



"THE EVALUATION OF A DEVELOPMENTAL SCREENING
PROGRAMME FOR USE BY CHILD HEALTH NURSES IN THE
AUSTRALIAN CHILDHOOD POPULATION"

by

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"THE EVALUATION OF A DEVELOPMENTAL SURVEILLANCE PROGRAMME FOR USE
BY CHILD HEALTH NURSES IN THE AUSTRALIAN CHILDHOOD POPULATION."

A B S T R A C T

The basic premise underlying paediatric screening is that the earlier a disability or defect is found, the better will be the final outcome for parents and child.

Traditionally, the surveillance of the development of children in the age group of 0 - 5 years was left either to the family doctor, or to the specialist paediatrician. However, in the past 2½ decades, developmental surveillance has also been carried out by various other professionals and para-professionals, so creating a need for more formal and valid methods of assessing and quantifying development. "Norms" for development were required not only for the traditional medical aspects of development (i.e. physical or structural growth, visual function and hearing function) but also for aspects which are more clearly related to educational needs (i.e. language development; cognitive function; eye/hand co-ordination).

This need was recognized and more formal screening systems and instruments were devised. Various instruments were constructed according to the ability and background of the users, who ranged from highly trained professionals to lesser trained para-professionals and also to parents for use with their own child. Of all the different instruments, the Woodside System, as adapted for Australian

conditions, was considered to be the one most appropriate to the work-load of the child health nurses of the Mothers and Babies' Health Association (M.B.H.A.) which is now part of the Child, Adolescent and Family Health Service (C.A.F.H.S.).

The Woodside System consists of 8 items, with 2 items in each of the 4 major subsections of "Gross Motor", "Hearing and Language", "Vision and Fine Motor" and "Social/Emotional Reaction". Over the past 3-4 years, the adapted Woodside system has been used as the screening instrument by M.B.H.A. Child Health Nurses in their regular monitoring of child development. Until now it had not been fully evaluated in terms of standardization, reliability and validity, though the impression of its accuracy had been favourable.

In the study the adapted Woodside System, administered by a trained child health nurse, was used on 444 children from Adelaide suburbs aged between 6 weeks and 4 years. The validation sample consisted on the 27 "abnormal" children, the 20 "doubtful" children, and 77 "normal" children. All these 124 children were re-assessed on the criterion test - the Griffiths Scales for the Abilities of Infants and Young Children. A highly significant correlation was obtained between the Woodside subsection scores and the relevant Griffiths subsection scores. Pearson's correlation coefficient ranged between $r = 0.5$ and $r = 0.8$, $p < 0.001$.

Since the environment plays an important role in child development, study also included an assessment of the Socio-Economic

Status (S.E.S.) and the home environment of the same 444 children. The correlation between S.E.S. and Mental Indices (Griffiths) was found to be poor in the 0 - 3 year age-group ($r = 0.25$, $p < 0.05$) and "not significant" in the 3-6 year age group, so supporting the growing dissatisfaction with the use of S.E.S. as a measure of the environment. The home environment was assessed using Caldwell's HOME inventory, which covers the amount of specific stimulation given by the parent or care-giver. There was a significant correlation between the HOME scores of the environment and the Griffith's scores of mental indices ($r = 0.5$, $p < 0.05$) for the older child.

The temperament of a child was also considered as a possible influence on development. However, the results with six-month-old infants, using Carey's Infant Temperament Scale (I.T.S.) were inconclusive.

Therefore, it is felt that a comprehensive profile of a child's development requires an assessment of both the child and his/her home environment. The assessment of the child himself/herself gives an indication of concurrent developmental status; while the assessment of the child's environment possibly gives a better indication of future development, especially in view of the latest concepts that development "waxes and wanes" according to environmental changes. (McCall 1974).

The present study has served to provide child health nurses with a standardized, reliable and valid test for Australian children

in the 0 - 5 years age group. There is no similar available test standardized on Australian children with as high a validity. The findings of the study support the initial impressions that the adapted Woodside System is an accurate instrument. It is highly recommended for use by child health nurses as part of their developmental surveillance.

The present study has also shown the value of the HOME inventory for assessing the Child's home environment. Although the "HOME" is time consuming and requires individual home visits to complete the inventory, it could be of value for use with families at "risk", and families with new babies. The study also recognises the need for further research into more sensitive and less time consuming methods of assessing the child's environment. With a combination of developmental screening of children, and the assessment of the home environment when indicated, it may be possible for all "handicapped" children to be identified. Identification is fundamental if one remembers that a "handicapped child" is - "One who suffers from any continuing disability of body, intellect or personality which is likely to interfere with his normal growth and development or capacity to learn and thus prevent him from achieving his inherent potential". (M. Sheridan, 1977)

STATEMENT OF ORIGINALITY:

I declare that:-

- (a) The planning and procedure of the investigations are original. The implementation and analysis of data was done personally or under my supervision.
- (b) To the best of my knowledge this thesis does not contain any material previously published or written by another person except when due reference is made to such material in the text.
- (c) No part of this thesis has been accepted for any other degree or qualification of any university or institution.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Date :4/1/84.....Signed : ..

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QUOTE:

" We are guilty of many errors and many faults.
But our worse crime is abandoning the child,
Neglecting the fountain of Life.
Many of the things we need can wait.
The child cannot.

Right now is the time his bones are being formed
His breath is being made.
And his senses are being developed.
To him we cannot say 'tomorrow',
His name is 'today'. "

Gabriela Mistral

Chilean Poet (Nobel Prize Winner)



Chapter I

INTRODUCTION

Screening may have many connotations to different health professionals. The definition of screening as proposed by the 1971 U.S. Commission on Chronic Illness appears to be the most comprehensive. It states that screening is:- "The presumptive identification of unrecognised disease or defects by the application of tests, examination or other procedures which can be applied rapidly. Screening tests sort out apparently well persons who probably do not have a disease from those who probably do have the disease. A screening test is not intended to be diagnostic. Persons with positive or suspicious findings must be referred to their physicians for necessary treatment."

Screening for the well known medical conditions such as tuberculosis, diabetes mellitus, syphilis and hypertension, was instituted approximately three decades ago. However, developmental screening of children in the age group 0-5 years is relatively new, and has been introduced only in the last 15 to 20 years.

The term, "developmental surveillance", refers to periodic and regular screening assessment rather than a once only examination. It usually applies to the assessment of the child in the sensory areas of hearing and visual function, together with the child's general ability which encompasses gross motor, fine motor (eye/hand co-ordination), language, cognitive and social development.

The basic premise underlying paediatric developmental screening is that the earlier a disability of a physical, mental, emotional or social nature is identified, the better will be the final outcome for parent/s and/or child. Sheridan (1977), Egan et al (1969), Loring (1971), Bax et al (1969), Starte (1974). Early diagnosis and early intervention is certainly important with hearing and visual dysfunction, since in these areas there are known "critical" or "sensitive" periods. If the dysfunction is not identified in or before these periods, irreversible damage or distortion will result. Northern et al (1978), Gardiner et al (1969), Norton-Taylor (1975).

The benefits in screening for general development are not so obvious, as there do not appear to be "critical" periods of equivalent importance. However, if a dysfunction does exist and is not recognised early, then the problem may become compounded. Holt (1977).

Traditionally, developmental screening was left to the family doctor, who used his experience to make an unstructured assessment of a child. In recent years, however, the art and science of developmental screening has become more sophisticated, and its implementation has, to some degree, been transferred from highly trained professionals to lesser trained personnel. As a consequence, screening instruments have been devised of a more formal nature and with pre-determined referral criteria.

The two most widely used developmental screening systems for children in the 0-5 years old age group are the Denver Developmental Screening Test (D.D.S.T.) and the Stycar Developmental Sequences. They were devised about 15 to 20 years ago: the D.D.S.T. was initially used in America, and the Stycar in England. The D.D.S.T. was devised by Prof. W. Frankenburg, an eminent American Paediatrician, for use by "paraprofessionals", and the test had specific referral criteria. The Stycar (acronym for Screening Test for Young Children and Retardates) was designed by Dr. M. Sheridan, an eminent English Paediatrician, for Medical Officers. Since the latter test is in the form of guidelines for medical officers, no defined referral criteria were considered necessary.

In America, the need for these tests were heightened in 1967/68 by a federal regulation to make early and periodic screening services available to large numbers of children. Following this regulation, the well-known abbreviation - "E.P.S.D.T." (Early & Periodic Screening, Diagnosis & Treatment) was used to describe the many programmes that sprung up in the early 70's. The E.P.S.D.T. later fell into disrepute since the developmental assessment component was not well implemented. Washington Research Report (1978). Then there commenced a proliferation of developmental screening tests for use by paediatricians, general practitioners, nurses, teachers, psychologists or "para-professionals" on children of various age group ranging from 0 to 8 years. Many of the tests were not fully evaluated in terms of standardisation, validity and reliability. Some of the better known test in use were Knobloch's.

(1966) Developmental Screening Questionnaire (D.S.Q.) for 0-18 months; Ireton's (1979-80) Minnesota Infant Development Inventory (M.I.D.I.) 0-3 years; and a host of screening tests for the pre-school child, e.g. Goldenburg's (1975) Developmental Indicators of Assessment of Learning (D.I.A.L.): Thorpe's (1974) Developmental Inventory (T.D.I.), in which she compared 3 other tests; Co-operative Pre-school Inventory (C.P.I.), School Readiness Survey (S.R.S.) and Head Start Developmental Screening (H.S.D.S.); Ireton's (1975) Minnesota Pre-school Inventory (M.P.I.); Lichtenstein's (1978) Minneapolis Pre-school Screening Instrument (M.P.S.I.) etc..... It is of interest to note the critical review by Thorpe et al of some of these pre-school tests.

In England, Sheridan's STYCAR sequences were used in the early sixties by Medical Officers working for various Boroughs and Counties as a guide to the developmental assessment of children in the 0-5 years age range. It was at this same time that an "At Risk" Register was established in England. This Register fell into disrepute because there were as many children deemed "abnormal" who were not on the Register as there were included on it, and the "normal" children were similarly distributed. Starte (1976). The fallacy of the "At Risk" Register was that too many (approximately forty) factors were considered to result in an "At Risk" child, for instance 'respiration distress syndrome', 'low apgar score', 'breech delivery', 'forceps delivery' and 'maternal age over 35 years'. The Register has consequently been discontinued.

Six years ago in Scotland at Woodside, a suburb north of Glasgow, a developmental screening system was devised and called the Woodside System. The people involved were Prof. J. Barber, Professor of General Practice, Woodside Health Centre; Dr R. Boothman, Research Paediatrician, Dept. of Child Health, University of Glasgow; and Dr J. Stanfield, Director of Social Paediatrics, University of Glasgow. In a personal communication in 1979, Prof. Barber stated that the Woodside System had been accepted by 4 Scottish Health Boards which, between them, represented one-third of the population of Scotland.

In Europe, French and Swedish policy on child assessment is of interest. In France, the French Government in November 1970 supported the concept that "the prevention of childhood handicap should be the first consideration in all medical and social actions on behalf of children" (Wynn 1976). In 1973, the Government asserted its view and "the continuing payment of family allowance for a young child became subject to the parent or guardian sending a Certificate of Examination before certain dates to the office paying family allowance". (Wynn).

In Sweden, screening programmes were encouraged in the late sixties according to the principles established by the Swedish National Board of Health & Welfare. By 1971, in the Swedish county of Uppsala, health screening was offered to all four-year-olds. Details of the programme are contained in the Manual for Health

Screening of four-year-olds, County Council of Uppsala, Swedish National Board of Health & Welfare. A psychomotor screen for 4 year-olds was included in the programme.

In Australia, W. Australia uses the Stycar Sequences with child health nurses carrying out the assessments. In South Australia in 1978 Burden devised the Developmental Record for Infants and Young Children (D.R.I.Y.C.), based on the D.D.S.T. The D.R.I.Y.C. has yet to be implemented on a practical basis.

The adapted version of the Woodside was introduced four years ago by the author for use by the Child Health Nurses of the M.B.H.A. (now part of the Child, Adolescent and Family Health Service of the S.A. Health Commission). It was found that the adapted Woodside system could readily be incorporated into the routine duties of the M.B.H.A. nurses, who were already involved in preventive care of children in the 0-5 years age group.

Although it had not until now been validated, the adapted Woodside was considered to have most of the basic characteristics of a successful developmental screening test. It is short, and over the last 4 years has been found to be eminently suitable for use by child health nurses of the M.B.H.A. However, it remained to be standardized and validated for Australian children of different ages.

There is an increasing awareness that a child's home environment plays an important role in his/her development. When assessing the home environment, Pavenstedt (1965), Marjoribanks

(1972), Elardo (1975), Starte (1975), Bradley & Caldwell (1978) all considered that "specific environmental processes" gave a more accurate picture of home environment than "structural indices" such as Socio-economic Status (S.E.S.).

Caldwell's HOME Inventory was considered to be a suitable instrument since it is sensitive to the factors in the environment which are important to child development.

This study proposes to fully evaluate the adapted Woodside System so that it can be used with confidence in the Adelaide community. Furthermore, the value of assessing the child's home environment is also examined.

Chapter II

SCREENING INSTRUMENTS FOR CHILD DEVELOPMENT

It has been the logical step to gauge the development of an infant or young child by assessing the individual child. However, assessment of the home environment may be an additional method of predicting the child's development.

The rationale for screening the individual child are in the main based on the "Biological" (Gesell), "Cognitive" (Piaget) and "Ethological" (Barnet) Theories of Child Development, Holt (1977). According to these theories development is pre-determined and maturation leads to the unfolding of these abilities. On the other hand, the rationale for screening the child's environment is based mainly on the "Psychodynamics" (Erikson) and "Learned Behaviour" (Skinner) Theories. (Further details on the different Theories of Child Development are found in Chapter VIII).

Screening assessment of the individual has been the more popular method. This popularity is perhaps partly due to the obvious logic in looking at the child himself/herself, and partly due to the fact that large groups of children (e.g. in clinics, kindergartens and schools) form a captive population so facilitating access.

Of the many currently available developmental screening tests for the 0-5 years old age group, only the D.D.S.T., the Stycar, the D.R.I.Y.C. and the Woodside appear to cover the whole 0 - 5 years range.

The D.D.S.T. has been comprehensively validated and standardized. Frankenburg (1971). However, it is time-consuming (20-30 mins.per child) and possibly as a consequence its authors have devised the Pre-Denver Questionnaire (P.D.Q.) to screen the D.D.S.T.

The D.R.I.Y.C. has been validated to some extent Burden(1978) but the validation sample in the study was small in number, especially for children over 5 years and for those aged less than 6 months. In fact, there were only 3 children under 6 months and 2 children at 5 years of age. Furthermore, the correlation between the D.R.I.Y.C. scores and the criterion test scores was variable ($r = 0.2$ to 0.8 , $p < 0.05$ to < 0.001). The D.R.I.Y.C. takes longer than the D.D.S.T. to administer since the D.R.I.Y.C. assesses "Cognitive" development as well as the areas covered by the D.D.S.T., namely "Gross Motor", "Fine Motor", "Social" and "Language" development.

The STYCAR sequences Sheridan (1977) have not been validated. The Stycar was initially devised as a quick reference for Medical Officers to assist them in making a reliable developmental assessment of a child in addition to their traditional physical examination. Even so, the STYCAR handbook remains an excellent text on child development, and is particularly useful to health professionals as the sequences incorporate an assessment of the sensory functions (i.e. hearing and vision) of the child.

The Adapted Woodside System, Barber (1976), Forfar & Arneil (1978), has not been validated nor standardized. However,

it is outstanding in that there are specific criteria described for interpretation of the screening assessment, and there is a record chart, which permits a clear picture of repeated screening assessments over a period of 5 years. It is hypothesised that the adapted Woodside is a brief and practical but also a sensitive instrument, which can readily be incorporated into the child health nurses' routine workload and that because of the set criteria for referral, the adapted Woodside will facilitate uniformity of scoring. This project proposes to standardize and validate the adapted Woodside as used by child health nurses.

The influence the Environment has on the child remains hypothetical with most workers feeling that child development must in some way be related to the home environment. The most frequently used method of assessing the quality of the environment is the S.E.S. which is gauged according to the occupation, education, housing and financial status of the family. Many workers considered that a higher S.E.S. would in some subtle way be related to more advanced development. Studies undertaken over the last 20 years have shown S.E.S. to be a poor guide to the developmental status of the child, Pavenstedt (1965), Bloom (1964), Frankenburg (1975), Sundelin (1979). Other workers, Majoribank (1972) and Elardo et al (1975) found that child development was more strongly related to "specific environmental processes" in the home than it is to S.E.S. classification. It would appear therefore that a measure of "specific environmental processes" is likely to be

a more accurate and useful guide in the assessment of the environment than would be the relatively static measure of S.E.S. This is reinforced by the fact that a child's development has been shown to "wax and wane" according to changes in the home environment, McCall (1973).

The value of assessing the home environment was first suggested by Bloom's work (1964). His students Davie (1963) and Wolf (1964) of the University of Chicago, developed instruments for measurement of the environment. Other researchers, Radin (1965) and Henderson (1972), followed suit, using the "Chicago" group's technique. Numerous other such instruments were devised to measure "specific environmental processes", Keeves (1972), Henderson (1972), Deutch et al (1968). However, these instruments were designed for diagnostic use rather than for screening purposes: they have not been fully standardized and validated. Caldwell's HOME Inventory is one instrument which has been fully standardized and validated (1977), and has been widely used as a screening tool by other researchers -Ramey (1975); Wulbert (1975); Eu (1980).

Many workers have found the HOME to be an effective measure of the environment, although it is recognized that the process of interviewing a parent at home is time-consuming. A more recent inventory consists of a questionnaire which is completed by the care-giver or parents and doesn't involve an interview. The Home

Screening Questionnaire was devised by Frankenberg (1979) and was based on work done by the "HOME" group. Preliminary findings, presented at the 3rd International Conference on Early Identification of Children "at risk" - Sept. 1980, appears encouraging.

In conclusion, it has been suggested that the development of the child can be assessed by screening the individual child or by screening his/her home environment. Furthermore, Coons and Frankenberg (1981) hypothesised that perhaps by using both screening measures, one might be better able to identify a child "at risk".

Chapter III

DESCRIPTION OF THE WOODSIDE SYSTEM

The Woodside System uses four charts to cover the areas of "Social", "Hearing and Language", "Vision and Fine Motor", and "Gross Motor", development. These charts provide a visual summary of the developmental progress of a child; they are shown in Figs. 1 and 2. They have been adapted for Australian conditions, mainly in the gross motor area.

On the horizontal axis of each chart is shown the age of the child, with a range from 6 weeks to 4 years. The vertical axis contains a variety of tests suitable for the different age groups. The tests are in pairs and each pair corresponds with a particular age, so forming a step-pattern across the chart. In each of the four charts a child's developmental ability is plotted against the age of the child. In practice, there is a minimum total of 8 test items to be applied for any individual child, (i.e. 2 test items for each of the 4 developmental areas).

With, for example, a 9 month-old child being assessed using the chart on "social" development, a mark is made on the upper level of the "step" if the child succeeds in both Test 11 and in Test 12, and at the lower level of the "step" if he or she succeeds in only one of them. (In Fig.3, these two marks are represented by "0" and "o" respectively.) If Tests 11 and 12 are both failed, the child is assessed on Tests 13 and 14 which are normally accomplished by a 6 month-old child. Success at one or both of Tests 13 and 14 is scored at the appropriate level. ("X" or "x" in Fig.3). Tests 15 and 16 are applied if a child fails at Tests 13 and 14. (Scored

"V" or "v" in Fig.3). If both Test 11 and Test 12 are passed, Tests 9 and 10 are applied (Scored "Y" or "y" in Fig.3).

The assessments recorded on the individual charts are interpreted as follows:- If the marks on the chart lie on or above the step, the child's development in the particular area is considered to be "Normal". If the marks lie between the "step" and the dotted, or "thresh-hold" line, development is considered to be "Doubtful". If the marks lie on or below the dotted line, development is considered to be "Abnormal/Delayed".

When the assessment plot lies on or below the dotted line in the first year of life, the child's development is delayed by approximately 3 months; in the second year, it is delayed by 6 months; and in the third and fourth years, it is delayed by 12 months. For purposes of computer analysis, a score was allocated to the levels of attainment, i.e. "Y", "y" = 7, 6; "O", "o" = 5, 4; "X", "x" = 3, 2; "V", "v" = 1, 0. (in Fig.3)

Criteria which are used to decide whether a particular child should be further followed up or referred for appropriate diagnostic assessment, are:-

1. If a total of two or more "Doubtful" marks are recorded from the four areas of assessment, the child is referred for a full diagnostic assessment.
2. In the event of one "Doubtful" mark being recorded in the area of "Gross Motor" development, the child is re-assessed in two months' time.

3. If one or more "Abnormal/Delayed" marks are recorded, the child is referred for a full diagnostic assessment.
4. If there is a "fall-off" in development from "Normal" at one assessment to "Doubtful" or "Abnormal/Delayed" at a subsequent assessment, the child is also referred for a full diagnostic assessment.

The System is most helpful for regular, routine screening, since it can be seen at a glance how a particular child is developing. Fig.1 demonstrates "Normal" progress and "Doubtful" progress, while Fig.2 demonstrates "Abnormal/Delayed" progress and a gradual "fall-off" in progress.

The designers of the Woodside System have reported a pilot study on 100 children, 52 of whom were normal children from a Child Care Centre (or Day Nursery), while the rest were children being followed up because of some neonatal risk factor. A further 10 children with confirmed major handicaps were also included in the study. This resulted in a bias towards "poor performers", so making it easier for the System to pick out "Doubtful" or "Abnormal/Delayed" performance. It was found that with the children from the Day Nursery, most plots fell around the "step" area, while for the handicapped children the majority fell below the dotted line. Further analysis of the scatter-gram can be obtained from their paper, "A New Visual Chart for Pre-School Developmental Screening". Barber et al (1976)

Adapted Woodside System

Although the majority of items on the original Woodside System were used, some items were substituted for tasks more relevant to the Australian environment. These substitutions are detailed in Fig.1 and Fig.2 (adapted Woodside) and Fig.4 and Fig.5 (original Woodside).

ADAPTED WOODSIDE SYSTEM

NAME:

D.O.B.

Emotional Reaction Check: Mother/child interaction. Interest in surroundings/people.

Observation: Normal / Doubtful / Abnormal.

SOCIAL

1. Able to dress — except laces and back buttons (H).
2. Dry at night (H).
3. Washes hands (H).
4. Pulls pants up and down (H).
5. Drinks and replaces cup (H).
6. Dry by day (H).
7. Drinks from cup without spilling (H).
8. Indicates toilet needs (H).
9. Puts cubes into box after being shown.
10. Finds toy under cup.
11. Rings bell.
12. Chews and swallows biscuit (observed). Copes with solid food.
13. Puts objects into mouth (cubes).
14. Reaches for and shakes rattle.
- *15. Responds to friendly face.
16. Enjoys being handled by mother (H).
17. Smiles when spoken to.
18. Some vocal sounds (H).

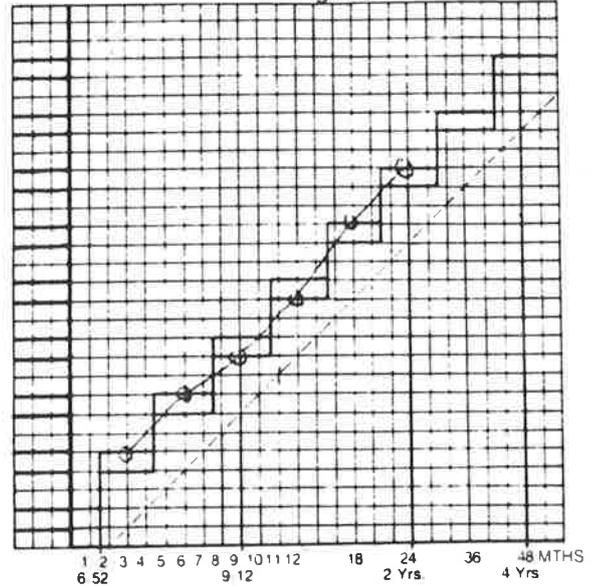
(H) — History of achievement sufficient.

Vision check: 0—2-1/2 follows object | 2—3-1/2 miniature toys | 3—5 5 letter card

VISION & FINE MOTOR

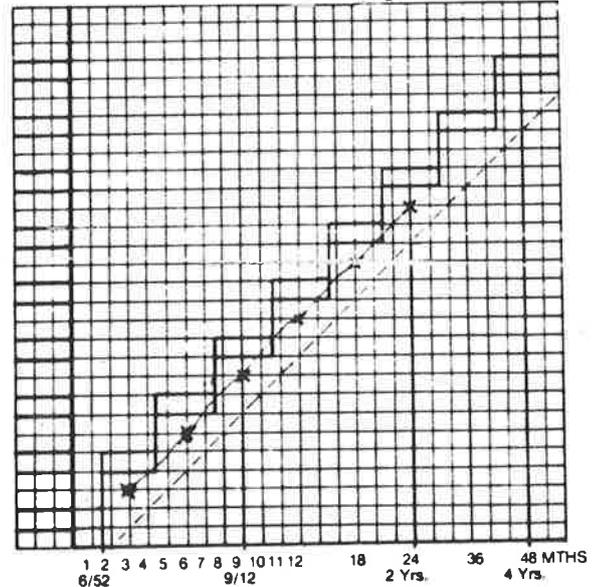
1. Picks up and replaces very small objects, e.g. pins, with each eye covered separately.
2. Copies a square.
3. Copies a circle.
- *4. Builds a bridge of three bricks.
5. Makes a vertical line when shown.
6. Makes a tower of six bricks when shown.
7. Makes a scribble on paper.
8. Makes a tower of three bricks when shown.
9. Pincer grasp using a small object e.g. Smartie.
10. Bangs bricks together when shown.
11. Side of finger grasp using a small object, e.g. Smartie.
12. Matches cubes.
13. Picks up cube from table or hand.
14. Transfers cube from one hand to another.
15. Holds a pencil briefly.
16. Follows a moving person with eyes.
17. Follows a moving face with eyes.

Normal Progress



Vision test: Yes | Object | miniature toys | 5 letter card
No | Doubtful | Progress

Doubtful Progress



* Items adapted for Australian conditions.

ADAPTED WOODSIDE SYSTEM

Hearing Check: 0—2-1/2 | 2—3-1/2 | 3—5
 sounds | picture | picture or Audiometer

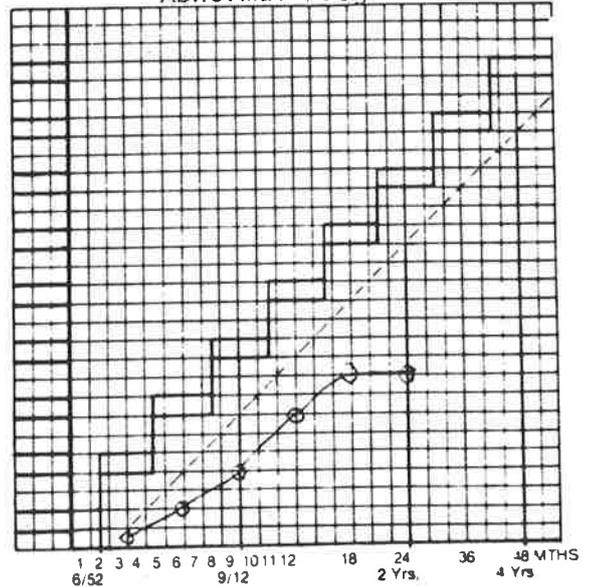
Hearing test — yes | Sounds | picture | audiometer
 No

HEARING & LANGUAGE

- *1. 2 or more pronouns in conversation
- 2. Grammatical speech articulated correctly.
- 3. Says first name.
- 4. Knows own sex.
- 5. Simple sentences (H).
- 6. Plays with miniature cup and saucer.
- 7. Points to parts of body.
- 8. Says five or more words (H).
- 9. Obeys simple commands, e.g. clap hands.
- *10. Says less than 5 words including "Mama" "Dada" "Baba" (if related to a person).
- 11. "Mamma" "Dadda" "Baba"
- 12. Hearing tests above ear level.
- 13. Unintelligible babble.
- 14. Hearing tests at ear level.
- 15. Turns eyes to sound.
- 16. Looks round meaningfully when spoken to.
- 17. Stills to bell.
- 18. Stills to mother's voice.

(H) — History of achievement sufficient.

Abnormal Progress



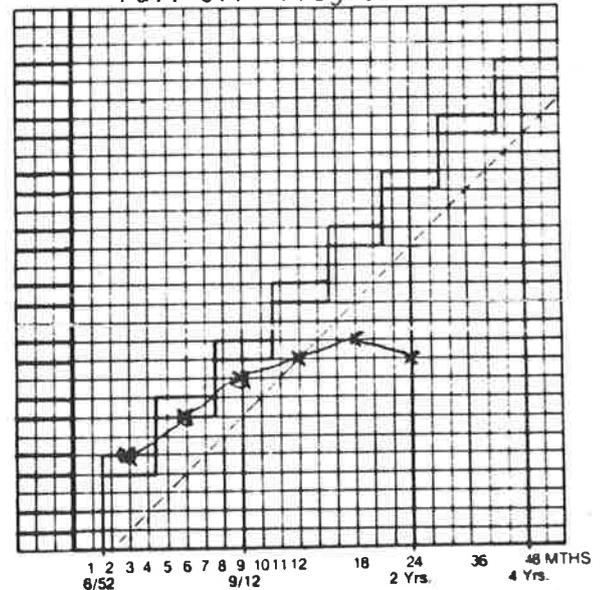
Gait: Normal | Abnormal | Doubtful

GROSS MOTOR

- *1. Stands on one leg 3-5 seconds.
- 2. Hops.
- *3. Stands on leg momentarily.
- 4. Walks on tiptoe (H).
- *5. Runs on whole of foot.
- 6. Kicks ball.
- *7. Picks object from floor without overbalancing.
- 8. Kneels without support (H).
- 9. Pulls to standing on furniture.
- 10. 'Cruises' round furniture.
- 11. Sits steadily on floor without support for few mins. (H)
- 12. Stands holding on to furniture.
- 13. Sits against wall or hand-no lateral support — 2/3 secs.
- 14. Hold round waist, lower abruptly exclude scissoring.
- 15. Pull from lying. Little or no head lag.
- 16. Ventral suspension. Holds head above plane of body.
- 17. Ventral suspension. Head in plane of body.

(H) — History of achievement sufficient.

'Fall-off' Progress



* Items adapted for Australian conditions

ADAPTED FROM THE WOODSIDE SYSTEM

Fig.3

NAME:

D.O.B.:

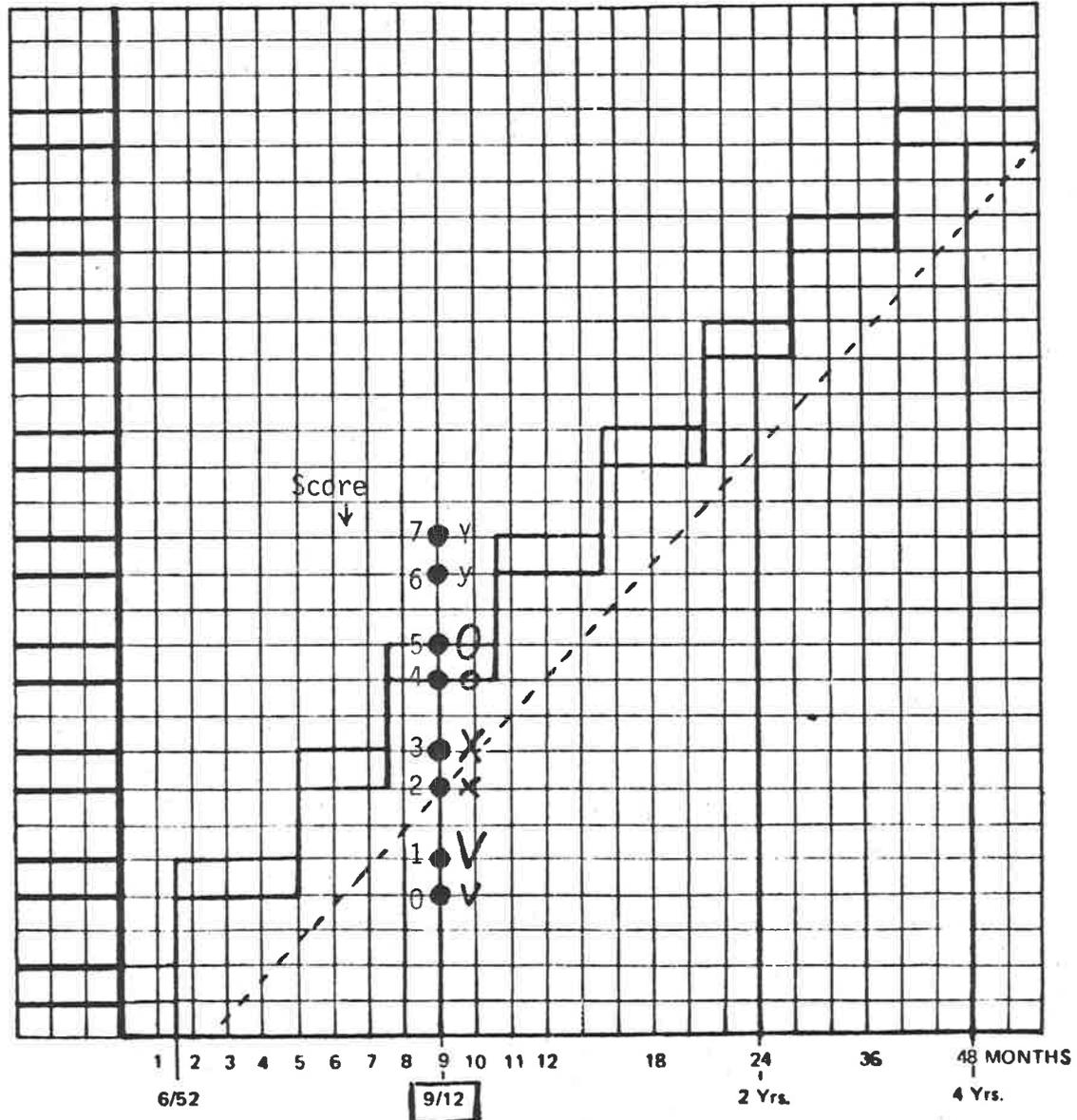
Emotional Reaction Check:

Mother/child interaction.
Interest in surroundings/people.
Activity, appropriate for age.

Observation: Normal / Doubtful / Abnormal.

SOCIAL

- 1. Able to dress — except laces and back buttons (H).
- 2. Dry at night (H).
- 3. Washes hands (H).
- 4. Pulls pants up and down (H).
- 5. Drinks and replaces cup (H).
- 6. Dry by day (H).
- 7. Drinks from cup without spilling (H).
- 8. Indicates toilet needs (H).
- 9. Puts cubes into box after being shown.
- 10. Finds toy under cup.
- 11. Apprehensive of strangers.
- 12. Chews and swallows biscuit (observed).
Copes with solid food (H).
- 13. Puts objects into mouth (cubes).
- 14. Reaches for and shakes rattle.
- 15. Responds to friendly face.
- 16. Enjoys being handled by mother (H).
- 17. Smiles when spoken to.
- 18. Some vocal sounds (H).

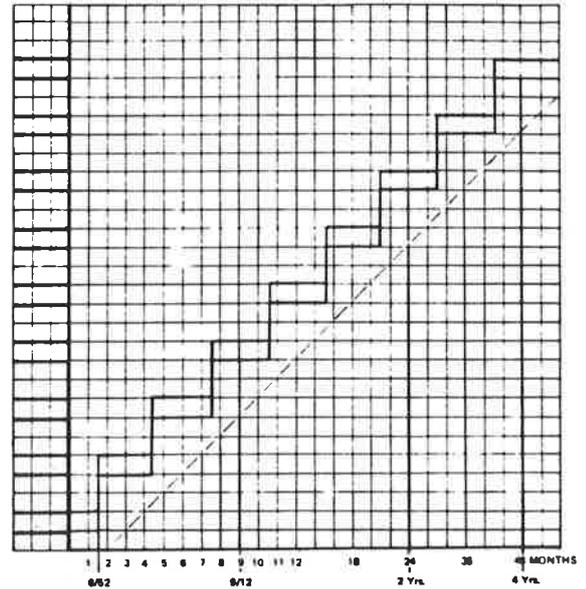


(H) = History of achievement sufficient.

SOCIAL

1. Able to dress — except laces and back buttons (H).
2. Dry at night (H).
3. Washes hands (H).
4. Pulls pants up and down (H).
5. Drinks and replaces cup (H).
6. Dry by day (H).
7. Drinks from cup without spilling (H).
8. Indicates toilet needs (H).
9. Puts cubes into box after being shown.
10. Finds toy under cup.
11. Rings bell.
12. Chews and swallows biscuit (observed).
Copes with solid food.
13. Puts objects into mouth (cubes).
14. Reaches for and shakes rattle.
- *15. Aware of and responsive to bath (H).
16. Enjoys being handled by mother (H).
17. Smiles when spoken to (H).
18. Some vocal sounds (H).

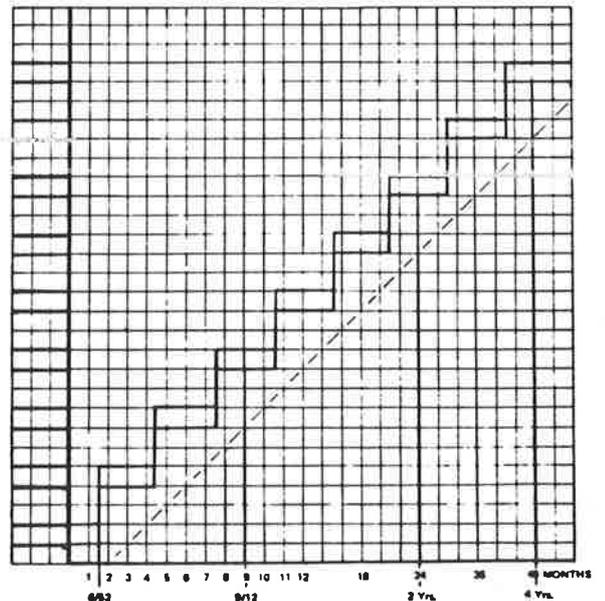
(H) = History of achievement sufficient.



HEARING AND LANGUAGE

- *1. Hears whisper at 3 ft. — R & L (Reed test).
2. Grammatical speech articulated correctly.
3. Says first name.
4. Knows own sex.
5. Simple sentences (H).
6. Plays with miniature cup and saucer.
7. Points to parts of body.
8. Says five or more words (H).
9. Obeys simple commands, e.g. clap hands.
- *10. Says less than 5 words excluding "Mama" "Dada" "Baba" (H).
11. "Mama" "Dada" "Baba".
12. Hearing tests above ear level.
13. Unintelligible babble.
14. Hearing tests at ear level.
15. Turns eyes to sound.
16. Looks round meaningfully when spoken to.
17. Stills to bell.
18. Stills to mother's voice.

(H) = History of achievement sufficient.



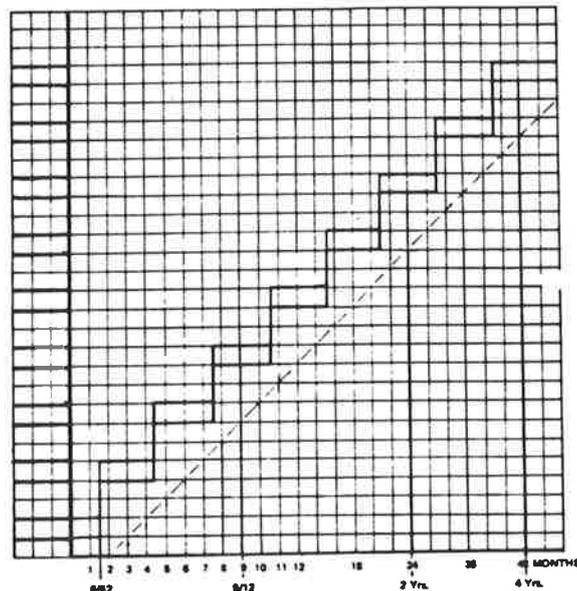
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* Items adapted for Australian conditions.

GROSS MOTOR

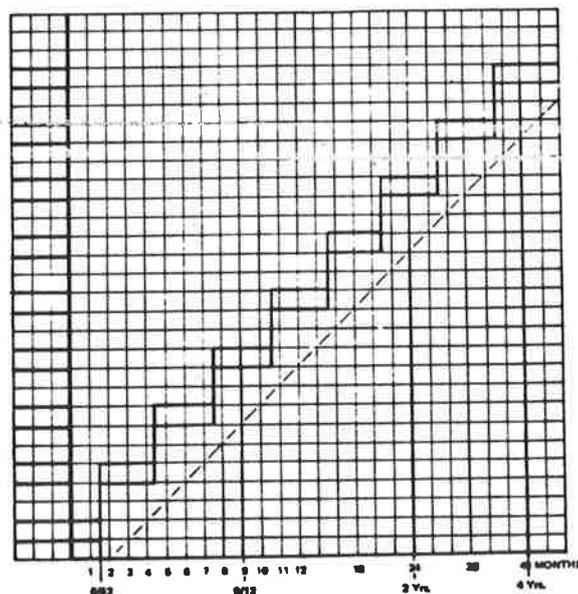
- *1. Descends stairs one foot per step.
- 2. Hops.
- *3. Climbs stairs in adult fashion.
- 4. Walks on tiptoe (H).
- *5. Up and down stairs holding on, 2 feet per step (H).
- 6. Kicks ball.
- *7. Climbs stairs, hand held, 2 feet on each step (H).
- 8. Kneels without support (H).
- 9. Pulls to standing on furniture.
- 10. 'Cruises' round furniture.
- 11. Sits steadily on floor without support for few mins. (H)
- 12. Stands holding on to furniture.
- 13. Sits against wall or hand-no lateral support - 2/3 secs.
- 14. Hold round waist, lower abruptly exclude scissoring.
- 15. Pull from lying. Little or no head lag.
- 16. Ventral suspension. Holds head above plane of body.
- 17. Ventral suspension. Head in plane of body.

(H) = History of achievement sufficient.



VISION AND FINE MOTOR

- 1. Picks up and replaces very small objects, e.g. pins, with each eye covered separately.
- 2. Copies a square.
- 3. Copies a circle.
- *4. Builds a bridge of three bricks when shown.
- 5. Makes a vertical line when shown.
- 6. Makes a tower of six bricks when shown.
- 7. Makes a scribble on paper.
- 8. Makes a tower of three bricks when shown.
- 9. Pincer grasp using a small object e.g. Smartie.
- 10. Bangs bricks together when shown.
- 11. Side of finger grasp using a small object, e.g. Smartie.
- 12. Matches cubes.
- 13. Picks up cube from table or hand.
- 14. Transfers cube from one hand to another.
- 15. Holds a pencil briefly.
- 16. Follows a moving person with eyes.
- 17. Follows a moving face with eyes.



* Items adapted for Australian conditions.

Chapter IV

POPULATION STUDIES AND METHODOLOGY

(a) SUBJECTS

The total number of children screened on the adapted Woodside System was 444. There were 224 males and 220 females. Further details regarding age, sex and S.E.S. distribution are shown in Table I.

Table I

AGE	6/52	3/12	6/12	9/12	12/12	18/12	2 Yrs.	3 Yrs.	4 Yrs.	TOTAL
Total	27	48	68	50	57	44	40	46	64	444
MALES	15	22	30	29	31	23	23	18	33	224
FEMALES	12	26	38	21	26	21	17	28	31	220
S.E.S. 1	6	16	24	19	22	13	10	9	20	139
S.E.S. 2	13	17	28	18	21	16	20	22	29	184
S.E.S. 3	8	15	16	13	14	15	10	15	15	121
S.E.S. 1										
MALES	3	7	14	10	10	7	6	4	11	72
FEMALES	3	9	10	9	12	6	4	5	9	67
S.E.S. 2										
MALES	8	6	8	10	16	7	11	8	13	87
FEMALES	5	11	20	8	5	9	9	14	16	97
S.E.S. 3										
MALES	4	9	8	9	5	9	6	6	9	65
FEMALES	4	6	8	4	9	6	4	9	6	56

Also included in the study were 18 confirmed abnormal children from a Spastic Centre. There were 10 males and 8 females, and their age range was from 1 year 10 months to 4 years 4 months.

16. Households with 2+ cars
17. Households without television
18. Shared Kitchen/Bathroom

These 18 attributes are assessed over 128 Adelaide suburbs by Stimson and Cleland. Each suburb was given a rank order 1 to 128. Thus, S.E.S. I includes rank order 1 to 26; S.E.S. II includes rank order 27 to 85; and S.E.S. III includes rank order 86 to 128. Rank order 1 being the Adelaide suburb of Burnside/Wattle Park and rank order 128 refers to the Adelaide suburb of Wingfield/Angle Park.

In general, areas of lowest S.E.S. tended to be located in the inner city suburbs, (the west and north west), the north western sector, the outer northern sector and the industrial suburbs in the southern sector. Suburbs of medium S.E.S. were in parts of the north eastern sector, near southern sector and northern sector. Areas in the highest S.E.S. suburbs are in the eastern sector, the hills suburbs and part of the coastal sectors.

A check as to whether the children were in the expected S.E.S. category was done by information on the fathers' occupations and/or professions.

ETHNICITY

Children from the ethnic groups were mainly Italian and Greek. A child was considered ^{to be} from an 'ethnic group' when both parents did not speak or spoke very little English. No attempt was made to screen children of the newly arrived Vietnamese. Of the 52 children (12% of the total 444) from the ethnic groups, 11 were from S.E.S. I (8% of 139); 18 were from S.E.S. II (9.8% of 184) and 23 were from S.E.S. III (19% of 121).

(b) METHODS

Letters of invitation were sent to parents explaining the project and offering them the option to participate in the study. The parents were from the selected S.E. groupings previously mentioned.

Of the 212 invitations sent for S.E.S. I, 139 accepted (66%); of the 317 invitations sent for S.E.S. II, 184 accepted (58%); and in the S.E.S. III, 121 accepted out of 176 invitations sent - (69% accepted).

Although there were missed and forgotten appointments, there was a final 100% of attendance of all those that accepted.

A child health nurse engaged solely for the purpose of this study, screened 462 children (444 "normals" and 18 known "abnormals") using the adapted version of the Woodside System which takes 10 minutes per child. The qualities looked for in the child health nurse were a rapport with young children, an ability to communicate effectively with parents and teachers, and experience in developmental screening. Training of the nurse in the implementation of the assessment was considered to be complete when there was a 95% agreement with the author in the scoring of 10 consecutive children. The implementation relates to the actual testing of the child, the

interpretation of the test, and the final scoring. The author collected the raw data from the nurse weekly, and discussed cases of difficulty in scoring, ambiguous statements, etc. The parents of all children deemed as "doubtful" (20) or "abnormal" (27) by the screen were seen personally by the author, who explained the implications and arranged for a further diagnostic assessment to be performed.

The Woodside was used and scored as described in Chapter III. Copies of the adapted Woodside and Manual are detailed in Appendix 1 and Appendix 2.

The reliability of the adapted Woodside was assessed firstly with two different testers assessing an individual child on separate occasions yet within a time interval of 2 weeks (50 children were so assessed with an age range of 6/52 to 4 years); and secondly, with the same tester assessing an individual child twice within a week (30 children). This section is to assess the stability of the individual test items; that is, if a child passed or failed certain items, he/she would do the same within a maximum period of 2 weeks. After 2 weeks, it is suggested that the continuing development of the child might change the performance of the child. No indication was given to the parents as to the "right" response for the different test items. Parents were also requested to refrain from "testing" their children. In this way, the problem of practising to pass a test item was to a certain extent obviated. The criteria for referral for diagnostic assessment, and the criteria for re-assessment in 2 months' time, are stated in Chapter III.

A diagnostic assessments or "Criterion Test" was performed on a total of 124 children; 27 "abnormal", 20 "doubtful" and 77 "normal" children. There was a 80% turn up of children in the validation sample. The other 20% were followed up by the author and tested in their homes. The numbers of children in each age group are shown in Table II.

Table II

	<u>VALIDATION SAMPLE</u> n = 124	
<u>Age</u>	<u>Number</u>	<u>Percentage</u>
6 Wks	6	5%
3 Mths	15	12%
6 Mths	19	15%
9 Mths	10	8%
1 Yr	21	17%
1½ Yrs	9	7%
2 Yrs	16	13%
3 Yrs	18	15%
4 Yrs	10	8%
	<u>124</u>	<u>100%</u>

The diagnostic assessments were performed by two psychologists, a paediatrician and the author using the widely accepted Griffiths Test as the "Criterion Test". The validation of the Griffiths was done on 2,260 children and full details are described in Griffiths (1976). All diagnostic assessments were made within two weeks of the nurse's screening on the Woodside.

Caldwell's "HOME" inventory was completed by a mothercraft nurse who visited the home of each child at a time when the child was awake and the interaction between parent(s) and child could be observed. The mothercraft nurse was engaged solely for the purpose of this study. The qualities looked for were an aptitude in relating to parents and young children. The training of the mothercraft nurse was complete when there was greater than 90% agreement (on all items of the inventory) between the nurse and the author on 6 consecutive visits. In this way, difference of interpretation of items were clarified. The author received the raw data weekly from the mothercraft nurse, who had then the opportunity to discuss items of concern.

The "HOME" inventory (acronym for Home Observation for Measurement of the Environment) is based on a list compiled by Caldwell (1968) indicating environmental features which are likely to stimulate early development. This basis of Caldwell's "HOME" Inventory is quoted as follows:-

- "(1) The optimal development of a young child requires an environment ensuring gratification of all basic physical needs and careful provisions for health and safety.
- (2) The development of a young child is fostered by a relatively high frequency of adult contact involving a small number of adults.
- (3) The development of a young child is fostered by a positive emotional climate in which the child learns to trust others and himself.
- (4) The development of a young child is fostered by an optimal level of need gratification.
- (5) The development of a young child is fostered by the provision of varied and patterned sensory input in an intensity range that does not overload the child's capacity to receive, classify and respond.
- (6) The development of a young child is fostered by people who respond physically, verbally, and emotionally with sufficient consistency and clarity to provide uses as to appropriate and valued behaviors and to reinforce such behaviors when they occur.

- (7) The development of a young child is fostered by an environment containing a minimum of social restrictions on exploratory and motor behavior.
- (8) The development of a young child is fostered by careful organization of the physical and temporal environment which permits expectancies of objects and events to be confirmed or revised.
- (9) The development of a young child is fostered by the provision of rich and varied cultural experiences rendered interpretable by consistent persons with whom the experiences are shared.
- (10) The development of a young child is fostered by the availability of play materials which facilitate the coordination of sensory-motor processes and a play environment permitting their utilization.
- (11) The development of a young child is fostered by contact with adults who value achievement and who attempt to generate in the child secondary motivational system related to achievement.
- (12) The development of a young child is fostered by the cumulative programming of experiences that provide an appropriate match for the child's current level of cognitive, social, and emotional organization."

There is a separate questionnaire for each of the two age groups, 0-3 years and 3-6 years. Both are based on the above concept of child development. The questionnaire for the 0-3 age

group has 45 items grouped under 6 main headings: Emotional & verbal responsivity of mother; Avoidance of restriction and punishment; Organisation of the physical & temporal environment; Provision of appropriate play material; Maternal involvement with the child; Opportunities for variety in daily stimulation.

The questionnaire for the 3-6 age group has 55 items grouped under 8 main headings: Stimulation through toys, games and other play materials; Language stimulation; Physical environment (safe, clean and conducive to development); Pride, affection and warmth; Stimulation of academic behavior; Modelling and encouragement of social maturity; Variety of stimulation; Physical punishment. Scoring on the HOME is carried out in a binary manner with a Yes/No answer to each item. Both questionnaires take about 1 hour to complete. Copies of the HOME questionnaire 0-3 years and 3-6 years are detailed in Appendix 3 and Appendix 4.

Carey's Temperament Questionnaire was completed by the mothers of 60 of the six month-old infants in the study. The 70 items in the questionnaire cover 9 different temperament characteristics (subscales): (1) Activity; (2) Rhythmicity; (3) Approach; (4) Adaptability; (5) Threshold; (6) Integrity; (7) Mood; (8) Distractability; (9) Persistence

These 9 categories of temperament were initially described by S. Chess (1968). They are:-

- " 1. Activity level: The motor component present in a given child's functioning, and the diurnal proportion of active and inactive periods.

2. Rhythmicity: The predictability of such functions as hunger, feeding pattern, elimination, and sleep-wake cycle.
3. Approach or withdrawal: The nature of the child's response to a new food, object or person.
4. Adaptability: The speed and ease with which current behaviour can be modified in response to altered environmental structuring.
5. Intensity of reaction: The energy level of response, irrespective of its quality or direction.
6. Threshold of responsiveness: The intensity level of stimulation required to evoke a discernible response to sensory stimuli, environmental objects and social contacts.
7. Quality of mood: The amount of pleasant, joyful, or friendly behaviour as contrasted with unpleasant, unfriendly behaviour or crying.
8. Distractibility: The effectiveness of extraneous environmental stimuli in interfering with, or in altering the direction of, on-going behaviour.
9. Attention span and persistence: These 2 categories are related. Attention span concerns the length of time a particular activity is pursued by the child. Persistence refers to the continuation of an activity in the face of obstacles to the maintenance of the activity."

Scoring is on a multi-choice method which permits classification of temperament into "Difficult", "Intermediate" or "Easy". Mothers usually take 15-20 minutes to complete the questionnaire. The "difficult" infant is identified with subscales 2, 3, 4, 6 and 7 as recommended by Carey. Infants are categorized as "difficult" if their scores

are 1 S.D. or more from the mean in 2 or more of these five subsections (Carey, 1970). (See chapter V table XIII). Copies of Carey Questionnaire and scoring chart are detailed in Appendix 5 and Appendix 6.

Vision was screened by a child health nurse using the Stycar method. The presence of strabismus was assessed by the light reflex technique. The type of vision test used depended on the age of the child:-

<u>Age</u>	<u>Test</u>
0 - 2½ years	Following a bright object.
2 - 3½ "	Miniature toy test (a matching test done at 3 metres).
3 - 5 "	5 or 9 letter card test (a matching test; 5 letter card done at 3 metres & 9 letter card done at 6 metres. The 5 letter card is more suited to the 3 - 4½ year-olds and the 9 letter card is relevant to the 4½ - 5 year-olds; although some 4 - 4½ year-olds are able to cope with the 9 letter card).

The criteria for referral to a specialist (after confirmation of the findings by the medical officer) were:-

- (1) Strabismus present.
- (2) Following a bright light - failure/inability to follow light.
- (3) Miniature toy test - to distinguish the small spoon, knife or fork.

- (4) 5 letter card test - a visual acuity of $\frac{3}{6}$ or worse.
- (5) 9 letter card test - a visual acuity of $\frac{6}{12}$ or worse.

Hearing was screened by the child health nurse using the Stycar sound-making equipment, the Stycar picture matching test or a pure tone audiometer, depending on the age of the child.

<u>Age</u>	<u>Test</u>
0 - 2½ years	Stycar sounds
2 - 3½ "	Stycar picture matching
3 - 5 "	Pure tone play audiometry, screened at 25 db. through 500 Hz. to 6,000 Hz.

The content, clarity and tonal quality of the children's speech was also noted.

The criteria for referral were:-

- (1) Babbling or jabbering in monotones for the 0-2 year-olds and unintelligible speech for the 3 & 4 year-olds.
- (2) Stycar sounds - failure to react to soft Stycar sounds.
- (3) Stycar picture matching - failure to indicate the correct picture on request.
- (4) Audiometry - Loss of 35 db. at any one frequency.

Height, Weight and Head Circumference were measured by the child health nurse.

A medical examination (physical) was performed on 426 children (95.9% of total).

Finally, the author was involved in:-

- (1) the weekly supervision of the two nurses as to their testing and interpretation, and further discussion on difficult and ambiguous cases.
- (2) the weekly collection of raw data from the nurses and listing the raw data in the manner requested by the statistician.
- (3) the retesting of all "failed" vision and hearing assessments prior to referral to the appropriate specialists.
- (4) the medical examinations of 425 children
- (5) the Griffiths testing of over 50% of the validation sample.
- (6) contact with at least 50% of parents in the validation sample to explain the reasons for the retest.
- (7) test/retest items were done in conjunction with the child health nurse on 80 children
- (8) punching in some raw data as instructed by the statistician due to a change in the statistician's availability
- (9) helping out in organizing testing times, and sending final letters of appreciation to all parents involved
- (10) chasing "resistant" or "lost" cases when the results of the screening for development, hearing or vision were dubious or abnormal.

It is however, appreciated that the actual testing on the children was done by the child health nurse, who was engaged full-time on the project. As the project was to validate a screening method done by a nurse (and not by a medical officer) this facet of the study was inevitable.

Chapter V

RESULTS

1. 48 hearing disabilities were referred (10.8% of 444).
2. 40 visual disabilities were referred (9.0% of 444).
3. 14 physical defects were referred (3.3% of 426).
4. Woodside (Adapted)
 - 4.1 The normative data for the 4 areas of the Woodside (social, hearing & language, vision & fine motor, and gross motor development), obtained on Adelaide children of different age groups and S.E.S. are shown as histograms in Tables III, IV, V, VI. The mean scores and S.D. , covering all age groups, for each of the 4 areas are also given.
 - 4.2 The reliability of the Woodside calculated as the percentage agreement in the scores obtained by the same tester performing the test at $1/52$ interval, was found to be 95.5%. The percentage agreement with 2 different testers at a $2/52$ interval was 95%.
 - 4.3 Validation studies were done in terms of correlation coefficients, sensitivity (co-positivity) and specificity (co-negativity), over-referrals, under-referrals and regression lines. (The criterion test, the Griffiths test, has a mean score of 100 and a S.D. of 12. The results of the validation studies are presented below:-

Table VII

Correlation between Woodside (Screening) and corresponding Griffiths (Criterion) in the 4 areas of development.

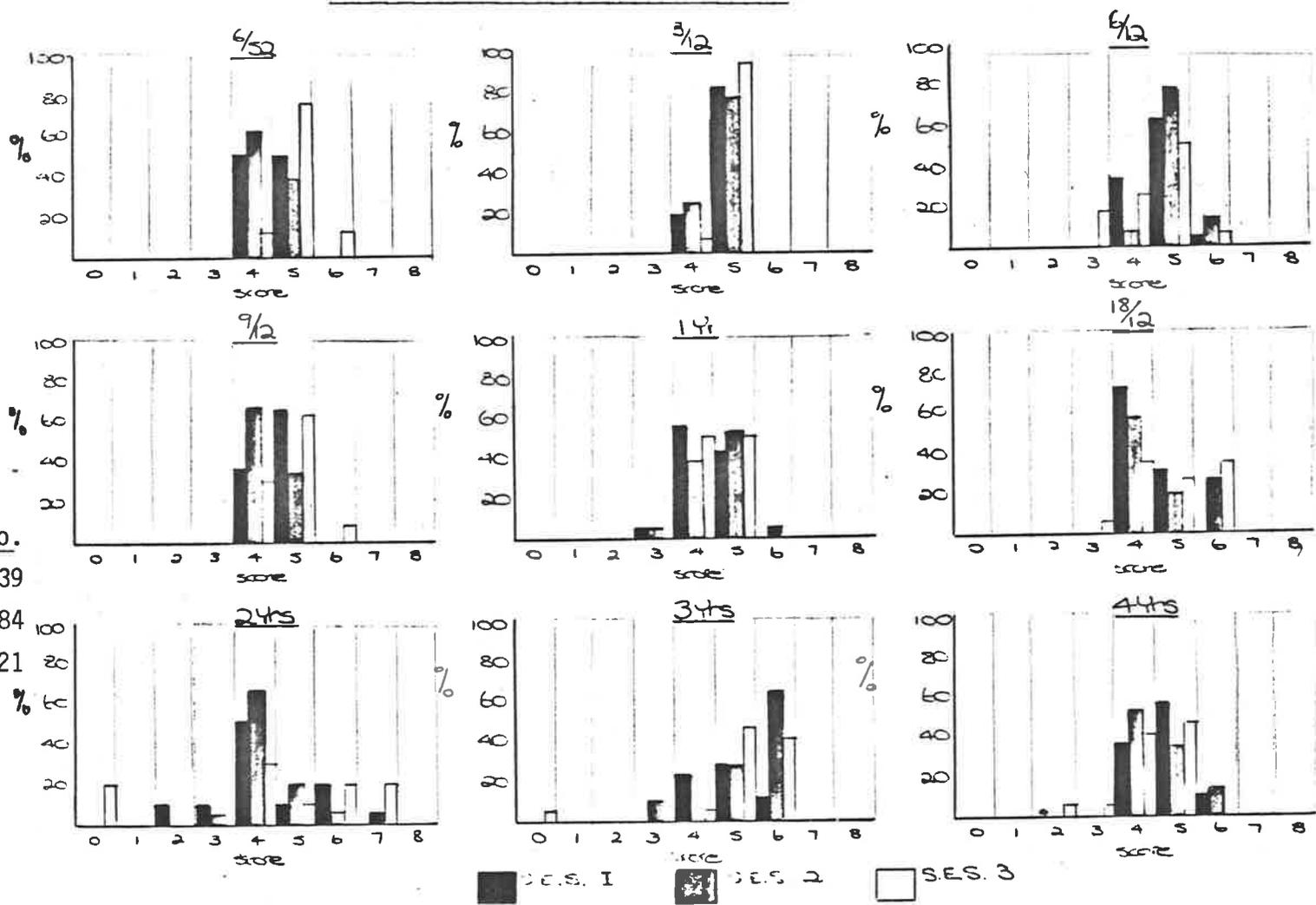
(1) Social Development	r 0.46 ***
(2) Hearing & Speech Development	0.69 ***
(3) Vision & Fine Motor Development	0.65 ***
(4) Gross Motor	0.76 ***
(5) Total	0.73 *

p = 0.001 *** n = 124

p = 0.05 *

HISTOGRAM OF WOODSIDE - SOCIAL SCORES, FOR ADELAIDE
CHILDREN ACCORDING TO AGE & S.E.S.

- 45 -

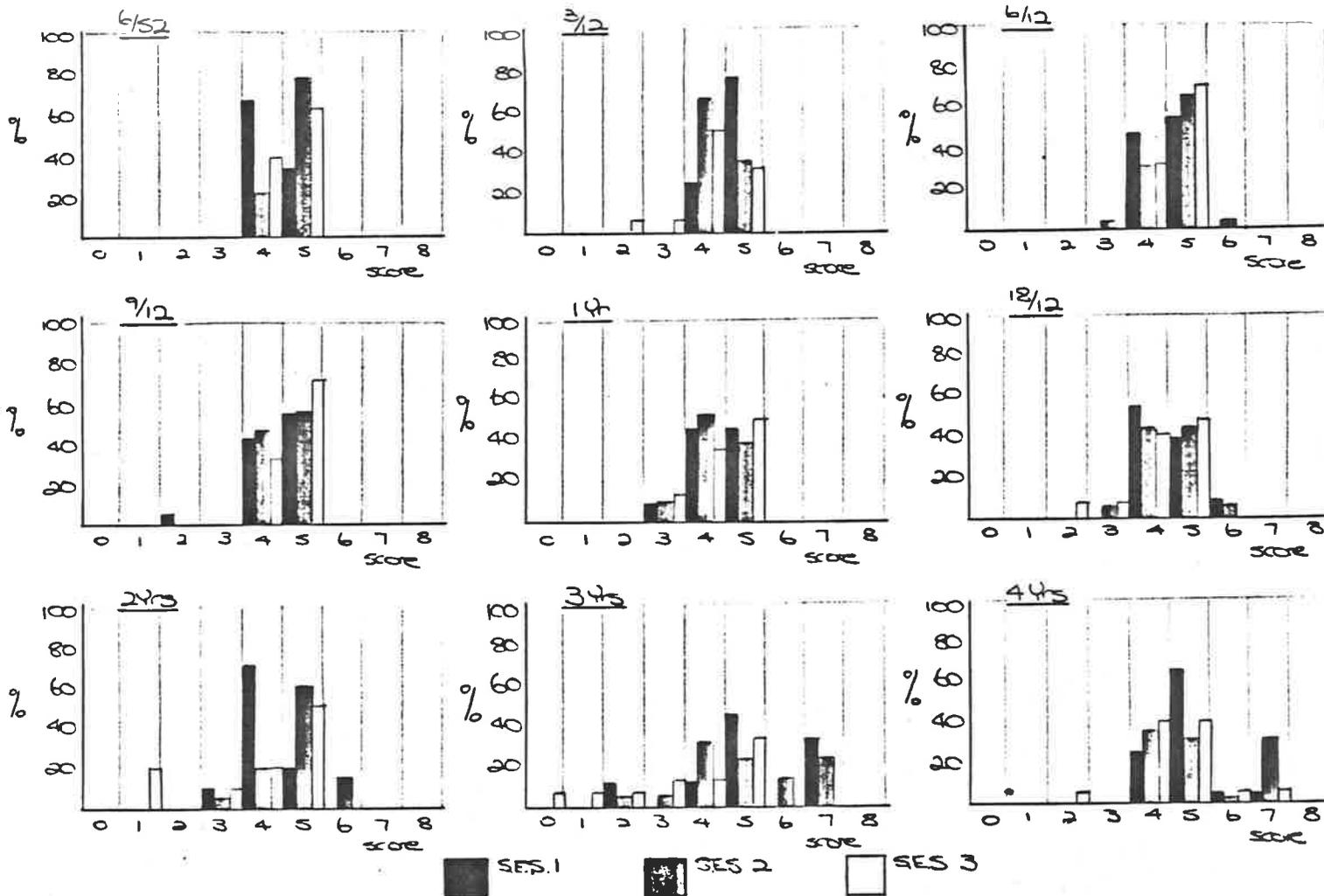


Mean scores covering all age groups:-

	Mean	S.D.	No.
<u>SES I</u>	4.6	0.6	139
<u>SES II</u>	4.7	0.8	184
<u>SES III</u>	4.7	1.1	121

HISTOGRAM OF WOODSIDE - HEARING SCORES, FOR ADELAIDE
CHILDREN ACCORDING TO AGE & S.E.S.

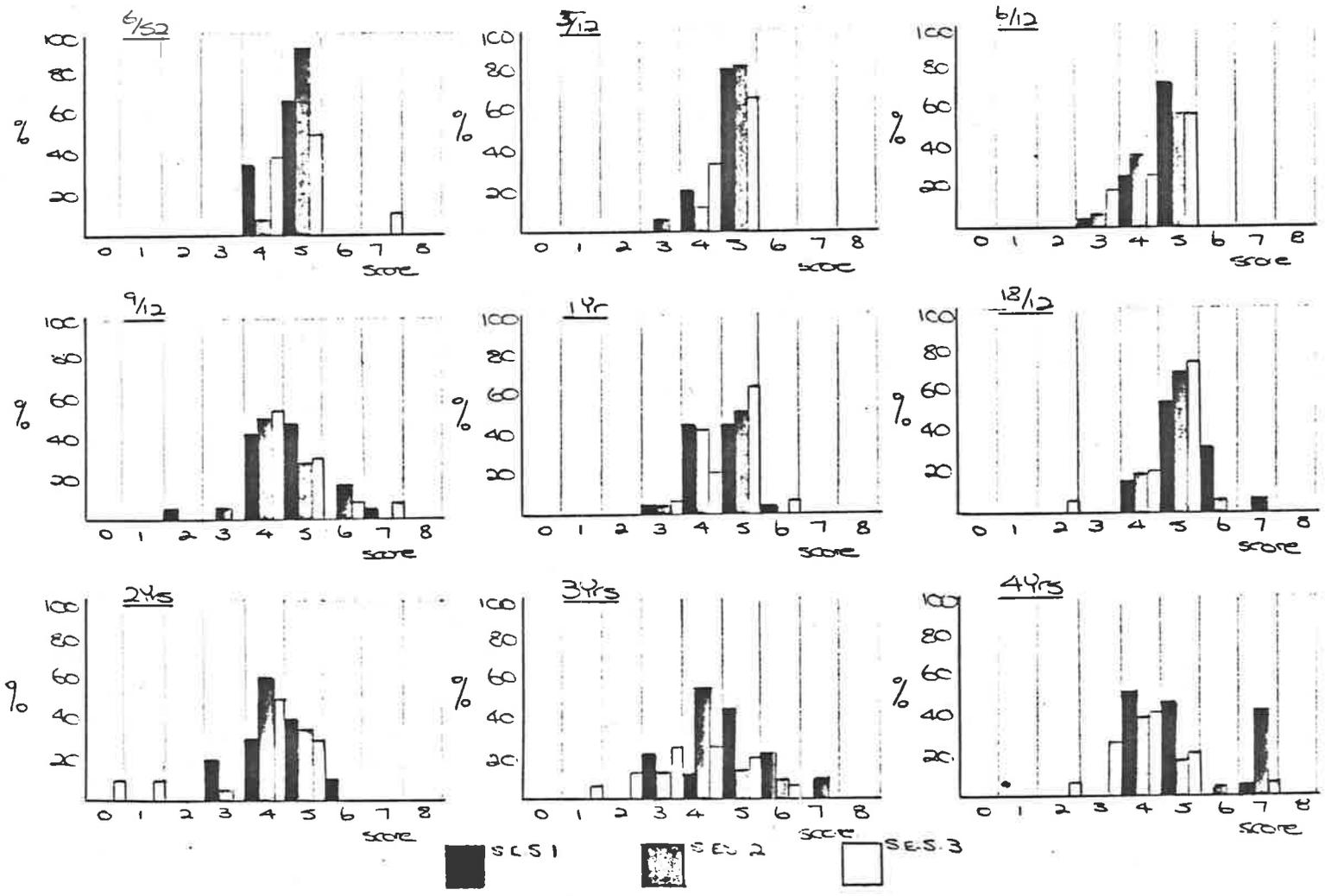
	Mean	S.D.	No.
SES I	4.6	0.8	139
SES II	4.8	0.9	184
SES III	4.4	1.1	121



HISTOGRAM OF WOODSIDE - VISION & FINE MOTOR SCORES
FOR ADELAIDE CHILDREN ACCORDING TO AGE & S.E.S.

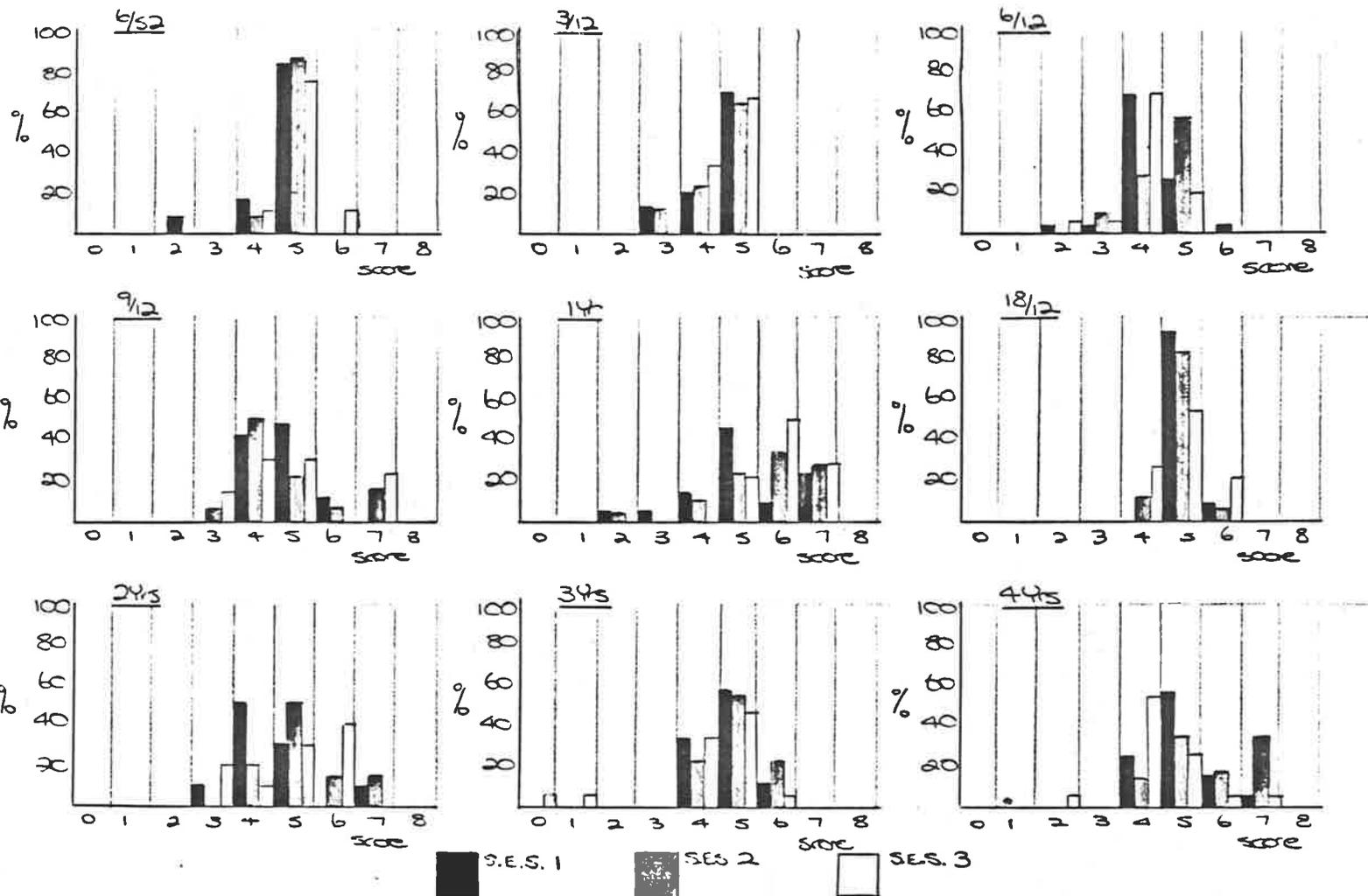
- 47 -

	Mean	S.D.	No.
SES I	4.7	0.7	139
SES II	4.7	0.9	183
SES III	4.4	1.1	121



HISTOGRAM OF WOODSIDE - GROSS MOTOR SCORES, FOR
ADELAIDE CHILDREN ACCORDING TO AGE & S.E.S.

48



	Mean	S.D.	No.
<u>SES I</u>	4.7	0.9	139
<u>SES II</u>	5.1	1.0	184
<u>SES III</u>	4.8	1.1	121

Table VIII 2 x 2 contingency table showing the number of abnormal and normal scores on the Woodside against the relevant Griffiths scores.

		<u>Griffiths</u>		
		Abnormal	Normal	
<u>Woodside</u>	Abnormal	22	5	27
	Normal	5	72	77
		27	77	124 (incl. 20 doubtful cases)

Co-positivity (Sensitivity) $\frac{22}{27} = 0.81$

Co-negativity (Specificity) $\frac{72}{77} = 0.94$

Over referrals = $\frac{5}{124} = 4\%$ or $\frac{5}{104} = 4.8\%$ (excluding the doubtful cases)

Under referrals = $\frac{5}{124} = 4\%$ or $\frac{5}{104} = 4.8\%$ (excluding the doubtful cases)

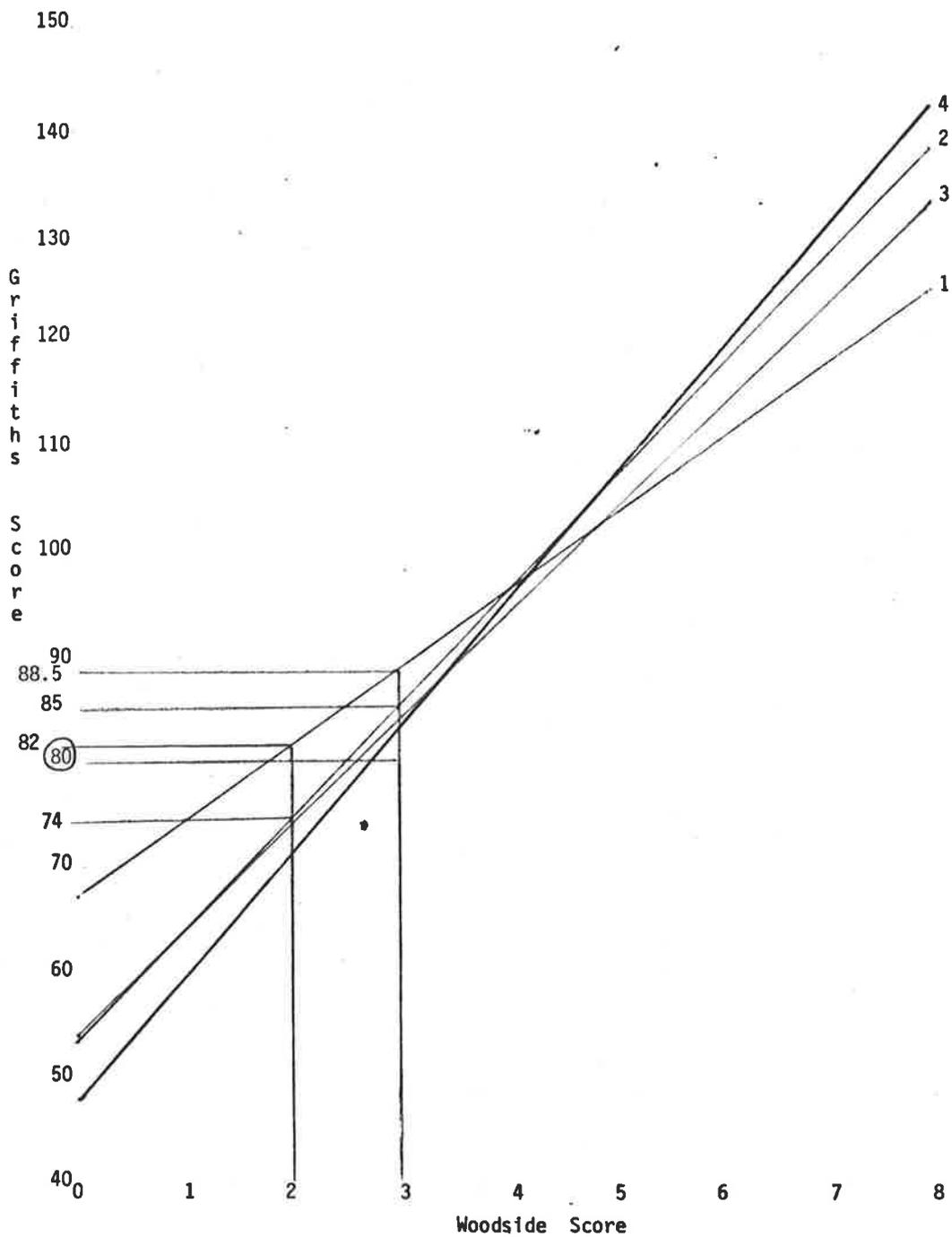
There were 20 doubtful cases, and these are dealt with separately and discussed in Chapter VII.

Key: Griffiths: "Normal" = score of 80 and above, in the relevant area
 "Abnormal" = " " 79 and below, " " " "

Woodside: "Normal" = score on the 'step' or above (i.e. a score of 4 or more) in all four areas of development.
 "Abnormal" = score on the dotted line or below (i.e. a score of 2 or less) in any one area or score of 3 in two or more areas. (see Chapter III for details on scoring).

Figure VI

REGRESSION LINES FOR WOODSIDE SCORES OF 1. SOCIAL, 2. VISION
& FINE MOTOR, 3. SPEECH & HEARING, 4. GROSS MOTOR



The term "sensitivity" is the word used to describe the accuracy of a test in identifying all of the diseased subjects in the population under study, while "specificity" describes the accuracy of a test in identifying all of the non-diseased subjects in the population under study. The terms "co-positivity" and "co-negativity" are used here instead of "sensitivity" and "specificity" respectively since the latter terms apply only to a full diagnostic assessment encompassing all aspects of child development whilst co-positivity and co-negativity relate directly to relevant areas of the criterion test. Bucks (1965)

The Regression Lines for the four areas of the Woodside plotted against Griffiths scores are shown in Fig.VI. The four lines represent (1) Social Development; (2) Hearing & Language; (3) Vision & Fine Motor and (4) Gross Motor. For the Woodside score of 2, the corresponding Griffiths scores (criterion test) was 74 or less in 3 of the 4 areas with the exception being the area of social development, where the relevant Griffiths score was 82. It is reasonable, therefore, to suggest that a Woodside score of 2 would be an acceptable "cut-off" point, as the corresponding Griffiths score of 74 is just over 2 S.D. from the mean. (Fig.VI). Thus a Woodside score of 2 is categorized as "abnormal".

For a Woodside score of 3, the corresponding Griffiths score was 85 or less in 3 of the 4 areas, with the exception being the area of social development where the Griffiths score was 88.5. A Woodside score of 3 is classified as "doubtful": it corresponds with a Griffiths score approximately 1 S.D. from the mean.

4.4 The number of children with a Woodside score of 4 or 5 or more, in the different age groups and in the 4 areas of development, are shown in Table IX. A score of 4 or 5 signifies that the child has obtained scores on the Woodside appropriate for his/her chronological age.

Table IX. Percentage of Children Scoring 4 or 5
or more (i.e. at or above their age level) on
the Four Areas of the Woodside

Age	n	Social %	Hearing & Language %	Vision & Fine Motor %	Gross Motor %
6/52	27	96 (96+0)	100 (100+0)	96 (96+0)	93 (93+0)
3/12	48	100 (100+0)	96 (96+0)	98 (98+0)	92 (92+0)
6/12	68	96 (87+9)	99 (97+2)	88 (88+0)	90 (88+2)
9/12	50	98 (98+0)	98 (98+0)	92 (84+8)	88 (76+12)
12/12	57	97 (95+2)	89 (89+0)	95 (91+4)	94 (40+54)
18/12	44	98 (77+21)	94 (89+5)	95 (84+11)	98 (89+9)
2	40	88 (68+20)	88 (80+8)	88 (85+3)	93 (65+28)
3	46	94 (48+46)	82 (52+30)	74 (52+15)	96 (80+16)
4	64	97 (88+9)	99 (77+22)	92 (69+23)	86 (67+19)

Of the two figures in parenthesis, the first is the percentage of children scoring 4 or 5 (i.e. at their age level), and the second is the percentage of children scoring more than 5 (i.e. above their age level).

Of the children aged 12 months, although only 40% scored at their age level in the Gross Motor area, a further 54% scored above their age level. The fact that Australian children achieve Gross Motor skills earlier than their Scottish counterparts may reflect a greater availability of both indoor and outdoor play areas and facilities. Therefore, in the Gross Motor area Australian children must be scored more strictly than their Scottish counterparts. "Doubtful" cases should probably be considered as "abnormal".

Of the children aged 2 years, 68% and 65% scored at their age level in the areas of Social and Gross Motor development respectively. An extra 20% and 28% respectively scored above their age level. This would indicate that these 2 areas must be scored cautiously for Australian children. Those assessed as "doubtful" in the social area should be followed-up more closely, and those assessed as "doubtful" in the gross motor area should be deemed "abnormal". In general, the social area of the Woodside was performed well by the Australian 2 year-olds. However, one item (item 6, Woodside/Social - "Dry by day") was only passed by 40%. Perhaps the environment played a part with poor weather and limited living space being incentives for mothers to teach/train their children early. It is suggested that this item should be replaced by an item like "Follows mother during domestic chores and imitates" (from M. Sheridan's Stycar sequences).

Of the children aged 3 years, 46% scored higher than their age level in the Social area, and 30% scored higher than their age level in Language area. In the area of Eye/Hand co-ordination, the scoring was variable with 15% scoring higher than their age level, and 20% scoring lower than their age level. The assessment of 3 year-old children on the Woodside must therefore be treated cautiously. These inconsistencies are also reflected in the number of 3 year-olds, who were classified as "doubtful" (see Table X). These 3 year-olds were all classified as "doubtful" in the Eye/Hand co-ordination area, and further diagnostic follow-up showed the ability of these children in that area to fall into the "abnormal" range.

Table X. Distribution of "Doubtful" Children
According to Age Group

<u>Age Group:</u>	<u>6/52</u>	<u>3/12</u>	<u>6/12</u>	<u>9/12</u>	<u>12/12</u>	<u>18/12</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>n</u> :	27	48	68	50	57	44	40	46	64
<u>'Doubtfuls':</u>	nil	3	3	1	4	nil	2	5	2
<u>% of n</u> :	nil	6%	4%	2%	7%	nil	5%	11%	3%
<u>% of 20</u> :	nil	15%	15%	5%	20%	nil	5%	25%	10%

4.5 There were 17 "handicapped" children from a "Spastic Centre" also included in this study for comparative purposes. 13 of the children had a Woodside total score (the combined scores of the four areas of the Woodside) of 0, with corresponding Griffiths-mean G.Q. score being less than 50. The other

4 children had total scores of 11, 7, 3 and 2, with the corresponding Griffiths-mean G.Q. score being 71, 78, 63 and 50 respectively. The mean score for the 17 children on the Griffiths-General quotient (G.Q.) was 42 (S.D. = 20).

5. HOME

5.1 The scores obtained showing the HOME Inventory with children in the 0-3 year-old age group are presented together with those from Caldwell's original study and Ramey's study.

(Table XI)

Table XI. HOME Subsection scores for children aged 0 to 3 years in 3 separate studies

	<u>Present Study</u>		<u>Caldwell</u>		<u>Ramey et al.</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
1. Emotional & Verbal responsiveness of Mother	9.1	1.8	8.5	2.1	8.7	1.0
2. Avoidance of Restriction & Punishment	7.2	0.8	5.6	1.7	6.7	0.7
3. Organization of Physical Environment	5.1	0.9	4.8	1.1	5.6	0.6
4. Provision of Appropriate Play Materials	7.4	1.7	6.0	2.4	7.6	1.6
5. Maternal Involvement with Child	5.1	1.2	3.5	1.6	5.7	1.0
6. Opportunities for Variety in Daily Stimulation	3.5	1.1	2.8	1.3	3.5	1.1
TOTAL	37.4	5.0	31.2	7.3	37.8	- (not presented)
	n = 313		n = 174		n = 30	

5.2 Children in the 3-6 year-old age group are presented together with Caldwell's study for 3 and 4 year-olds. (Table XII.)

Table XII HOME (3-6 years) Subsection scores for 3-6
year-old children in 3 separate studies

	3 & 4 yr olds Present Study		3 yr olds Caldwell		4 yr olds Caldwall	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
1. Toys, Games & Materials	8.8	1.6	6.6	3.5	6.0	3.6
2. Language Stimulation	6.5	0.7	6.0	1.4	6.1	1.0
3. Physical Environment	6.8	0.6	5.4	2.1	5.6	1.4
4. Pride, Affection & Warmth	5.1	1.2	5.1	1.9	5.6	1.6
5. Stimulation of Academic Behaviour	4.0	0.9	3.3	1.3	3.9	1.2
6. Modelling Social Maturity	3.6	0.9	2.4	1.3	2.7	1.4
7. Variety of Stimulation	6.5	1.4	7.9	2.0	8.0	2.3
8. Physical Punishment	3.4	0.7	3.2	1.0	3.4	1.1
TOTAL	44.7	4.9	37.5	10.4	42.0	10.0

5.3 Correlation studies of the HOME scores with Mental Indices are presented for this study and Caldwell's in Table XIII for children in the 0-3 years age group, and in Table XIV for children in the 3-6 years age group. Mental Indices were assessed in the present study using the Griffiths test, and in Caldwell's study using the Stanford-Binet test.

Table XIII Correlation between HOME subsection scores and Mental Indices in the present study and in Caldwell's study for children in the 0-3 age group

HOME	Present Study (Griffiths)	Caldwell (Stanford-Binet)
	r	r
1. Emotional & Verbal Responsivity of Motor	0.12	.01
2. Avoidance of Restriction & Punishment	-0.03	.01
3. Organization of Physical & Temporal Environment	-0.01	.22*
4. Provision of Appropriate Play Materials	-0.04	.15
5. Maternal Involvement with Child	0.10	.06
6. Opportunities for Variety in Daily Stimulation	0.00	.20*
	<hr/>	<hr/>
TOTAL	.06	.14
	n = 87	n = 174

p < 0.05*

In this study, correlations between Mental Indices (Griffiths) and stimulating factors in the environment (HOME) did not reach statistical significance for the 0-3 years group. Moreover, there was a negative correlation in some of the sub-scales, indicating advanced mental ability (as measured by Griffiths) associated with a decrease in amount of stimulation (as measured by HOME).

In Caldwell's study there was a significant though low correlation between Mental Indices and the HOME sub-scales of "Organization of Physical & Temporal Environment", and "Opportunities for variety in Daily Stimulation".

Table XIV Correlation between HOME subsection scores and Mental Indices in the present study and in Caldwell's Study for children in the 3-6 years age group

HOME	Present Study (Griffiths) r	Caldwell (Stanford-Binet) r	Adelaide (McCarthy) r
1. Toys, Games & Materials	0.28	0.55***	0.56***
2. Language Stimulation	0.33	0.40**	0.61***
3. Physical Environment	0.22	0.22	0.42***
4. Pride, Affection & Warmth	0.14	0.27	0.30**
5. Stimulation of Academic Behaviour	0.31	0.47***	0.32**
6. Modelling Social Maturity	0.21	0.21	0.38**
7. Variety of Stimulation	0.07	0.51**	0.53***
8. Physical Punishment	0.36	0.08	0.23*
TOTAL	0.46*	0.58***	0.59***
	n = 21	n = 51	n = 59

p < 0.05 *

p < 0.01 **

p < 0.001***

In the present study, the correlation between HOME scores and Mental Indices for children in the 3-6 years age group, reached statistical significance only in the total overall

correlation ($p < 0.05$). This may have been due to the small total numbers studied: 2, 5 and 8, were approaching significance at the $p < 0.05$ level. However, in similar studies shown in Table XI with larger numbers of children, there was a stronger correlation between HOME scores and Mental Indices. (The author was a co-participant in the 'Adelaide' study). It is perhaps worthy of note that in the HOME subsection of "language stimulation" and the "total score", the correlation was consistently high in all the 3 studies.

6. Carey - Infant Temperament Scale (I.T.S.)

6.1 Carey's I.T.S. was used only with children aged 6 months.

The practical implications in Carey's scoring are:-

1. Activity : an increase score denotes a less active infant.
2. Rhythmicity: an increase score denotes an irregular infant.
3. Adaptability: an increase score denotes a less adaptable infant.
4. Approach: an increase score denotes a less approachable infant.
5. Threshold: an increase score denotes a less aware infant.
6. Intensity: an increase score denotes a more placid infant.
7. Mood: an increase score denotes a fussy infant.
8. Distractibility: an increase score denotes a less distractible infant.

9. Persistence: an increase score denotes a less persistent infant.

The mean scores and S.D. obtained in this study and in 2 studies by Carey, are presented in Table XV. According to Carey's original study, the average infant of 4-8 months is active, regular, adaptable, high to initial approach, low in threshold, mild, predominantly positive in mood, distractable and persistent.

Table XV. Infant Temperament Scale (Carey): Mean Subsection Scores

<u>Carey I.T.S.</u>	<u>Present Study</u>		<u>Carey I</u>		<u>Carey II</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
1) Activity	.55	.29	.52	.32	.49	.31
2) Rhythmicity	.59	.39	.53	.46	.55	.47
3) Adaptability	.27	.23	.35	.21	.34	.26
4) Approach	.47	.29	.48	.35	.47	.33
5) Threshold	1.03	.40	1.08	.39	1.09	.38
6) Intensity	1.12	.28	1.05	.32	1.06	.31
7) Mood	.39	.21	.40	.25	.41	.23
8) Distractibility	.34	.32	.57	.32	.54	.31
9) Persistence	.81	.37	.69	.38	.71	.41
	n = 61		n = 100		n = 200	

The mean and S.D's. of the 3 studies appear to be comparable, and any variations are within 1 S.D. of the mean.

6.2 The scoring for "very difficult" and "slightly to moderately difficult" infants according to Carey's criteria is shown in Table XVI. Carey uses subsections 2, 3, 4, 6 & 7 to identify "difficult" infants. In subsections 2, 3, 4 & 7, the higher the score, the more "difficult" the infant. In subsection 6, the lower the score, the more "difficult" the infant.

Table XVI. Infant Temperament Scale (Carey): Mean Scores and Scores for "difficult" Babies (see text)

Category	Mean \pm SD	FOR SCORING QUESTIONNAIRE	
		Slightly to moderately difficult	Very difficult
Activity	0.49 \pm 0.31		
Rhythmicity	0.55 \pm 0.47	0.56-1.02	1.03-2.00
Adaptability	0.34 \pm 0.26	0.35-0.59	0.60-2.00
Approach	0.47 \pm 0.33	0.47-0.79	0.80-2.00
Threshold	1.09 \pm 0.38		
Intensity	1.06 \pm 0.31	0.76-1.05	0.00-0.75
Mood	0.41 \pm 0.23	0.41-0.63	0.64-2.00
Distractibility	0.54 \pm 0.31		
Persistence	0.71 \pm 0.41		

* From Carey, William B.: Measuring infant temperament, J. Pediatr. 81:414, 1972.

"Slightly to Moderately difficult" infants are categorized as those infants scoring up to 1 S.D. from the mean in 2 or more of these 5 subsections. "Very difficult" infants are categorized as those infants whose scores are greater than 1 S.D. from the mean in 2 or more of the 5 subsections.

Using these criteria, the present study included 3 "very difficult" and 3 "slightly to moderately difficult" infants. There were 55 "easy" infants. Thus 5% of six-months-old infants were assessed as "very difficult" compared with 8% in Carey's Study. (Carey, 1970). Of the 3 children classified as "difficult" in this study, all had satisfactory HOME scores. Mother's direct report identified only 1 child out of the 3 "difficult" children. This same child was also classified as "abnormal" on the Woodside Screening and the Griffith criterion tests.

6.3 The correlations between Carey's Infant Temperament Scores and Mental Indices (using Griffiths-G.Q. scores) are shown in Table XVII. The negative correlation denotes increased mental ability associated with an infant whose temperament is active, regular, adaptable, approachable, more aware, intense, happy, distractable and persistent. The Carey subsection score for "mood" had a significant correlation with the Griffiths (G.Q.) score. The 8 other subsections did not reach statistical significance.

Table XVII Correlation between temperament (using Carey's I.T.S. scores) and Mental Indices (using Griffiths (G.Q.) Scores)

<u>CAREY'S I.T.S.</u>	Mental Indices Griffiths (G.Q.)	n = 15
	r	
1) Activity	- .23	
2) Rhythmicity	- .11	
3) Adaptability	- .23	
4) Approach	- .34	
5) Threshold	- .14	
6) Intensity	- .28	
7) Mood	- .51*	
8) Distractibility	- .27	
9) Persistence	- .00	

* p < 0.05

6.4 The Carey's Infant Temperament Scores were also correlated with the HOME scores of the environment. (See Table XVIII).

Table XVIII

<u>CAREY</u>	<u>HOME</u>						Total
	Emotional & Verbal Respons.	Avoidance of Restrict. & Punishment	Organiz. of Phy. & Temp. Env.	Prov. of Approp. Play Mat.	Maternal invol. with child	Oppor. for Variety of Stim.	
	r	r	r	r	r	r	r
1. Activity	.30**	.25*	-.05	.30**	.14	.22	.32**
2. Rhythmicity	.06	-.07	-.20	-.20	-.12	-.11	-.13
3. Adaptability	-.06	-.29*	-.04	.18	-.01	.12	-.00
4. Approach	.14	-.10	-.26*	.04	.08	.10	.04
5. Threshold	.17	-.01	.07	.14	.14	.14	.14
6. Intensity	.13	.11	.07	-.10	-.19	.04	.06
7. Mood	-.01	-.04	-.28*	.21	.03	-.21	.04
8. Distractibility	.25*	.12	.11	.20	.13	.04	.28*
9. Persistence	.28*	.08	.14	.09	.15	.06	.18

* p < 0.05

** p < 0.01

n = 60

Further comments can be made on each of Carey's subsections:-

- Carey 1) Activity. There was a significant correlation between less active infants and the HOME areas of "emotional & verbal responsivity", ($p < 0.01$), "avoidance of restrictions and punishment" ($p < 0.01$), "provision of appropriate play material", ($p < 0.01$), and "total" HOME stimulation, ($p < 0.01$). That is, in general, a high degree of home stimulation tends to be associated with infants who are less active. (See page 82).
- Carey 2) Rhythmicity. The negative correlation imply that home stimulation is associated with infants who are regular in their habits and therefore more predictable. The correlation did not however reach statistical significance for any of the subsections of HOME.
- Carey 3) Adaptibility. The "avoidance of restriction and punishment" as assessed by HOME was associated with infants who were more adaptable, ($p < 0.05$).
- Carey 4) Approach. The HOME subsection of "organization of physical and temporal environment" was significantly associated with infants who were easier to approach, ($p < 0.05$).
- Carey 5) Threshold. Positive correlations imply an association in HOME stimulation and infants who are more aware of their surroundings. Statistical significance was not reached for any of the HOME subsections.

Carey 6) Intensity. The findings in this temperament subsection were variable. An increase in verbal stimulation was associated with a more placid child, whilst increase play material and maternal involvement was associated with a more intense infant (negative correlation). Statistical significance was not reached in any of the subsections.

Carey 7) Mood. An increase in the HOME subsection of "organization of physical and temporal environment" was associated with happy infants with "positive moods", ($p < 0.05$).

Carey 8) Distractibility. Increases in "emotional and verbal responsivity" and of the HOME total score were associated with infants who were less easily distracted, ($p < 0.05$).

Carey 9) Persistence. An increase in "emotional and verbal responsivity" was associated with infants who were of a less persistent temperament, ($p < 0.05$).

6.5 Table XIX shows the Carey I.T.S. mean scores and S.D. for the three Socio-economic groupings. Statistical significance, ($p < 0.05$) was reached in only two subsections, which were "adaptability" and "intensity" for SES I and SES III. In general, the temperament of infants in the lowest SES group (SES III) tended to be more active, less regular, less adaptable, less approachable, less aware, more intense, more fussy, less distractable and less persistent as compared with the infants in the highest SES group (SES I).

Table XIX Means & S.D. for Carey's I.T.S. listed
according to S.E.S.

		<u>MEAN</u>	<u>S.D.</u>	<u>NOS.</u>
1. Activity	SES I	.65	.34	21
	SES II	.50	.24	26
	SES III	.50	.26	14
2. Rythm	SES I	.53	.37	21
	SES II	.57	.38	26
	SES III	.71	.46	14
3. Adaptability	SES I	.21*	.20	21
	SES II	.27	.24	26
	SES III	.38*	.24	14
4. Approachability	SES I	.44	.25	21
	SES II	.44	.28	26
	SES III	.57	.36	14
5. Threshold	SES I	.93	.36	21
	SES II	1.04	.40	26
	SES III	1.15	.44	14
6. Intensity	SES I	1.24*	.32	21
	SES II	1.13	.23	26
	SES III	.94*	.22	14
7. Mood	SES I	.37	.24	21
	SES II	.39	.19	26
	SES III	.42	.22	14
8. Distractability	SES I	.34	.17	21
	SES II	.32	.24	26
	SES III	.36	.26	14
9. Persistence	SES I	.73	.30	21
	SES II	.87	.41	26
	SES III	.81	.38	14

* P < 0.05

7. Socio-economic Status (S.E.S.)

7.1 In Table XX the numbers of children classified as "normal", "doubtful" and "abnormal" by the Woodside screen are listed according to S.E.S. groups.

Table XX Classification of Children identified from the Woodside Screen according to S.E.S.

	<u>WOODSIDE</u>		
	<u>"Normal"</u>	<u>"Doubtful"</u>	<u>"Abnormal"</u>
S.E.S. I	128	3	8
S.E.S. II	169	10	5
S.E.S. III	100	7	14*
TOTAL	397	20	27

n = 444

* In S.E.S. III (the lowest SES group) there were 14 children classified as "abnormal" on the Woodside. Statistically, this is twice the number than would be expected by chance, at the probability level of 0.05.

7.2 The correlation between the HOME scores and the three S.E.S. groupings is shown in Table XXI for children in the 0-3 year-old group, and in Table XXII for children in the 3-6 year-old group.

The correlation is negative since a high S.E.S. is classified as I, and a low S.E.S. is classified as III. In general, the higher the S.E.S., the greater the home stimulation.

Table XXI Correlation between Home Scores and S.E.S.
Groups, for Children in the 0-3 years Age Group

		<u>S.E.S.</u>
		r
HOME	1. Emotional and Verbal Responsivity	- .14
	2. Avoidance of Restriction & Punishment	- .13
	3. Organization of Phys. & Temp. Envir.	- .09
	4. Prov. of Approp. Play Material	- .21**
	5. Maternal involmnt. with Child	- .22**
	6. Opportunity for Variety of Stim.	- .09
TOTAL		- .24

n = 313

p < 0.01**

Table XXII Correlation between Home Scores with S.E.S.
Group for Children in the 3-6 Years Age Group

		<u>S.E.S.</u>
		r
HOME	1. Stimulation through Toys, Games & Reading Materials	- .37***
	2. Language Stimulation	- .12**
	3. Physical Environment: Safe, Clean and conducive to Development	- .08
	4. Pride, Affection and Warmth	- .16
	5. Stimulation of Academic Behaviour	- .27**
	6. Modelling and Encouragement of Social Maturity	- .12
	7. Variety of Stimulation	- .41***
	8. Physical Punishment	- .17
TOTAL		- .23*

n = 97

p < 0.05*

p < 0.01**

p < 0.001***

In the 0-3 years age group, there was a significant relationship between S.E.S. and the HOME subsections of: "provision of appropriate play material", "maternal involvement with child" and "total" home stimulation.

In the 3-6 years age group, there was a significant relationship between S.E.S. and HOME subsections of: "stimulation through toys", etc., "language stimulation", "stimulation of academic behaviour", "variety of stimulation" and "total" home stimulation.

7.3 Correlations between S.E.S. group and Mental Indices (Griffiths - General quotient) in the 0-3 year-old age group and the 3-4 year-old age group are:

S.E.S. vs. Griffiths (0-3): $r = 0.25$ ($n = 94$) $p < 0.05$

S.E.S. vs. Griffiths (3-6): $r = 0.25$ ($n = 28$) - not significant

In the 0-3 age group, it is interesting to note the positive correlation, and the association of higher mental scores with the lowest S.E.S. group significant at $p < 0.05$. In the 3-6 age group the correlation was negative, and higher mental scores were associated with higher S.E.S. However, this later correlation did not reach statistical significance. This finding would appear to support the discussion by Frankenburg (1975) where he found that children in the low S.E.S. group before the age of 1½-2 years were more advanced in development than their peers in the higher S.E.S. groups. Furthermore, Frankenburg found that after 2 years the higher S.E.S. group caught up and surpassed

the lower S.E.S. group.

- 7.4 The means and S.D. for the HOME scores according to S.E.S. are presented in Table XXIII for the 0-3 year-old children and in Table XXIV for the 3-6 year-old children. There is a tendency for more stimulation (as measured by HOME scores) to be given in the highest S.E.S. group compared to the lowest S.E.S. group.
- 7.5 A one-way analysis of variance for S.E.S. on HOME scores is presented in Table XXV for 0-3 year-old children, and in Table XXVI for 3-6 year-old children. The analysis confirmed that children in the high S.E.S. group have a more stimulating home environment than children in lower S.E.S. group. This result is supported by a study by Ramey et al (1975) and by another Adelaide study by Eu & O'Neill(1981/82), the relevant data of which is presented in Table XXVII.

Table XXIII

HOME scores in the three S.E.S. Groups -
for children in the 0-3 years age group

<u>HOME - Subsections</u>	<u>S.E.S. I</u>			<u>S.E.S. II</u>			<u>S.E.S. III</u>			<u>TOTAL</u>		
	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>
1. Emotional & Verbal Responsivity	9.63	1.66	102	8.83	1.58	127	9.01	2.10	84	9.14	1.79	313
2. Avoidance of Restriction and Punishment	7.25	.78	102	7.28	.74	127	6.96	.83	84	7.18	.79	313
3. Organization of the Physical & Temporal Environment	5.16	.86	102	5.28	.88	127	4.94	.94	84	5.15	.90	313
4. Provision of Appropriate Play Material	7.87	1.48	102	7.27	1.68	127	6.94	1.90	84	7.38	1.72	313
5. Maternal Involvement with the Child	5.44	.86	102	5.11	1.21	127	4.76	1.45	84	5.12	1.21	313
6. Opportunities for Variety in Daily Stimulation	3.52	1.25	102	3.56	.99	127	3.23	1.17	84	3.46	1.13	313
TOTAL	38.90	4.10	102	37.30	4.70	128	35.80	5.90	84	37.40	5.00	314

Table XXIV.

HOME scores in the three S.E.S. Groups -
for children in the 3-6 years age group

<u>HOME - Subsections</u>	<u>S.E.S. I</u>			<u>S.E.S. II</u>			<u>S.E.S. III</u>			<u>TOTAL</u>		
	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Nos.</u>
1. Stimulation through Toys, Games & Reading Materials	9.67	1.39	27	8.73	1.54	45	8.08	1.55	25	8.82	1.60	97
2. Language Stimulation	6.59	.69	27	6.60	.65	45	6.36	.70	25	6.54	.68	97
3. Physical Environment: safe, clean & conducive to Development	6.78	.70	27	6.96	.21	45	6.64	.91	25	6.82	.61	97
4. Pride, Affection & Warmth	5.41	.97	27	4.98	1.18	45	4.92	1.32	25	5.08	1.17	97
5. Stimulation of Academic Behaviour	4.30	.61	27	3.96	.85	45	3.64	1.11	25	3.97	.90	97
6. Modelling & Encouragement of Social Maturity	3.74	.90	27	3.56	.87	45	3.44	1.08	25	3.58	.93	97
7. Variety of Stimulation	7.37	1.24	27	6.36	1.17	45	5.80	1.58	25	6.49	1.42	97
8. Physical Punishment	3.67	.48	27	3.18	.72	45	3.86	.76	25	3.36	.70	97
TOTAL	47.5	4.00	27	44.3	4.10	45	42.20	5.70	25	44.70	4.90	97

Table XXV

Analysis of Variance for S.E.S. (I,II and III)
on HOME Scores for children aged 0-3 years

HOME 0-3 years

	F-Ratio	df.	Pairs of S.E.S. Groups		
			I/II	I/III	II/III
<u>Subsections</u>					
1) Emotional and Verbal Responsivity	6.15**	2/310	***	*	not sig.
2) Avoidance of Restriction and Punishment	4.56*	2/310	not sig.	**	**
3) Organization of Physical and Temp. Environment	3.59*	2/310	not sig.	not sig.	**
4) Provision of Appropriate Play Material	7.52**	2/310	**	***	**
5) Maternal involvement with Child	7.59**	2/310	not sig.	***	not sig.
6) Opportunity for Variety of Stimulation	2.44	2/310	not sig.	not sig.	not sig.
TOTAL	9.53**	2/310	**	***	*

• *** p < 0.001

** p < 0.01

* p < 0.05

Table XXVI

Analysis of Variance for S.E.S.(I,II & III)
on HOME Scores for Children aged 3-6 years

HOME 3-6 years

<u>Subsections</u>	F-Ratio	df	Pairs of S.E.S. Groups		
			I/II	I/III	II/III
1) Stimulation through Toys, Games & Reading Materials	7.38**	2/94	*	***	Not sig.
2) Language Stimulation	2.30	2/94	Not sig.	Not sig.	Not sig.
3) Physical Environment: safe, clean & conducive to development	1.48	2/94	"	"	"
4) Pride, Affection and Warmth	1.48	2/94	"	"	"
5) Stimulation of Academic Behaviour	3.70*	2/94	"	*	"
6) Modelling & Encouragement of Social Maturity	0.69	2/94	"	Not sig.	"
7) Variety of Stimulation	9.84**	2/94	**	***	"
8) Physical Punishment	4.48**	2/94	*	Not sig.	***
TOTAL	9.02**	2/94	*	***	Not sig.

*** $p < 0.001$

** $p < 0.01$

* $p < 0.05$

Table XXVII Analysis of Variance for S.E.S.(I, II and III)
on HOME Scores (from Previous Adelaide Study)
for Children aged 3-6 years

<u>Subsections</u>	F-Ratio	df	Pairs of S.E.S. Groups		
			I/II	I/III	II/III
1) Stimulation through Toys, Games & Reading Materials	15.00***	2/265	*	*	n/s
2) Language Stimulation	8.08***	"	*	*	n/s
3) Physical Environment: safe, clean & conducive to development	5.33**	"	n/s	*	n/s
4) Pride, Affection and Warmth	4.00*	"	n/s	*	n/s
5) Stimulation of Academic Behaviour	5.74**	"	n/s	*	n/s
6) Modelling and Encouragement of Social Maturity	12.23***	"	*	*	n/s
7) Variety of Stimulation	11.08***	"	n/s	*	*
8) Physical Punishment	0.48	"	n/s	n/s	n/s

***p < 0.001

**p < 0.01

*p < 0.05

Chapter VI

FURTHER INTERPRETATION OF RESULTS

Examination for Organic Defects

The percentage of referrals for hearing (10.8%), vision (9.0%) and physical (3.3%) disabilities or defects are consistent with referral trends in 2 other Adelaide studies. Eu (1979) Johnstone (1980). The two latter studies were carried out on 4-year-old children and it is interesting to note that the referral rates for the various defects are similar to those in the present study of children aged 0-5 years.

Woodside Assessment

The highest correlations between the Woodside Screening assessment and the Griffith criterion test were in the areas of Gross Motor development ($r = 0.8$, $p < 0.001$) and Hearing and Speech development ($r = 0.7$, $p = 0.001$), and the lowest area was in the area of Social development ($r = 0.5$, $p < 0.001$). This could possibly be explained by the fact that the environments of Glasgow and Adelaide are very different. In Glasgow there is limited indoor and outdoor living and recreation space as well as a poor climate, and it is suggested that there may be greater pressure on the child to acquire acceptable social habits (e.g. "dry by day") early. The validity of the Adapted Woodside Screening System was presented in terms of normative data, reliability, correlations, sensitivity and specificity. However, in evaluating a screening test, validity is not the only consideration. Other factors, as described by Abramson (1979) must be taken into account are:-

- (1) Requisiteness, with the implication that the test in question has advantages over other already accepted tests, that the defects being screened are important, and that early intervention will make treatment easier and more effective. It is the author's belief that the adapted Woodside is easier to apply, score and interpret than other available screening tests, and that unlike many others it has now been formally validated. It is also felt that the defects screened, namely hearing, vision, articulation and mental defects, are important, and that early intervention does improve the prognosis.
- (2) Quality, which refers to validity and reliability, both of which have been presented in the preceeding chapters.
- (3) Efficiency, in terms of overall cost, sensitivity, specificity, under-referrals and over-referrals. The actual cost of the kit for applying the adapted Woodside is nominal compared to other psychological tests: only paper, pencil, rattle, a doll, and some wooden cubes are needed. It is acknowledged that there are other costs to be considered such as personnel training, follow-up and treatment. These costs should be considered if one is starting in a community without any of these facilities. However, in the Adelaide context these facilities are already available, and it is only the upgrading of the nurses' expertise which is an added factor. The actual

Woodside test takes 10 minutes to administer and score. (see pg 102 for further discussion). The sensitivity (or in this study, co-positivity) was 81% and the specificity (co-negativity) was 94%. The over-referral rate was 4% as was the under-referral rate. The percentage of over-referrals must also be considered in conjunction with the prevalence (the incidence in the community) of the particular defect being sought. If the prevalence is very low, and the percentage of over-referrals is high, then a large number of children will be referred in order to make a positive diagnosis in a few. In the present study, the incidence of developmental abnormalities was 5.0% (22 out of 444). The over-referral rate was 4.0% (5 out of 124) which should not be considered as high. For instance, if all 444 children had been fully assessed on the Griffiths, then the over-referral rate would have been 1.1% (5 out of 444), bearing in mind that the co-positivity could conceivably have been found to be less than 81%.

- (4) Satisfaction, which relates to the acceptability of the test by professionals, parents and children. It was noted that the parents, the children and the professionals all participated with interest in the present study.

- (5) Differential value, which refers to the screening test's value when used with different population groups. In the present validation of the adapted Woodside, the "standardized" values (as shown in the histograms) were drawn from a range of socio-economic levels.

Assessment of the Environment

The HOME inventory is an instrument used to reveal the presence or absence of specific environmental factors which might influence development.

The correlation between the environment as measured by the HOME and mental indices as measured by the Griffiths test, was low and in some areas negative for very young children (0-3 years age group). However, for older children (3-4 years age group) there was a significant correlation between the HOME scores and the Griffiths scores ($r = 0.5$, $p < 0.05$). A similar correlation was also seen in studies by Caldwell (1978) from Little Rock, Arkansas and by Eu (1981) from Adelaide, South Australia ($r = 0.6$, $p < 0.001$).

This phenomenon of a high correlation between development and environmental factors being found in older children (over the age of 3 years) and a poor correlation in young children (under the age of 3 years), has also been described by Caldwell and Bradley (1978).

They hypothesized that the finding could be due to:-

- (a) the variable stability of the test situation when assessing very young children, or
- (b) the fact that the environment has a cumulative influence on development, and that this influence is not in evidence until the age of 3-4 years.

A third and possibly most likely hypothesis was put forward by Lewis at the Third International Conference on "Early Identification of Children who are Developmentally 'At Risk'", September 1980. He suggested that with very young children "Mother Nature holds close to her own" and that the infant is therefore less open to environmental manipulations. He further suggested that it is only after the age of 2-3 years that modest environmental deprivation makes any impression on the child's development. With children less than 3 years of age environmental deprivation and biological assaults must be extreme before measurable developmental delays are seen.

From the findings of the three studies mentioned (the present study, Caldwell's study and the Adelaide study - Chapter V, Table XIV) it appears that the specific environmental variables which are important to the development of older children (3-6 years age group) are:-

- (a) the amount of stimulation given through appropriate play material;
- (b) language stimulation as a result of parental encouragement of the child to relate experiences, and as a result of the parents' own language content;
- (c) stimulation of academic behaviour by parental encouragement for the child to learn colours, words, numbers, etc.;
- (d) provision of a variety of stimulation such as outings, a musical instrument, the choosing of food at the supermarket, etc.

Furthermore, the total overall scores of all the eight subsections of the HOME inventory bears a consistently significant relationship with developmental indices.

Assessment of Temperament

Carey's measurement of temperament characteristics was used to ascertain whether certain types of infant temperament have an influence on the rate of development or on the level of environmental stimulation which could in turn influence the rate of development. In this study, there was a significant correlation between positive mood (happy, smiling, pleasant) and advanced development of the infant. Which is cause and which is effect is not clear. For example, if the infant's mood is pleasant, does this lead to more environmental stimulation and improved development or does the more advanced infant tend to have more amenable moods? Perhaps larger numbers of children and more controlled and sophisticated research strategies can further elicit this point.

There were also significant correlations between quiet infants and increased environmental stimulation in the areas of "emotional and verbal responsivity", "avoidance of restrictions and punishment", and "provision of appropriate play material". The popular concept that relatively active babies receive more stimulation and develop more rapidly does not appear to be, in this study. It is suggested that quietness and placidness are more attractive traits to parents, and this may be more conducive to attracting parental stimulation in play.

Socio-Economic Status (S.E.S.) in Developmental Assessment

There is an increasing consensus that the quality of the environment is better assessed by measurement of "specific environmental processes" (e.g. the amount of verbal stimulation by parent) than by the traditional S.E. Status. Bradley (1976), Elardo (1975), Marjoribank (1972), Pavenstadt (1965), Eu and O'Neill (1981/82), Ramey (1975). This is borne out by comparisons of the correlations between mental indices (Griffiths) and both S.E.S. and HOME scores. In the present study, the correlations between total HOME scores and mental indices (Griffiths) for children in the 3-6 years age group was higher ($r = 0.5$, $p < 0.05$) than the corresponding correlation between S.E.S. and mental indices (Griffiths) $r = -0.25$, statistically not significant). This finding is in accordance with a study by Elardo, Bradley and Caldwell (1975) who recorded correlations ranging from 0.4 to 0.7 between specific measures of the early home environment and mental indices (Binet) but correlations of only 0.2 to 0.4 between various S.E.S. measures and mental indices (Binet). Further in another by Eu and O'Neill (1981/82) found the correlation between HOME and mental indices (McCarthy) to be 0.6 ($p < 0.001$) while the correlation between S.E.S. and mental indices (McCarthy) was only 0.3 ($p < 0.001$).

As previously stated, the correlation between S.E.S. and mental indices (Griffiths) for children in the 3-6 years age group was low and negative ($r = -0.25$, n/s) as might be expected. For children in the 0-3 year-old age group, however, the correlation was not only low but positive ($r = 0.25$, $p < 0.05$). That is, for younger children a low S.E.S. was associated with more advanced development. Over the age of 3 years, the reverse situation was found, with more advanced development tending to be associated with a high S.E.S., although the correlation did not reach statistical significance. A study by Frankenburg et al (1975) supports this impression, while another study by Euand O'Neill (1981/82) demonstrates a statistically significant relationship, ($r = -0.33$, $p < 0.01$).

The above phenomenon of enhanced early development (in children less than 3 years of age) tending to be associated with lower S.E.S. and enhanced later development (in children older than 3 years) tending to be associated with higher S.E.S., was recognised by Bayley and Jones (1937). They hypothesized that advanced early development may be associated with a limited future development. Alternatively, it was suggested that the early development of low S.E.S. was due to their being left more often at a young age, to fend for themselves. Children from high S.E.S. were more protected and development progressed more slowly, initially. This latter hypothesis was further supported by other studies, Ericson, M.C., (1946-1947); White, M.S.(1957); Bayley, N. & Schaefer, E. (1960) and Frankenburg, et al (1975).

The number of children classified as "abnormal" on the Woodside in the lowest S.E.S. was twice that would be expected by chance (Chapter V, 7.1), and on analysis of variants, there was a statistically significant difference between the highest and lowest S.E.S. groups, favouring better stimulation in the highest S.E.S. group (Chapter V, 7.5).

Chapter VII

"SPECIAL CASES" (INDIVIDUAL DIFFERENCE)

It is of interest to consider individual instances in which the classification by the Woodside (Screening) test was not confirmed by the Griffiths (Criterion) test. There were 10 children involved in this mis-classification.

20 children who were scored as "doubtful" will also be individually considered.

Woodside - "Under-referrals" (i.e. those children who were classified as "normal" on the Woodside test, but were "abnormal" on the Griffiths (Criterion) test.

Case 050: aged 6 weeks, passed the screening test but was found to be "abnormal" in eye/hand co-ordination by the criterion test. However, at screening, this child did not pass on the vision test, and was to be followed-up in any case.

Case 124: aged 6 months, was "abnormal" on the criterion test in the Social area. However, although this child passed on the screening test, he was slow to react to sound stimuli, did not co-operate well and was on phenobarbitone for "convulsions". This child was to be closely monitored.

Case 286: aged 3 months, passed the screening test but was found to be "abnormal" on the criterion test in the Gross Motor area. This child was also found at the general physical examination to have a head circumference over the 97th percentile whilst height and weight were at the 10th percentile. This is being followed-up by the local doctor.

Case 329: aged 3 months, passed the screening test but was "abnormal" in the "performance" area of the Griffiths test. At screening, this child was reported to be slow to locate sound stimuli, and was therefore to be further assessed.

Case 361: aged 6 weeks, was "abnormal" in the eye/hand co-ordination section of the criterion test, whilst passing on the screening test. It was recorded at the time of the screening assessment that this child was "difficult to assess".

Woodside - "Over-referrals" (i.e. those children who were classified as "abnormal" on the Woodside test, but were "normal" on the Griffiths (Criterion) test.

Case 104: aged 2 years, was classified as "abnormal" on the Woodside Eye/Hand Co-ordination area, but was "normal" on the criterion test. She was referred for further follow-up because of a discrepancy in height as compared with weight and head circumference. At that assessment, the paediatrician reported that the child was "less advanced" in Fine Motor development than in the other areas, and that her level of co-operation in that area was poor.

Case 369: aged 4 years, was classified as "abnormal" in the Social area of the Woodside test, but was found to be "normal" on the criterion test. There was some doubt in this case about the interpretation of the Social item "able to dress", as the child was "able to dress" but "with some difficulty".

Case 370: aged 3 months, was "abnormal" in the Language area of the Woodside test, but "normal" on the Griffith criterion test. Although the child was classified as "normal" on the Griffiths test, he did not pass the Hearing test and was being managed by an E.N.T. specialist for suspected serous otitis media.

Case 386: aged 18 months, was misclassified as "abnormal" on the Woodside. However, the nurse recorded that the child was "tired and un-cooperative".

Case 389: aged 18 months, was scored "abnormal" on the Woodside test in the area of Social and Language development. Although this child was developmentally normal on the criterion test, she had a behaviour problem, which may have complicated the assessor's implementation of the screening test.

"Doubtful" Cases

A case was classified as "doubtful" on the Woodside when the score was 3 or less in one area, or the mark on the chart was between the "step" and the "dotted line". There were 20 such "doubtful" cases. In the clinical context, the "doubtful" cases are kept under close surveillance by a child health nurse (during her routine work) until they are re-assessed at a later date as either "normal" or "abnormal". In the present study, all "doubtfuls" were immediately further assessed on the Criterion test: they were not automatically categorized as "abnormals" as is done in some studies.

Of the 20 "doubtful" cases, 5 were classified as "normal" and 15 as "abnormals" by the Criterion test.

Details of the 5 "normals" are as follows:-

"Doubtfuls" finally termed "Normals"

<u>Age</u>	<u>Area of doubt</u>	<u>Griffiths (criterion) score - in the relevant area</u>
1. 3 mths.	Gross Motor	83
2. 6 mths.	Eye/Hand Co-ordination	83
3. 1 yr.	" " "	83
4. 4 yrs.	" " "	88
5. 4 yrs.	" " "	92

Details of the 15 "abnormals" are as follows:-

"Doubtfuls" finally termed "Abnormals"

<u>Age</u>	<u>Area of doubt</u>	<u>Griffiths (criterion) score - in relevant area</u>
1. 3 mths.	Gross Motor	66
2. 3 mths.	Language	75
3. 6 mths.	Gross Motor	75
4. 6 mths.	" "	75
5. 9 mths.	" "	73
6. 1 yr.	Social	69
7. 1 yr.	Language	73
8. 1 yr.	"	75
9. 2 yrs.	"	67
10. 2 yrs.	Eye/Hand Co-ordination	75
11. 3 yrs.	" " "	70
12. 3 yrs.	" " "	70
13. 3 yrs.	" " "	76
14. 3 yrs.	" " "	76
15. 3 yrs.	" " "	76

It would appear that the "doubtfuls" who were finally termed "normals" had scores between the low 80's and low 90's, i.e. at the lower range of "normal". The "doubtfuls" who were "abnormals" scored mainly between the high 60's and low 70's.

It is therefore recommended that the "doubtfuls" be followed-up as "doubtfuls" without a final conclusion until the child is deemed "normal" or "abnormal" on the Woodside screening test. This will minimize needless anxiety in the parents. It is a very rare occurrence for a child to continue on the "doubtful" course. However, if that did happen, then the child should be referred for a diagnostic assessment. The screening assessment would have greater sensitivity in the one area of "Gross Motor", if all the "doubtfuls" in the Gross Motor were immediately classified as "abnormals".

Chapter VIII

"NATURE & NURTURE" - THEORIES OF CHILD DEVELOPMENT

It is generally accepted that the development of a child is influenced by both heredity and the environment. Bloom (1964) put this concept in concrete but rather narrow terms and states:- "As intelligence is now measured, we believe that the equation:

$$MI = F(GP \text{ and } E)$$

is likely to account for the intelligence test scores at any age, where M.I. is measured intelligence; G.P. is genetic potential and E is the environment." F being a factor (constant). The wider term of "development" instead of "intelligence" is used in this study. Sheridan's (1975) definitions of "heredity" and "environment" is appropriate in this context. "Heredity determines the limites of each individual child's capacity to achieve optimal structural and functional maturity. Environment determines the extent to which each individual child can fulfil his potential capacity".

The different Theories of Child Development are described by Holt (1977) in his book "Developmental Paediatrics". He wrote that all of the various hypotheses lie between two extremes. At one extreme, theories prepose that all abilities are inherited and predetermined and as the nervous system matures, a predetermined pattern of development unfolds. Since "nature" or hereditary is the governing factor and the child's environment plays no part, these theories led in the past to a fatalistic or negative attitude towards child development. At the other extreme, different theories propose that the infant's brain is totally blank at birth, and

that "Nurture" and the effects of the environment are the only factors which influence development. Such hypotheses led in the past to rigorous training procedures and programmes for young children.

It is now appreciated that child development is influenced, not unexpectedly, by both "Nature" and "Nurture".

The major theories on child development to be considered and discussed will be along the lines as presented in "Developmental Psychology Today" (1975) R. Schell (Editor).

The five main theories of child development and their main proponents are:-

- (1) The Biological or Genetic Theory (Gesell)
- (2) The Cognitive/Evolved-Primate Theory (Piaget)
- (3) Psychoanalytic or psychodynamic Theory (Freud/Eriksen)
- (4) Learned Behaviour Theory (Skinner)
- (5) Ethological Theory (Barnett)

1. The Biological Theory

This theory was strongly supported by A. Gesell (1920's) who was both a child psychologist and a paediatrician. R. Illingworth (1950), M. Sheridan (1960) and R. MacKeith (1960) also had a tendency towards the Biological Theory.

According to the theory, the development of a child is essentially dependent on the maturation of the Central Nervous System, which was

itself genetically predetermined. For example, in the development of gross motor function it was considered that development was cephalocaudal; with muscular control progressing from coarse movements of the head, body and legs to finer movements of the fingers and hands.

The emphasis is on the maturation of the Central Nervous System. Lack of environmental stimulation does not prevent this maturation, and teaching and practice do not hasten the appearance of the response. Environment is therefore not important. Workers who believed in this theory, absolutely, adopted a negative attitude to child development. For many years the application of the theory was popular with medical clinician, who used these predetermined "milestones" to help in developmental diagnosis.

2. The Cognitive or Evolved-Primate Theory

The father of this theory was J. Piaget (1920's), a Swiss Zoologist and later psychologist. Other workers with similar theories were J. Bruner (1960's), and N. Chomsky (1970).

According to this theory the child adapts to his/her environment, and in doing so, develops a balance between "assimilation" and "accommodation". "Assimilation" has been defined as the "absorbing and organizing experiences around existing activity patterns", and "accommodation" is the "modifying of existing patterns to allow incorporation of new knowledge" - Developmental Psychology Today. 1975, Schell (Ed.).

The phases of development in relation to this Theory are:-

- (1) "Sensorimotor stage" - up to 2 years.
- (2) "Stage of concrete operation" - from 2 to 12 years.
- (3) "Stage of formal operation" - from 12 years onwards.

The Theory focuses on cognitive structure thinking processes. It was mainly used by teachers and other educationalists for assessing intelligence, communication and problem-solving ability.

3. The Psychoanalytical or Psychodynamic Theory

This Theory was initiated by S. Freud (1910's) but E. Erikson (1960's) expounded it further, especially as regards the individual and also in the context of the family. H. Sullivan (1950's) worked on similar lines.

This Theory views development in terms of interaction with others; of "man's struggle to cope, to master and to overcome", Maier (1965). Freud presented psychosexual developmental stages, and Erikson presented a sequence of biological, psychological and social events. Erikson commented, "the developing child needs society, and society needs him."

The phases of development according to Erikson are:-

- I. Sense of Basic Trust vs. Basic Mistrust (Infancy) - A realization of Hope.
- II. Sense of Basic Autonomy vs. Doubt & Shame (Early Childhood) - A realization of Will.
- III. Sense of Basic Initiative vs. Guilt (Preschool) - A realization of Purpose.

- IV. Sense of Basic Industry vs. Inferiority (School) - A realization of Competence.
- V. Sense of Basic Identity vs. Identity Diffusion (Adolescence) - A realization of Fidelity.
- VI. Sense of Basic Intimacy vs. Isolation (Young Adult) - A realization of Love.
- VII. Sense of Basic Generativity vs. Self Absorption (Adult) - A realization of Care.
- VIII. Sense of Basic Integrity vs. Disgust/Despair (Mature Adult) - A realization of Wisdom.

The Theory suggests that growth and development arise out of interaction between the individual's needs and the demands of society.

It relates to everyday life and is widely applied. In particular, this theory is helpful for assessing parent/child relationship and in psychiatry and in psychotherapy.

4. Learned Behaviour Theory

B. Skinner (1930's), A. Bandura (1960's), R. Sears (1960's), T. Risley (1970's) were proponents of this Theory.

According to the Theory the environment has a great influence on behaviour, and perhaps is the main influence.

Precise environmental conditions are considered to determine behaviour, while inherited motivational characteristics have little effect.

The Theory is useful in designing more effective learning environments and in understanding self-control and "behaviour modification" therapy.

5. Ethological Theory

S.Barnett (1960's) and N.Blurton Jones (1970's) were supporters of the Ethological Theory - "the scientific study of animal behaviour".

According to this Theory, inbuilt reflex activities and instincts are of primary importance. This potential for development is heightened at certain "sensitive" periods during which environmental factors, or lack of these factors, can markedly influence development. This Theory also describes "critical" periods beyond which the potential for development can be lost permanently.

This Theory is used by physiotherapist and clinicians to facilitate the understanding of play for learning. It is also used as an aid in the early diagnosis of motor dysfunction.

To date, there is no complete theory which encompasses and explains all aspects of child development. Depending on which parameter of development is being considered, one theory will be more applicable and useful than the other. For example, when considering Gross Motor development, Gesell's thoughts are valuable. When considering cognitive development, Piaget's thoughts are more relevant, while for personality development, then Erikson's thoughts are the most appropriate.

Hypotheses range from concepts based mainly on hereditary factors as in the "Biological Theory" to concepts based mainly on environmental factors as in the "Learned Behaviour Theory". The Biological and Cognitive Theories tend to justify the screening of the individual, while the Psychodynamic and Learned Behaviour Theory tend to justify the screening of the child's home environment. In truth, child development is extremely complex and it would appear that the concepts involved in all of the theories are closely intertwined.

Screening of child development constitutes an attempt to use simple procedures to assess a complex issue. Nevertheless, if screening instruments are properly validated and administered skilfully, then screening for development is both possible and worthwhile.

Chapter IX

SUITABILITY OF A "DISEASE" FOR SCREENING

The preceding chapters have mainly been concerned with the standardization and validation of a screening instrument. In general, screening instruments are used to identify particular defects or "diseases" within the community, and, it is probably useful at this juncture to consider the criteria used to determine which diseases are suitable for screening. However, the main purpose of this study is to validate a screening method. Whether developmental screening itself is justified remains to be further debated. It is the intention in this chapter to present developmental screening in perspective and in the Adelaide context.

Table XXVIII, giving the conditions recommended for screening is presented based on W.K. Frankenburg's chapter "Principles in Selecting Diseases for Screening" from the comprehensive textbook on "Pediatric Screening Tests" (1975) Ed. W.K. Frankenburg and B.W. Camp.

Table XXVIII

Conditions currently recommended for
Screening Programs

Hearing	Phenylketonuria
Vision	Maple Syrup Urine Disease
Speech	Hypercholesterolemia
Language	Hyperlipoproteinemia
Development	Wilson's Disease
School Readiness	Galactosemia
Lead Poisoning	Hereditary Angioneurotic Edema
Anemia	Cretinism
Sex Chromosome Abnormalities	Mellituria
Congenital Dislocation of Hip	Succinylcholinesterase Deficiency
Rheumatic Heart Disease	Glucose-6-Phosphate Dehydrogenase Deficiency
Inguinal Hernia	Gargoylism
Congenital Heart Disease	Tay-Sachs Disease
Dental Problems	Learning Disorders
Apgar	
Bacteriuria	
Tuberculosis	
Venereal Disease	
Color Blindness	

From "Pediatric Screening Tests" - Ed.W.K. Frankenburg and
B.W. Camp, 1975, C.Thomas. Pub.

The "disease" or "condition" that is being considered in this paper is "developmental delay". Developmental delay is not a single condition but encompasses the development of the sensory processes (hearing and vision) as well as gross motor development, language development, fine motor and eye/hand co-ordination, social/emotional development and cognitive development.

The 10 criteria used for selecting a "condition" suitable for screening (adapted from W.K. Frankenburg 1975) are:-

1. The condition should be serious or potentially so.

The condition should have some impact on the community. The seriousness can be equated to cost or to the short and longer term effects the condition has on a person.

Developmental delay may result in a child not reaching his/her full potential, and may lead to the child being "handicapped" throughout life

2. Through Diagnostic Tests and Procedures it should be possible to differentiate "diseased" from borderline or "non-diseased" individuals.

If developmental delay is suspected, confirmatory diagnostic tests for impairment of hearing, vision, language, behaviour and cognitive development can be applied with a relatively high degree of certainty. However, in some of these conditions it can be difficult on the screening assessment to differentiate variations of "normal" from minor degrees of "abnormality". In this event it is acceptable practice for "doubtful" findings to remain as such until further assessments can be made over a period of time.

3. The prognosis should be improved if the "condition" is detected and treated prior to the usual time of diagnosis.

The development of the sensory processes, language and emotional/social behaviour may be improved, once a disability or delay is recognised and appropriate intervention instituted. Cognitive delay on the other hand may well not improve with instruction, though without early diagnosis and intervention various associated problems may be compounded.

4. The difference between the "lead time" and the "screening time" of the condition being sought, should be appreciable.

The "screening time" is the period between the initial screen identifying the condition and the time for optimal treatment. The "lead time" is the period from the initial screen to the usual time of diagnosis. Thus if the "lead time" is appreciably longer than the "screening time", then the identification of a condition at screening permits optimal treatment to be instituted much earlier than would otherwise have been the case.

In the different areas of developmental delay the "lead time" is relatively long, since the child is usually not able to draw attention to his/her disability and hence recognition rests with parents and health workers. In this study, all defects and disabilities detected by screening were previously unknown.

5. The "disease" should be treatable or controllable.

Screening for a condition can only be justified if treatment for the condition is available. The treatment or intervention



should be able to reverse the process, to keep it stationary, to slow down the rate of progression, or to prevent complications. In developmental delay, all these criteria can be met. If treatment is not available for a condition that has been screened, screening can sometimes be justified on a research basis, possibly to demonstrate a need for a suitable treatment or intervention.

6. The condition being screened for should be relatively prevalent.

The prevalence of the different components of developmental delay are:-

Hearing disability	10%
Visual disability	10%
Language disability	10- 15%
Behaviour disability	3 - 10%
Mental retardation	3 - 10%

(From "Pediatric Screening Tests (1975) Frankenburg & Camp)

7. Screening should not harm the individual being screened.

Developmental screening does not harm in the physical sense, and if the screener is experienced at relating to both the child and the child's parents, then most of the customary fears and anxieties can be avoided.

8. Facilities should be available to follow up where necessary the screening assessment with a diagnostic assessment.

All the necessary facilities are available in Adelaide for the positive diagnosis of all of the different suspected delays identified at developmental screening. The children in this study were all from near Adelaide suburbs, and thus all necessary follow-ups were easily available.

Remote from Adelaide, however, diagnosis plus treatment are not always available. Here, the aim of developmental screening should be to identify the need for more diagnostic and treatment facilities. Developmental screening in the country areas can therefore be justified, but the population should be made aware of its somewhat different aims. It has been the author's impression, during country trips, that country children in remote areas are disadvantaged in terms of early identification and intervention of developmental problems.

9. The cost of screening diagnosis and treatment should be reasonable when weighed against firstly, failure of children to reach their full potential, and secondly, the cost of treatment when the diagnosis is made at the usual time.

In Adelaide, developmental screening is carried out by nurses who are already involved in developmental surveillance and the promotion of health in infants and young children. Facilities for diagnostic assessments and for appropriate interventions or treatments, are also available from existing established institu-

tions, namely the developmental clinics at the two major children's hospitals. The actual testing kit would cost under \$5. Thus Frankenburg's costing of individual items i.e. collecting specimen, cost of test, administration of test, rescreening, recording, follow-up and treatment does not apply in the Adelaide context as they are already available. Also, with the drop in numbers of the under 5-year old population, there is not a waiting list for these facilities.

The benefits of screening are not so readily accountable. However, it is very difficult to refute the basic premise underlying developmental screening, that the earlier a defect or disability is discovered, the better will be the eventual outcome for both mother and child. (Sheridan, 1977; Egan, 1969; Northern 1978). With hearing disabilities for instance, early diagnosis permits early intervention with consequently greater opportunity for the acquisition of language skills. (It has been shown that the possession of language skills can markedly influence earning capacity in later life. (Schein and Delk, 1974).

10. Screening for a particular disease or condition should be acceptable to the public

The continuing demand by parents and kindergarten directors for the developmental screening services of the M.B.H.A. (now CAFHS) nurses, strongly suggests that this type of screening is readily accepted by the public.

It is concluded after consideration of the above 10 criteria that developmental defects or delays are in fact "conditions" which should be actively sought using screening routines at appropriate ages.

As stated in the beginning of this chapter, it is not the intention to fully debate the justification of performing developmental screening. However, during the course of the Survey, some positive points were presented, which contributes to supporting the concept of early identification through a formal developmental screening process. These were:-

- (a) that all defects and delays found, in this study, were previously unknown.
- (b) that parents were enthusiastic and appreciative during their participation.
- (c) that the nurse become more acutely aware of the difference between using a formal and informal method of developmental screening.
- (d) that parents, teachers, nurses and specialists were made more conscious of the presence of developmental delays in children, especially of mental retardation.

Chapter X

COMMENTS AND CONCLUSION

The aim of Developmental Screening is to identify disorders that will handicap or disadvantage a child. Sheridan (1977) defined a handicapped child as one "who suffers from any continuing disability of body, intellect or personality which is likely to interfere with his normal growth and development or capacity to learn". She also defined a disadvantaged child as "one who suffers from a continuing inadequacy of material, affectional, educational or social provisions, or who is subject to detrimental environmental stresses of any kind, which are likely to interfere with the growth and development of his/her body, intellect or personality and thus prevent him/her from achieving his inherent potential".

These broad concepts of a "handicap " and of being "disadvantaged" pertain to the quality of life rather than to life threatening illnesses of the individual. Whether or not an individual wants the quality of life improved, as opposed to whether he/she needs it improved, is a contentious point. However, a quote used by the eminent American Psychologist, E.E. Werner, in her longitudinal study of children from 0 - 18 years, appears to be most apt: "No man is an Island, entire of it self.". John Donne. (Devotions).

The Woodside System adapted for Australian conditions was found to be valid, with a Pearson's correlation coefficient of $r = 0.70$ ($p < 0.05$) when compared against the widely accepted

Griffiths diagnostic test. Therefore the adapted Woodside System can be used to identify conditions which are likely to handicap a child. It is an accurate and helpful tool for Child Health Nurses to use as a guide to the developmental status of infants and young children.

It is important that the screener can relate well with both the child and the parent and that care is taken not to "label" children. A screening test does not take the place of a diagnostic assessment. In this study, the diagnostic assessment or criterion test used was the validated Griffiths test. The Griffiths was chosen as it gives a profile of the separate areas of child development, i.e. Gross Motor, Social, Language, Eye/Hand co-ordination and Performance. An informal diagnostic assessment performed by a paediatrician would not have addressed itself to all areas specifically. For example, a delay in eye/hand co-ordination alone, all other areas being normal, might easily be overlooked on an informal assessment.

The predictive value of early examinations, especially of infants before the age of 2 years, is sometimes questioned. It was initially thought that an infant's developmental status was too unstable to have any reliable predictive value of performance later in life. However, Werner (1955-1974) and Van Doornicke (1978) refuted these beliefs and showed that a definite relationship existed between the findings at early examinations and problems later in school.

The use of a formal protocol as described, in preference to an informal unstructured method for screening a child, is another issue. With an informal unstructured method, the examiner must be very experienced and intimately familiar with the vast range of normal variation which can be found in children of different ages. For most examiners, the unstructured assessment of a child is insufficient, and they can be helped greatly by a simple formal tool. Even many paediatricians need some sort of instrument for a valid assessment of development. Werner (1971). It was found that if a paediatrician's relied only upon clinical acumen, they they would miss 50% of children with delay. Werner(1971). This "accuracy" for determining mental retardation did not improve with greater paediatric clinical experience. Korsch(1961). For the less experienced or occasional examiner, a formal tool is essential.

The home environment has traditionally been regarded as one of the more important factors contributing to the development of the child. Initially, the environment was measured by the S.E.S. of the parents. This measure has been shown, however, to be limited both in explaining variations within a group and in planning intervention programmes (Bloom 1964; Pavenstedt 1965). Over recent years, it has become apparent that what is important is the amount of stimulation and encouragement given by parents to promote factors relevant to child development. In the present study using Caldwell's HOME Inventory, the items which were associated with improved development were:- appropriate play material; the encouragement of language interaction; the encouragement towards academic skills of learning numbers and colours etc.; and providing the opportunity to experience a wide range of situations. Perhaps if these important needs could be communicated to parents, it would be a step towards promoting improved development in children.

The use of a tool such as the HOME inventory could help to identify "disadvantaged" children. Furthermore, it could form the basis of an early and effective intervention programme.

Carey's Infant Temperament Questionnaire can be helpful in assessing "difficult babies", but it is seen more as a research tool at present. Further concurrent and longitudinal studies need to be carried out to determine the relationship between a child's temperament and its development, and to determine whether the temperaments of "difficult babies" have a transient effect on development

or a long-term and far-reaching impact on the child's ability to reach its potential. In Werner's longitudinal study (1955-1974) of 660 infants in Kauai (Hawaii) over a period of 18 years, she found that "non-rewarding" temperament traits (e.g. high activity, low responsivity) were predictive of long-term mental health problems in middle childhood. A tool such as Carey's I.T.Q. would be useful to help identify these "non-rewarding" traits.

The question of whether developmental screening and early intervention is worthwhile has been debated at length by many health and education professionals. Few argue the benefits of early intervention with defects of vision, but many dispute the role of early diagnosis, and intervention when indicated, with hearing loss due to chronic serous media or "glue ear" for instance. It has been shown, however, by Holm & Kunze (1961), Kaplan et al (1973) and Lewis (1976) that mild hearing losses (35db) at an early age can lead to "auditory language learning problems" which can persist after the initial ear disorder has resolved. Furthermore, it has been shown that there is a difference between the income earning ability of the "prelinguistically deaf" and those who become deaf after the age of 6 years (Schein and Delk, 1974). The difference, they concluded, "represented the superior language level" of those who had normal hearing for the first 6 years of life. It has been suggested that serous otitis media is a disease of the socially disadvantaged, and that these children finally have poorer income because of their status. This suggestion is not supported by the data of this study, as serous otitis media is prevalent in all three S.E. groups.

The implications of early identification of other developmental disorders should also be considered in this light, and not only in the narrow traditional medical sense of early diagnosis and early cure.

Perhaps early sensory experience may play some crucial role in determining whether the growing child will develop the ability to use sensory input in meaningful and intelligent ways.

It is the author's firm belief that developmental screening is well worthwhile. Eminent pediatricians in the field have also advocated and supported the concept: Illingworth, McKeith, Sheridan, Holt, Frankenburg are but a few. More supportive evidence is given by other workers, who identified disorders which were previously unknown or unrecognized, and only identified through developmental screening (Sundelin 1975; Nowotney 1979; Johnston 1980; Eu & O'Neill 1981/82).

Van Doorninck (1978) suggests that to predict a larger proportion of school achievement problems, one ought to assess a) the child's environmental characteristics and combine this with b) a developmental evaluation. It is concluded from the present studies that Caldwell's HOME Inventory can be used for a systematic assessment of the environment, and that the Woodside, adapted for Australian conditions, can be used for a systematic assessment of the child himself/herself. However, it must not be forgotten that "..... developmental screening inventories are human instruments and designed for human purposes. By themselves they treat no patients, educate no children, solve no social problems. But in the hands of skilled professionals or para professional workers they can help in all these undertakings". Werner (1974).

In practical terms, it is suggested that child health nurses use the Woodside system on all children at the ages of 6/52, 6/12, 2 years and 4 years. These specific ages are chosen as at 6 weeks the infant will first present at the 'well-baby' clinic, and any obvious defects or delays will be identified. At six months a hearing test and eye-hand co-ordination can be more specifically assessed; at 2 years the language development is critical and at 4 years of age a check for 'readiness' to attend school is important. The referral criteria for the Woodside is fully detailed in Chapter III.

It is acknowledged that this study had a small staff of two nurses and therefore their proficiency was easily monitored. However, the instrument is only as good as its user, and experienced supervisors should have weekly or fortnightly discussions with screening teams. This study had weekly discussions, which were important as specific difficulties, eg. unresponsive child, crying child, over-enthusiastic parent, critical parent, difficult test item, etc, could be sorted out.

The follow-up in this study was precise as each child was referred to the relevant specialist by the author. However, in practice, nurses usually refer children to their General Practitioner, who may or may not be aware of the concept of developmental delays. This/^{uncertainty} can be over-come by parent education, so that the parent is aware that the follow up is appropriate.

In general, a screening test is not only used to identify a delay in a child, but also used as a means of increasing awareness and interest of parents to the development of their child.

In practice, the HOME Inventory takes too long, (one hour plus an individual visit to the home) and it is suggested that perhaps the HOME can be used only for children at risk.'

Finally, the statement by the Working Party of experts from the disciplines of paediatrics, public health, education, psychology and psychiatry. Egan, Illingworth, Mackeith (1969) is probably just as true today. "We feel that any country that wishes to raise the quality of its child care will do well to ensure competent periodic developmental paediatric screening examinations of all infants and young children. The proportion of children with major defects detected under the age of 12 months and of other defects detected before the child is of school age provide good criteria of the quality of paediatric services".

HOME INVENTORY (Birth to Three) (Caldwell)

Child's Name _____ Date of Interview _____

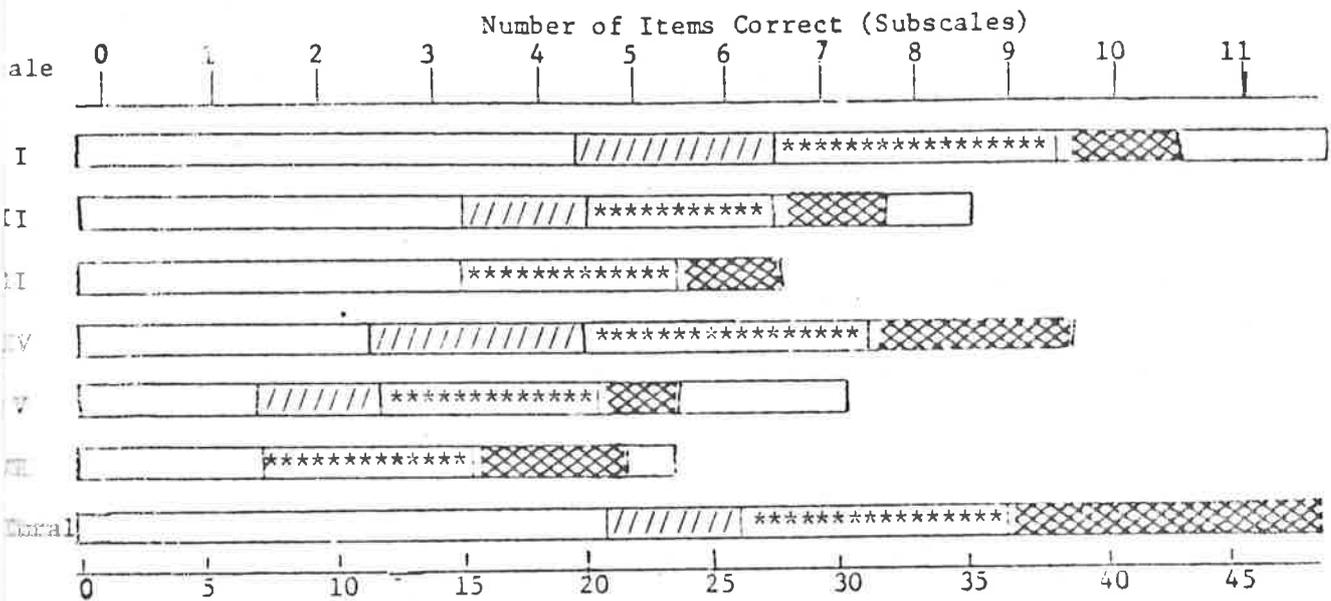
Child's Birthdate _____ Interviewer _____

Relationship of person interviewed to child _____ Place of Interview _____

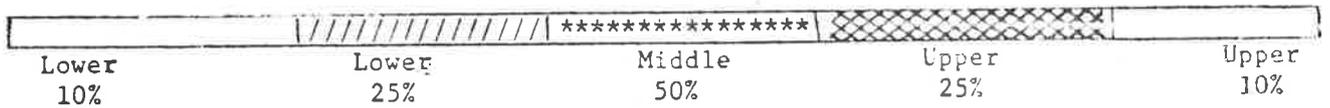
Family Composition _____
(Indicate persons living in household, including sex and age of children)

Persons present in home at time of interview _____

Comments _____



Number of Items Correct (Total Scale)



Subscale	Raw Score	Percentile Band
I Emotional and Verbal Responsivity of Mother		
II Avoidance of Restriction and Punishment		
III Organization of the Physical and Temporal Environment		
IV Provision of Appropriate Play Materials		
V Maternal Involvement with the Child		
VI Opportunities for Variety in Daily Stimulation		
Total		

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT

INVENTORY (Birth to Three)

I. EMOTIONAL AND VERBAL RESPONSIVITY OF MOTHER	YES	NO
1. Mother spontaneously vocalizes to child at least twice during visit (excluding scolding)		
2. Mother responds to child's vocalizations with a verbal response.		
3. Mother tells child the name of some object during visit or says name of person or object in a "teaching" style.		
4. Mother's speech is distinct, clear, and audible.		
5. Mother initiates verbal interchanges with observer--asks questions, makes spontaneous comments.		
6. Mother expresses ideas freely and easily and uses statements of appropriate length for conversation (e.g., gives more than brief answers).		
*7. Mother permits child occasionally to engage in "messy" types of play.		
8. Mother spontaneously praises child's qualities or behavior twice during visit.		
9. When speaking of or to child, mother's voice conveys positive feeling.		
10. Mother caresses or kisses child at least once during visit.		
11. Mother shows some positive emotional responses to praise of child offered by visitor.		
SUBSCORE		
II. AVOIDANCE OF RESTRICTION AND PUNISHMENT		
12. Mother does not shout at child during visit.		
13. Mother doesn't express overt annoyance with or hostility toward child.		

(* Items from Categories I and II which may require direct questions.)

14. Mother neither slaps nor spansks child during visit.		
*15. Mother reports that no more than one instance of physical punishment occurred during the past week.		
16. Mother does not scold or derogate child during visit.		
17. Mother does not interfere with child's actions or restrict child's movements more than three times during visit.		
18. At least ten books are present and visible.		
*19. Family has a pet.		
SUBSCORE		

III. ORGANIZATION OF PHYSICAL AND TEMPORAL ENVIRONMENT

20. When mother is away, care is provided by one of three regular substitutes.		
21. Someone takes child into grocery store at least once a week.		
22. Child gets out of house at least four times a week.		
23. Child is taken regularly to doctor's office or clinic.		
*24. Child has a special place in which to keep his toys and "treasures."		
25. Child's play environment appears safe and free of hazards.		
SUBSCORE		

IV. PROVISION OF APPROPRIATE PLAY MATERIALS

26. Child has some muscle activity toys or equipment.		
27. Child has push or pull toy.		
28. Child has stroller or walker, kiddie car, scooter, or tricycle.		

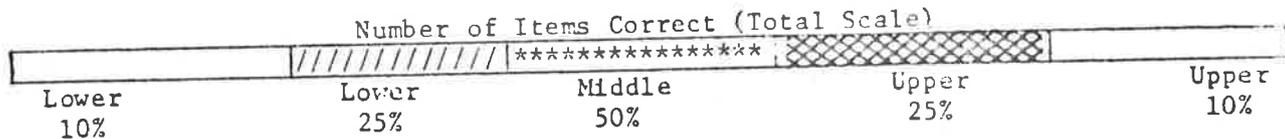
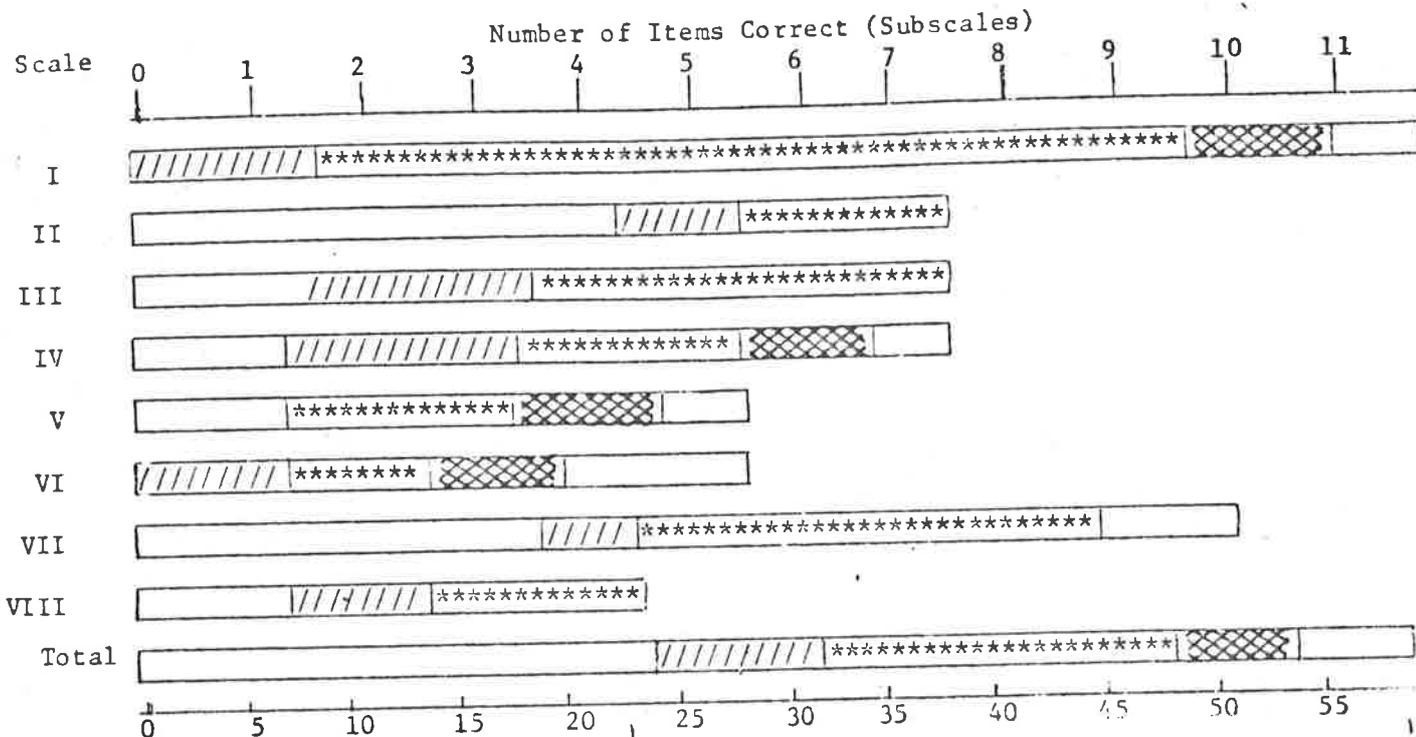
	YES	NO
29. Mother provides toys or interesting activities for child during interview.		
30. Provides learning equipment appropriate to age--cuddly toy or role-playing toys.		
31. Provides learning equipment appropriate to age--mobile, table and chairs, high chair, play pen.		
32. Provides eye-hand coordination toys--items to go in and out of receptacle, fit together toys, beads.		
33. Provides eye-hand coordination toys that permit combinations--stacking or nesting toys, blocks or building toys.		
34. Provides toys for literature or music.		
SUBSCORE		

V. MATERNAL INVOLVEMENT WITH CHILD		
35. Mother tends to keep child within visual range and to look at him often.		
36. Mother "talks" to child while doing her work.		
37. Mother consciously encourages developmental advances.		
38. Mother invests "maturing" toys with value via her attention.		
39. Mother structures child's play periods.		
40. Mother provides toys that challenge child to develop new skills.		
SUBSCORE		

VI. OPPORTUNITIES FOR VARIETY IN DAILY STIMULATION		
41. Father provides some caretaking every day.		
42. Mother reads stories at least three times weekly.		
43. Child eats at least one meal per day with mother & father.		
44. Family visits or receives visits from relatives.		
45. Child has three or more books of his own.		
SUBSCORE		

HOME INVENTORY (Preschool) (Caldwell)

Child's Name _____ Date of Interview _____
 Child's Birthdate _____ Interviewer _____
 Relationship of person interviewed to child _____ Place of interview _____



Subscale	Raw Score	Percentile Band
I Stimulation Through Toys, Games and Reading Materials		
II Language Stimulation		
III Physical Environment: Safe, Clean, and Conducive to Development		
IV Pride, Affection, and Warmth		
V Stimulation of Academic Behavior		
VI Modeling and Encouragement of Social Maturity		
VII Variety of Stimulation		
VIII Physical Punishment		
Total		

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT

INVENTORY (Preschool)

I. STIMULATION THROUGH TOYS, GAMES, AND READING MATERIALS	YES	NO
1. Toys to learn colors and sizes and shapes--pressouts, play school, pegboards, etc.		
2. Three or more puzzles.		
3. Record player and at least five children's records.		
4. Toys or game permitting free expression (finger paints, play dough, crayons or paint and paper, etc.)		
5. Toys or game necessitating refined movements (paint by number, dot book, paper dolls, crayons and coloring books).		
6. Toys or game facilitating learning numbers (blocks with numbers, books about numbers, games with numbers, etc.)		
7. Ten children's books.		
8. At least ten books are present and visible in the apartment.		
9. Family buys a newspaper daily and reads it.		
10. Family subscribes to at least one magazine.		
11. Child is encouraged to learn shapes.		

II. POSITIVE SOCIAL RESPONSIVENESS	YES	NO
12. Toys to learn animals--books about animals, circus, games, animal puzzles, etc.		
13. Child is encouraged to learn the alphabet.		
14. Parent teaches child some simple manners--to say, "Please," "Thank you," "I'm sorry."		
15. Mother uses correct grammar and pronunciation.		

	YES	NO
16. Parent encourages child to relate experiences or takes time to listen to him relate experiences.		
17. When speaking of or to child, mother's voice conveys positive feeling.		
18. Child is permitted some choice in lunch or breakfast menu.		
SUBSCORE		

III. PHYSICAL ENVIRONMENT: SAFE, CLEAN AND CONDUCTIVE TO DEVELOPMENT		YES	NO
19. Building has no potentially dangerous structural or health defect (e.g., plaster coming down from ceiling, stairway with boards missing, rodents, etc.)			
20. Child's outside play environment appears safe and free of hazards. (No outside play area requires an automatic "no".)			
21. The interior of the apartment is not dark or perceptably monotonous.			
22. Neighborhood has trees, grass, birds--is esthetically pleasing.			
23. There is at least 100 square feet of living space per person in the house.			
24. In terms of available floor space, the rooms are not overcrowded with furniture.			
25. All visible rooms of the house are reasonably clean and minimally cluttered.			
SUBSCORE			

IV. PRIDE, AFFECTION, AND WARMTH		YES	NO
26. Parent holds child close ten to fifteen minutes per day, e.g., during TV, story time, visiting.			
27. Mother converses with child at least twice during visit (scolding and suspicious comments not counted.)			

28. Mother answers child's questions or requests verbally.		
29. Mother usually responds verbally to child's talking.		
30. Mother spontaneously praises child's qualities or behavior twice during visit.		
31. Mother caresses, kisses or cuddles child at least once during visit.		
32. Mother sets up situation that allows child to show off during visit.		
SUBSCORE		

V. STIMULATION OF ACADEMIC BEHAVIOR		
33. Child is encouraged to learn colors.		
34. Child is encouraged to learn patterned speech (nursery rhymes, prayers, songs, TV commercials, etc.)		
35. Child is encouraged to learn spatial relationships (up, down, under, big, little, etc.)		
36. Child is encouraged to learn numbers.		
37. Child is encouraged to learn to read a few words.		
SUBSCORE		

VI. MODELING AND ENCOURAGEMENT OF SOCIAL MATURITY		
38. Some delay of food gratification is demanded of the child, e.g., not to whine or demand food unless within 1/2 hour of meal time.		
39. Family has TV, and it is used judiciously, not left on continuously. (No TV requires an automatic "No"--any scheduling scores "Yes".		
40. Mother introduces interviewer to child.		
41. Child can express negative feelings without harsh reprisal.		
42. Child is permitted to hit parent without harsh reprisal		
SUBSCORE		

VII. VARIETY OF STIMULATION		YES	NO
43.	Real or toy musical instrument (piano, drum, toy xylophone or guitar, etc.)		
44.	Family members have taken child on one outing (picnic, shopping excursion) at least every other week.		
45.	Child has been taken by family member on a trip more than 50 miles from his home during the past year (50 mile radial distance not total distance).		
46.	Child has been taken by a family member to a scientific, historical, or art museum within the past year.		
47.	Tries to get child to pick up and put away toys after play session--without help.		
48.	Mother uses complex sentence structure and some long words in conversing.		
49.	Child's art work is displayed some place in house (anything that child makes.)		
50.	Child eats at least one meal per day, on most days, with mother (or mother figure) and father (or father figure). (One parent families get an automatic "no".)		
51.	Parent lets child choose certain favorite food products or brands at grocery store.		
SUBSCORE			

VIII. PHYSICAL PUNISHMENT		YES	NO
52.	Mother does not scold (yell?) or derogate child more than once during visit.		
53.	Mother does not use physical restraint, shake, grab, or pinch child during visit.		
54.	Mother neither slaps or spanks child during visit.		
55.	No more than one instance of physical punishment occurred during the past week. (accept parental report).		
SUBSCORE			

INFANT TEMPERAMENT SCALE

APPENDIX 5

Name:

D.O.B.

Centre:

SURVEY OF TEMPERAMENTAL CHARACTERISTICS

Sleep

1. (a) Generally goes to sleep at about same time (within half an hour) night and naps.
(b) Partly the same times, partly not.
(c) No regular pattern at all. Times vary 1-2 hours or more.
2. (a) Generally wakes up at about same time, night and naps.
(b) Partly the same times, partly not.
(c) No regular pattern at all. Times vary 1-2 hours or more.
3. (a) Generally happy (smiling, etc.) on waking up and going to sleep.
(b) Variable mood at these times.
(c) Generally fussy on waking up and going to sleep.
4. (a) Moves about crib much (such as from one end to other) during sleep.
(b) Moves a little (a few inches).
(c) Lies fairly still. Usually in same position when awakens.
5. With change in time, place or state of health:
(a) Adjusts easily and sleeps fairly well within 1-2 days.
(b) Variable pattern.
(c) Bothered considerably. Takes at least 3 days to readjust sleeping routine.

Feeding

6. (a) Generally takes milk at about same time. Not over 1 hour variation.
(b) Sometimes same, sometimes different times.
(c) Hungry times quite unpredictable.
7. (a) Generally takes milk at about same time. Not over 1 hour variation.
(b) Sometimes same, sometimes different amounts.
(c) Amounts taken quite unpredictable.
8. (a) Easily distracted from milk feedings by noises, changes in place or routine.
(b) Sometimes distracted, sometimes not.
(c) Usually goes right on sucking in spite of distractions.
9. (a) Easily adjusts to parents' efforts to change feeding schedule within 1-2 tries.
(b) Slowly (after several tries) or variable.
(c) Adjusts not at all to such changes after several tries.
10. (a) If hungry and wants milk, will keep refusing substitutes (solids, water, pacifier) for many minutes.
(b) Intermediate or variable.
(c) Gives up within a few minutes and takes what is offered.
11. (a) With interruptions of milk or solid feedings, as for burping, is generally happy, smiles.
(b) Variable response.
(c) Generally cries with these interruptions.

12. (a) Always notices (and reacts to) change in temperature or type of milk or substitution of juice or water.
(b) Variable.
(c) Rarely seems to notice (and react to) such changes.
13. (a) Suck generally vigorous.
(b) Intermediate.
(c) Suck generally milk and intermittent.
14. (a) Activity during feedings - constant squirming, kicking, etc.
(b) Some motion: intermediate.
(c) Lies quietly throughout.
15. (a) Always cries loudly when hungry.
(b) Cries somewhat but only occasionally hard or for many minutes.
(c) Usually just whimpers when hungry, but doesn't cry loudly.
16. (a) Hunger cry usually stopped for at least a minute by picking up,
(b) Sometimes can be distracted when hungry.
(c) Nothing stops hunger cry.
17. (a) After feeding baby smiles and laughs.
(b) Content but not usually happy (smiles, etc.) or fussy.
(c) Fussy and wants to be left alone.
18. (a) When full, clamps mouth closed, spits out food or milk, bats at spoon, etc.
(b) Variable.
(c) Just turns head away or lets food drool out of mouth.
19. (a) Initial reaction to new foods (solids, juices, vitamins) acceptance. Swallows them promptly without fussing.
(b) Variable response.
(c) Usually rejects new foods. Makes face, spits out, etc.
20. (a) Initial reaction to new foods pleasant (smiles, etc.), whether accepts or not.
(b) Variable or intermediate.
(c) Response unpleasant (cries, etc.), whether accepts or not.
21. (a) This response is dramatic whether accepting (smacks lips, laughs, squeals) or not (cries).
(b) Variable.
(c) This response milk whether accepting or not. Just smiles, makes face or nothing.
22. (a) After several feedings of any new food, accepts it.
(b) Accepts some, not others.
(c) Continues to reject most new foods after several tries.
23. (a) With changes in amounts, kinds, timing of solids, does not seem to mind.
(b) Variable response. Sometimes accepts, sometimes not.
(c) Does not accept these changes readily.
24. (a) Easily notices and reacts to differences in taste and consistency.
(b) Variable)
(c) Seems seldom to notice or react to these differences.

25. (a) If does not get type of solid food desired, keeps crying till gets it.
(b) Variable.
(c) May fuss briefly but soon gives up and takes what offered.

Soiling and Wetting

26. (a) When having bowel movement, generally cries.
(b) Sometimes cries.
(c) Rarely cries though may get red in face. Generally happy (smiles, etc.) in spite of having bowel movement.
27. (a) Bowel movements generally at same time of day (usually within 1 hour of same time).
(b) Sometimes at same time, sometimes not.
(c) No real pattern. Usually not same time.
28. (a) Generally indicates somehow that is soiled with bowel movement.
(b) Sometimes indicates.
(c) Seldom or never indicates.
29. (a) Usually fusses when diaper soiled with bowel movement.
(b) Sometimes fusses.
(c) Usually does not fuss.
30. (a) Generally indicates somehow that is wet (no bowel movement).
(b) Sometimes indicates.
(c) Seldom or never indicates.
31. (a) Usually fusses when diaper wet (no bowel movement).
(b) Sometimes fusses.
(c) Usually does not fuss.
32. (a) When fussing about diaper, does so loudly. A feal cry.
(b) Variable.
(c) Usually just a little whimpering.
33. (a) If fussing about diaper, can easily be distracted for at least a few minutes by being picked up, etc.
(b) Variable.
(c) Nothing distracts baby from fussing.

Diapering and Dressing

34. (a) Squirms and kicks much at these times.
(b) Moves some.
(c) Generally lies still during these procedures.
35. (a) Generally pleasant (smiles, etc.) during diapering and dressing.
(b) Varied.
(c) Generally fussy during these times.
36. (a) These feelings usually intense:
(b) Varied.
(c) Mildly expressed usually. Little smiling or fussing.

Bathing

37. (a) Usual reaction to bath - smiles or laughs.
(b) Variable or neutral.
(c) Usually cries or fusses.
38. (a) Like or dislike of bath is intense. Excited.
(b) Variable or intermediate.
(c) Like or dislike is mild. Not very excited.
39. (a) Kicks, splashes and wiggles throughout.
(b) Intermediate - moves moderate amount.
(c) Lies quietly or moves little.
40. (a) Reaction to very first tub (or basin) bath.
(b) Seemed to accept it right away.
(c) At first protested against bath.
41. (a) If protested at first, accepted it after 2 or 3 times.
(b) Sometimes accepted sometimes not.
(c) Continued to object even after two weeks.
42. (a) If bath by different person or in different place, readily accepts change first or second time.
(b) May or may not accept.
(c) Objects consistently to such changes.

Procedures - nail cutting, hair brushing, washing face and hair, medicines.

43. (a) Initial reaction to any new procedure - generally accepted.
(b) Variable.
(c) Generally objects; fusses or cries.
44. (a) If initial objection, accepts after 2 or 3 times.
(b) Variable.
(c) Continues to object even after several times.
45. (a) Generally pleasant during procedures once established - smiles, etc.
(b) Neutral or variable.
(c) Generally fussy or crying during procedures.
46. (a) If fussy with procedures, easily distracted by game, toy, singing, etc. - and stops fussing.
(b) Variable response to distractions.
(c) Not distracted. Goes on fussing.

Visits to Doctor

47. (a) With physical exam, when well, generally friendly and smiles.
(b) Both smiles and fusses: variable.
(c) Fusses most of time.
48. (a) With shots cries loudly for several minutes or more.
(b) Variable.
(c) Cry over in less than a minute.

49. (a) When crying from shot, easily distracted by milk, pacifier, etc.
(b) Sometimes distracted, sometimes not.
(c) Goes right on crying no matter what is done.

Response to Illness

50. (a) With any kind of illness much crying and fussing.
(b) Variable.
(c) Not much crying with illnesses. Just whimpering sometimes. Generally his usual self.

Sensory - reactions to sound, light, touch.

51. (a) Reacts little or not at all to unusual loud sound or bright light.
(b) Intermediate or variable.
(c) Reacts to almost any change in sound or light.
52. (a) This reaction to light or sound is intense - startles or cries loudly.
(b) Intermediate - sometimes does, sometimes not.
(c) Mild reaction - little or no crying.
53. (a) On repeated exposure to these same lights or sounds, does not react so much any more.
(b) Variable.
(c) No change from initial negative reaction.
54. (a) If already crying about something else, light or sound makes crying stop briefly at least.
(b) Variable response.
(c) Makes no difference.

Responses to People

55. (a) Definitely notices and reacts to differences in people: age, sex, glasses, hats, other physical differences.
(b) Variable reaction to differences.
(c) Similar reactions to most people unless strangers.
56. (a) Initial reaction to approach by strangers positive, friendly (smiles, etc.).
(b) Variable.
(c) Initial rejection or withdrawal.
57. (a) This initial reaction to strangers is intense: crying or laughing.
(b) Variable.
(c) Mild - frown or smile.
58. (a) General reaction to familiar people is friendly - smiles, laughs.
(b) Variable reaction.
(c) Generally glum or unfriendly. Little smiling.
59. (a) This reaction to familiar people is intense - crying or laughing.
(b) Variable.
(c) Mild - frown or smile.

Reaction to new places and situations.

60. (a) Initial reaction accepted - tolerates or enjoys them within a few minutes.
(b) Variable.
(c) Initial reaction rejection - does not tolerate or enjoy them within a few minutes.
61. (a) After continued exposure (several minutes) accepts these changes easily.
(b) Variable.
(c) Even after continued exposure, accepts changes poorly.

Play

62. (a) In crib or play pen can amuse self for half hour or more looking at mobile, hands, etc.
(b) Amuses self for variable length of time.
(c) Indicates need for attention or new occupation after several minutes.
63. (a) Takes new toy right away and plays with it.
(b) Variable.
(c) Rejects new toy when first presented.
64. (a) If rejects at first, after short while (several minutes) accepts new toy.
(b) Variable.
(c) Adjusts slowly to new toy.
65. (a) Play activity involves much movement - kicking, waving arms, etc. Much exploring.
(b) Intermediate.
(c) Generally lies quietly while playing. Explores little.
66. (a) If reaching for toy out of reach, keeps trying at it for 2 minutes or more.
(b) Variable.
(c) Stops trying in less than $\frac{1}{2}$ minute.
67. (a) When given a toy, plays with it for many minutes.
(b) Variable.
(c) Plays with one toy for only short time (only 1 - 2 minutes).
68. (a) When playing with one toy, easily distracted by another.
(b) Variable.
(c) Not easily distracted by another toy.
69. (a) Play usually accompanied by laughing, smiling, etc.
(b) Variable or intermediate.
(c) Generally fussy during play.
70. (a) Play is intense: much activity, vocalization or laughing.
(b) Variable or intermediate.
(c) Plays quietly and calmly.

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QUOTE:

" Your children are not your children.
They are the sons and daughters of Life's longing
for itself.
They come through you but not from you.
And though they are with you yet they belong not
to you.
You may give them your love but not your thoughts,
For they have their own thoughts.
You may house their bodies but not their souls,
For their souls dwell in the house of tomorrow, which
you cannot visit not even in your dreams.
You may strive to be like them, but seek not to
make them like you.
For life goes not backwards nor tarries with yesterday.
You are the bows for which your children as living
arrows are sent forth. "

Kahlil Gibran
(Poet & Philosopher)

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APPENDIX 2



Adapted from the Woodside System

MANUAL

PRE-SCHOOL DEVELOPMENTAL SCREENINGS

DESCRIPTION OF TESTS

SIGNIFICANT FINDINGS

There are several points to be noted when testing normal development. These can be present at any age and are listed below.

1. Any worry the mother has no matter whether it seems important or trivial to you.
2. Congenital abnormalities.
3. Clumsiness.
4. Aimless overactivity.
5. Lack of interest and concentration.
6. Behaviour problems.
7. Poor muscle co-ordination, tremor or muscle weakness.
8. Defective vision.
9. Defective hearing.
10. Backwardness in any field.
11. Dribbling incontinence.
12. Mouthing and drooling.

1

SOCIAL

Tests to be used

4 YEARS

1. Able to dress except for laces and back buttons. (H)

2. Dry at night. (H)

3 YEARS

3. Washes hands. (H)

4. Pulls pants up and down. (H)

2 YEARS

5. Drinks and replaces cup. (H)

6. Dry by day. (H)

(H) = History of Achievement Sufficient.

SOCIAL

Description of Tests

1. Ask the mother if the child is able to dress himself except for his tie, back buttons and shoe laces. Ask if he shows any clumsiness or apparent backwardness in dressing himself.
2. Ask the mother if the child is dry during the night. An occasional 'slip up' is allowed. Exclude dribbling incontinence.
3. Ask the mother if the child manages to wash and dry his hands. The basin should not be too high for him.
4. Ask the mother if the child manages to pull his pants up and down. He may be able to manage other articles of clothing: The above represents the minimum that the child should be able to do.
5. Ask the mother if the child is able to drink properly from a cup without spilling and if he can replace the cup on to the table. He should also be able to feed himself with a spoon.
6. Ask the mother if the child is dry during the day. The occasional 'slip up' is allowed. Exclude dribbling incontinence.

18 MONTHS

7. Drink from cup without spilling. (H)

8. Indicates toilet needs. (H)

12 MONTHS

9. Puts cubes into box after being shown.

10. Finds toy under cup.

7. Ask the mother if the child can drink from a cup without spilling when it is handed to him and taken away from him. Ask the mother if the child manages to hold the cup properly in one or both hands.

8. Ask the mother if the child tells her when he wants to go to the toilet. If the child has already wet himself or is dirty he should be able to indicate this to his mother.
Excluding dribbling incontinence.

9. Using 3 or 4 1" cubes show the child how to pick them up one at a time and put them into a box. See if he can copy what you have done. Two attempts can be allowed. Watch for lack of interest and poor muscle co-ordination.

10. With the child watching hide a 1" cube under an inverted cup. Encourage him to find the cube. Two attempts can be allowed. Watch for any difficulty the child may have when reaching for the cup or cube.

9 MONTHS

11. Rings bell.

12. Chews and swallows biscuit (observed).
Copes with solid food. (H)

6 MONTHS

13. Puts objects into mouth (cubes).

14. Reaches for and shakes rattle.

11. Show the child how to ring a small hand bell. Encourage him to copy the action. He should be alert and responsive and have full muscle co-ordination.

12. Give the child a small biscuit or a rusk. Observe if he bites it, chews it and swallows it. Ask the mother if he manages to chew and swallow lumpy solid food.

13. Give the baby a 1" cube. Observe if he puts it into his mouth. Note poor muscle co-ordination or abnormal position of his hands or limbs.

14. Put a rattle within easy reach of the baby. Observe if he reaches and shakes it. Note any tremor or poor muscle co-ordination.

3 MONTHS

15. Aware of and responsive to bath. (H)

16. Enjoys being handled by mother. (H)

6 WEEKS

17. Smiles when spoken to. (H)

18. Some vocal sounds. (H)

(H) History of Achievement sufficient.

15. Ask mother if the baby enjoys his bath. The baby should be aware of and responsive to it. Note any limpness, rigidity or jerky movements. It is important to exclude complete disinterest or apathy, which can be due to mental retardation.

16. Ask mother if the baby enjoys being cuddled and played with. He should react to familiar surroundings by coo-ing and smiling. He should show some interest when his bath and feeds are being prepared. He should respond with obvious pleasure to being handled by his mother. He should be contented while being fed.

17. Ask mother if the baby is responsive and smiles when spoken to.

18. Ask mother if the baby makes some vocal sounds when she is playing with or talking to him.

HEARING AND LANGUAGE

Tests to be used

4 YEARS

1. Hears whisper at three feet - right and left. (Stycar Picture Test)
2. Grammatical speech articulated correctly.

3 YEARS

3. Says first name.

4. Knows own sex.

HEARING AND LANGUAGE

Description of Tests

1. Hears a whisper at three feet - right and left.
(Stycar Picture Test)

2. Speech should be intelligible, grammatical and articulated correctly. The child should now have an extensive vocabulary, be able to describe a picture in a 'ladybird' book or a picture puzzle correctly and with some imagination. He can easily be encouraged to describe his home to the examiner.

3. The child's vocabulary should be rapidly extending although some 'baby talk' is still used. Ask the child if he knows his own first name. The child should be able to give his first and second names.

4. Ask a little boy if he is a little girl and vice versa. He should answer correctly and not just with a nod or a shake of his head.

2 YEARS

5. Simple sentences. (H)

6. Plays with miniature cup and saucer.

18 MONTHS

7. Points to parts of the body.

8. Says five or more words. (H)

12 MONTHS

9. Obeys simple commands e.g. 'claphands'.

10. Says less than five words excluding 'mama' 'dada' and 'baba'. (H)

5. The child should now know numerous words and should understand many more. He should show interest when listening to other peoples conversation. Ask the mother if he manages to put three or four words together to make a simple sentence.
6. Place some small toys near the child to play with and while talking to the mother watch to see if he plays with them meaningfully without tremor or clumsiness. Ask him to pour out an imaginary cup of tea for his mother. Observe how he handles the teapot and the cup and saucer.
7. Ask the child to point to his nose or his toes. Alternately 'a ladybird' book can be used for this test, or a doll from Stycar test kit.
8. Ask the mother if the child is talking. He should be able to say five or more words.
9. Ask the child quietly to 'clap his hands', wave 'bye bye' or to 'hand a toy to mummy'. Be careful that the mother does not demonstrate the action to the child who may copy it without understanding the request.
10. Ask the mother how many recognisable words the child says. He should be able to say up to five words excluding 'mama' 'dada' and 'baba'.

9 MONTHS

11. 'Mama' 'Dada' 'Baba'.

12. Hearing tests above ear level.

6 MONTHS

13. Unintelligible babble.

14. Hearing tests at ear level.

11. Baby tries to communicate to his mother by vocalizing. Babbles in long sequences and is able to say to "Mama" "Dada" and "Baba".
Baby is attentive to sound.

12. Be careful to stay out of sight of the baby.
Make an oo-oo-oo sound three feet away from baby and above his ear level. See if baby responds by turning his eyes or head in an attempt to locate the sound. Repeat the test for each ear.

13. The baby should be vocalizing tunefully in fairly long sequences of sounds. He laughs when happy, screams when annoyed.

14. Be careful to stay out of sight of the baby.
Make an oo-oo-oo sound or strike a cup very gently with a spoon eighteen inches away from the baby's right ear on level with it. Observe if the baby looks towards the sound. Repeat the test for the left ear. Also use Nuffield rattle.

3 MONTHS

15. Aware of sound.

16. Looks round meaningfully when spoken to.

6 WEEKS

17. Stills to bell.

18. Stills to mother's voice.

15. Without the baby watching you, make a gentle noise with a rattle or a cup and spoon about twelve inches away from baby's ear. Be careful to stay out of the baby's line of vision. Observe how he reacts to the noise - he may turn his eyes, quieten or try to turn his head. The noise should not be loud as this would alarm the baby. Repeat the test for each ear.
16. Speak gently to the baby first at one side then at the other. Baby should look towards the side from which the sound comes. Baby should react to and be aware of sounds.
17. Baby will be startled by a sudden noise but he will quieten momentarily when a small bell is rung gently about five inches from his ear. The baby may move his eyes or head towards the sound. Repeat the test for each ear.
18. Baby watches mother's face intently when she is feeding and speaking to him. He smiles and looks contented when spoken to by his mother.

GROSS MOTOR

Tests to be used

4 YEARS

1. Stand on one leg, 3-5 seconds.

2. Hops.

3 YEARS

3. Stands on one leg momentarily.

4. Walks on tip toe. (H)

GROSS MOTOR

Description of Tests

1. Stands on one foot for 3-5 seconds without holding on.
2. Ask the child to stand on one foot then on the other. He should manage to stand on either foot for two or three seconds. He should be able to hop, particularly on his preferred foot. He may want to have his hand held during this test. This should be allowed.
3. Stands on one foot momentarily without holding on when shown.
4. Ask the mother if the child can walk on tip toe.

2 YEARS

5. Runs on whole foot.

6. Kicks ball.

18 MONTHS

7. Picks object from floor without overbalancing.

8. Kneels without support. (H)

1 YEAR

9. Pulls to standing on furniture.

10. 'Cruises' round furniture.

5. Runs safely on whole foot, stopping and starting with ease and avoiding obstacles.
6. Ask the child to kick a large light colourful ball after you have demonstrated how to do it. He should be able to stand momentarily on one foot to do this.
7. Stoops or squats to pick up toy from floor without falling over, and rises to feet alone.
8. Ask the mother if the child can kneel sitting on his heels but without support for a few moments while playing with his toys.
9. Encourage the child to pull himself to stand against a suitable piece of furniture. The child should be weight bearing on his legs and be able to lower himself to the floor without hurting himself.
10. Encourage the child to move from one piece of furniture to another placed nearby. He should be able to lower himself to the floor without hurting himself.

9 MONTHS

11. Sit steadily on floor without support for a few minutes. (H)

12. Stands holding on to furniture.

6 MONTHS

13. Sits against wall or hand - no lateral support 2-3 sec.

14. Rolls over. (If in doubt, perform the Downward Parachute Reaction)

11. Ask the mother if the child can sit on the floor for ten to fifteen minutes without support. He should be able to turn to reach for his toys while sitting.
12. Encourage the child to pull himself up to a standing position on a piece of furniture. He will not be able to lower himself without help. Observe if he is weight bearing on his legs.
13. Sit baby on a flat surface against a wall or with a hand supporting his back. He should have no lateral support and be able to maintain his position for two to three seconds. Baby should not fall sideways. This test should be done with baby's nappy removed.
14. Rolls over front to back and (usually) back to front. 'The Downward Parachute Reaction'. Hold the baby firmly round the waist and lower him abruptly to the floor. Scissoring of his legs should be specially looked for and if present would indicate spasticity. This test should be carried out with baby's nappy removed.

3 MONTHS.

15. Pull from lying little or no head lag.

16. Ventral suspension. Holds head above plane of body.

6 WEEKS

17. Ventral suspension. Head in plane of body.

15. With the baby lying in the mother's arms or on an examination table, hold his forearms firmly and pull him up to a sitting position. The baby's head should stay in line of his body, while he is being pulled from the horizontal to the vertical position.

16. Holding the baby firmly round the trunk lift him into the air with his trunk parallel to the floor. He should be able to hold his head above the plane of the body.

17. Holding the baby firmly round the trunk and hold him so that he is facing the floor. He should be able to hold his head in the same plane as his body.

VISION AND FINE MOTOR

Test to be used

4 YEARS

1. Picks up and replaces very small object e.g. pins with each eye covered separately.

2. Copies a square.

3 YEARS

3. Copies a circle.

4. Builds a bridge of three bricks when shown.

VISION AND FINE MOTOR

Description of Tests

1. Place a number of very small objects such as pins, threads or small beads on a table. Give the child a pair of non optical spectacles with the right eye blacked out. Ask the child to pick up some of the objects one at a time. Repeat the test with spectacles with the left eye blacked out. Look for squint or obvious blindness.
2. With the child's attention distracted so that he cannot see what you are doing, draw a square on a piece of paper. Ask the child to copy the drawing. The child should be able to hold the pencil properly between the thumb, forefinger, and middle finger. Note any clumsiness tremor or poor muscle control.
3. With the child's attention distracted so that he cannot see what you are doing draw a circle on a piece of paper. Ask the child to copy it. If he is unable to do so show him how to draw the circle and see if he succeeds. Note the grip on the pencil and if there is any tremor or poor muscle control.
4. Using 2" cubes build a bridge of three bricks  Leave it completed and ask the child to copy it. Watch for lack of interest, poor muscle control or tremor. Two attempts can be allowed.

2 YEARS

5. Makes a vertical line when shown.

6. Makes a tower of six bricks when shown.

18 MONTHS

7. Makes a scribble on paper.

8. Makes a tower of three bricks when shown.

12 MONTHS

9. Pincer grasp using a small object e.g. smartie.

10. Bangs bricks together when shown.

5. Draw a vertical line on a piece of paper with the child watching. Ask the child to copy it. Note his grip on the pencil poor muscle co-ordination or tremor.
6. Using 1" cubes build a tower of six bricks. Ask the child to copy it. His vision can be tested by the examiner holding up small toys one at a time ten feet away from the child. The child should be asked to match them with corresponding toys placed on a tray in front of him.
7. Show the child how to hold a pencil. Make a scribble on paper. Ask the child to copy it. The child must not stab at the paper, but any scribbling drawing is acceptable.
8. Using 1" cubes show the child how to build a tower of three bricks. Knock down the tower. Ask the child to copy it. Two attempts can be allowed. Note how he uses each hand. Note any tremor or poor muscle control.
9. Encourage the child to pick up a small object such as a smartie from your hand or from a table. Make sure that the child picks it up using the tip of his index finger and the tip of his thumb. Repeat the test with the other hand. Note any squint or difficulty in using one or other hand. Child should not use the side of finger grasp.
10. Pick up two 1" bricks one in each hand and bang them together. Ask the child to copy the action. Note any tremor, squint, poor muscle control or weakness in one or other hand.

9 MONTHS

11. Side of finger grasp using a small object e.g. smartie.

12. Matches cubes.

6 MONTHS

13. Picks up cube from table or hand.

14. Transfers cube from one hand to another.

11. Encourage the child to pick up a small object such as a smartie from your hand or from a table. The child should pick the smartie up using the side of his thumb and the side of his index finger. Repeat the test with his other hand. Note any squint, tremor, poor muscle control or muscle weakness.

12. Give the baby two 1" cubes. The baby should bring one cube up to the side of the other as if he is comparing them. Make sure that the baby uses both of his hands. Make sure that there is muscle coordination and no tremor.

13. Place a 1" cube in the palm of your hand or on a table within easy reach of the baby. Observe how secure his grip is when he picks it up.

14. Place a 1" cube in the palm of your hand or on a table within easy reach of the baby. Observe if he picks it up and transfers it from one hand to the other.

3 MONTHS

15. Holds a pencil briefly.

16. Follows a moving person with eyes.

6 WEEKS

17. Follows a moving face with eyes.

15. Open the baby's hand if necessary and place a pencil gently in the palm of his hand. Observe if the baby grips the pencil for a few moments.

16. With the baby lying comfortably, observe if he follows a moving person with his eyes.

17. With the baby in a comfortable supine position, observe if he follows a moving face with his eyes. The examiner should be about twelve inches, away from baby's face.

