding of a slight increased effectiveness of contingent social reinforcement over such reinforcement delivered noncontingently in a laboratory setting (Experiment 4, Chapter 8), an experimental situation was sought in which attending could be monitored as the dependent variable using subjects of high IQ involved in a complex task. The use of attention, rather than output, would enable more direct comparisons to be drawn with the experimental work reported in Chapter 7.

However, high baseline attending levels commonly observed with intelligent subjects posed difficulties; a reinforcement effect could not be shown if attending was already at or near 100%. Hence a task was needed which would provide a close analogy with sewing on a machine for retardates, in that level of attending whould not be too high. Working large numbers of calculations on a calculating machine might be suitable since this involves a large motor component and presumably has little intrinsic interest. It would also provide output measures.

Phase 1. The subjects were five female First Year Psychology students who were asked to convert six numbers to a percentage of a specified focal number. The experimenter worked two examples and then subjects worked two to three practice runs before commencing the task proper. Subjects were supplied with a task sheet and blank answer sheets.

Unfortunately this task was not as boring as might be expected. Subjects showed a strong tendency to do the task in preference to not doing it, and attention levels as ascertained by time-sampling were always between 95-100%. This result supported Orne's (1962) well known findings on the social

APPENDIX 8.3. (continued)

psychology of the psychology experiment.

Phase 2. Distractions were introduced in the form of a bizarre collection of slides covering a wide range of topics, including landscapes, family photographs, visual illusions, abstract figures, hideous car crashes, and some pornography.

Five subjects worked for four sessions of 20 minutes duration. The first two sessions were baseline observations and slides were introduced in the last two sessions. The slides were presented at regular intervals of about ten seconds using a carousel projector. The experimenter sat behind the subject at a desk and worked quietly. The use of the slide distractors did not affect speed of performance ($t = 0.08$, $df = 4$, n.s.), the overall mean numbers of calculations with and without slides being 65.0 and 65.2, respectively.

The percentage of calculations correct each day was calculated for each subject. Slide distraction did not significantly affect accuracy of calculations ($t = 0.57$, $df = 4$, n.s.), the overall mean percentage correct with and without slides being 92.5% and 91.9% respectively.

Subjects were asked at the end of day 4 about their reactions to the experiment. They invariably reported that they knew the slides were being shown, but that they also knew they were not supposed to be distracted. Occasionally a subject would take a quick glance as a slide came on, but then returned quickly to the task. More radical means of affecting attention levels were therefore attempted.

Phase 3. Two subjects worked with auditory distractions as well as slides. A 20-minute baseline session was followed by one session with auditory distraction (a tape, including speech and music), one session with the tape and slides, and a final session with the slides alone. These subjecst did not show any decrement in number of calculations completed after the introduction of the auditory distractors, and both reported that the noise was supposed to distract them and so they were determined not to be "put off".

Behaviour monitoring via time-sampling (10-second samples) of these subjects reveals a considerable distraction effect upon

APPENDIX 8.3. (continued)

the introduction of slides. The average percentages of time spent working under baseline and the three distraction conditions were 83.5% (baseline), 83.5% (tape distraction), 40% (tape and slides), and 36.5% (slides only). It can be seen that introduction of slides induced some glancing away from the task, but even then output was not affected. Since the slides changed at regular intervals, both subjects managed to gauge when the next slide was due to appear and timed their glances so as to waste the minimal amount of time, thus not affecting output.

Phase 4. Next, the possible interaction between experimenter presence and the operation of the distractors was examined. Two subjects performed the calculating task in a room on their own, using a videotape recorder to monitor behaviour. A transistor radio was used to muffle the sound of the projector. In each session subjects were taken to the experimental room, seated and instructed to commence the task, and then left with the slide projector working while the experimenter disappeared for a few moments: this was to make absolutely certain that they were aware of the slides and their unusual content. A similar finding of lack of distractibility emerged, thus invalidating any suggestion that the experimenter's presence was the cause of subjects' steady output on the task.

Phase 5. The question arose as to whether the pictorial stimuli were sufficiently interesting, in the absence of an experimental task. Subjects were taken to the experimental room, given a magazine to read and then waited for 20 minutes for the experimenter to return with a "missing" piece of equipment. Behaviour monitoring via 10-second time-samples of the behaviour of the two subjects who were observed under this condition gave evidence of attention to the slides; one subject showed 50% and the other 100% in attending. The second subject did not open the magazine at all, but looked continually at the screen, displaying signs of mild embarrassment and amusement when a pornographic scene appeared. It seemed clear that lack of distraction from experimental tasks was not due to inadequate stimuli.

APPENDIX 8.3. (continued)

Phase 6. The possibility was also investigated that testing more than one subject at a time might enhance distractibility and provide a more realistic situation. Again, trials were 20 minutes long and the experimenter was not present. This too failed to lower output. Three different groups of three subjects did the calculating task under baseline and slide distraction conditions. There was no significant difference between performance under baseline and distraction conditions for these subjects ($t = 0.24$, $df = 8$, n.s.). The mean scores were: 69.1 and 68.6 respectively.

The lack of effect on output was reflected in the absence of talking amongst subjects or attending to the slides. Subjects' behaviour was observed unobtrusively through a chink in a curtain; time sampling revealed attending rates of between 95 and 100% in all cases.

Phase 7. A less "intellectual" task was also investigated with one student. In the attempt to find a task that would be more open to distraction, a subject was placed in the experimental room with a typewriter and a learn-to-type tutor. Slide distractions were provided. The subject was instructed to proceed through each chapter of the tutoring text in two sessions. On session 1(40 minutes duration), attention as gauged by time-sampling was 88%. On session 2, attention had risen to 92% over the 40 minute session. This task also failed to provide a moderate baseline level of attention.

The failure to produce a distraction effect in the tasks investigated, led to the abandonment of this experiment. The results were a convincing illustration of the powerful control exercised by the experimental situation, in holding the attention and maintaining the output of university students when engaged in a "legitimate" task.

APPENDIX 9.1.

MATHS ANXIETY QUESTIONNAIRE USED IN EXPERIMENT 6

Please indicate your response to the following statements. If the statement is in complete accordance with the way you feel, tick "1"; if the statement does not apply to you at all tick "5". Use the intermediate ratings for statements which are only partially true of the way you feel.

	1	2	3	4	5
1. My heart-beat rate increases when I am doing Maths.					
2. Brain teasers intrigue me.					
3. I feel anxious if I have to do some calculations.					
4. I would tend to worry about the results of a Maths test because I thought I had done badly.					
5. I usually feel happy and confident when someone asks me to do some calculations.					
6. If I knew Maths was involved I would hesitate to enrol in a particular subject.					
7. When working a Maths problem I get butterflies in my stomach.					
8. Maths is an interesting and challenging subject.					
9. When I hear Maths being discussed I get a slightly sick feeling.					
10. Maths makes me feel insecure.					
11. I always feel confident when doing Maths.					
12. I have always disliked my Maths teachers.					
13. I always feel worried before a Maths test.					

APPENDIX 11.1.

VALIDATION REINFORCEMENT SAMPLES (EXPERIMENT 8)

1.	That's very good work.	CS
2.	You're doing very well.	WNS
3.	That's very good work.	WS
4.	Good, you're trying hard.	WNS
5.	That's good, keep it up.	CNS
6.	That's very good work.	WS
7.	That's very good work.	CS
8.	That's right, do as many as you can.	CNS
9.	That's good, you're doing very well.	WNS
10.	Good, keep going now.	CNS

NOTE: C = Cold; W = Warm; S = Standardized;
NS = Nonstandardized.

APPENDIX 11.2.

REINFORCEMENT PHRASES USED IN EXPERIMENT 8

That's very good work.
You're doing very well now.
That's great, keep it up.
Do as many as you can.
That's right, keep going now.
You're working very well.
I'm pleased to see you try so hard.
That's right, go as fast as you can.
That's really good work.
You're working very fast.
I can see you're trying hard.
Go as fast as you can.
You're doing very well now.
You're doing a great job.
Good, you've really caught on there.
I can see you're working hard.
Good, you've got the idea.
You're doing a very good job.
See how many you can do.
What a good job you're doing.
That's terrific.
That's an excellent job.
Good, I like what you are doing.
Good, keep it up.
You're doing quite well.

APPENDIX 12.1. INDIVIDUAL SUBJECTS' SCORES FOR EXPERIMENT 9B*

	(a) $\overline{BL}$		(b) VICARIOUS (%BL)				DIRECT (%BL)				(c) EXPTAL Ss (%BL)				(d) CONTROL Ss (%BL)							
			$\overline{E1}$		$\overline{E2}$		$\overline{E1}$		$\overline{E2}$		$\overline{RBL}$		$\overline{FBL}$		$\overline{E1}$		$\overline{RBL}$		$\overline{E2}$		$\overline{FBL}$	
SS	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.	Att.	Out.
1	49.75	19.5					150.25	131.79	105.03	105.13	100.00	104.10	94.97	95.38								
2	50.25	5.4	108.96	98.15	94.53	112.96					116.92	100.00	99.00	111.11								
3	39.25	5.4					135.03	142.59	77.07	88.89	110.19	124.07	96.18	114.81								
4	28.75	0.6	79.13	33.33	102.61	66.67					73.04	83.33	76.52	83.33								
5	53.00	14.3					127.36	169.23	100.47	132.87	93.40	139.16	92.92	131.47								
6	49.50	10.7	134.34	194.39	93.94	109.35					103.03	128.04	96.97	117.76								
7	30.75	13.8	186.18	141.30	153.66	125.36					119.51	92.75	117.89	98.55								
8	27.25	8.9					139.45	156.18	196.33	261.80	150.46	121.35	144.95	156.18								
9	45.75	12.2	116.39	155.74	92.90	119.67					96.72	105.74	113.11	136.07								
10	35.00	6.4					140.00	168.75	139.29	110.94	112.14	112.50	103.57	104.69								
11	57.50	3.0					103.04	96.67	120.43	106.67	76.52	76.67	94.35	86.67								
12	82.25	11.5	103.95	102.61	109.12	113.04					88.15	103.48	103.95	101.74								
13	39.50	7.4													110.76	66.22	87.34	55.41	116.46	50.00	113.92	54.05
14	62.00	3.9													92.74	100.00	100.00	84.62	104.03	94.87	100.00	89.74
15	55.25	3.9													121.72	64.10	115.38	58.97	106.33	48.72	100.00	66.67
16	64.25	5.9													98.83	108.47	80.54	67.80	83.66	59.32	94.94	84.75
17	84.75	26.6													99.71	77.44	107.96	93.98	105.60	95.11	102.65	93.61
18	73.00	24.6													99.66	78.46	103.77	104.47	101.03	110.16	105.48	106.10

*Note: Appendix 12.1(a) presents raw data for the initial baseline phase; 12.1(b), (c), and (d) give mean percentage-change scores.

APPENDIX 12.2.

MULTIVARIATE ANALYSIS (INCLUDING CONTROL GROUP) FOR EXPERIMENT 9B.

Source	Pillai's Criterion	Approx. F	df	p =
R	0.59	7.99	2,11	0.01*
G	0.72	3.38	4,24	0.03*
C	0.26	1.92	2,11	0.19
D	0.12	0.78	2,11	0.48
RxG	0.55	2.30	4,24	0.09
RxD	0.13	0.80	2,11	0.47
CxG	0.31	1.10	4,24	0.38
CxD	0.20	1.34	2,11	0.30
GxD	0.26	0.88	4,24	0.49
CxR	0.22	1.54	2,11	0.26
RxGxD	1.22	0.39	4,24	0.81
CxGxD	0.84	0.26	4,24	0.90
CxRxG	0.30	1.05	4,24	0.40
CxRxD	0.57	7.38	2,11	0.01*
CxRxDxG	0.40	1.49	4,24	0.24

* Significant effects using $\alpha = .05$

APPENDIX 12.3.

MULTIVARIATE ANALYSIS (NOT INCLUDING CONTROL GROUP) FOR EXPERIMENT 9B.

Source	Pillai's Criterion	Approx. F	df	p =
R	0.69	7.63	2,7	0.02*
G	0.28	1.34	2,7	0.32
C	0.45	2.82	2,7	0.13
D	0.11	0.45	2,7	0.65
RxG	0.34	1.84	2,7	0.23
RxD	0.19	0.80	2,7	0.49
CxG	0.24	1.09	2,7	0.39
CxD	0.31	1.60	2,7	0.27
GxD	0.01	0.04	2,7	0.96
CxR	0.39	2.24	2,7	0.18
RxGxD	0.02	0.09	2,7	0.92
CxGxD	0.00	0.00	2,7	-
CxRxG	0.29	1.46	2,7	0.29
CxRxD	0.78	12.65	2,7	0.005*
CxRxDxG	0.07	0.26	2,7	0.78

* Significant effects using $\alpha = .05$

APPENDIX 12.4.

MEAN ATTENDING FOR DIRECT AND VICARIOUS REINFORCEMENT SUBJECTS IN EACH GROUP DURING EXPERIMENTAL (Exp.) AND BASELINE (BL) PHASES IN EXPERIMENT 9B.

GROUP		Contingent		Noncontingent	
		Exp. phases	BL phases	Exp. phases	BL phases
Control group		103.90	99.17	102.85	102.83
Expt. group 1	D	137.55	101.20	94.19	94.69
	V	107.48	97.66	97.03	90.83
Expt. group 2	D	152.02	114.29	127.50	113.04
	V	118.56	111.65	135.51	101.46

D = Direct reinforcement

V = Vicarious reinforcement

APPENDIX 12.5.

MEAN OUTPUT FOR DIRECT AND VICARIOUS REINFORCEMENT SUBJECTS IN EACH GROUP DURING EXPERIMENTAL (Exp.) AND BASELINE (BL) PHASES IN EXPERIMENT 9B.

GROUP		Contingent		Noncontingent	
		Exp. phases	BL phases	Exp. phases	BL phases
Control group		82.49	77.54	76.36	82.19
Expt. group 1	D	147.87	122.44	108.96	113.89
	V	108.62	103.79	96.33	104.07
Expt. group 2	D	159.80	115.85	140.53	103.51
	V	119.36	112.12	133.22	100.66

D = Direct reinforcement

V = Vicarious reinforcement

BIBLIOGRAPHY

ACKERMAN, J. *Operant conditioning techniques for the classroom teacher.* Glenview, Ill.: Scott, Foresman, 1972.

ADAMS, J.S., & FREEDMAN, S. Equity theory revisited: Comments and annotated bibliography. In: L. Berkowitz & E. Walster (Eds.), *Advances in Experimental and Social Psychology*, Vol.9. New York: Academic Press, 1976.

ADDISON, R.M., & HOMME, L.E. The reinforcing event (RE) menu. *National Society for Programmed Instruction Journal*, 1965, 5, 8-9.

ALLEN, K.E., HENKE, L.B., HARRIS, F.B., BAER, D.M., & REYNOLDS, N.J. Control of hyperactivity by social reinforcement of attending behavior. *Journal of Educational Psychology*, 1967, 58, 231-237.

ALLEN, S.A., SPEAR, P.S., & JOHNSON, J. Experimenter role effects on children's task performance and perception. *Child Development*, 1969, 40, 1-9.

ALOVISETTI, M., & WEAVER, J. Perceptions of psychological distance to parents in institutionalized, retarded and normal children. *Paper presented at the Annual Convention of the National Association of School Psychologists.* Atlanta, Georgia. 1975.

ALTMAN, K.I., & LINTON, J.E. Operant conditioning in the classroom setting: A review of the research. *Journal of Educational Research*, 1971, 64, 277-286.

ALTMAN, R., TALKINGTON, L.W., & CLELAND, C.C. Effects of novelty on verbal reinforcement effectiveness with retardates. *Psychological Record*, 1971, 21, 529-532.

ALVEY, N.G., BANFIELD, C.F., BAXTER, R.I., GOWER, J.C., KRZANOWSKI, W.J., LANE, P.W., LEECH, P.K., NELDER, J.A., PAYNE, R.W., PHELPS, K.M., ROGERS, C.E., ROSS, G.J.S., SIMPSON, H.R., TODD, A.D., WEDDERBURN, R.W.M., & WILKINSON, G.N. *Genstat.* Rothamsted, 1977.

ANDREATTA, H., & RUMBOLD, B. *Organisation development in action.* Melbourne: Productivity Promotion Council of Australia, 1974.

ARGYLE, M. *The social psychology of work.* Harmondsworth: Penguin Books, 1972.

ASCIONE, F.R. The effects of continuous nurturance and nurturance withdrawal on children's behavior: A partial replication. *Child Development*, 1975, 46, 790-795.

ASCIONE, F.R., & COLE, P. Are nurturance and the satiation of social reinforcers equivalent operations? *Journal of Psychology*, 1977, 96, 223-233.

AYLLON, T., & AZRIN, N.H. Reinforcement and instructions with mental patients. *Journal of the Experimental Analysis of Behavior*, 1964, 7, 327-331.

AYLLON, T., & AZRIN, N.H. *The token economy*. New York: Appleton-Century-Crofts, 1968.

AYLLON, T., LAYMAN, D., & BURKE, S. Disruptive behavior and reinforcement of academic performance. *Psychological Record*, 1972, 22, 315-323.

AYLLON, T., LAYMAN, D., & KANDEL, H.J. A behavioral-educational alternative to drug control of hyperactive children. *Journal of Applied Behavior Analysis*, 1975, 8, 137-146.

AYLLON, T., & ROBERTS, M.D. Eliminating discipline problems by strengthening academic performance. *Journal of Applied Behavior Analysis*, 1974, 7, 71-76.

AYRES, J.J.B., BENEDICT, J.O., & WITCHER, E.S. Systematic manipulation of individual events in a truly random control in rats. *Journal of Comparative and Physiological Psychology*, 1975, 88, 97-103.

BABAD, E.Y. Effects of informational input on the social deprivation-satiation effect. *Journal of Personality and Social Psychology*, 1973, 27, 1-5.

BABAD, E.Y. SES differences in effects of brief social satiation. *Journal of Psychology*, 1974, 88, 153-164.

BABAD, E.Y. Can social satiation be learned vicariously? *Journal of Social Psychology*, 1977, 103, 139-147.

BABAD, E.Y., & WEISZ, P. Effects of social satiation on efficacy of social and nonsocial reinforcers. *Journal of Social Psychology*, 1976, 100, 269-275.

BABAD, E.Y., & WEISZ, P. Effectiveness of social reinforcement as a function of contingent and noncontingent satiation. *Journal of Experimental Child Psychology*, 1977, 24, 406-414.

BAER, D.M. A technique of social reinforcement for the study of child behavior: Behavior avoiding reinforcement withdrawal. *Child Development*, 1962, 33, 847-858.

BALLA, D. The verbal action of the environment on institutionalized and non-institutionalized retardates and normal children of two social classes. *Unpublished doctoral dissertation*. Yale University, 1967.

BALLA, D.A. Relationship of institution size to quality of care: A review of the literature. *American Journal of Mental Deficiency*, 1976, 81, 117-124.

BALLA, D., BUTTERFIELD, E.C., & ZIGLER, E. Effects of institutionalization on retarded children: A longtitudinal cross-institutional investigation. *American Journal of Mental Deficiency*, 1974, 78, 530-549.

BALLA, D., KOSSAN, N., & ZIGLER E. Effects of preinstitutional history and institutionalization on the behavior of the retarded. (Unpublished manuscript, Yale University, 1976). Cited in Zigler, E. & Balla, D. Personality factors in the performance of the retarded: Implications for clinical assessment. *American Academy of Child Psychiatry*, 1977, 16, 19-37.

BALLA, D., McCARTHY, E., & ZIGLER, E. Some correlates of negative reaction tendencies in institutionalized retarded children. *Journal of Psychology*, 1971, 79, 77-84.

BALLA, D., STYFCO, S.J., & ZIGLER, E. Use of the opposition concept and outerdirectedness in intellectually-average, familial retarded and organically retarded children. *American Journal of Mental Deficiency*, 1971, 75, 663-680.

BALLA, D., & ZIGLER, E. Preinstitutional social deprivation, responsibeness to social reinforcement, and IQ change in institutionalized retarded individuals: A six year follow-up study. *American Journal of Mental Deficiency*, 1975, 80, 228-230.

BAROFF, G.S., & TATE, B.G. A demonstration sheltered workshop in a state institution for the retarded. *Mental Retardation*, 1966, 4, 30-34.

BARON, A., & KAUFMAN, A. Human free-operant avoidance of "time out" from monetary reinforcement. *Journal of the Experimental Analysis of Behavior*, 1966, 9, 557-565.

BARRISH, H.H., SAUNDERS, M., & WOLF, M.M. Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. *Journal of Applied Behavior Analysis*, 1969, 2, 119-124.

BARTON, E.J., & ASCIONE, F.R. Social reinforcer satiation: An outcome of frequency not ambiguity - sometimes. *Developmental Psychology*, 1978, 14, 363-370.

BARTON, J. Reported in an article: "Students warned on maths study". *The Australian* (Daily Newspaper), December 1, 1980, p.2.

BAUMEISTER, A.A. Behavioral inadequacy and variability of performance. *American Journal of Mental Deficiency*, 1968, 73, 477-483.

BECKER, W.C., ENGELMANN, S., & THOMAS, D.R. *Teaching: A basic course in applied psychology*. Chicago: Science Research Associates, 1971.

BECKER, W.C., MADSEN, C.H., ARNOLD, C.R., & THOMAS, D.R. The contingent use of teacher attention and praise in reducing classroom behavior problems. *Journal of Special Education*, 1967, 1, 287-307.

BELL, R.Q. A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, 1968, 75, 81-95.

BELL, R.Q. Stimulus control of parent or caretaker behavior by offspring. *Developmental Psychology*, 1971, 4, 63-72.

BELLAMY, T.G. Habilitation of the severely and profoundly retarded: A review of research on work productivity. In: T.G. Bellamy (Ed.), *Habilitation of severely and profoundly retarded adults*. Eugene, Oregon: University of Oregon Center on Human Development, 1976.

BELLAMY, T.G., PETERSON, L., & CLOSE, D. Habilitation of the severely and profoundly retarded: Illustrations of competence. *Education and Training of the Mentally Retarded*, 1975, 10, 174-186.

BENEDICT, J.O., & AYRES, J.J.B. Factors affecting conditioning in the truly random control procedure in the rat. *Journal of Comparative and Physiological Psychology*, 1972, 78, 323-330.

BERG, B., BALLA, D., & ZIGLER, E. Satiation and setting condition: Components of social reinforcer effectiveness. *Child Development*, 1976, 47, 715-721.

BERKOWITZ, H. Effects of prior experimenter-subject relationships on reinforced reaction times of schizophrenics and normals. *Journal of Abnormal and Social Psychology*, 1964, 69, 522-530.

BERKOWITZ, H., BUTTERFIELD, E.C., & ZIGLER, E. The effectiveness of social reinforcers on persistence and learning tasks following positive and negative social interactions. *Journal of Personality and Social Psychology*, 1965, 2, 706-714.

BERKOWITZ, H., & ZIGLER, E. Effects of preliminary positive and negative interactions and delay conditions on children's responsiveness to social reinforcement. *Journal of Personality and Social Psychology*, 1965, 2, 500-505.

BERNHARDT, A.J., & FOREHAND, R. The effects of labeled and unlabeled praise upon lower and middle class children. *Journal of Experimental Child Psychology*, 1975, 19, 536-543.

BERNHARDT, A.J., FREDERICKS, C., & FORBACH, G.B. Comparison of effects of labeled and unlabeled praise, and time-out upon children's learning. *Psychological Reports*, 1978, 42, 771-776.

BIRNBAUER, J.S., BIJOU, S., WOLF, M.M., & KIDDER, J.D. Programmed instruction in the classroom. In: L.P. Ullman & L. Krasner (Eds.), *Case studies in behavior modification*. New York: Holt, Rinehart and Winston, 1965.

BIRNBAUER, J.S., WOLF, M.M., KIDDER, J.D., & TAGUE, C.E. Classroom behavior of retarded pupils with token reinforcement. *Journal of Experimental Child Psychology*, 1965, 2, 219-235.

BLUM, M.L., & NAYLOR, J.C. *Industrial psychology: Its theoretical and social foundations*. New York: Harper and Row, 1968.

BOLSTAD, O.D., & JOHNSON, S.M. Self regulation in the modification of disruptive classroom behavior. *Journal of Applied Behavior Analysis*, 1972, 5, 443-454.

BOWLBY, J. *Child care and the growth of love*. Abridged and edited by Margery Fry. Melbourne: Penguin Books, 1953.

BOWLBY, J. The nature of the child's tie to his mother. *International Journal of Psychoanalysis*, 1958, 30, 350-373.

BRETHOWER, D.N. *Behavior analysis in business and industry: A total performance system*. Kalamazoo, Michigan: Behaviordelia Inc., 1972.

BRIGHAM, T.A., FINFROCK, S.R., BREUNIG, M.K., & BUSHELL, D.Jr. The use of programmed materials in the analysis of academic contingencies. *Journal of Applied Behavior Analysis*, 1972, 5, 177-182.

BRIGHAM, T.A., GRAUBARD, P.S., & STANS, A. Analysis of the effects of sequential reinforcement contingencies on aspects of composition. *Journal of Applied Behavior Analysis*, 1972, 5, 421-429.

BRODEN, M., BRUCE, C., MITCHELL, M.A., CARTER, V., & HALL, R.V. Effects of teacher attention on attending behavior of two boys at adjacent desks. *Journal of Applied Behavior Analysis*, 1970, 3, 205-211.

BRODEN, M., HALL, R.V., DUNLAP, A., & CLARK, R. Effects of teacher attention and a token reinforcement system in a junior high school education class. *Exceptional Children*, 1970, 36, 341-349.

BRODEN, M., HALL, R.V., & MITTS, B. The effect of self-recording on the classroom behavior of two eighth-grade students. *Journal of Applied Behavior Analysis*, 1971, 4, 191-199.

BROUGHTON, S.F., & LAHEY, B.B. Direct and collateral effects of positive reinforcement, response cost, and mixed contingencies for academic performance. *Journal of School Psychology*, 1978, 16, 126-136.

BROWN, J.C., MONTGOMERY, R., & BARCLAY, J.R. An example of psychologist management of teacher reinforcement procedures in the elementary classroom. *Psychology in the Schools*, 1969, 6, 336-340.

BROWN, L., JOHNSON, S., GADBERRY, E., & FENRICK, N. Increasing individual and assembly line production rates of retarded students. *Training School Bulletin*, 1971, 67, 206-213.

BROWN, L., & PEARCE, E. Increasing the production rates of trainable retarded students in a public school simulated workshop. *Education and Training of the Mentally Retarded*, 1970, 5, 15-22.

BROWN, L., VAN DEVENTER, P., PERLMUTTER, L., JONES, S., & SONTAG, E. Effects of consequences on production rates of trainable retarded and severely emotionally disturbed students in a public school workshop. *Education and Training of the Mentally Retarded*, 1972, 7, 74-81.

BRYAN, T. Learning disabled children's classroom behaviors and teacher-child interactions. *Journal of Pediatric Psychology*, 1979, 4, 233-246.

BUCKLEY, N.K., & WALKER, H.M. *Modifying classroom behavior: A manual of procedure for classroom teachers.* Champaign, Ill.: Research Press Company, 1970.

BUGENTAL, D.B., COLLINS, S., COLLINS, L., & CHANEY, L.A. Attributional and behavioral changes following two behavior management interventions with hyperactive boys: A follow-up study. *Child Development*, 1978, 49, 247-250.

BUGENTAL, D.B., WHALEN, C.K., & HENKER, B. Causal attributions of hyperactive children and motivational assumptions of two behavior-change approaches: Evidence for an interactionist position. *Child Development*, 1977, 48, 874-884.

BUSHELL, D., WROBEL, P.A., & MICHAELIS, M.L. Applying "group" contingencies to the classroom study behavior of preschool children. *Journal of Applied Behavior Analysis,* 1968, 1, 55-61.

BUTTERFIELD, E.C., & ZIGLER, E. The influence of differing social climates on the effectiveness of social reinforcement in the mentally retarded. *American Journal of Mental Deficiency*, 1965(a), 70, 48-56.

BUTTERFIELD, E.C., & ZIGLER, E. The effects of success and failure on the discrimination learning of normal and retarded children. *Journal of Abnormal Psychology*, 1965(b), 70, 25-31.

BUYS, C.J. Effect of teacher reinforcement on an elementary pupil's behavior and attitudes. *Psychology in the Schools*, 1972, 9, 278-288.

CAIRNS, R.B. The information properties of verbal and nonverbal events. *Journal of Personality and Social Psychology*, 1967, 5, 353-357.

CAIRNS, R.B. Meaning and attention as determinants of social reinforcer effectiveness. *Child Development*, 1970, 41, 1067-1082.

CAIRNS, R.B. *Effects of verbal evaluation on 4-11 year olds' learning and performance*. Indiana University, Bloomington, Indiana, January 1973: Sponsored by National Center for Education and Development, Washington, D.C.

CAIRNS, R.B., & PARIS, S.G. Informational determinants of social reinforcement effectiveness among retarded children. *American Journal of Mental Deficiency*, 1971, 76, 362-369.

CALLAN, H. *Ethology and society: Towards an anthropological view*. Oxford: Clarendon Press, 1970.

CAMPBELL, D.P., DUNNETTE, M.D., LAWLER, E.E., & WEICK, K.E. *Managerial behavior, performance, and effectiveness.* New York: McGraw-Hill, 1970.

CAMPBELL, J.P. Personnel training and development. *Annual Review of Psychology*, 1971, 22, 565-602.

CAMPBELL, J.P., & PRITCHARD, R.D. Motivation theory in industrial and organizational psychology. In: M.D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology*. Chicago: Rand McNally College Publishing Company, 1976.

CANTRELL, R.P., STENNER, A.J., & KATZENMEYER, W.G. Teacher knowledge, attitudes, and classroom teaching correlates of student achievement. *Journal of Educational Psychology*, 1977, 69, 172-179.

CAREY, A. The Lysenko Syndrome in Western Social Science. *Australian Psychologist*, 1977, 12, 27-37.

CARLSON, J.C., & MACMILLAN, D.L. Comparison of probability judgements between EMR and non-retarded children. *American Journal of Mental Deficiency*, 1970, 74, 697-700.

CARNINE, D., BECKER, W.C., THOMAS, D.R., POE, M., & PLAGER, E. The effects of direct and vicarious reinforcement on the behavior of problem boys in an elementary school classroom. (Unpublished manuscript, University of Illinois, 1968). Cited in Altman, K.I., & Linton, T.E. Operant conditioning in the classroom setting: A review of research. *Journal of Educational Research*, 1971, 64, 277-286.

CHADWICK, B.A., & DAY, R.C. Systematic reinforcement of academic performance of underachieving students. *Journal of Applied Behavior Analysis*, 1971, 4, 311-319.

CHRISTENSEN, D.E. Effects of combining methylphenidate and a classroom token system in modifying hyperactive behavior. *American Journal of Mental Deficiency*, 1975, 80, 266-276.

CHRISTENSEN, D.E., & SPRAGUE, R.L. Reduction of hyperactive behaviors by conditioning procedures alone and combined with methylphenidate (Ritalin). *Behavior Research and Therapy*, 1973, 11, 331-334.

CHRISTY, P.R. Does use of tangible rewards with individual children affect peer observers? *Journal of Applied Behavior Analysis*, 1975, 8, 187-196.

CLARK, C.A., & WAHLBERG, H.J. The use of secondary reinforcement in teaching inner city school children. *Journal of Special Education*, 1969, 3, 177-185.

CLARK, J.W., & MILLER, S.B. The development of rapid running in T-mazes in the absence of obvious rewards. *Psychonomic Science*, 1966, 4, 127-128.

CLARK, M., LACHOWICZ, J., & WOLF, M. A pilot basic education program for school dropouts incorporating a token reinforcement system. *Behavior Research and Therapy*, 1968, 6, 183-188.

CLARKE, A.D.B., & HERMELIN, B.F. Adult imbeciles: Their abilities and trainability. *The Lancet*, 1955, 2, 337-339.

CLEMENTS, C.B., & McKEE, J.M. Programmed instruction for institutionalized offenders: Contingency management and performance contracts. *Psychological Reports*, 1968, 22, 957-964.

CLEMENTS, J.E., & TRACY, D.B. Effects of touch and verbal reinforcement on the classroom behavior of emotionally disturbed boys. *Exceptional Children*, 1977, 43, 453-454.

COBB, J.A. The relationship of discrete classroom behaviors to fourth-grade academic achievements. *Journal of Educational Psychology*, 1972, 63, 74-80.

COBB, J.A., & HOPS, H. Effects of academic survival skill training on low achieving first graders. *Journal of Educational Research*, 1973, 67, 105-113.

COHEN, E., & BURNS, P. SPSS-MANOVA-multivariable analysis of variance and covariance. *SPSS Document No. 413 (Rev. A)*. Evanston, Ill.: Vogelback Computing Center, Northwestern University, 1976.

COHEN, H.L., & FILIPCZAK, J.A. Programming educational behavior for institutionalized adolescents. In: H.C. Rickard (Ed.), *Behavioral intervention in human problems*. New York: Pergamon, 1971.

COHEN, M.E., & CLOSE, D.W. Retarded adults' discrete work performance in a sheltered workshop as a function of overall productivity and motivation. *American Journal of Mental Deficiency*, 1975, 79, 526-529.

COHEN, R., RUBIN, S., & HEINEN, J.R.K. Collateral increases in performance of long division resulting from on-task gains using token reinforcement and self-recording. *Psychological Reports*, 1979, 44, 651-658.

COLEMAN, P., & BLAMPIED, N.M. Effects of self-monitoring, token reinforcement and different back-up reinforcers on the classroom behavior of retardates. *The Exceptional Child*, 1977, 24, 95-107.

COLEMAN, R. A conditioning technique applicable to elementary school classrooms. *Journal of Applied Behavior Analysis*, 1970(a), 3, 293-297.

COLEMAN, R. A pilot demonstration of the utility of reinforcement techniques in trainable programs. *Education and Training of the Mentally Retarded*, 1970(b), 5, 68-70.

COLQUHOUN, W.P. Circadian variations in mental efficiency. In: W.P. Colquhoun (Ed.), *Biological rhythms and human performance*. London: Academic Press, 1971.

CONANT, E.H., & KILBRIDGE, M.O. An inter-disciplinary analysis of job enlargement: Technology, costs, and behavioral implications. *Industrial and Labor Relations Review*, 1965, 18, 377-395.

CONNOLLY, T. Some conceptual and methodological issues in expectancy models of work performance motivation. *Academic Management Review*, 1976, 1, 37-47.

COOK, H. Verbal satiation of a positive and negative verbal reinforcer in children. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 1082-1087.

COOK, H., HILL, D., EMRICK, J., & WITTROCK, M.C. Verbal satiation of a reinforcer in pre-school children. *Paper presented at the meeting of the American Educational Research Association*. New York, 1967.

COOK, W.W., LEEDS, C.H., & CALLIS, R. *The Minnesota Teacher Attitude Inventory*. New York: Psychological Corporation, 1951.

COOPER, H.M., & BARON, R.M. Academic expectations and attributed responsibility as predictors of professional teachers' reinforcement behavior. *Journal of Educational Psychology*, 1977, 69, 409-418.

COOPER, M.L., THOMSON, C.L., & BAER, D.M. The experimental modification of teacher attending behavior. *Journal of Applied Behavior Analysis*, 1970, 3, 153-157.

CORMIER, W.H. Effects of approving teaching behaviors on classroom behaviors of disadvantaged adolescents. *U.S. Department of Health, Education and Welfare: Final Report*. Office of Education, Bureau of Research, March, 1970.

CORMIER, W.H., & WAHLER, R.G. The application of social reinforcement in six junior high school classrooms. *Educational Research, Sociology and Education : Symposium presented at the 1971 Annual Meeting of the Association of The American Educational Research Association*. New York City.

COSSAIRT, W., HALL, R.V., & HOPKINS, B.L. The effects of experimenter's instructions, feedback, and praise on teacher praise and student attending behavior. *Journal of Applied Behavior Analysis*, 1973, 6, 89-100.

COSTELLO, E.J. Using contingent token reinforcement to strengthen ready-to-work behaviors and concomitant productivity in mentally retarded adults in a sheltered workshop. *Dissertation Abstracts International*, 1974, 35(1-A), 284-285.

COVENTRY, W.F. *Management made simple*. London: W.H. Allen & Co. Ltd., 1970.

COWLES, J.T. Food-tokens as incentives for learning by chimpanzees. *Comparative Psychology Monographs*, 1937, 14, 1-96.

COX, F.N. Some effects of test anxiety and presence or absence of other persons on boys' performance on a repetitive motor task. *Journal of Experimental Child Psychology*, 1966, 3, 100-112.

CRAIG, H.B., & HOLLAND, A.L. Reinforcement of visual attending in classrooms for deaf children. *Journal of Applied Behavior Analysis*, 1970, 3, 97-109.

CRIST, R.L. Use of a programmed multiplication text under group-paced and individual-paced conditions. *Audio Visual Communication Review*, 1966, 14, 507-513.

CROMWELL, R.L. A social learning theory approach to mental retardation. In: N.R. Ellis (Ed.), *Handbook of mental deficiency*. New York: McGraw-Hill, 1963.

DANIELS, L.K., & HANSEN, K.P. Effects of social reinforcement and visual feedback on work production among mentally retarded sheltered workshop clients. *Psychological Reports*, 1976, 39, 664.

DANIELSON, G.I. The cross-sex effect in children's learning as a function of experimenter affect and children's responsiveness to social reinforcement. *Dissertation Abstracts International*, 1979, 39(3-B), 1454.

DARCH, C.B., & THORPE, H.W. The principal game: A group consequence procedure to increase classroom on-task behavior. *Psychology in the Schools*, 1977, 14, 341-347.

DAWIS, R.V., LOFQUIST, L.H., & WEISS, D.J. A theory of work adjustment. *Minnesota Studies in Vocational Rehabilitation XXIII*. Minneapolis: University of Minnesota, 1968.

DE CASPAR, A.J., & FIFER, W.P. Of human bonding: Newborns prefer their mothers' voices. *Science*, 1980, 208, 1174-1176.

DECI, E.L. Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 1971, 18, 105-115.

DECI, E.L. *Intrinsic motivation*. New York: Plenum Publishing Co. 1975.

DENO, S.L. Direct observation approach to measuring classroom behavior. *Exceptional Children*, 1980, 46, 396-399.

DEPARTMENT OF EMPLOYMENT AND INDUSTRIAL RELATIONS. *Managing time*. Canberra: Australian Government Publishing Service, 1976.

DEITZ, S.M., REPP, A.C., & DEITZ, D.E.D. Reducing inappropriate classroom behavior of retarded students through three procedures of differential reinforcement. *Journal of Mental Deficiency Research*, 1976, 20, 155-170.

DICKSON, R.L. The relationship between attitudes and reinforcers: An investigation with emotionally disturbed children. *Journal of Special Education*, 1976, 10, 365-370.

DORWART, W., EZERMAN, R., LEWIS, M., & ROSENHAN, D. The effect of brief social deprivation on social and nonsocial reinforcement. *Journal of Personality and Social Psychology*, 1965, 2, 111-115.

DOWRICK, P.W., & JOHNS, E.M. Video feedback effects on teacher attention to on-task behaviors of disturbed children. *Journal of Behavior Therapy and Experimental Psychiatry*, 1976, 7, 255-257.

DRABMAN, R.S., JARVIS, G.J., & ARCHBOLD, J. The use and misuse of extinction in classroom behavioral programs. *Psychology in the Schools*, 1976, 13, 470-476.

DRABMAN, R.S., & LAHEY, B.B. Feedback in classroom behavior modification: Effects on the target and her classmates. *Journal of Applied Behavior Analysis*, 1974, 7, 591-598.

DRABMAN, R.S., SPITALNIK, R., & O'LEARY, K.D. Teaching self-control to 'disruptive' children. *Journal of Abnormal Psychology*, 1973, 82, 10-16.

DROTAR, D. Outer-directedness and the puzzle performance of nonretarded and retarded children. *American Journal of Mental Deficiency*, 1972, 77, 230-236.

DROTAR, D. Discrimination learning in normal and retarded children as a function of instructions, cue locus, and cue relevance. *Child Development*, 1974, 45, 1146-1150.

DUBEY, D.R., KENT, R.N., O'LEARY, S.G., BRODERICK, J.E., & O'LEARY, K.D. Reactions of children and teachers to classroom observers: A series of controlled investigations. *Behavior Therapy*, 1977, 8, 887-897.

DUBIN, R. Work in modern society. In: R. Dubin (Ed.), *Handbook of work, organization, and society*. Chicago: Rand McNally, 1976.

DUCKWORTH, R., & ENTWISTLE, N.J. Attitudes to school subjects: A repertory grid technique. *British Journal of Educational Psychology*, 1974, 44, 76-82.

DUNNETTE, M.D. (Ed.). *Handbook of industrial and organizational psychology*. Chicago: Rand McNally, 1976.

DWECK, C.S., DAVIDSON, W., NELSON, S., & ENNA, B. Sex differences in learned helplessness. *Developmental Psychology*, 1978, 14, 268-276.

EBNER, M. An investigation of the role of the social environment in the generalization and persistence of the effect of a behavior modification program. *Unpublished doctoral dissertation*. University of Oregon, 1967.

EDELSON, R.I., & SPRAGUE, R.L. Conditioning of activity level in a classroom with institutionalized retarded boys. *American Journal of Mental Deficiency*, 1974, 78, 384-388.

EDERER, R.J. *The evolution of money*. Washington, D.C.: Public Affairs Press, 1964.

EDGERTON, R.B., & SABAGH, G. From mortification to aggrandizement: Changing self-concepts in the careers of the mentally retarded. *Psychiatry*, 1962, 25, 263-272.

EIBL-EIBESFELDT, I. *Ethology: The biology of behavior*. New York: Holt, Rinehart & Winston, 1970.

EIBL-EIBESFELDT, I. Similarities and differences between cultures in expressive movements. In: R.A. Hinde (Ed.), *Non-verbal communication*. Cambridge, England: Cambridge University Press, 1972.

EIBL-EIBESFELDT, I. The expressive behavior of the deaf- and blind-born. In: M. Von Cranach & I. Vine (Eds.), *Social communication and movement*. New York: Academic Press, 1973.

EISENBERGER, R. Is there a deprivation-satiation function for social approval? *Psychological Bulletin*, 1970, 74, 255-275.

EISENBERGER, R., KAPLAN, R.M., & SINGER, R.D. Decremental and nondecremental effects of noncontingent social approval. *Journal of Personality and Social Psychology*, 1974, 30, 716-722.

ELLIS, N.R. Do the mentally retarded have poor memory? *Intelligence*, 1978, 2, 41-54.

ELZEY, F.F. *A programmed introduction to statistics* (2nd Edition). Belmont, California: Wadsworth Publishing Company, 1966.

ENDO, G.T. Social drive or arousal: A test of two theories of social isolation. *Journal of Experimental Child Psychology*, 1968, 6, 61-74.

ERICKSON, N.T. The effects of social deprivation and satiation on verbal conditioning in children. *Journal of Comparative and Physiological Psychology*, 1962, 55, 953-957.

FABER, O., & KELL, J.R. *Heating and air-conditioning of buildings* (4th Edition). London: Architectural Press, 1966.

FANTINO, E. Conditioned reinforcement: Choice and information. In: W.K. Honig & J.E.R. Staddon (Eds.), *Handbook of operant behavior*. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

FANTINO, E., & LOGAN, C.A. *The experimental analysis of behavior: A biological perspective*. San Francisco: W.H. Freeman, 1979.

FELIXBROD, J.J., & O'LEARY, K.D. Effects of reinforcement on children's academic behavior as a function of self-determined and externally imposed contingencies. *Journal of Applied Behavior Analysis*, 1973, 6, 241-250.

FERGUSON, D. A study of occupational stress. *Ergonomics*, 1973, 16, 649-664.

FERRITOR, D.C., BUCKHOLDT, D., HAMBLIN, R.L., & SMITH, L. The noneffects of contingent reinforcement for attending behavior on work accomplished. *Journal of Applied Behavior Analysis*, 1972, 5, 7-18.

FERSTER, C.B., & SKINNER, B.F. *Schedules of reinforcement*. New York: Appleton-Century-Crofts, 1957.

FLEXER, R.W., MARTIN, A.S., & FRIEDENBERG, W.P. Increasing the productivity of the severely retarded with monetary reinforcement: Developing a work ethic. *Mental Retardation*, 1977, 15, 44-45.

FLEXER, R.W., NEWBERY, J.F., & MARTIN, A.S. Use of goal setting procedures in increasing task assembly rate of severely retarded workers. *Education and Training of the Mentally Retarded*, 1979, 14, 177-184.

FORNESS, S.R. Behavioristic approach to classroom management and motivation. *Psychology in the Schools*, 1970, 7, 356-363.

FORNESS, S.R., & MACMILLAN, D.L. Reinforcement overkill: Implications for education of the retarded. *Journal of Special Education*, 1972, 6, 221-230.

FORNESS, S.R., SILVERSTEIN, A.B., & GUTHRIE, D. Relationship between classroom behavior and achievement of mildly mentally retarded children. *American Journal of Mental Deficiency*, 1979, 84, 260-265.

FORREST, G.M., SMITH, G.A., & BROWN, M.H. *General studies (advanced) and academic aptitude*. Manchester: Joint Matriculation Board (occasional publication), 1970.

FOSTER, G.G., YSSELDYKE, J.E., & REESE, J.H. "I wouldn't have seen it if I hadn't believed it". *Exceptional Children*, 1975, 42, 469-473.

FRANKEL, F., & GRAHAM, V. Systematic observation of classroom behavior of retarded and autistic preschool children. *American Journal of Mental Deficiency*, 1976, 81, 73-84.

FRANKEL, F., SIMMONS, J.Q., & OLSON, S. Effects of social deprivation upon operant behavior in mentally retarded and autistic children. *Journal of Pediatric Psychology*, 1977, 2, 172-175.

FRIEDMANN, P. Comparisons of teacher reinforcement schedules for students with different social class backgrounds. *Journal of Educational Psychology*, 1976, 68, 286-292.

GARCIA, C.H., ALMAGUER, V., SÁNCHEZ, R.M., MARTINEZ, M.G., LAMBRÉTON, G.R., & LAMBRÉTON, S. Effectos diferenciales de la alabanza verbal, retroalimentacion de los resultados, y alabanza verbal mas retroalimentacion de los resultados sobre el mantenimiento de la tasa de respuesta aritmetica. *Revista Interamericana de Psicologia*, 1974, 8, 1-2.

GARCIA, J., CLARKE, J.C., & HAWKINS, W.G. Natural responses to scheduled rewards. In: P.P.G. Bateson & P.H. Klopfer (Eds.), *Perspectives in Ethology*. New York: Plenum Press, 1973.

GARCIA, J., & KOELLING, R. Relation of cue to consequence in avoidance learning. *Psychonomic Science*, 1966, 4, 123-124.

GARDNER, J.M. Behavior modification research in mental retardation: Search for an adequate paradigm. *American Journal of Mental Deficiency*, 1969, 73, 844-851.

GARDNER, J.M. Behavior modification in mental retardation: A review of research and analysis of trends. In: R.D. Rubin, H. Fensterheim, A.A. Lazarus & C.M. Franks (Eds.), *Advances in Behavior Therapy*. New York: Academic Press, 1971.

GATELY, M.J. Manipulation drive in experimentally naive rhesus monkeys. *Unpublished Master's thesis*. University of Wisconsin, 1950.

GAYTON, W.F., & BASSETT, J.E. The effect of positive and negative reaction tendencies on receptive language development in mentally retarded children. *American Journal of Mental Deficiency*, 1972, 76, 499-508.

GELFAND, D.N., GELFAND, S., & DOBSON, W.R. Unprogrammed reinforcement of patients' behavior in a mental hospital. *Behavior Research and Therapy*, 1967, 5, 201-207.

GEWIRTZ, J.L. Deprivation and satiation of social stimuli as determinants of their reinforcing efficacy. In: J.P. Hill (Ed.), *Minnesota Symposium on Child Psychology*, Vol.1. Minneapolis: University of Minnesota Press, 1967.

GEWIRTZ, J.L. Mechanisms of social learning: Some roles of stimulation and behavior in early human development. In: D.A. Goslin (Ed.), *Handbook of socialization theory and research*. Chicago: Rand McNally, 1969(a).

GEWIRTZ, J.L. Potency of a social reinforcer as a function of satiation and recovery. *Developmental Psychology*, 1969(b), 1, 2-13.

GEWIRTZ, J.L. The attachment acquisition process as evidenced in the maternal conditioning of cued infant responding (particularly crying). *Human Development*, 1976, 19, 143-155.

GEWIRTZ, J.L., & BAER, D.M. The effect of brief social deprivation on behaviors for a social reinforcer. *Journal of Abnormal and Social Psychology*, 1958(a), 56, 49-56.

GEWIRTZ, J.L., & BAER, D.M. Deprivation and satiation of social reinforcers as drive conditions. *Journal of Abnormal and Social Psychology*, 1958(b), 57, 165-172.

GEWIRTZ, J.L., & BOYD, E.F. Experiments on mother-infant interaction underlying mutual attachment acquisition: The infant conditions the mother. In: T. Alloway, P. Pliner, & L. Krames (Eds.), *Advances in the study of communication and affect* (Vol.3). New York: Plenum Press, 1977.

GILBRETH, F.B. *Bricklaying system*. New York: M.C. Clark, 1909.

GITLER, D., & GORDON, R. Observing and recording young children's behavior: A comparison among observational methodologies. *Exceptional Children*, 1979, 46, 134-135.

GLYNN, E.L. Verbal and token reinforcement: Elements of behaviour control in a problem class. *New Zealand Psychologist*, 1972, 1, 13-20.

GOLD, M.W. Preworkshop skills for the trainable: A sequential technique. *Education and Training of the Mentally Retarded*, 1968, 3, 31-39.

GOLD, M.W. Stimulus factors in skill training of the retarded on a complex assembly task: Acquisition, transfer and attention. *American Journal of Mental Deficiency*, 1972, 76, 517-526.

GOLD, M.W. Research on the vocational habilitation of the retarded: The present, the future. In: N.R. Ellis (Ed.), *International Review of Research in Mental Retardation*, Vol.6. New York: Academic Press, 1973.

GOLDWYN, E. (Producer). *Now the chips are down* (Film). London: British Broadcasting Commission, 1978.

GOLLUB, L. Condition reinforcement: Schedule effects. In: W.K. Honig & J.E.R. Staddon (Eds.), *Handbook of operant behavior*. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

GOODALL, J. A preliminary report on expressive movements and communication in the Gombe Stream chimpanzees. In: P.C. Jay (Ed.), *Primates: Studies in adaptation and variability*. New York: Holt, Rinehart & Winston, 1968.

GOODE, W.J. *The celebration of heroes: Prestige as a social control system*. Berkeley: University of California Press, 1978.

GRAY, P.H. Theory and evidence of imprinting in human infants. *Journal of Psychology*, 1958, 46, 155-166.

GREEN, C. Social interaction in feeble-minded children. (Unpublished Master's thesis, University of Missouri, 1960). Cited in Zigler, E. The retarded child as a whole person. In: D.K. Routh (Ed.), *The experimental psychology of mental retardation*. Chicago: Aldine Publishing Co., 1973.

GREEN, C., & ZIGLER, E. Social deprivation and the performance of retarded and normal children on a satiation type task. *Child Development*, 1962, 33, 499-508.

GREEN, R.W. The effects of in-class cueing and feedback to teachers upon student and teacher behaviors. *Dissertation Abstracts International*, 1974, 34(9-A), 5174.

GREENE, C.N. The Satisfaction-Performance controversy. *Business Horizons*, 1972, 15, 31-41.

GREENSPOON, J. The reinforcing effect of two spoken sounds on the frequency of two responses. *American Journal of Psychology*, 1955, 68, 409-416.

GROESBECK, R.W., & DUERFELDT, P.H. Some relevant variables in observational learning of the rat. *Psychonomic Science*, 1971, 22, 41-43.

GURIN, G., VEROFF, J., & FELD, S. *Americans view their mental health*. New York: Basic Books, 1960.

HACKENBERG, D.A. A latent extinction interpretation of social drive. *Dissertation Abstracts International*, 1976, 36(8-B), 4131.

HACKMAN, R.J. The design of work in the 1980's. In: R.M. Steers & L.W. Porter (Eds.), *Motivation and work behavior* (2nd edition). New York: McGraw-Hill, 1979.

HACKMAN, J.R., & LAWLER, E.E. Employee reactions to job characteristics. *Journal of Applied Psychology*, 1971, 55, 259-286.

HACKMAN, J.R., & OLDHAM, G.R. Development of the job diagnostic survey. *Journal of Applied Psychology*, 1975, 60, 159-170.

HACKMAN, J.R., & OLDHAM, G.R. Motivating through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 1976, 16, 250-279.

HACKMAN, J.R., & OLDHAM, G.R. *Work redesign*. Reading, Mass.: Addison-Wesley, 1979.

HACKMAN, J.R., & SUTTLE, J.L. *The importance of life at work*. Pacific Palisades, California: Goodyear, 1977.

HAFEZ, E.S.E. *Behaviour of domestic animals*. London: Bailliere, Tindall & Cox, 1962.

HAFEZ, E.S.E. Behavioral adaptation. In: E.S.E. Hafez (Ed.), *Adaptation in domestic animals*. Philadelphia: Lea & Febiger, 1968.

HALL, R.V., CRISTLER, C., CRANSTON, S.S., & TUCKER, B. Teachers and parents as researchers using multiple baseline designs. *Journal of Applied Behavior Analysis*, 1970, 3, 247-255.

HALL, R.V., FOX, R., WILLARD, D., GOLDSMITH, L., EMERSON, N., OWENS, N., DAVIS, F., & PORCIA, E. The teacher as observer and experimenter in the modification of disputing and talking-out behaviors. *Journal of Applied Behavior Analysis*, 1971, 4, 141-149.

HALL, R.V., LUND, D., & JACKSON, D. Effects of teacher attention on study behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 1-12.

HALL, R.V., PANYAN, M., RABON, D., & BRODEN, M. Instructing beginning teachers in reinforcement procedures which improve classroom control. *Journal of Applied Behavior Analysis*, 1968, 1, 315-322.

HAMBLIN, R.L., & BUCKHOLDT, D. Structured exchanges and childhood learning: Hyperaggressive children. *Programmed Activities*. Central Midwestern Regional Educational Laboratory, St.Ann, Missouri, 1967.

HAMERLYNCK, L.A., MARTIN, J.W., & ROLLAND, J.C. Systematic observation of behavior: A primary teacher skill. *Education and Training of the Mentally Retarded*, 1968, 3, 39-42.

HAMILTON, D.L., THOMPSON, J.J., & WHITE, A.M. Role of awareness and intentions in observational learning. *Journal of Personality and Social Psychology*, 1970, 16, 689-694.

HAMILTON, M.L. Response to social reinforcement rates as a function of reinforcement history. *Developmental Psychology*, 1972, 6, 180.

HARLOW, H.F., HARLOW, M.K., & MEYER, D.R. Learning motivated by a manipulation drive. *Journal of Experimental Psychology*, 1950, 40, 228-234.

HARRIS, A., & KAPCHE, R. Behavior modification in schools: Ethical issues and suggested guidelines. *Journal of School Psychology*, 1978, 16, 25-33.

HART, P.M., REYNOLDS, N.J., BAER, D.M., BRAWLEY, E.R., & HARRIS, F.R. Effect of contingent and non-contingent social reinforcement on the cooperative play of a preschool child. *Journal of Applied Behavior Analysis*, 1968, 1, 73-76.

HART, B.M., & RISLEY, T.R. Establishing use of descriptive adjectives in the spontaneous speech of disadvantaged preschool children. *Journal of Applied Behavior Analysis*, 1968, 1, 109-120.

HARTER, S. Mental age, IQ, and motivational factors in the discrimination learning set performance of normal and retarded children. *Journal of Experimental Child Psychology*, 1967, 5, 123-141.

HARTER, S., & ZIGLER, E. The effectiveness of adult and peer reinforcement on the performance of institutionalized and non-institutionalized retardates. *Journal of Abnormal Psychology*, 1968, 73, 144-149.

HARTUP, W.W. Nurturance and nurturance-withdrawal in relation to dependency behavior in preschool children. *Child Development*, 1958, 29, 191-201.

HARTUP, W.W., & HIMENO, Y. Social isolation vs. interaction with adults in relation to aggression in preschool children. *Journal of Abnormal and Social Psychology*, 1959, 59, 17-22.

HASAZI, J.E., & HASAZI, S.E. Effects of teacher attention on digit-reversal behavior in an elementary school child. *Journal of Applied Behavior Analysis*, 1972, 5, 157-162.

HAUBRICH, P.A., & SHORES, R. Attending behavior and academic perseverance of emotionally disturbed children. *Exceptional Children*, 1976, 42, 337-338.

HAY, W.M., HAY, L.R., & NELSON, R.C. Direct and collateral changes in on-task and academic behavior resulting from on-task versus academic contingencies. *Behavior Therapy*, 1977, 8, 431-441.

HAYES, C.S., & KOCH, R. Interpersonal distance behavior in mentally retarded and nonretarded children. *American Journal of Mental Deficiency*, 1977, 82, 207-209.

HAYES, L.A. Information level and frequency as determinants of social reinforcer efficacy. *Dissertation Abstracts International*, 1977, 37(11-B), 5812-5813.

HAYWOOD, H.C. Alternatives to normative assessment. In: P.J. Mittler (Ed.), *Research and practice in mental retardation*. 4th Congress of the International Association for the Scientific Study of Mental Deficiency (IASSMD). Baltimore: University Park Press, 1977.

HEDIGER, H. *Studies of the psychology and behaviour of captive animals in zoos and circuses*. (Translated by Geoffrey Sircom). New York: Criterion Books, 1955.

HELLER, F.A., & YUKL, G. Participation, managerial decision-making, and situational variables. *Organizational Behavior and Human Performance*, 1969, 4, 227-241.

HENDRY, D.P. (Ed.), *Conditioned reinforcement*. Homewood, Ill.: The Dorsey Press, 1969.

HERZBERG, F. One more time: How do you motivate employees? *Harvard Business Review*, 1968(a), 46, 53-62.

HERZBERG, F. *Work and the nature of man*. London: Staples Press, 1968(b).

HERZBERG, F. Motivation-hygiene profiles. *Organizational Dynamics*, 1974, 3, 18-29.

HERZBERG, F. *The managerial choice: To be efficient and to be human*. Homewood, Ill.: Dow Jones - Irwin, 1976.

HERZBERG, F., MAUSNER, B., & SNYDERMAN, G. *The motivation to work*. New York: Wiley, 1959.

HEWETT, F.M. Educational engineering with emotionally disturbed children. *Exceptional Children*, 1967, 33, 459-467.

HEWETT, F.M., TAYLOR, F.D., & ARTUSO, A.A. The Santa Monica project: evaluation of an engineered classroom design with emotionally disturbed children. *Exceptional Children*, 1969, 35, 523-529.

HICKEY, K.A., IMBER, S.C., & RUGGIERO, E.A. Modifying reading behavior of elementary special needs children: A cooperative resource-parent program. *Journal of Learning Disabilities*, 1979, 12, 20-25.

HILDUM, D.C., & BROWN, R.W. Verbal reinforcement and interviewer bias. *Journal of Abnormal and Social Psychology*, 1956, 53, 108-111.

HILGARD, E.R., & BOWER, F.H. *Theories of learning* (4th Edition). Englewood Cliffs, N.J.: Prentice-Hall, 1975.

HILL, A.D. The effects of social reinforcers on the task persistence of educable mentally retarded children: An implication for mainstreaming. *Dissertation Abstracts International*, 1976, 37(5-A), 2784.

HILL, A.D., & STRAIN, P.S. The effects of teacher-delivered social reinforcement on the task persistent behavior of educable mentally retarded children. *Psychology in the Schools*, 1977, 14, 207-212.

HILL, J. The psychological impact of unemployment. *New Society*, 1978, 19, 118-120.

HILL, K.T. Social reinforcement as a function of test anxiety and success-failure experiences. *Child Development*, 1967, 38, 723-737.

HILL, K.T., & MOELY, B.E. Social reinforcement as a function of task instructions, sex of S, age of S, and baseline performance. *Journal of Experimental Child Psychology*, 1969, 7, 153-165.

HILL, K.T., & STEVENSON, H.W. The effectiveness of social reinforcement following social and sensory deprivation. *Journal of Abnormal and Social Psychology*, 1964, 68, 579-584.

HINDE, R.A. *Animal behavior: A synthesis of ethology and comparative psychology* (2nd Edition). New York: McGraw-Hill, 1970.

HINDE, R.A. *Social behavior and its development in subhuman primates.* Congdon Lectures, Oregon State System of Higher Education. Eugene, Oregon, 1972.

HINDE, R.A., & STEVENSON-HINDE, J. (Eds.), *Constraints on learning.* London: Academic Press, 1973.

HOLLY, K.A., PURL, M.C., DAWSON, J.A., & MICHAEL, W.B. The relationship of an experimental form of the maths self-concept scale to cognitive and non-cognitive variables for a sample of seventh grade pupils in a middle class Southern California community. *Educational and Psychological Measurement*, 1973, 33, 505-508.

HOLMES, D.S. The application of learning theory to the treatment of a school behavior problem: A case study. *Psychology in the Schools*, 1966, 3, 355-359.

HOLT, G.L. Effect of reinforcement contingencies in increasing programmed reading and mathematics behaviors in first-grade children. *Journal of Experimental Child Psychology*, 1971, 12, 362-369.

HOMME, L.E., DE BACA, P.C., DEVINE, J.V., STEINHORST, R., & RICKERT, E.J. Use of the Premack principle in controlling the behavior of nursery school children. *Journal of the Experimental Analysis of Behavior*, 1963, 6, 544.

HOPKINS, B.L., SCHUTTE, R.C., & GARTON, K.L. The effects of access to a playroom on the rate and quality of printing and writing of first and second-grade students. *Journal of Applied Behavior Analysis*, 1971, 4, 77-87.

HOPKINSON, R.G., & COLLINS, J.B. *The ergonomics of lighting.* London: McDonald Technical and Scientific, 1970.

HORTON, G.O. Generalization of teacher behavior as a function of subject matter specific discrimination training. *Journal of Applied Behavior Analysis*, 1975, 8, 311-319.

HUDDLE, D.D. Work performance of trainable adults influenced by competition, cooperation and monetary reward. *American Journal of Mental Deficiency*, 1967, 72, 192-211.

HUGHES, D.C. An experimental investigation of the effects of pupil responding and teacher reacting on pupil achievement. *American Educational Research Journal*, 1973, 10, 21-37.

HULIN, C.L., & BLOOD, M.R. Job enlargement, individual differences, and worker responses. *Psychological Bulletin*, 1968, 69, 41-55.

HUNDERT, J., BUCHER, B., & HENDERSON, M. Increasing appropriate classroom behavior and academic performance by reinforcing correct work alone. *Psychology in the Schools*, 1976, 13, 195-200.

HURSH, H.B., BAER, D.M., & ROWBURY, T. A pilot project to examine whether teachers "turn on" only when observers are present. (Unpublished maunscript, Western Carolina Center, Morgantown, N.C., 1974). Cited in O'Leary, S.G., & O'Leary, K.D. Behavior modification in the school. In: H. Leitenberg (Ed.), *Handbook of behavior modification and behavior therapy.* Englewood Cliffs, N.J.: Prentice-Hall, 1976.

IMBER, S.C., IMBER, R.B., & ROTHSTEIN, C. Modifying independent work habits: An effective teacher-parent communication. *Experimental Child Psychology*, 1979, 46, 218-221.

IRONS, N., & ZIGLER, E. Children's responsiveness to social reinforcers as a function of short-term preliminary social interactions and long-term social deprivation. *Developmental Psychology*, 1969, 1, 402-409.

JENSON, W.R. Behavior modification in secondary schools: A review. *Journal of Research and Development in Education*, 1978, 11, 56-63.

JOHNSON, S.M., & BOLSTAD, O.D. Methodological issues in naturalistic observation: Some problems and solutions for field research. In: L.A. Hamerlynck, L.C. Handy, & E.J. Mash (Eds.), *Behavior change: Methodology, concepts, and practice*. Champaign, Ill.: Research Press, 1973.

JONES, H.H., & COHEN, A. Noise as a health hazard at work, in the community, and in the home. United States Public Health Service Report, *Public Health Reports*, 1968, 83, 533-536.

KANAREFF, V.T., & LANZETTA, J.T. Effects of congruent social and task reinforcement upon acquisition of imitative responses. *Psychological Reports*, 1961, 8, 47-57.

KAPLAN, M.F., & OLCZAK, P.V. Attitude similarity and direct reinforcement as determinants of attraction. *Journal of Experimental Research in Personality*, 1970, 4, 186-189.

KAREN, R., EISNER, M., & ENDRES, R. Behavior modification in a sheltered workshop for severely retarded students. *American Journal of Mental Deficiency*, 1974, 79, 338-347.

KATZ, D. The motivational basis of organizational behavior. *Behavioral Science*, 1964, 9, 131-146.

KATZ, D., & KAHN, R.L. *The social psychology of organizations* (2nd Edition). New York: Wiley, 1978.

KATZ, D., MACCOBY, N., & MORSE, N.C. *Productivity, supervision and morale in an office situation*. Ann Arbor, Michigan: Institute for Social Research, University of Michigan, 1950.

KAUFMAN, A., & BARON, A. Discrimination of periods of avoidance-extinction by human subjects. *Psychonomic Monograph Supplements*, 1969, 3, 53-60.

KAUFMAN, K.F., & O'LEARY, K.D. Reward, cost and self-evaluation procedures for disruptive adolescents in a psychiatric hospital school. *Journal of Applied Behavior Analysis*, 1972, 5, 293-309.

KAZDIN, A.E. The effect of vicarious reinforcement on performance in a rehabilitation setting. *Education and Training of the Mentally Retarded*, 1973(a), 8, 4-11.

KAZDIN, A.E. The effect of vicarious reinforcement on attentive behavior in the classroom. *Journal of Applied Behavior Analysis*, 1973(b), 6, 71-78.

KAZDIN, A.E. Vicarious reinforcement and direction of behavior change in the classroom. *Behavior Therapy*, 1977, 8, 57-63.

KAZDIN, A.E., & BOOTZIN, R.R. The token economy: An evaluative review. *Journal of Applied Behavior Analysis*, 1972, 5, 343-372.

KAZDIN, A.E., & FORSBERG, S. Effects of group reinforcement and punishment on classroom behavior. *Education and Training of the Mentally Retarded*, 1974, 9, 50-55.

KAZDIN, A.E., & KLOCK, J. The effect of nonverbal teacher approval on student attentive behavior. *Journal of Applied Behavior Analysis*, 1973, 6, 643-654.

KAZDIN, A.E., SILVERMAN, N.A., & SITTLER, J.L. The use of prompts to enhance vicarious effects of nonverbal approval. *Journal of Applied Behavior Analysis*, 1975, 8, 279-286.

KELLER, F.S., & SCHOENFELD, W.N. *Principles of psychology: A systematic text in the science of behavior*. New York: Appleton-Century-Crofts, 1950.

KELLY, M.B. A review of the observational data - collection and reliability procedures reported in the Journal of Applied Behavior Analysis. *Journal of Applied Behavior Analysis*, 1977, 10, 97-101.

KENT, R.N., FISHER, J.E., & O'LEARY, K.D. Observer presence as an influence on child behavior in a classroom setting. (Unpublished manuscript, SUNY, Stony Brook, N.Y., 1974). Cited in O'Leary, S.G., & O'Leary, K.D. Behavior modification in the school. In: H. Leitenberg (Ed.), *Handbook of behavior modification and behavior therapy*. Englewood Cliffs, N.J.: Prentice-Hall, 1976.

KINCAID, M.S., & WEIZBERG, P. Alphabet letters as tokens: Training preschool children in letter recognition and labelling during a token exchange period. *Journal of Applied Behavior Analysis*, 1978, 11, 199.

KINDALL, L.M. To praise and ignore classroom behaviors or to praise and punish classroom behaviors: That is the question. *Dissertation Abstracts International*, 1974, 34(11-A), 7048.

KIRBY, F.D., & SHIELDS, F. Modification of arithmetic response rate and attending behavior in a seventh-grade student. *Journal of Applied Behavior Analysis*, 1972, 5, 79-84.

KIRSCHENBAUM, D.S., STEFFEN, J.J., & D'ORTA, C. An easily mastered social competence classroom behavioral observation system. *Behavioral Analysis and Modification*, 1978, 2, 314-322.

KLABER, M.M., BUTTERFIELD, E.C., & GOULD, L.J. REsponsiveness to social reinforcement among institutionalized retarded children. *American Journal of Mental Deficiency*, 1969, 73, 890-895.

KLEIN, R.D., & MECHELLI, T. *The modification of on-task and task completion behaviors in an elementary school child.* National Institute of Education (Department of Health, Education & Welfare). Learning Research and Development Center, Pittsburgh University, Pennsylvania, 1973.

KLEITMAN, N. *Sleep and wakefulness.* Chicago: University of Chicago Press, 1963.

KLING, J.W., & SCHRIER, A.M. Positive reinforcement. In: Kling, J.W., & Riggs, L.A. (Eds.), *Woodworth and Schlosbergs' Experimental Psychology* (3rd Edition). London: Methuen, 1971.

KORNHAUSER, A.W. *Mental health of the industrial worker: A Detroit study.* New York: Wiley, 1965.

KOUNIN, J. Experimental studies of rigidity. I: The measurement of rigidity in normal and feeble-minded persons. *Character and Personality*, 1941(a), 9, 251-272.

KOUNIN, J. Experimental studies of rigidity. II: The explanatory power of the concept of rigidity as applied to feeble-mindedness. *Character and Personality*, 1941(b), 9, 273-282.

KOUNIN, J.S., & GUMP, P.V. The ripple effect in discipline. *Elementary School Journal*, 1958, 59, 158-162.

KOZMA, A. The effects of anxiety, stimulation and isolation on social reinforcer effectiveness. *Journal of Experimental Child Psychology*, 1969, 8, 1-8.

KOZMA, A. Instructional and isolation effect on susceptibility to social reinforcement. *Canadian Journal of Behavioural Science*, 1971, 3, 388-392.

KREMER, E.G., & KAMIN, L.J. The truly random control procedure: Associative or nonassociative effects in rats. *Journal of Comparative and Physiological Psychology*, 1971, 74, 203-210.

KROEMER, K.H.E. Push forces exerted in 65 common working positions. *Report of the Aerospace Medical Research Laboratory*, Wright-Patterson Air Force Base, Ohio, 1969.

KRUMBOLTZ, J.D., & GOODWIN, D.L. *Increasing task orientated behavior: An experimental evaluation of training teachers in reinforcement techniques*. Final Report. School of Education, Stanford University, Grant 5-85-95, Office of Education, 1966.

KRUPSKI, A. Are retarded children more distractable? Observational analysis of retarded and nonretarded children's classroom behavior. *American Journal of Mental Deficiency*, 1979, 84, 1-10.

KRUPSKI, A. Attention processes: Research, theory and implications for special education. In: B.K. Keogh (Ed.), *Advances in special education* (Vol.1). Greenwich, Connecticut: JAI Press, 1980.

KRYTER, K.D. *Effects of noise on man*. New York: Academic Press, 1970.

KUHME, W. Freilandstudien zur Soziologie des Hyänenhundes. *Tierpsychol.*, 1965, 22, 495-541.

KUHME, W. Beobachtungen zur Soziologie des Löwen in der Serengeti Steppe. *Z. Säugetierk,* 1966, 31, 205-213.

KUYPERS, D.S., BECKER, W.C., & O'LEARY, K.D. How to make a token system fail. *Exceptional Children*, 1968, 11, 101-108.

LAHADERNE, H.M. Attitudinal and intellectual correlates of attention: A study of four sixth-grade classrooms. *Journal of Educational Psychology*, 1968, 59, 320-324.

LAIR, C.V., & SMITH, R.K. Utilization of verbal and non-verbal feedback among college students. *Psychological Reports*, 1970, 27, 807-810.

LANDAU, R., & GEWIRTZ, J.L. Differential satiation of a social reinforcing stimulus as a determinant of its efficacy in conditioning. *Journal of Experimental Child Psychology*, 1967, 5, 391-405.

LANSBURY, R., & KNIGHT, J. *Appraisal: A two sided process*. Canberra: Australian Government Publishing Service, 1976.

LANSBURY, R.D., & PRIDEAUX, G.J. *Improving the quality of work life*. Melbourne: Longman Cheshire, 1978.

LAWLER, E.E. *Pay and organizational effectiveness*. New York: McGraw-Hill, 1971.

LE BARRE, W. Paralinguistics, kinesics and cultural anthropology. In: T.A. Sebeok, A.S. Hayes, & M.C. Bateson (Eds.), *Approaches to semiotics*. The Hague: Mouton, 1964.

LEAKEY, R.E., & LEWIN, R. *Origins*. London: Macdonald & Jane's Publishers, 1977.

LEPPER, M.R. Anxiety and experimenter valence as determinants of social reinforcer effectiveness. *Journal of Personality and Social Psychology*, 1970, 16, 704-709.

LEVENTHAL, H., & FISCHER, K. What reinforces in a social reinforcement situation - words or expressions? *Journal of Personality and Social Psychology*, 1970, 14, 83-94.

LEVIN, G.R. Social modeling as a teacher education technique: Its effects on teacher praise and student attending behaviors. *Dissertation Abstracts International*, 1974, 34(12-A), 7627.

LEVINE, F.M., & FASNACHT, G. Token rewards may lead to token learning. *American Psychologist*, 1974, 29, 816-820.

LEWIS, B.L., & STRAIN, P.S. Effects of feedback, timing and motivational content on teachers' delivery of contingent social praise. *Psychology in the Schools*, 1978, 15, 423-430.

LEWIS, M. Social isolation: A paremetric study of its effects on social reinforcement. *Journal of Experimental Child Psychology*, 1965, 2, 205-218.

LEWIS, M., & LEE-PAINTER, S. An interactional approach to the mother-infant dyad. In: M. Lewis & L.A. Rosenblum (Eds.), *The effect of the infant on its caregiver*. New York: Wiley-Interscience, 1974.

LEWIS, M., & RICHMAN, S. Social encounters and their effect on subsequent social reinforcement. *Journal of Abnormal and Social Psychology*, 1964, 69, 253-257.

LEYHAUSEN, P. Das verhalten der Katzen. *Hundbuch der Zoologie*, 1956, 8, 1-34.

LINDSLEY, O.R. Experimental analysis of social reinforcement: terms and methods. *American Journal of Orthopsychiatry*, 1963, 33, 624-633.

LIPTON, H. Social reinforcement effectiveness in retardates with differing social deprivation histories. *Dissertation Abstracts International*, 1974, 35(2-B), 1053.

LITROWNIK, A.J., FRANZINI, L.R., & TURNER, G.L. Acquisition of concepts by TMR children as a function of type of modeling, rule verbalization, and observer gender. *American Journal of Mental Deficiency*, 1976, 80, 620-628.

LOBITZ, W.C., & BURNS, W.J. The "least intrusive intervention" strategy for behavior change procedures: The use of public and private feedback in school classrooms. *Psychology in the Schools*, 1977, 14, 89-94.

LOCKE, B.J. Verbal conditioning with retarded subjects: Establishment or reinstatement of effective reinforcing consequences. *American Journal of Mental Deficiency*, 1969, 73, 621-626.

LOCKE, E.A., CARTLEDGE, N., & KNERR, C.S. Studies of the relationship between satisfaction, goal-setting, and performance. *Organizational Behavior and Human Performance*, 1970, 5, 135-158.

LOGAN, D.L., KINSINGER, J., SHELTON, G., & BROWN, J.M. The use of multiple reinforcers in a rehabilitation setting. *Mental Retardation*, 1971, 9, 3-6.

LORENZ, K.Z. *Evolution and modification of behavior*. London: Methuen, 1966.

LOTT, A.J., & LOTT, B.E. Liked and disliked persons as reinforcing stimuli. *Journal of Personality and Social Psychology*, 1969, 11, 129-137.

LOVAAS, O.I., SCHAEFFER, B.M., & SIMMONS, J.Q. Building social behavior in young children by use of electric chock. *Journal of Experimental Research in Personality*, 1965, 1, 99-109.

LOVITT, T.C., GUPPY, T.E., & BLATTNER, J.E. The use of a free-time contingency with fourth graders to increasing spelling accuracy. *Behavior Research and Therapy*, 1969, 7, 151-156.

LUPTON, T. Wage and salary payment for higher productivity. *Work Study and Management Services*, 1971, 15, 272-281.

LUTHANS, F. *Organizational behavior*. New York: McGraw-Hill, 1973.

LUTHANS, F., & KREITNER, R. The role of punishment in organizational behavior modification (O.B.Mod.). *Public Personnel Management*, 1973, 2, 156-161.

LUTHANS, F., & KREITNER, R. *Organizational behavior modification*. Glenview, Ill.: Scott Foresman & Co., 1975.

LUTHANS, F., & WHITE, D.D. Behavior modification: Application to manpower management. *Personnel Administration*, 1971, 34, 41-47.

MACMILLAN, D.L. The problem of motivation in the education of the mentally retarded. *Exceptional Children*, 1971, 37, 579-586.

MACMILLAN, D.L. *Mental retardation in school and society.* Toronto: Little, Brown & Co., 1977.

MACMILLAN, D.L., & CAUFFIEL, S.R. Outerdirectedness as a function of interpolated success and failure in educationally handicapped and regular class males. (Unpublished study). University of California, Riverside, 1973.

MACMILLAN, D.L., & CAUFFIEL, S.R. Outerdirectedness as a function of success and failure in educationally handicapped boys. *Journal of Learning Disabilities*, 1977, 10, 48-59.

MACMILLAN, D.L., & FORNESS, S.R. Behavior modification: Limits and liabilities. *Exceptional Children*, 1970, 37, 291-297.

MACMILLAN, D.L., & FORNESS, S.R. Behavior modification: Savior or savant? In: G. Tarjan, R.K. Eyman, & C.E. Meyers (Eds.), *Sociobehavioral studies in mental retardation.* Monographs of the American Association on Mental Deficiency (No.1), 1973.

MACMILLAN, D.L., & WRIGHT, D.L. Outerdirectedness in children of three ages as a function of experimentally induced success and failure. *Journal of Educational Psychology*, 1974, 66, 919-925.

MCALLISTER, L.W., STACHOWIAK, J.G., BAER, D.M., & CONDERMAN, L. The application of operant conditioning techniques in a secondary school classroom. *Journal of Applied Behavior Analysis*, 1969, 2, 277-285.

MCARTHUR, L.A., & ZIGLER, E. Level of satiation on social reinforcers and valence of the reinforcing agent as determinants of social reinforcer effectiveness. *Developmental Psychology*, 1969, 1, 739-746.

MCCARVER, R.B., & CRAIG, E.M. Placement of the retarded in the community. In: N.R. Ellis (Ed.), *International Review of research in mental retardation* (Vol.7). New York: Academic Press, 1974.

MCCORMICK, M., BALLA, D., & ZIGLER, E. Resident-care practice in institutions for retarded persons: A cross-institutional, cross-cultural study. *American Journal of Mental Deficiency*, 1975, 80, 1-17.

MCCOY, N., & ZIGLER, E. Social reinforcer effectiveness as a function of the relationship between child and adult. *Journal of Personality and Social Psychology*, 1965, 1, 604-612.

MCKEE, J.M., & CLEMENTS, C.B. A behavioral approach to learning: The Draper Model. In: H.C. Rickard (Ed.), *Behavioral intervention in human problems.* New York: Pergamon, 1971.

MCKENZIE, H.S., EGNER, A.N., KNIGHT, M.F., PERELMAN, P.F., SCHNEIDER, B.M., & GARVIN, J.S. Teaching consulting teachers to assist elementary teachers in the management and education of handicapped children. *Exceptional Children*, 1970, October, 137-143.

MCKINNEY, J.D., MASON, J., PERKERSON, K., & CLIFFORD, M. Relationship between classroom behavior and academic achievement. *Journal of Educational Psychology*, 1975, 67, 198-203.

MCLAUGHLIN, T.F., BROWN, D., MALABY, J.E., & DOLLIVER, P. The comparative effects of a timing device and group and individual contingencies for on-task behavior and academic responding in a special education class. *Behavioral Engineering*, 1977, 4, 11-15.

MCVEY, P.J. Are public examinations fair to science students? *Physics Education*, 1978, 13, 28-32.

MADLE, R.R., NEISWORTH, J.T., & KURTZ, P.D. Biasing of hyperkinetic behavior ratings by diagnostic reports: Effects of observer training and assessment method. *Journal of Learning Disabilities*, 1980, 13, 30-33.

MADSEN, C.H., BECKER, W.C., & THOMAS, D.R. Rules, praise, and ignoring: Elements of elementary classroom control. *Journal of Applied Behavior Analysis*, 1968, 1, 139-150.

MADSEN, C.H., BECKER, W.C., THOMAS, D.R., KOSER, L., & PLAGER, E. An analysis of the function of "Sit Down" commands. In: R.K. Parker (Ed.), *Readings in Educational Psychology*. Boston: Allyn & Bacon, 1968.

MADSEN, C.H., MADSEN, C.K., SAUDARGAS, R.A., HAMMOND, W.R., & EGAR, D.E. Classroom RAID (Rules, Approval, Ignore, Disapproval): A cooperative approach for professionals and volunteers. (Unpublished manuscript). University of Florida, Tallahassee, Florida, 1970.

MAGGS, A., & STIRLING, K. The effects of verbal reinforcement and contingency management in increasing and stabilizing responses in reading behaviors: A report. *The Exceptional Child*, 1976, 23, 46-52.

MAGUIRE, M. Failure effects on outerdirectedness: A failure to replicate. *American Journal of Mental Deficiency*, 1976, 81, 256-259.

MALONEY, M.P., & WARD, M.P. *Mental retardation and modern society*. New York: Oxford University Press, 1979.

MANDELKER, A.V., BRIGHAM, T.A., & BUSHELL, D.Jr. The effects of token procedures on a teacher's social contacts with her students. *Journal of Applied Behavior Analysis*, 1970, 3, 169-174.

MANN, F.C., & HOFFMAN, L.R. *Automation and the worker.* New York: Henry Holt & Co., 1960.

MARCY, C.R. Effects of Variable Interval schedules of praise on attending and computation proficiency of third graders. *Dissertation Abstracts International,* 1978, 38(10-A), 6058.

MARHOLIN, D., & STEINMAN, W.M. Stimulus control in the classroom as a function of the behavior reinforced. *Journal of Applied Behavior Analysis*, 1977, 10, 465-478.

MARHOLIN, D., STEINMAN, W.M., MCINNES, E.T., & HEADS, T.B. The effect of a teacher's presence on the classroom behavior of conduct-problem children. *Journal of Abnormal Child Psychology*, 1975, 3, 11-25.

MARLER, P. Aggregation and dispersal: Two functions in primate communication. In: P.C. Jay (Ed.), *Primates: Studies in adaptation and variability.* New York: Holt, Rinehart & Winston, 1968.

MARLOWE, R.H., MADSEN, C.H., BOWEN, C.E., REARDON, R.C., & LOGUE, P.E. Severe classroom behavior problems: Teachers or counsellors. *Journal of Applied Behavior Analysis*, 1978, 11, 53-66.

MARTENS, R. Internal-external control and social reinforcement effects on motor performance. *Research Quarterly*, 1970(a), 42, 307-313.

MARTENS, R. Social reinforcement effects on preschool children's motor performance. *Perceptual and Motor Skills*, 1970(b), 31, 787-792.

MARTIN, G., LEONHART, B., PALLOTTA-CORNICK, A., YU, D., SUTHONS, E., & QUINN, G. Investigation of a production technology for improving vocational competence of the trainable mentally retarded. *Paper presented to the Third National Congress of the Council for Exceptional Children*, October, 1978.

MARTIN, G., & PALLOTTA-CORNICK, A. Behavior modification in sheltered workshops and community group homes: Status and future. In: L.A. Hamerlynck (Ed.), *Behavioral systems for the developmentally disabled: Institutional, clinic, and community environments.* New York: Bruner/Mazel, 1979.

MARTIN, G., PALLOTTA-CORNICK, A., JOHNSTONE, G., & GOYOS, A.C. A supervisor strategy to improve work performance for lower-functioning retarded clients in a sheltered workshop. *Journal of Applied Behavior Analysis*, 1980, 13, 183-190.

MASLOW, A.H. A theory of human motivation. *Psychological Review*, 1943, 50, 370-396.

MASLOW, A.H. *Motivation and personality*. New York: Harper, 1954.

MASLOW, A.H. *Toward a psychology of being* (2nd Edition). New York: Van Nostrand Reinhold, 1968.

MASLOW, A.H. *Motivation and personality* (2nd Edition). New York: Harper & Row, 1970.

MASLOW, A.H. *The farther reaches of human nature*. Harmondsworth: Penguin, 1973.

MASSARI, D.J. Reinforcer effectiveness in children as a function of stimulus satiation. *Paper presented at the American Educational Research Association Convention in New York*. New York, February, 1971.

MASSARI, D.J., & MANSFIELD, R.S. Field dependence and outer-directedness in the problem solving of retarded and normal children. *Child Development*, 1973, 44, 346-350.

MATSON, J.L., & MARTIN, J.E. A social learning approach to vocational training of the severely retarded. *Journal of Mental Deficiency Research*, 1979, 23, 9-16.

MAWHINNEY, T.C. Intrinsic x extrinsic work motivation: Perspectives from behaviorism. *Organizational Behavior and Human Performance*, 1979, 24, 411-440.

MAYNARD, H.B., STEGEMERTEN, G.J., & SCHWAB, J.L. *Methods - Time Measurement*. New York: McGraw-Hill, 1948.

MAYO, E. *The human problems of an industrial civilization*. New York: Macmillan, 1933.

MAYO, E. *The social problems of an industrial civilization*. Boston: Harvard University Press, 1945.

MEDLAND, M.B., & STACHNIK, T.J. Good-behavior game: A replication and systematic analysis. *Journal of Applied Behavior Analysis*, 1972, 5, 45-51.

MEISSNER, M. The language of work. In: R. Dubin (Ed.), *Handbook of work, organization, and society*. Chicago: Rand McNally, 1976.

MERCATORIS, M., & CRAIGHEAD, W.E. The effects of non-participant observation on teacher and pupil classroom behavior. *Journal of Educational Psychology*, 1974, 66, 512-519.

MILLENSON, J.R., & LESLIE, J.C. *Principles of behavioral analysis* (2nd Edition). New York: Macmillan, 1979.

MILLER, A.L., & KIRSCHENBAUM, D.S. Effectiveness of social reinforcement as a function of reinforcer satiation and experimenter valence. *Journal of Genetic Psychology*, 1979, 134, 57-69.

MITCHELL, T.R. Expectancy models of satisfaction, occupational preference and effort: A theoretical, methodological and empirical appraisal. *Psychological Bulletin*, 1974, 81, 1053-1077.

MITCHELL, T.R. Organizational behavior. *Annual Review of Psychology*, 1979, 30, 243-281.

MITCHELL, W.S., MOWAT, E.M., & STOFFELMAYR, B.E. Effects of social deprivation and satiation on the reinforcing properties of social stimulation in chronic male hospitalized schizophrenics. *Journal of Abnormal Psychology*, 1975, 84, 494-497.

MOORE, E.M. The effects of behavioral charting, token reinforcement and social reinforcement on the production rates of sheltered workshop clients. *Dissertation Abstracts International*, 1975, 35(12-B), 6105.

MORRIS, E.K. The differential effectiveness of social reinforcement with children in laboratory and natural settings: A conditioned reinforcement analysis. *Psychological Records*, 1980, 30, 9-16.

MORRIS, E.K., & REDD, W.H. Children's performance and social preference for positive, negative, and mixed adult-child interactions. *Child Development*, 1975, 46, 525-531.

MOSS, H.A. Sex, age, and state as determinants of mother-infant interaction. *Merrill-Palmer Quarterly*, 1967, 13, 19-36.

MUELLER, F.L., LIGHT, J.A., & REYNOLDS, L.J. The effects of two styles of tutoring on academic performance. *Paper presented at the Annual Convention of the American Educational Research Association*. New York City, 1971.

MÜNSTERBERG, H. *Psychology and industrial efficiency*. London: Constable & Co., 1913.

MURRELL, K.F.H. *Ergonomics: Man in his working environment*. London: Chapman & Hall, 1965.

MURRELL, K.F.H. Industrial work rhythms. In: W.P. Colquhoun (Ed.), *Biological rhythms and human performance*. London: Academic Press, 1971.

MYER COMMITTEE OF INQUIRY INTO TECHNOLOGICAL CHANGE IN AUSTRALIA, Vol.1. *Technological change and its consequences.* Canberra: Australian Government Publishing Service, 1980.

NASH, L.T. The development of the mother-infant relationship in wild baboons (*papio anubis*) *Animal Behavior,* 1978, 26, 746-759.

NEFF, W.S. *Work and human behavior.* Chicago: Aldine, 1968.

NELSON, R.O., KAPUST, J.A., & DORSEY, B.L. Minimal reactivity of overt classroom observations on student and teacher behaviors. *Behavior Therapy*, 1978, 9, 695-702.

NIE, N.H., HULL, C.H., JENKINS, J.G., STEINBRENNER, K., & BENT, D.H. *SPSS: Statistical Package for the Social Sciences* (2nd Edition). New York: McGraw-Hill, 1975.

NORD, W.R. Beyond the Teaching Machine: The neglected area of operant conditioning in the theory and practice of management. *Organizational Behavior and Human Performance*, 1969, 4, 375-401.

NOTTELMAN, E.D., & HILL, K.T. Test anxiety and off-task behavior in evaluative situations. *Child Development*, 1977, 48, 225-231.

NOTTERMAN, J.M., & MINTZ, D.E. *Dynamics of response.* New York: Wiley, 1965.

OFFICE OF EDUCATION (D.H.E.W.), Washington, D.C. *The role of social rewards in children's learning and performance.* Final Report. Indiana University, Bloomington, Indiana, 1971.

OKOVITA, H.W., & BUCHER, B. Attending behavior of children near a child who is reinforced for attending. *Psychology in the Schools*, 1976, 13, 205-211.

O'LEARY, K.D., & BECKER, W.C. Behavior modification of an adjustment class: A token reinforcement program. *Exceptional Children*, 1967, 33, 637-642.

O'LEARY, K.D., BECKER, W.C., EVANS, M.B., & SAUDARGAS, R.A. A token reinforcement program in a public school: A replication and systematic analysis. *Journal of Applied Behavior Analysis*, 1969, 2, 3-13.

OPSAHL, R.L., & DUNNETTE, M.D. The role of financial compensation in industrial motivation. *Psychological Bulletin*, 1966, 66, 94-118.

ORNE, M.T. On the social psychology of the psychology experiment: With particular reference to demand characteristics and their implications. *American Psychologist*, 1962, 17, 776-783.

OSGOOD, C.E. *Method and theory in experimental psychology.* New York: Oxford University Press, 1953.

OSGOOD, C.E., SUCI, G.J., & TANNEBAUM, P.H. *The measurement of meaning.* Urbana: University of Illinois Press, 1957.

PALLOTTA-CORNICK, M.A., & MARTIN, G.L. Evaluation of a staff manual for improving work performance of retarded clients in sheltered workshops. University of Manitoba. (Submitted for publication), 1980.

PANDA, K.C. Effects of social reinforcement, locus of control, and cognitive style on concept learning among retarded children. *Ph.D. Dissertation, Indiana University*, Bloomington, Indiana, 1970. (Ann Arbor, Michigan: University Microfilm).

PANDA, K.C. Social reinforcement: Theoretical issues and research implications. *Psychological Studies*, 1971, 16, 55-67.

PANDA, K.C., & LYNCH, W.W. Effects of social reinforcement on the retarded child: A review and interpretation for classroom instruction. *Education and Training of the Mentally Retarded*, 1972, 7, 115-123.

PARIS, S.G., & CAIRNS, R.B. Experimental-ethological studies of social reinforcment in children. *Paper presented at the Midwestern Psychological Association Convention*, Detroit, Michigan, May, 1971.

PARIS, S.G., & CAIRNS, R.B. An experimental and ethological analysis of social reinforcement with retarded children. *Child Development*, 1972, 43, 717-729.

PARKER, S. *The future of work and leisure.* London: MacGibbon and Kee, 1971.

PARTON, D.A., & ROSS, A.O. Social reinforcement of children's motor behavior: A review. *Psychological Bulletin*, 1965, 64, 65-73.

PARTON, D.A., & ROSS, A.O. A reply to "The use of rate as a measure of response in studies of social reinforcement". *Psychological Bulletin*, 1967, 67, 323-325.

PAUL, L. High performance obtained with no reward. *Psychonomic Science*, 1969, 14, 224-226.

PAUL, L., & CALABRESE, F. The development of self-reinforcing running in satiated rats. *Animal Learning and Behavior*, 1973, 1, 268-272.

PAVLOV, I.P. *Conditioned reflexes*. New York: Dover, 1927.

PELECHANO, V., & VINAGRE, J. Efficacy and differential effects of social reinforcement on the behavior modification of the mental retardate. *Anâlsis y Modificaion de Conducta*, 1976, 2, 133-144.

PERRY, D.G., & GARROW, H. The "Social deprivation-satiation effect": An outcome of frequency of perceived contingency? *Developmental Psychology*, 1975, 11, 681-688.

PETER, H.W. Learning from Australian Survey Feedback Programmes. In: D. Gunzberg (Ed.), *Bringing work to life*. Melbourne: Cheshire & Productivity Promotion Council of Australia, 1975.

PETERS, R.F., COX, M.A., & BIJOU, S.W. Training children to work productively in classroom groups. *Exceptional Children*, 1971, 37, 491-500.

PHILLIPS, D. Application of behavioral principles to classroom settings. In: W.C. Becker (Ed.), *An empirical basis for change in education*. Chicago: Scientific Research Associates, Inc., 1971.

POOLE, T.B. An analysis of social play in polecats (*mustelidae*) with comments on the form and evolutionary history of the open mouth play face. *Animal Behavior*, 1978, 26, 36-49.

PORTER, L.W., & LAWLER, E.E. *Managerial attitudes and performance*. Homewood, Ill.: Irwin-Dorsey, 1968.

QUAY, H.C., WERRY, J.S., MCQUEEN, M., & SPRAGUE, R.L. Remediation of the conduct problem child in the special class setting. *Exceptional Children*, 1966, 32, 509-515.

QUINN, R., & COBB, W. *What workers want: Factor analysis of importance ratings of job facets*. Ann Arbor, Michigan: Institute for Social Research, 1971.

REITZ, W.E., & MCDOUGALL, L. Interest items as positive and negative reinforcements: Effects of social desirability and extremity of endorsement. *Psychonomic Science*, 1969, 17, 97-98.

RENSCH, B., & DUCKER, G. Die spiele von mungo und ichneumon. *Behavior*, 1959, 14, 185-213.

REPUCCI, N.D., & REISS, S. Effects of operant treatment with disruptive and normal elementary school children. *Proceedings of the Annual Convention of the American Psychological Association*, 1970, 5, 743-744.

RESCORLA, R.A. Probability of shock in the presence and absence of CS in fear conditioning. *Journal of Comparative and Physiological Psychology*, 1968, 66, 1-5.

RESCORLA, R.A. Conditioned inhibition of fear resulting from negative CS-US contingencies. *Journal of Comparative and Physiological Psychology*, 1969, 67, 504-509.

RESTLE, F. *Learning: Animal behavior and human cognition.* New York: McGraw-Hill, 1975.

RICHARDSON, W.D. The effects of tokens, praise, and tangibles on academic and conduct behaviors. *Dissertation Abstracts International*, 1976, 36(10-B), 5278.

RICKARD, H.C., CLEMENTS, C.B., & WILLIS, J.W. Effects of contingent and noncontingent token reinforcement upon classroom performance. *Psychological Reports*, 1970, 27, 903-908.

RICKARD, H.C., TAYLOR, G.E., & LIBB, J.W. Contingency management and rate of classroom productivity. *Perceptual and Motor Skills*, 1973, 36, 1267-1273.

ROBINSON, H.B., & ROBINSON, N.M. *The mentally retarded child: A psychological approach* (2nd Edition). New York: McGraw-Hill, 1976.

ROETHLISBERGER, F.J., & DICKSON, W.J. *Management and the worker.* Cambridge, Mass.: Harvard University Press, 1939.

ROODIN, P.A., & SIMPSON, W.E. Effectiveness of social reinforcement as a function of children's familiarity with the experimenter. *Journal of Genetic psychology*, 1976, 128, 33-39.

ROSENBAUM, M. Effects of FI 30 seconds and FR 15 schedules of social reinforcement on children's response rate and persistence on a simple motor task. *Psychological Reports*, 1976, 39, 667-678.

ROSENBAUM, M., & HILL, K.T. Effects of success-failure and praise-criticism on retardates, persistence and performance. *Journal of Experimental Research in Personality*, 1969, 3, 253-263.

ROSENHAN, D. Aloneness and togetherness as drive conditions. *Journal of Experimental Research in Personality*, 1967, 2, 32-40.

ROSENKRANTZ, A.L., & VAN DE RIET, V. The influence of prior contact between child subjects and adult experimenters on subsequent child performance. *Journal of Genetic Psychology*, 1974, 124, 79-90.

ROSENSHINE, B. Teaching behaviors related to pupil achievement. Cited in Wright, C.J., & Nuthall, G. Relationships between teacher behaviors and pupil achievement in three experimental elementary school lessons. *American Educational Research Journal*, 1970, 7, 491.

ROSOW, J.M. Changing attitudes to work and life styles. *Journal of Contemporary Business*, 1979, 8, 5-18.

RUBIN, R., & BALOW, I.B. Prevalence of teacher identified behavior problems: A longitudinal study. *Exceptional Children*, 1978, 45, 102-111.

RUBLE, D.N., & NAKAMURA, C.U. Task orientation versus social orientation in young children and their attention to relevant social cues. *Child Development*, 1972, 43, 471-480.

RUBLE, D.N., & NAKAMURA, C.U. Outerdirectedness as a problem-solving approach in relation to developmental level and selected task variables. *Child Development*, 1973, 44, 519-528.

RUDNAI, J.A. *The social life of the lion: A study of the behavior of wild lions (Panthero leo massaica [Newman]) in the Nairobi National Park, Kenya.* Wallingford, Pa.: Washington Square East, 1973.

RUSCH, F.R. A functional analysis of the relationship between attending and producing in a vocational training program. *Journal of Special Education*, 1979, 13, 399-410.

SALZEN, E.A. Imprinting in birds and primates. *Behavior*, ,1967, 28, 232-254.

SALZBERG, B.H., WHEELER, A.J., DEVAN, L.T., & HOPKINS, B.L. The effect of intermittent feedback and intermittent contingent access to play on printing of kindergarten children. *Journal of Applied Behavior Analysis*, 1971, 4, 163-171.

SAMPH, T. Observer effects on teacher verbal classroom behavior. *Journal of Educational Psychology*, 1976, 68, 736-741.

SAMUELS, S.J., & TURNURE, J.E. Attention and reaching achievement in first grade boys and girls. *Journal of Educational Psychology*, 1974, 66, 29-32.

SANDERS, B., ZIGLER, E., & BUTTERFIELD, E.C. Outer-directedness in the discrimination learning of normal and mentally retarded children. *Journal of Abnormal Psychology*, 1968, 73, 368-375.

SAUDARGAS, R.A. Setting criterion rates of teacher praise: The effects of video tape feedback in a behavior analysis follow through classroom. Cited in G. Semb (Ed.), *Behavior Analysis and Education*. Lawrence: University of Kansas, 1972.

SCHNEIER, C.E. Behavior modification in management: A review and critique. *Academy of Management Journal*, 1974, 17, 528-548.

SCHNEIRLA, T.C. Aspects of stimulation and organization in approach/withdrawal processes underlying vertebrate behavioral development. In: Lehrman, D.S., Hinde, R.A., & Shaw, E. *Advances in the Study of Behavior* (Vol.1). New York: Academic Press, 1965.

SCHRIESHEIM, C.A., & MURPHY, C.J. Relationships between leader behavior and subordinate satisfaction and performance: A test of some situational moderators. *Journal of Applied Psychology*, 1976, 61, 634-641.

SCHUTTE, R.C., & HOPKINS, B.L. The effects of teacher attention on following instructions in a kindergarten class. *Journal of Applied Behavior Analysis*, 1970, 3, 117-122.

SCHWAB, D.P., & CUMMINGS, L.L. Theories of performance and satisfaction: A review. *Industrial Relations*, 1970, 7, 408-430.

SCOTT, J.P. Critical periods in behavioral development. *Science*, 1962, 138, 949-958.

SCOTT, J.W., & BUSHELL, D.Jr. The length of teacher contacts and students' off-task behavior. *Journal of Applied Behavior Analysis*, 1974, 7, 39-44.

SEASHORE, S.E. *Group cohesiveness in the industrial work group.* Institute for Social Research, University of Michigan, Ann Arbor, 1954.

SECHREST, L. Implicit reinforcement of responses. *Journal of Educational Psychology*, 1963, 54, 197-201.

SELIGMAN, M.E.P. On the generality of the laws of learning. *Psychological Review*, 1970, 77, 406-418.

SELIGMAN, M.E.P., & HAGER, J.L. (Eds.), *Biological boundaries of learning*. New York: Appleton-Century-Crofts, 1972.

SERBIN, L.A., GELLER, M.I., & GELLER, S.E. Effects of social reinforcement for visual attention on classroom learning by disadvantaged preschoolers. *Perceptual and Motor Skills*, 1977, 45, 1339-1346.

SHALLENBERGER, P., & ZIGLER, E. Rigidity, negative reaction tendencies and cosatiation effects in normal and feebleminded children. *Journal of Abnormal and Social Psychology*, 1961, 63, 20-26.

SHARP, J.S. Can we assume a pupil's on-task behavior will generalize across subjects? *Journal of Learning Disabilities*, 1980, 13, 60-61.

SHEPARD, J.M. Technology, alienation, and job satisfaction. *Annual Review of Sociology*, 1977, 3, 1-21.

SIBLEY, S.A., ABBOTT, M.S., & COOPER, B.P. Modification of the classroom behavior of a disadvantaged kindergarten boy by social reinforcement and isolation. *Journal of Experimental Child Psychology*, 1969, 7, 203-219.

SIDMAN, M. *Tactics of scientific research.* New York: Basic Books, 1960.

SIMPSON, M.J.A. The study of animal play. In: P.P.G. Bateson & R.A. Hinde (Eds.), *Growing points in ethology*. London: Cambridge University Press, 1976.

SINGLETON, W.J. The ergonomics of information presentation. *Applied Ergonomics*, 1971, 2, 213-220.

SISK, H.L. *Management and organization* (3rd Edition). Cincinnati, Ohio: South-western Publishing Co., 1977.

SKEMP, R.R. Reflective intelligence and mathematics. *British Journal of Educational Psychology*, 1960, 31, 45-55.

SKIBA, E.A., PETTIGREW, E., & ALDEN, S.E. A behavioral approach to the control of thumbsucking in the classroom. *Journal of Applied Behavior Analysis*, 1971, 4, 121-125.

SKINNER, B.F. *Behavior of organisms: An experimental analysis.* New York: Appleton-Century-Crofts, 1938.

SKINNER, B.F. *Science and human behavior*. New York: Macmillan, 1953.

SKINNER, B.F. The science of learning and the art of teaching. *Harvard Educational Review*, 1954, 24, 86-97.

SKINNER, B.F. *Verbal behavior*. New York: Appleton-Century-Crofts, 1957.

SKINNER, B.F. Teaching machines. *Science*, 1958, 128, 969-977.

SKINNER, B.F. *The technology of teaching*. New York: Appleton-Century-Crofts, 1968.

SKINNER, B.F. *Beyond freedom and dignity*. New York: Alfred A. Knopf, 1971.

SKINNER, B.F., & MORSE, W.H. Fixed-interval reinforcement of running in a wheel. *Journal of the Experimental Analysis of Behavior*, 1958, 1, 371-379.

SLUCKIN, W. *Imprinting and early learning.* London: Methuen, 1964.

SMITH, D.E.P., BRETHOWER, D., & CABOT, R. Increasing task behavior in a language arts program by providing reinforcement. *Journal of Experimental Child Psychology*, 1969, 8, 45-62.

SMITH, E.O. An historical view of the study of play: Statement of the problem. In: E.O. Smith (Ed.), *Social play in primates*. New York: Appleton-Century-Crofts, 1978.

SPENCE, J.T. Verbal reinforcement combinations and concept identification learning: The role of non-reinforcement. *Journal of Experimental Psychology*, 1970, 85, 321-329.

SPENCE, J.T. Factors contributing to the effectiveness of social and nonsocial reinforcers in the discrimination learning of children from two socioeconomic groups. *Journal of Experimental Child Psychology*, 1973, 15, 367-380.

SPENCE, J.T., ARMSTRONG, J., & CONRAD, R. Contribution of instructions to the effects of two types of symbolic reinforcers on the discrimination learning of children. *Psychonomic Science*, 1969, 17, 107-108.

SPITZ, R.A., & WOLF, K.M. The smiling response: A contribution to the ontogenesis of social relations. *Genetic Psychology Monographs*, 1946, 34, 57-125.

SPRAGUE, R.L., & WERRY, J.S. Methodology of psychopharmacological studies with the retarded. In: N.R. Ellis (Ed.), *International review of research in mental retardation* (Vol.5). New York: Academic Press, 1971.

STEERS, R.M., & SPENCER, D.G. The role of achievement motivation in job design. *Journal of Applied Psychology*, 1977, 62, 472-479.

STEINMAN, W.M. The strengthening of verbal approval in retardates by discrimination training. *Journal of Experimental Child Psychology*, 1968, 6, 100-112.

STEVENSON, H.W., & CRUSE, D.B. The effectiveness of social reinforcement with normal and feebleminded children. *Journal of Personality*, 1961, 29, 124-135.

STEVENSON, H.W., & FAHEL, L.S. The effect of social reinforcement on the performance of institutionalized and noninstitutionalized normal and feebleminded children. *Journal of Personality*, 1961, 29, 136-147.

STEVENSON, H.W., & HILL, K.T. The effect of social reinforcement and nonreinforcement following success and failure. *Journal of Personality*, 1965, 33, 418-427.

STEVENSON, H.W., & HILL, K.T. Use of rate as a measure of response in studies of social reinforcement. *Psychological Bulletin*, 1966, 66, 321-326.

STEVENSON, H.W., & KNIGHTS, R.M. The effectiveness of social reinforcement after brief and extended institutionalization. *American Journal of Mental Deficiency*, 1962, 66, 589-594.

STEVENSON, H.W., & ODOM, R.D. The effectiveness of social reinforcement following two conditions of social deprivation. *Journal of Abnormal and Social Psychology*, 1962, 65, 429-431.

STEVENSON, H.W., & ZIGLER, E. Discrimination learning and rigidity in normal and feebleminded individuals. *Journal of Personality*, 1957, 25, 699-711.

STEVENSON, H.W., KEEN, R., & KNIGHTS, R.M. Parents and strangers as reinforcing agents for children's performance. *Journal of Abnormal and Social Psychology*, 1963, 67, 183-186.

STRAIN, P.S., & PIERCE, J.E. Direct and vicarious effects of social praise on mentally retarded preschool children's attentive behavior. *Psychology in the Schools*, 1977, 14, 348-353.

STRAIN, P.S., SHORES, R.E., & KERR, M.M. An experimental analysis of "spillover" effects on the social interaction of behaviorally handicapped preschool children. *Journal of Applied Behavior Analysis*, 1976, 9, 31-40.

STRUBLE, J.B. The application of positive social reinforcement to the behaviors of getting reading to work. *School Applications of Learning Theory*, 1971, 4, 34-39.

SULZER, B., HUNT, S., ASHBY, E., KONIARSKI, C., & KRAMS, M. Increasing rate and percent correct in reading and spelling in a fifth grade public school class of slow readers by means of a token system. In: E.P. Ramp & B.C. Hopkins (Eds.), *A new direction for education: Behavior analysis*. Lawrence: The University of Kansas, Department of Human Development, 1971.

SURRATT, P.R., ULRICH, R.E., & HAWKINS, R.P. An elementary student as a behavioral engineer. *Journal of Applied Behavior Analysis*, 1969, 2, 85-92.

SWANSON, H.L. Effect of positive reinforcement on visual academic performance with a partially sighted child. *Education of the Visually Handicapped*, 1977, 9, 72-76.

SWARTZ, K.B., & ROSENBLUM, L.A. Operant responding by Bonnet Macaques for color videotape recordings of social stimuli. *Animal Learning and Behavior*, 1980, 8, 311-321.

SYLVA, K., BRUNER, J.S., & GENOVA, P. The role of play in the problem-solving of children 3-5 years old. In: J.S. Bruner, A. Jolly, & K. Sylva (Eds.), *Play - its role in development and evolution*. New York: Penguin, 1976.

SZARTO, R., CARLSON, B.A., HELLIGE, P., & SALYERS, W.M. The effectiveness of tokens in increasing and maintaining promptness of work groups in a sheltered workshop. *Rehabilitation Literature*, 1976, 37, 107-108.

TAFFEL, S.J., O'LEARY, K.D., & ARMEL, S. Reasoning and praise: Their effects on academic behavior. *Journal of Educational Psychology*, 1974, 66, 291-295.

TAYLOR, F.W. *The principles of scientific management*. New York: Harper & Brothers, 1911.

TEITELBAUM, P. The use of operant methods in the assessment and control of motivational states. In: W.K. Honig (Ed.), *Operant behavior: Areas of research and application*. Englewood Cliffs, N.J.: Prentice-Hall, 1966.

THOMAS, D.A., NIELSEN, L.J., KUYPERS, D.S., & BECKER, W.C. Social reinforcement and remedial instruction in the elimination of a classroom behavior problem. *Journal of Special Education*, 1968, 2, 291-302.

THOMAS, D.R. Preliminary findings on self-monitoring for modifying teaching behaviors. In: E. Ramp & B. Hopkins (Eds.), *A new direction for education: Behavior analysis*. Lawrence: University of Kansas, 1971, 1, 102-114.

THOMAS, D.R., BECKER, W.C., & ARMSTRONG, M. Production and elimination of disruptive classroom behavior by systematically varying teacher's behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 35-45.

THOMAS, J.D., PRESLAND, I.E., GRANT, M.D., & GLYNN, T.L. Natural rates of teacher approval and disapproval in Grade 7 classrooms. *Journal of Applied Behavior Analysis*, 1978, 11, 91-94.

THOMPSON, C.R. *Apprentice education: An educational model analysis*. Diploma in Applied Psychology Thesis, University of Adelaide, 1979.

THORNDIKE, E.L. *Animal intelligence*. New York: Columbia University, 1898.

TIZARD, J. The role of social institutions in the causation, prevention, and alleviation of mental retardation. In: H.C. Haywood (Ed.), *Socio-cultural aspects of mental retardation*. New York: Appleton-Century-Crofts, 1970.

TODD, J., & NAKAMURA, C.Y. Interactive effects of informational and affective components of social and nonsocial reinforcers. *Child Development*, 1970, 41, 365-376.

TRONICK, D., ALS, H., & BRAZELTON, T.B. Mutuality in mother-infant interaction. *Journal of Communication*, 1977, 27, 74-79.

TRYBUS, R.J., & LACKS, P.B. Modification of vocational behavior in a community agency for mentally retarded adolescents. *Rehabilitation Literature*, 1972, 33, 258-266.

TURNURE, J. Children's reactions to distractors in a learning situation. *Developmental Psychology*, 1970(a), 2, 115-122.

TURNURE, J. Distractibility in the mentally retarded: Negative evidence for an orienting inadequacy. *Exceptional Children*, 1970(b), 37, 181-186.

TURNURE, J. Reactions to physical and social distractors by moderately retarded institutionalized children. *Journal of Special Education*, 1970(c), 4, 283-294.

TURNURE, J.E. Outerdirectedness in EMR boys and girls. *American Journal of Mental Deficiency*, 1973, 78, 163-170.

TURNURE, J., & ZIGLER, E. Outer-directedness in the problem solving of normal and retarded children. *Journal of Abnormal and Social Psychology*, 1964, 69, 427-436.

TURNURE, J.E., LARSEN, S.N., & THURLOW, M.L. Outerdirectedness in retarded children as a function of sex of experimenter and sex of subject. *American Journal of Mental Deficiency*, 1976, 80, 460-468.

VALETT, R.E. A social reinforcement technique for the classroom management of behavior disorders. *Exceptional Children*, 1966, 33, 185-189.

VAMPLEW, C. Automated process operators: Work attitudes and behaviour. *British Journal of Industrial Relations*, 1973, 11, 415-430.

VAN HOUTEN, R., & SULLIVAN, K. Effects of an audio cueing system on the rate of teacher praise. *Journal of Applied Behavior Analysis*, 1975, 8, 197-201.

VARNA GARIS, A., & BECKER, W.C. Effects of remedial tutoring and social reinforcement by teachers on classroom behavior problems. (Unpublished manuscript, Bureau of Educational Research, University of Illinois, 1969). In Becker, W.C., Thomas, D.R., & Carnine, D. Reducing behavior problems: An operant conditioning guide for teachers. In: W.C. Becker (Ed.), *An empirical basis for change in education.* Chicago: Scientific Research Associates, Inc., 1971.

VERPLANCK, W.S. The control of the content of conversation: Reinforcement of statements of opinion. *Journal of Abnormal and Social Psychology*, 1955, 51, 668-676.

VERPLANCK, W.S. The operant conditioning of human motor behavior. *Psychological Bulletin*, 1956, 53, 70-83.

VROOM, V.H. *Some personality determinants of the effects of participation.* New Jersey: Prentice-Hall, 1960.

VROOM, V.H. *Work and motivation.* New York: Wiley, 1964.

WALKER, H.M., & BUCKLEY, N.K. The use of positive reinforcement in conditioning attending behavior. *Journal of Applied Behavior Analysis*, 1968, 1, 245-250.

WALKER, H.M., & BUCKLEY, N.K. Effects of reinforcement, punishment, and feedback upon academic response rate. *Psychology in the Schools*, 1972(a), 9, 186-193.

WALKER, H.M., & BUCKLEY, N.K. Programming generalization and maintenance of treatment effects across three settings. *Journal of Applied Behavior Analysis*, 1972(b), 5, 45-51.

WALKER, H.M., & HOPS, H. Increasing academic achievement by reinforcing direct academic performance and/or facilitative nonacademic responses. *Journal of Educational Psychology*, 1976, 68, 218-225.

WALKER, H.M., HOPS, H., & FIEGENBAUM, E. Deviant classroom behavior as a function of combinations of social and token reinforcement and cost contingency. *Behavior Therapy*, 1976, 7, 76-88.

WALTERS, R.H., & KARAL, P. Social deprivation and verbal behavior. *Journal of Personality*, 1960, 28, 89-107.

WALTERS, R.H., & PARKE, R.D. Emotional arousal, isolation and discrimination learning in children. *Journal of Experimental Child Psychology*, 1964(a), 1, 163-173.

WALTERS, R.H., & PARKE, R.D. Social motivation, dependency and susceptibility, and social influence. *Advances in Experimental Social Psychology*, 1964(b), 1, 231-276.

WALTERS, R.H., & QUINN, M.J. The effects of social and sensory deprivation on autokinetic judgements. *Journal of Personality*, 1960, 28, 210-219.

WALTERS, R.H., & RAY, E. Anxiety, social isolation, and reinforcer effectiveness. *Journal of Personality*, 1960, 28, 258-267.

WALTON, R.E. How to counter alienation in the Plant. *Harvard Business Review*, 1972 (Nov.-Dec.), 72-81.

WALTON, R.E. From Hawthorne to Topeka and Kalman. In: E.L. Cass & F.G. Zimmer (Eds.), *Man and work in society*. New York: Van Nostrand Reinhold, 1975.

WARD, J. Behavior modification in education: An overview and a model for programme implementation. *Bulletin of the British Psychological Society*, 1976, 29, 257-268.

WARD, M.H., & BAKER, B.L. Reinforcement therapy in the classroom. *Journal of Applied Behavior Analysis*, 1968, 1, 323-328.

WARGO, D.G., & MEEK, V.C. Concept identification performance as a function of experimenter warmth in educable mental retardates and nonretarded rehabilitation clients. *American Journal of Mental Deficiency*, 1971, 75, 593-598.

WARR, P.B. (Ed.), *Psychology at work* (2nd Edition). New York: Penguin Books, 1978.

WARR, P., & WALL, T. *Work and well-being*. Harmondsworth: Penguin Books, 1975.

WARREN, V.L., & CAIRNS, R.B. Social reinforcement satiation: An outcome of frequency or ambiguity. *Journal of Experimental Child Psychology*, 1972, 13, 249-260.

WASIK, B.H., SENN, K., WELCH, R.H., & COOPER, B.R. Behavior modification with culturally deprived school children: Two case studies. *Journal of Applied Behavior Analysis*, 1969, 2, 181-194.

WASSERMAN, E.A., DEICH, J.D., HUNTER, N.B., & NAGAMATSU, L.S. Analysing the random control procedure: Effects of paired and unpaired CSs and USs on autoshaping the chick's key peck with heat reinforcement. *Learning and Motivation*, 1977, 8, 467-487.

WATERS, L.K. Social reinforcement of the working behaviour of retardates in a rehabilitation centre. *Australian Journal of Psychology*, 1979, 31, 201-211.

WEAVER, S.J. The effects of motivation - hygiene orientation and interpersonal reaction tendencies in intellectually subnormal children. (Unpublished doctoral dissertation). George Peabody College for Teachers, 1966.

WEAVER, T.R. The incidence of maladjustment among mental defectives in a military environment. *American Journal of Mental Deficiency*, 1946, 51, 238-246.

WEAVER, S.J., BALLA, D., & ZIGLER, E. Social approach and avoidance tendencies of institutionalized retarded and noninstitutionalized retarded and normal children. *Journal of Experimental Research in Personality*, 1971, 5, 98-110.

WHITE, M.A. Natural rates of teacher approval and disapproval in the classroom. *Journal of Applied Behavior Analysis*, 1975, 8, 367-372.

WHITE-BLACKBURN, G., SEMB, S., & SEMB, G. The effects of a good behavior contract on the classroom behaviors of sixth grade students. *Journal of Applied Behavior Analysis*, 1977, 10, 312.

WHITEHEAD, C.W. Sheltered workshops in the decade ahead: Work and wages or welfare? In: T.G. Bellamy, G. O'Connor & O.C. Karan (Eds.), *Vocational rehabilitation of severely handicapped persons: Contemporary service strategies*. Baltimore: University Park Press, 1979.

WHITMAN, T.J., MERCURIO, J.R., & CAPONIGRI, V. Development of social responses in two severely retarded children. *Journal of Applied Behavior Analysis*, 1970, 3, 133-138.

WIESENFELD, A.R., & KLORMAN, R. The mother's psychophysiological reactions to contrasting affective expressions by her own and an unfamiliar infant. *Developmental Psychology*, 1978, 14, 294-304.

WINDLE, C. Prognosis of mental subnormals. *American Journal of Mental Deficiency*, 1962, 66 (Monograph Supplement 5).

WINETT, R.A., & ROACH, A.M. The effects of reinforcing academic performance on social behavior: A brief report. *Psychological Record*, 1973, 23, 391-396.

WINETT, R.A., & WINKLER, R.C. Current behavior modification in the classroom: Be still, be quiet, be docile. *Journal of Applied Behavior Analysis*, 1972, 5, 499-504.

WODTKE, K.H., & BROWN, B.R. Social learning and imitation. *Review of Educational Research*, 1967, 37, 514-538.

WOLF, M.M., GILES, D.K., & HALL, R.V. Experiments with token reinforcement in a remedial classroom. *Behavior Research and Therapy*, 1968, 6, 51-64.

WOLFE, J.B. Effectiveness of token-rewards for chimpanzees. *Comparative Psychology Monographs*, 1936, 12, 1-72.

WOOLFOLK, A.E. Student learning and performance under varying conditions of teacher verbal and nonverbal evaluative communication. *Journal of Educational Psychology*, 1978, 70, 87-94.

WRIGHT, C.J., & NUTHALL, G. Relationships between teacher behaviors and pupil achievement in three experimental elementary school lessons. *American Educational Research Journal*, 1970, 7, 477-491.

YANDO, R., & ZIGLER, E. Outerdirectedness in the problem-solving of institutionalized and noninstitutionalized normal and retarded children. *Developmental Psychology*, 1971, 5, 300-311.

YOSHINO, N. Satiation of social reinforcement. *Japanese Journal of Educational Psychology*, 1972, 20, 236-243.

YOUNG, A., & COCHRANE, R. Social isolation and reinforcer effectiveness: A test of three theories. *Journal of Social Psychology*, 1977, 101, 281-289.

YSSELDYKE, J.E., & FOSTER, G.G. Bias in teachers' observations of emotionally disturbed and physically disabled children. *Exceptional Children*, 1978, 44, 613-615.

ZANDER, A. The psychology of group processes. *Annual Review of Psychology*, 1979, 30, 417-451.

ZEAMAN, D., & HOUSE, B.J. The role of attention in retardate discrimination learning. In: N.R. Ellis (Ed.), *Handbook of mental deficiency*. New York: McGraw-Hill, 1963.

ZEAMAN, D. Learning processes of the mentally retarded. In: S.F. Osler & R.E. Cooke (Eds.), *The biosocial basis of mental retardation*. Baltimore, Maryland: John Hopkins Press, 1965.

ZENTALL, T.R., & HOGAN, D.E. Imitation and social facilitation in the pigeon. *Animal Learning and Behavior*, 1976, 4, 427-430.

ZIGLER, E. The effect of pre-institutional social deprivation on the performance of feebleminded children. (Unpublished doctoral dissertation). University of Texas, 1958.

ZIGLER, E. Social deprivation and rigidity in the performance of feebleminded children. *Journal of Abnormal and Social Psychology*, 1961, 62, 413–421.

ZIGLER, E. Social deprivation in familial and organic retardates. *Psychological Reports*, 1962, 10, 370.

ZIGLER, E. Rigidity of social reinforcement effects in the performance of institutionalized and non-institutionalized normal and retarded children. *Journal of Personality*, 1963, 31, 258-269.

ZIGLER, E. The effect of social reinforcement on normal and socially deprived children. *Journal of Genetic Psychology*, 1964, 104, 235-242.

ZIGLER, E. Training the intellect vs development of the child. *Paper presented at the Annual Conference of the American Educational Research Association*, Los Angeles, February, 1968.

ZIGLER, E. Developmental versus difference theories of mental retardation and the problem of motivation. *American Journal of Mental Deficiency*, 1969, 73, 536-556.

ZIGLER, E. The retarded child as a whole person. In: D.K. Routh (Ed.), *The experimental psychology of mental retardation*. Chicago: Aldine Publishing Co., 1973.

ZIGLER, E. Effects of preinstitutional history and institutionalization on the behavior of the retarded. *Lecture presented at Nebraska University Medical Center*. Omaha, May, 1976.

ZIGLER, E., & BALLA, D. Developmental course of responsiveness to social reinforcement in normal children and institutionalized retarded children. *Developmental Psychology*, 1972, 6, 66-73.

ZIGLER, E., & BALLA, D. Motivational aspects of mental retardation. In: R. Koch & J.C. Dobson (Eds.), *The mentally retarded child and his family: A multidisciplinary handbook* (2nd Edition). New York: Bruner/Mazel, 1976.

ZIGLER, E., & BUTTERFIELD, E.C. Motivational aspects of changes in IQ test performance of culturally deprived nursery school children. *Child Development*, 1968, 39, 1-14.

ZIGLER, E., & WILLIAMS, J. Institutionalization and the effectiveness of social reinforcement: A three-year follow-up study. *Journal of Abnormal and Social Psychology*, 1963, 66, 197-205.

ZIGLER, E., & YANDO, R. Outerdirectedness and imitative behavior of institutionalized and noninstitutionalized younger and older children. *Child Development*, 1972, 43, 413-425.

ZIGLER, E., ABELSON, W.D., & SEITZ, V. Motivational factors in the performance of economically disadvantaged children on the Peabody Picture Vocabulary Test. *Child Development*, 1973, 44, 294-303.

ZIGLER, E., BALLA, D., & BUTTERFIELD, E.C. A longtitudinal investigation of the relationship between preinstitutional social deprivation and social motivation in institutionalized retardates. *Journal of Personality and Social Psychology*, 1968, 10, 437-445.

ZIGLER, E., BUTTERFIELD, E.C., & CAPOBIANCO, F. Institutionalization and the effectiveness of social reinforcement: A five- and eight-year follow-up study. *Developmental Psychology*, 1970, 3, 255-263.

ZIGLER, E., BUTTERFIELD, E.C., & GOFF, G. A measure of pre-institutional social deprivation for institutionalized retardates. *American Journal of Mental Deficiency*, 1966, 70, 873-885.

ZIGLER, E., HODGDEN, L., & STEVENSON, H. The effect of support and nonsupport on the performance of normal and feebleminded children. *Journal of Personality*, 1958, 26, 106-122.

ZIMMERMAN, J., & BAYDAN, N.T. Punishment of S^{Δ} responding of humans in conditional matching to sample by time-out. *Journal of the Experimental Analysis of Behavior*, 1963, 6, 589-597.

ZIMMERMAN, E.H., & ZIMMERMAN, T. The alteration of behavior in a special classroom situation. *Journal of the Experimental Analysis of Behavior*, 1962, 5, 59-60.

ZIMMERMAN, E.H., ZIMMERMAN, J., & RUSSELL, C.D. Differential effects of token reinforcement on instruction-following behavior in retarded students instructed as a group. *Journal of Applied Behavior Analysis*, 1969, 2, 101-112.

ZIMMERMAN, J., OVERPECK, C., EISENBERG, C., & GARLICK, B. Operant conditioning in sheltered workshops. *Rehabilitation Literature*, 1969, 30, 326-334.

ZIMMERMAN, J., STUCKEY, T., GARLICK, B., & MILLER, M. Effects of token reinforcement on productivity in multiply handicapped clients in a sheltered workshop. *Rehabilitation Literature*, 1969, 30, 34-41.