PSYCHOLOGICAL PERSPECTIVES ON THE PERCEPTION, APPRAISAL, AND PRODUCTION OF EVERYDAY ARGUMENTS

Philip Chittleborough

B.A. (Hons) (Adelaide)

Department of Psychology

University of Adelaide

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ABSTRACT

Logicians and psychologists are both interested in arguments, although from different perspectives. Within the field of logic today are two main branches: formal logic and informal logic. An examination of the psychology literature indicated that formal arguments have been the main focus of attention in theory and research, with relatively little work relating to informal arguments. The latter area was therefore selected as needing investigation.

In Study 1, the participants were asked to evaluate a large number of informal arguments and to give reasons for their evaluations. A range of evaluative criteria were identified. In Study 2, participant responses to arguments were explored under less restrictive conditions. In this major study, three main categories of responses were found, along with several less-common categories. Various aspects of the participants' perceptions of the arguments were also investigated.

The focus of the research was then shifted from the perception and evaluation of everyday arguments to the *production* of these arguments, and in particular, to the role of assumptions. Assumptions were argued to make up a significant proportion of the content of typical everyday arguments. Attention was given particularly to unconscious assumptions, and the need for them to be better understood. A psychological model of unconscious assumptions was proposed that applied to all thinking contexts, including problem solving. This was argued to be the only possible model of unconscious assumptions.

In Study 3, verification of this model was sought (and obtained) in the convenient medium of problem solving. In Study 4, verification of the model was sought in the context of everyday argumentation. Participants were asked to produce arguments on three everyday topics, and these arguments were analysed by other participants for assumptions. When the

original participants were questioned by the experimenter, it was found that whenever they agreed to having used an assumption unconsciously, the nature of this assumption was always consistent with the model. Some theoretical and practical issues were also identified.

Ultimately, it was concluded that everyday arguments must be regarded as being as much psychological entities as they are 'logic' entities. Illustrations of this thesis were given.

Relatedly, it was proposed that everyday arguments can only be *fully* understood and satisfactorily evaluated when the psychological aspects of argumentation are thoroughly identified. It was also argued that the nature of responses to arguments can only be properly understood by examining them in terms of the psychological factors and processes that attend the recipient's exposure to the argument.

STATEMENT

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

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

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Philip Chittleborough

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INTRODUCTION

In the popular sense of the word, an 'argument' is a dispute, a disagreement, a conflict. In the more technical sense of the term, an argument could be loosely described as the putting forward of a proposition (a conclusion) on the basis of some other supporting propositions, or by the use of certain persuasive means. It is this latter type of 'argument' that is the focus of this dissertation.

Arguments are the subject of study in the field of logic. The purpose of this study could be generally described as seeking to characterise the nature of arguments, and to develop principles and methods for evaluating those arguments.

Arguments are also of interest to some psychologists. Strictly speaking though, these psychologists are interested in the way in which people *produce* or *evaluate* arguments, rather than with the arguments themselves.

Within the field of logic, it is generally acknowledged that there are two basic categories of arguments: formal arguments, and informal arguments. These are studied by the two main branches of logic that exist today: 'formal' logic and 'informal' logic. Formal logic has a long history and, perhaps for this reason, has dominated the study of logic up the present day. This can be seen in the existing proliferation of texts and courses on formal logic. Informal logic, however, is a relatively recent branch of logic. It could even be regarded as still in its infancy, even though it has made some very significant advances.

Formal logic has been criticised by informal logicians on the grounds that the types of arguments it studies are rarely, or at least infrequently, encountered in 'real life'. As a consequence of this, it is also asserted that its methods of evaluation are very limited in their applicability. In contrast, informal logic is regarded by its proponents as being well and truly focused on everyday arguments; seeking to characterise their nature, and to develop appropriate methods of evaluation.

In this dissertation, initially, these claims will be examined. The first two chapters will review both branches of logic, with special reference to the nature of the arguments that they study. Chapter 1 will be concerned with formal logic, and Chapter 2, informal logic. Conclusions will then be drawn as to whether it is true that the arguments studied by informal logicians correspond more to those encountered in everyday life than those studied by formal logicians.

Given the focus of this dissertation, a definition of the term 'argument' is given in Chapter 3. This definition is based on a publication of which the first author is the writer of this dissertation. This definition is argued to constitute an improvement over existing definitions.

In Chapter 4, a review is provided of the psychological research that has been conducted on both formal and informal arguments. In this chapter, it is concluded that there is a deficiency of research work on one of these types of arguments. This provides the impetus for a series of investigations which were conducted by the writer. These investigations are reported in the remaining chapters of this dissertation, along with several theses that are developed and supported.

CHAPTER 1

FORMAL LOGIC

1.1 Overview

The purpose of this chapter is to provide a review of formal logic, with special reference to the types of arguments that it studies. There are actually many formal systems of logic, but these can be divided into two categories: 'classical logic' and 'non-classical logic'. Classical logic represents the standard, mainstream approach in formal logic. In this chapter, the basic terms and concepts of classical logic will be described (these being relevant to almost all formal systems of logic). The two divisions of classical logic will then be introduced: propositional and predicate logic. Attention will be given to the types of arguments studied by these two logics. Following this, the 'non-classical' logics will be briefly discussed. The chapter will conclude with a summary of observations concerning the general nature of the kinds of arguments studied by formal logicians.

1.2 Introduction to formal logic

As observed by one notable author on the philosophy of logics, "there is not just one, but a plurality of formal logics" (Haack, 1978, p. 2). These various formal systems of logic are generally divided into two categories: 'classical logic' and 'non-classical logic' (Haack, p. 152). Of the two, however, classical logic is the standard, mainstream approach in formal logic (p. 4), and is widely taught in university subjects on logic.

Despite the fact that there is this multiplicity of formal logics, and this classical/non-classical division between them, much of the literature in logic simply refers to 'formal logic'. In most cases, the 'formal logic' that is referred to is actually classical logic. In this dissertation, the term 'formal logic' will be used primarily to refer to classical logic, but it will also be used to refer to the non-classical logics, unless stated otherwise.

Classical logic comprises two formal systems of logic: two-valued sentence calculus (propositional logic), and predicate calculus (see Haack, p. 4). In many ways, these two systems can be regarded as the most fundamental of the formal logics, providing a foundation for many of the non-classical logics (although not all). These two formal systems of logic will now be examined, followed by a discussion of the non-classical logics.

1.3 Classical logic

Classical logic has a very long history. The development of syllogistic logic (the precursor of predicate logic) is generally credited to Aristotle, who lived between the years of 384 and 322 B.C. Propositional logic was developed by the Stoic school of philosophy, which arose some time after Aristotle, and continued well into the end of the second century, A.D. (Lukasiewicz, 1957, pp. 47-48).

Since those times, these two logics have been expanded in scope or improved in other ways. Gottlob Frege (1848-1925) was responsible for developing predicate logic, and MacColl has been credited as being the first to present modern propositional logic, with Frege also playing a pivotal role in the development of this logic. For a detailed history of classical logic, scholars such as Lukasiewicz (1957), Kneale and Kneale (1962), Bochenski (1961), and the very extensive Dumitriu (1977) may be consulted.

In the following discussion of classical logic, substantial reference will be made to the popular text by Copi (1979). Modern accounts of classical logic all draw, ultimately, upon the systems developed by Frege, MacColl, and the work of Boole as the founder of mathematical logic. For this reason, the text by Copi is not in any way an idiosyncratic treatment of classical logic (although different authors will vary on a few minor details). This text represents an elucidation of the standard concepts and principles that are particular to this division of formal logic.

In the following review, the discussion will be generally limited to those concepts and principles that are necessary to present a basic view of this approach to logic and the arguments that it studies. Nonetheless, some details will be provided in order to facilitate an understanding of the research that will be reported later in this dissertation. This review will begin by examining the fundamental terms and concepts that relate not just to classical logic, but to formal logic generally.

1.3.1 Fundamental terms and concepts

In formal terms, logic has been defined as "the study of the methods and principles used in distinguishing correct (good) from incorrect (bad) arguments" (Copi, 1979, p. 1). A formal argument is typically defined as "any group of propositions or statements, of which one is claimed to follow from the others, which are alleged to provide grounds for the truth of that one" (Copi, p. 2).

These statements are labelled as premisses or conclusions, depending on their role:

> The conclusion of an argument is that proposition which is affirmed on the basis of the other propositions of the argument. These other propositions, which are affirmed as providing grounds or reasons for accepting the conclusion, are the premisses of that argument. (Copi, p. 3)

Formal logicians divide arguments into two basic types: deductive and inductive. Deductive arguments are those which necessitate their conclusions. That is, if the premisses are true, the conclusion must be true (Copi, p. 3). Deductive arguments are assessed as either valid or invalid. A valid (deductive) argument is one in which it is "impossible for the premisses to be true unless the conclusion is true also" (Copi, p. 3).

In the case of inductive arguments, only *some* grounds are offered as a basis for asserting the conclusion in question. As noted by Copi, "inductive arguments differ among themselves in the degree of likelihood or probability that their premisses confer upon their conclusions" (p. 3). Clearly, inductive arguments can only be assessed in terms of the extent to which it is likely the conclusion follows from the premisses; as such, the terms valid and invalid do not apply. In any discussion of arguments, then, if the terms 'valid' or 'invalid' are used, the subject of study must (or should) be deductive arguments.

One common misconception concerning deductive and inductive arguments is that deductive arguments always involve reasoning from general premisses to a specific conclusion, while inductive arguments always involve reasoning from specific premisses to a general conclusion. This is not necessarily true.

It is relatively easy to understand why such misconceptions have evolved, since many deductive arguments *do* argue from at least one general proposition to a specific proposition, such as in the following argument:

All humans are mortal
Socrates is human
Therefore, Socrates is mortal

Nevertheless, the following example has been used by Munson (1976; p. 218) to illustrate that some deductive arguments do *not* argue from a general proposition to a specific one:

If public school teachers do not receive a wage increase, then they will be forced to strike
They will not receive a wage increase
[Therefore] They will be forced to strike

This deductive argument may be regarded as arguing from a general proposition to another general proposition.

With respect to inductive arguments, it is certainly true that many *do* argue from specific premisses to a general conclusion. There are exceptions, however, as argued by Munson (1976; p. 218) with reference to the following example:

The chocolate cake I bought at Tom's Bakery was stale
The coconut cake I bought at Tom's Bakery was stale
[Therefore] The next cake I buy from Tom's Bakery will be stale

Since the likelihood of the conclusions of inductive arguments will vary according to the degree of strength provided by the premisses, such arguments cannot be evaluated according to the dichotomy of 'valid' or 'invalid'.

In contrast, deductive arguments can *only* be evaluated as either valid or invalid, as mentioned before. An argument is valid on the condition that if the premisses of an argument are true, or were treated as if true, then the conclusion would have to be true also (Copi, p. 4). Valid arguments may contain all true propositions, but they may also contain all false propositions - as in the following example from Copi (p. 4):

All trout are mammals
All mammals have wings
Therefore, all trout have wings.

If the premisses of this argument were treated *as if* true, then the conclusion would have to be true also, so this argument is valid.

Arguments that are defined as 'sound' possess qualities over and above validity: they are valid arguments *with* true premisses (Copi, p. 5). The conclusions of such arguments will always be true. On the other hand, if an argument can be minimally stated as being valid, then it is possible for the conclusion of that argument to be false (as in the above case). The truth of a conclusion is only guaranteed if a valid argument also has true premisses (p. 5).

Invalid arguments also have interesting properties. These are illustrated by Copi (p. 5) with reference to the following argument:

If I am President, then I am famous
I am not President
Therefore, I am not famous

Although the premisses and conclusion of this argument may be true for any one person, the argument is invalid. As pointed out by Copi, this invalidity can be established by considering the following:

If Rockefeller is President, then Rockefeller is famous
Rockefeller is not President
Therefore, Rockefeller is not famous.

This argument has exactly the same form as the previous argument, but is invalid because its premisses are true but its conclusion is false (p. 5). As noted by Copi, "any argument is proved to be invalid if another argument of *exactly the same form* can be constructed with true premisses and a false conclusion" (p. 20).

As with valid arguments, the relationship between the truth or falsehood of a conclusion and the invalidity of an argument is not straightforward. It is clear from the previous examples that an invalid argument can have a true conclusion. It may also be said that an argument is not necessarily invalid just because its conclusion is false (as in the 'All trout are mammals' argument). However, "the falsehood of [an argument's] conclusion does guarantee that *either* the argument is invalid *or* at least one of its premisses is false" (Copi, p. 5).

At this point, sufficient mention has been made of the most fundamental terms and concepts in classical logic (and of formal logic generally). It is now appropriate to examine some further concepts and principles that are specific to propositional logic.

1.3.2 Propositional logic

Propositional logic only concerns itself with arguments composed of premisses and conclusions which are truth-functional compound statements, or simple statements which can be truth-functionally combined into compound statements (Copi, p. 63). These terms will need some explanation.

A simple statement is one that stands on its own in a meaningful way, such as 'The sky is blue' (Copi, p. 8). A compound statement, however, differs in that it contains another statement as a component part. A statement is only a component of a compound statement if two conditions are met. First, it must be a simple statement, and second, any other statement must be able to be meaningfully substituted in the compound statement (p. 8).

These concepts are illustrated by Copi in the following way: the last six words of the sentence 'The third wife of Bertrand Russell was a beautiful girl' could be regarded as a statement in its own right (however bizarre), but if they were replaced with another statement, such as 'Where there's smoke, there's fire', the result would not meaningful, hence the original statement is not a compound statement (p. 8).

In propositional logic, every statement is either true or false (Copi, p. 9), and therefore, every statement has a truth value. The notions of truth-values and of compound statements combine together to form the concept of a truth-functional compound statement. Such a statement is defined by Copi as a compound statement in which the overall truth value remains the same if the component statement is replaced with another component statement of the same truth value (p. 9).

At this point, it is necessary to discuss the use of symbols in representing arguments. As noted by Copi, words can be ambiguous and vague. Modern systems of logic (and not just propositional logic) use symbols to represent the elements of an argument in order to facilitate more objective evaluations (Copi, pp. 5-6). The use of symbols is due, ultimately,

to the work of Gottfried Leibniz (1646-1716), who is generally acknowledged to be the founder of symbolic logic (Styazhkin, 1969, p. 61). Leibniz has been quoted to have said:

> Ordinary languages...are yet subject to countless ambiguities and cannot do the task of a calculus...This remarkable advantage is afforded up to date only by the symbols...of arithmeticians and algebraists, for whom inference consists only in the use of characters, and a mistake in thought and in the calculus is identical. (Bochenski, 1961, p. 276)

Today, certain conventions of symbolisation now apply: statements are represented by small letters from the middle of the alphabet (such as p, q, r, and s). These letters are known as *statement variables*, for which any one written statement may be substituted for the letter (Copi, p. 8).

There are some other symbols which should be introduced at this point. These are generally termed to be connectives, or truth-functional connectives. The form that these symbols take varies from text to text, especially with some very old texts, however the meaning of these symbols is the same. The system used by Copi (pp. 8-18) will be referred to here, as the most common.

The most simple connective (which is not strictly a connective) is the tilde symbol (~) which denotes negation. Hence, if 'p' denotes 'it is raining', then the expression '~p' translates as 'it is not the case that it is raining' (or, in everyday language, 'it is not raining'). The conjunction of two statements (inserting an 'and' between the statements) is symbolised by a dot (·), hence, for example, if 'q' is used to denote 'the roof is leaking', then 'p · q' translates as 'it is raining and the roof is leaking'. The disjunction of two statements (inserting an 'or' between the statements) is symbolised by the lower case letter 'v'. If 'q' were to symbolise 'the sprinkler is on', then 'p v q' would translate as 'It is raining or the sprinkler is on'.

Another truth-functional connective is the 'horseshoe' (⊃) which indicates that a statement of an 'if-then' form is being expressed. If, for example, 'q' represents the statement 'the gutters will overflow', then 'p ⊃ q' translates as 'if it is raining, then the gutters will overflow'. Such statements are termed 'conditional' statements, with the statement 'p' known as the 'antecedent', and the statement 'q' known as the 'consequent'.

Associated with each of these truth-functional connectives are 'truth-tables', which display the various possible combinations of truth values of propositions (expressed as statement variables) which may be truth-functionally connected. Depending on these truth values, and their connective, the resultant proposition itself will have its own truth value (which is also stated in the truth-table).

As noted by Copi, the simplest example is of negation. Here, the associated truth-table is as follows:

p	~p
T	F
F	T

This shows that if a true proposition is negated, then the proposition becomes false. Similarly, if a false proposition is negated, then the proposition becomes true.

In the case of conditional statements (connected by the 'if-then' connective), the associated truth-table appears as follows:

p	q	p ⊃ q
T	T	T
T	F	F
F	T	T
F	F	T

The first line of this truth-table indicates that if the antecedent ('p') is true, and the consequent ('q') is also true, then that entire conditional statement is true. If the antecedent is true, but the consequent is false, then the conditional itself is false, as shown on the second line.

There are three commonly used methods for determining whether an argument is valid (or invalid). The first method is known as the truth-table method. This involves using truth tables to identify possible truth values of the premisses and conclusion with the ultimate goal of determining whether it is possible for the conclusion to be false while the premisses are true (Copi, pp. 19-25).

The second method involves attempting to deduce the conclusion from the premisses by using argument forms that are known to be valid (pp. 32-52). This method may require statements to be converted into a different, but logically equivalent form. A variant of this method is known as the method of indirect proof, which involves assuming the negation of the conclusion as a premiss, and attempting to deduce a contradiction (pp. 52-54). If this is possible, then the assumption must be false, rendering its negation (the original conclusion) true.

The third method is the 'Shorter Truth-Table Technique' (pp. 61-62). This method is similar to the truth-table method described above, as would be expected, but involves attempting to assign truth values to simple statements in such a way that the premisses can be made true, and conclusion made false. If it can only be achieved by inconsistently assigning truth values, then the argument is valid.

Now that some insight has been gained into propositional logic, and the types of arguments that it studies, it is appropriate to consider predicate logic. As shall be seen, much of the above can be directly related to this system of logic.

1.3.3 Predicate logic

As indicated previously, Aristotle (384-322 B.C.) is generally regarded as the founder of syllogistic logic, the precursor of predicate logic. In the ensuing centuries, various other scholars worked on this system of logic. One of the most noteworthy of these (in terms of enduring contributions) was Gottlob Frege, who developed the modern system of predicate logic. Other noteworthy scholars included Gottfried Leibniz, the founder of symbolic logic (Dumitriu, 1977, p. 24).

One scholar who lived around the time of Gottlob Frege was George Boole (1815-1864), who not only founded mathematical logic, but made some interesting psychological claims. One of Boole's most well-known works was entitled 'An Investigation of the Laws of Thought' (1854). As noted by Styazhkin (1969; p. 176), Boole believed that human thinking corresponds to the laws of logic. Naturally, this was a claim in which some psychologists have been interested. Research investigations in relation to this claim will be reported in Chapter 4.

Predicate logic is perhaps best introduced by giving an example of the type of argument that it studies. The following is one such example (it is also an example of syllogistic logic):

All humans are mortal
Socrates is human
Therefore, Socrates is mortal

The tools of propositional logic cannot be used to show that this argument is valid, since "the validity of such an argument depends upon the inner logical structure of the non-compound statements that it contains" (Copi, 1979, p. 63).

It is the task of predicate logic to deal with such arguments, which are composed of propositions which have a subject term (e.g., 'Socrates') and a predicate term (e.g., 'human'). In other words, these propositions entail reference to an individual or thing (the

subject term), which is said (in that same proposition) to have an attribute (designated by the predicate term). Interestingly, Aristotle regarded all truths as taking the form of subject-predicate propositions (Kneale and Kneale, 1962, p. 31).

In syllogistic logic, there are four basic types of subject-predicate propositions, which are traditionally exemplified and labelled as follows:

All humans are mortal (A)
No humans are mortal (E)
Some humans are mortal (I)
Some humans are not mortal (O).

In symbolising subject-predicate statements, a common convention is to use capital letters to denote the predicate term (e.g., 'H' for 'human', and 'M' for 'mortal'), and lower case letters to denote the subject when a singular proposition is involved (e.g., 's' for Socrates). Hence, the statement 'Socrates is human' would be symbolised as 'Hs', while the statement 'Socrates is mortal' would be symbolised as 'Ms'.

In general propositions, where more than one subject is referred to (e.g., 'All humans', or even 'Some humans'), the lower case 'x' is typically used to denote those subjects. These general propositions take two forms: universal or existential. Universal propositions are those in which the word 'All' precedes the subject term, such as '*All* humans are mortal'.

The word 'All' is known as a universal quantifier, and is symbolised as '(x)', which may be read as 'Given any x' (Copi, p. 65). When symbolically representing a universal statement, this symbol is used immediately before any one or more denotations of attributes that apply to these subjects.

Hence, for example, the proposition 'All humans are mortal' would be written in symbolic form as:

$(x)(Hx \supset Mx)$

This would read as 'Given any x, if x is human, then x is mortal'.

Existential propositions are those in which the word 'Some' precedes the subject term, for example, '*Some* humans are mortal'. The word 'Some' is known as an existential quantifier, and is symbolised as '$(\exists x)$', which is read as 'There is at least one x, such that' (Copi, p. 65). As for universal quantifiers, this symbol precedes the description of any attributes that apply to the subjects. To illustrate, the proposition 'Some humans are mortal' would be symbolically represented as follows:

$(\exists x)(Hx \cdot Mx)$

If converted into words, this would read as 'There is at least one x, such that x is human and x is mortal'.

Even though predicate logic studies arguments with entirely different types of statements to those studied in propositional logic, exactly the same connectives are used in symbolising premisses and conclusions, as may be seen in the previous examples.

Another similarity concerns the methods used in evaluating arguments. In propositional logic, use is made of 19 valid argument forms (or rules of inference) in determining validity or invalidity. In predicate logic, an additional four rules are used. These rules are Universal Instantiation, Universal Generalisation, Existential Generalisation, and Existential Instantiation (Copi, pp. 71-74).

On the basis of these four rules, and the 19 rules used in propositional logic, the same basic methods of proving validity or invalidity are used for arguments containing simple subject-predicate propositions of the above type (Copi, pp. 71-81) and for more complex subject-predicate propositions that contain more than one quantifier (Copi, pp. 83-107).

1.4 Non-classical logic

From the preceding discussion, it can be seen that classical logic (the dominant approach in formal logic) focuses on two very specific types of arguments: those composed of truth-functional compound statements (or simple statements that may be truth-functionally combined), and those composed of statements containing subject and predicate terms.

With respect to the *non-classical* logics, three sub-categories have been identified: 'extended' logics, 'deviant' logics, and 'inductive' logics (Haack, 1978, p. 4). The essential nature of the extended logics is that they "add a new logical vocabulary" (p. 4) to the classical logics. These extended logics include: modal logic, tense logic, deontic logic, epistemic logic, preferential logic, imperative logic, and interrogative logic (Haack, pp. 4-5).

These extended logics are described by Haack in the following way. Modal logic attempts to deal with operators such as 'necessarily' and 'possibly', while tense logic is concerned with expressions of past, present and future tense, such as 'it used to be the case that' or 'it will be the case that'. Deontic logic seeks to equip the logician with the ability to evaluate arguments which employ terms such as 'may' or 'ought'. Terms such as 'knows' and 'believes' are addressed by epistemic logic, while preferential logic deals with arguments in which the expression 'prefer' is used. Finally, sentences which are of an imperative or interrogative nature are the focus of imperative and interrogative logics. As can be seen, these extended logics literally seek to extend the applicability of classical logic to arguments composed of other types of statements.

There is, however, one extended logic that is not mentioned by Haack. Copi (1979) has devoted a chapter of his text to what he calls the 'logic of relations'. When this is examined, it is clearly an extended logic. The types of arguments studied in this logic are those in which any kind of relation is expressed between two people, places, things, or even events.

The following examples are given by Copi: 'New York is east of Chicago' (a relation of direction), 'Plato was a student of Socrates' (a relation of roles), and 'John loves Mary' (a relation of intimacy) (p. 116).

Such types of relational statement may appear in an argument, as in the following example from Copi (p. 117):

Helen likes David
Whoever likes David likes Tom
Helen likes only good-looking men
Therefore, Tom is a good-looking man.

The symbols used to express relations bear great resemblance to those used for predicate logic, except that the nature of the relation is symbolised by an appropriate capital letter, followed by two lower case letters that denote the subjects between which there is a relation. Thus, the first premiss of the above argument may be symbolised simply as 'Lhd' where 'L' indicates a relation of 'liking', and the subjects are 'h' (Helen) and 'd' (David).

This is the only symbolic convention needed to represent expressions of relations. However, other symbolic conventions are also used, as necessary, from classical logic. For example, the second premiss of the above argument may be symbolised as:

$(x)(Lxd \supset Lxt)$

which may be read as 'given any x, if x likes David, then x likes Tom'.

The methods of proof of validity for arguments such as the above are exactly the same as for propositional and predicate logic (Copi, p. 117).

While the above 'extended' logics added a new logical vocabulary to the classical logics, the 'deviant' logics use "the same vocabulary but different (usually more restricted) axioms or rules" (Haack, 1978, p. 5). The following systems of logic are extended logics: many-valued logic, Intuitionist logic, quantum logics, and free logics (p. 4).

Of these deviant logics, many-valued logics are possibly the best known. One of the major limitations of classical logic is that it only permits two-valued statements (either true or false). Such a system of logic cannot deal with cases which do not fall into either category. As an example, an object or person may not be able to be described as 'tall' or 'not tall' in predicate logic (Haack, p. 165).

One proposed solution to this is three-valued logic, which introduces a value which denotes such cases, but, as noted by Haack, the difficulty with this approach is that there is now a dividing line, which may be arbitrary, between what may be regarded as tall, and borderline (p. 165). Another many-valued logic mentioned by Haack is the popularly known 'fuzzy logic'. Here, any real number between 0 and 1 can be used to refer to any type of case involved (p. 165).

The 'inductive' logics are those systems of logic that "aim to formalise a notion of support analogous to, but weaker than, logical consequence" (Haack, 1978, p. 5). Whilst deductive arguments contain premisses which *necessitate* the conclusion (or are alleged to necessitate the conclusion), inductive arguments contain premisses that give *likelihood* to their conclusions (to differing degrees). At this point, it is important to emphasise that inductive arguments have been studied by informal logicians as well as formal logicians; however, the *type* of inductive argument studied by these two branches of logic has differed (as well as the approach to studying them).

For the most part, the inductive arguments studied by formal logicians have been those that lend themselves to analysis using Bayesian probability theory and decision theory, or those that may be characterised in a formal syntactic manner (Holland, Holyoak, Nisbett, & Thagard, 1986). Such arguments include generalisations that are drawn on the basis of a sample, statistical inferences, and those that relate to numerical probability (Barker, 1965; Holland et al., 1986). Holland et al. (1986) have argued that these formalised types of inductive argument are used very little in everyday life (p. 7).

Perhaps the least formal of the inductive arguments to be studied by formal logicians are those that involve hypotheses relating to cause (e.g., that a particular food served in a cafeteria was responsible for causing food poisoning). The nineteenth-century English philosopher John Stuart Mill developed five methods for detecting or testing causal claims of this kind. These methods are the Method of Difference, Method of Agreement, Joint Method of Agreement and Difference, Method of Concomitant Variation, and Method of Residues (Conway & Munson, 1990; Barker, 1965). These methods involve the mental application of principles, rather than the use of more mechanistic and specific rules and procedures.

1.5 Conclusion

This chapter has presented an overview of the field of formal logic, with its many component systems. Some summary observations may now be made of the kinds of arguments that are typically studied (remembering the dominance of the classical logics).

Classical formal logic studies arguments that have a well-defined structure of one or more premisses and a conclusion (the latter being affirmed on the basis of the former). Further, the premisses and conclusions are dichotomised as either true or false (with the exception of many-valued logic). These premisses or conclusions typically comprise statements that can be combined with other statements via the use of truth-functional connectives (these connectives are used in both of the classical logics and in some non-classical logics).

The premisses and conclusions in classical formal arguments are also unambiguous in their meaning, typically being represented in symbolic form for the purpose of evaluation. The arguments studied are deductive in nature. These deductive arguments are evaluated according to the dichotomy of 'valid' or 'invalid' (i.e., the conclusion either follows completely from the premisses, or it does not). The validity of an argument is no guarantee that the conclusion is true: a valid argument may have a false conclusion (but only if the premisses are false also).

Non-classical formal logic studies arguments of greater diversity than classical formal logics, but they generally still examine arguments that are highly structured and very specific in form. They either extend the tools of classical logic to arguments that use different terms (whilst retaining the key principles and methods), or they use different axioms and rules than classical logic (often more restricted), or they examine inductive arguments that lend themselves to mathematical or algorithmic-like methods of evaluation.

CHAPTER 2

INFORMAL LOGIC

2.1 Overview

The purpose of this chapter is to provide a review of informal logic, with special reference to the types of arguments that it studies. Since this branch of logic is relatively young (especially when one considers the long history of logic as a field), this chapter will begin by giving a brief account of the emergence of informal logic. The remainder of the chapter will then draw attention to the principal characteristics of informal arguments. This will be achieved by considering the issues that informal logicians have had to confront when addressing themselves to the tasks of argument identification, analysis, representation and evaluation.

2.2 The emergence of informal logic

Some time ago, Johnson and Blair (1980) noted that "something new has been emerging in logic" (p. 4). Their account of this change is worth quoting at length:

> First, there has been a turn in the direction of actual (i.e., real-life, ordinary, everyday) arguments in their native habitat of public discourse and persuasion, together with an attempt to deal with the problems that occur as a result of that focus. Second, there has been a growing disenchantment with the capacity of formal logic to provide standards of good reasoning that illuminate the argumentation of ordinary discourse. The result has been a number of initiatives to develop methods of identifying, analysing and evaluating reasoning, which do not rely primarily on the instruments or nomenclature of formal logic. (p. 5)

This disenchantment was well illustrated by an early writer in informal logic, Kahane (1971), who stated in his preface:

> In class a few years back, while I was going over the (to me) fascinating intricacies of the predicate logic quantifier rules, a student asked in disgust how anything he'd learnt all semester long had any bearing whatever on President Johnson's decision to escalate again in Vietnam. I mumbled something about bad logic on Johnson's part, and then stated that Introduction to Logic was not that kind of course. His reply was to ask what courses did take up such matters, and I had to admit so far as I knew none did. He wanted what most students today want, a course relevant to everyday reasoning, a course relevant to the arguments they hear and read about race, pollution, poverty, sex, atomic warfare, the population explosion, and all the other problems faced by the human race in the second half of the twentieth century. (p. vii)

Of course, it was not only students who were interested in studying everyday arguments. Various logicians around the world were turning their concerns to arguments as encountered in 'real life', as noted above. These logicians, however, were scattered around the world, often working without a knowledge of the ideas of their like-minded colleagues.

Fortunately, two Canadian logicians, Ralph Johnson and Anthony Blair, brought together the various isolated ideas and works of these informal logicians in such a way that a new field of endeavour was formed. In 1978, the First International Symposium on Informal Logic was held, organised by Johnson and Blair. These two logicians played a critical role in the formation of this new branch of logic.

At this point, it should be emphasised that informal logic should not be thought of as first beginning in 1978, with this symposium. At the time of their writing (1980), Johnson and Blair stated that informal logic had been emerging over the last 25 years (that is, since about 1955).

By the time the first international symposium was held, however, informal logic had "begun to take its place alongside formal logic as an independent branch of logic" (Johnson & Blair, 1980, p. 4). Since that symposium, another two international symposia have been held; the second in 1983, and the third in 1989.

In the remainder of this chapter, attention will be drawn to the observations that informal logicians have made about the nature of informal arguments, along with the implications for argument identification, analysis, representation, and evaluation. During the course of this discussion, the above-mentioned limitations of formal logic will become most evident and, conversely, it will also become quite clear that informal logic represents a genuine study of everyday, 'real life' arguments.

2.3 The general nature of informal arguments

It is perhaps most appropriate to begin by describing what is exactly meant by an 'everyday', 'real life', 'informal' argument. Essentially, these are arguments that are encountered in the many different facets of everyday life, *as they are actually expressed or presented.*

As noted by Johnson and Blair (1980), natural arguments may be found in newspapers, magazines, and popular books (p. 14). Everyday arguments may also be found in committee meetings, election campaign speeches, research articles, advertisements, seminars, law courts, everyday conversation, parliament, and so on. The following is an example of a natural argument:

> When you hear all those scare statistics about our economy and unemployment, just remember this: more Americans now have jobs than at any time in our history prior to Mr. Ford taking [presidential] office. (Kahane, 1984, p. 128)

The study of informal arguments such as these raises a number of problems, for example:

> What *is* the argument? How is it to be extracted from its surrounding rhetoric? What verbal or contextual clues may be used, and how? What principles of interpretation apply? How is the argument to be displayed fairly and perspicuously? (Johnson & Blair, 1980, p. 14).

Although Kahane (1984) did not present an analysis of the above argument, it is nevertheless a useful example to consider. In seeking to determine what the argument is, there are a number of possible answers. It is possible that the person is arguing that the statistics are incorrect. Alternatively, the person may be attempting to persuade the listener or reader to regard Mr. Ford as being successful and worthy of re-election. Yet another possibility is that the argument is intended to convince an unemployed person (or unemployed people in general) that the chances of getting a job are not as bad as they might think (with the reference to Mr. Ford being a side-issue). Without contextual clues, it is clearly difficult to ascertain the actual nature of the argument.

Not all everyday arguments are as brief as the above example. Some are extremely long and complex. In a committee meeting, for example, a person may give a 20 minute presentation in which a complex argument is put forward in favour of a certain policy. Election speeches are also often lengthy, with many subtle techniques of persuasion used throughout. These types of arguments are appropriately described as 'extended' arguments (Johnson & Blair, 1980, p. 17).

2.4 Specific attributes of informal arguments

As informal logicians turned their attention to everyday life arguments, they made numerous observations about these arguments. These observations often required them to develop new principles and strategies for identifying, analysing, representing, and evaluating these arguments. Some of the major observations, and their implications, will now be outlined.

In doing so, much reference will be made to the earlier works by informal logicians which often formed the foundation for subsequent more recent work, which will also be examined.

2.4.1 Premiss and conclusion identification

In formal arguments, the premisses and conclusions can be readily identified by virtue of the neat, orderly manner in which they are set out. In contrast, informal logicians have recognised that the premisses and conclusions of informal arguments are often jumbled in their sequence, and, to make matters even more difficult, their identity is not always clear. The 'scare statistics' example given previously is one such example. For convenience, it is re-stated here:

> When you hear all those scare statistics about our economy and unemployment, just remember this: more Americans now have jobs than at any time in our history prior to Mr. Ford taking [presidential] office. (Kahane, 1984, p. 128)

Here, the actual conclusion does not seem to be explicitly stated at all, let alone labelled. There is no 'therefore' to indicate what the conclusion is. Rather, the conclusion is merely implied (which also makes its nature rather unclear, as indicated previously). If this argument is interpreted to be arguing that the statistics are incorrect, then it would seem that the premiss (of there being more jobs now than ever before) is stated at the *end* of the argument.

These kinds of qualities of informal arguments have led informal logicians to identify various 'indicator words' that signal whether a premiss or a conclusion is being (or has been) stated.

One of the earliest informal logicians to treat this matter was Thomas (1973), who listed 18 words or phrases that often indicate that a premiss is to follow. Some of these are as follows: 'because ...', 'since ...', 'follows from ...', and, 'in view of the fact that ...' (p. 5). Similarly, Thomas also listed 21 words or phrases which often indicate that a conclusion

is to follow, such as 'therefore', 'so', 'accordingly ...', and 'suggests very strongly that ...' (p. 4). More recent writers have provided similar lists of indicator words (e.g., Kahane, 1984, p. 4; Moore & Parker, 1986, pp. 183-184).

Barry (1992) has added to these lists by referring to specific premiss indicators such as 'firstly' or 'secondly', 'furthermore', 'moreover', and 'in addition' (p. 15). He also drew attention to words that signal the use of premisses or conclusions that make a qualification, such as 'however' or 'despite this' (p. 15).

Despite this work, some problems still remain. Fisher (1988) has pointed out that some words can be used in a passage which might falsely be interpreted as indicator words; for example, the word 'because' may be used in a causal sense (e.g., 'John broke the window because he tripped'), or it may be used as an explanation (e.g., 'John broke the window because he had forgotten his key') (p. 18). In neither of these examples is a premiss being stated. In making these observations, Fisher was not opposing the use of indicator words, but simply indicating the need for caution.

Informal logicians have also recognised that some arguments do not contain any indicator words at all. The 'scare statistics' argument cited previously is one such example. Barry and Rudinow (1990) have suggested that in such instances, the analyst should first ask "What, if anything, is being advocated? What claims is the arguer attempting to establish as true? What is the arguer trying to convince me of or get me to do?" (p. 102). This helps the reader (or listener) identify any conclusion(s). If this process yields a conclusion, then the analyst can ask the following questions to determine the premisses: "What reasons, data, or evidence does the arguer offer in support of the conclusion?" (p. 102). As noted by Barry and Rudinow, arguments without indicator words require close contextual analysis.

Another approach to dealing with arguments without indicator words was proposed by Thomas (1973), who suggested that the argument analyst applies the 'Principle of Charity'. By this principle, if an argument does not contain any indicators, and that suspected

argument is a bad argument, then the passage is *not* to be regarded as an argument (p. 9). This seems to be a kind of variation on the principle of giving someone 'the benefit of the doubt'. Similar advice has also been offered by Fisher (1988) who stated (somewhat awkwardly): "if interpreting as reasoning a passage which is not *obviously* reasoning yields only bad arguments, assume it is *not* reasoning" (pp. 17-18).

Cederblom and Paulsen (1986) have also recommended this principle (referring to it as the 'Principle of Charitable Interpretation'). They suggested that argument analysts test each of the various statements in an argument as possible conclusions: the statement which should be regarded as the conclusion is that statement which is best supported by the other statements (p. 12).

These references to being 'charitable' are not isolated. Other informal logicians have recommended the use of the guiding principle of 'charity' in this context, and in others - especially in argument evaluation (e.g., Baum, 1975, p. 135; Scriven, 1976, p. 71). Such has been the frequency of these recommendations, that the term 'Principle of Charity', or some similar turn of phrase, has evolved.

The Principle of Charity, however, can be criticised (depending on how it is applied). As mentioned, Thomas (1973) has suggested that if an argument does not contain any indicators, and if the suspected argument is a bad one, then it should not be regarded as an argument. An obvious problem with this advice is that it overlooks the fact that a bad argument *may* have indeed been produced. A similar criticism could be made of the advice offered above by Cederblom and Paulsen (1986), and Fisher (1988). On the other hand, use of the Principle of Charity has merit in that it is important for an argument analyst to avoid the social and intellectual error of assuming without question that a person has indeed produced a clearly absurd argument.

The above discussion should not be taken as implying that the premisses and conclusions of informal arguments are always difficult to identify. This is certainly not true. It is simply that they are often not presented in an orderly fashion, nor are they always easy to identify.

2.4.2 Argument structure

Formal arguments have a very simple structure; each of the premisses combine to offer support for the conclusion. In contrast, informal arguments can be very complex. One of the earlier informal logicians, Thomas (1973), provided an excellent treatment of the structure of informal arguments.

In Thomas' terminology, the simplest structure of an argument is a 'linked' argument, which involves "several reasons, each of which is helped by the other(s), to support the conclusion" (p. 36). The following example illustrates this structure: 'Bill is taller than Charles. Charles is taller than Graham. Therefore, Bill is taller than Graham'. As will be noticed, this is a typical formal argument.

Thomas also described another three structures that are more complex, which are generally not found in formal logic. The first of these are 'convergent' arguments - arguments in which the premisses *independently* and *separately* provide support for a conclusion. An example given by Thomas is that of a person deciding to become a business partner with a friend (the conclusion). This conclusion was arrived at for two independent reasons: the person recalled promising to become a partner, and, the person sees the prospect of making considerable amounts of money. As noted by Thomas (1973), "in the genuine convergent argument, the support given [to] the conclusion by each distinct reason would be undiminished if the other (separate and independent) reasons(s) were false" (p. 39).

'Divergent' arguments are those in which a premiss provides support for more than one conclusion. As an example, the premiss 'It's going to rain' will support two conclusions: 'We'll get wet', and, 'The game will be cancelled' (p. 36).

The other type of argument structure identified by Thomas is the 'serial' or 'chain' argument, in which a conclusion is derived from a premiss, and that conclusion itself is used as a premiss for another conclusion. Such conclusions which are used as premisses may be termed 'intermediate conclusions' (p. 35). An example of a serial argument is as follows: "The room was sealed and empty when we entered. No one could have left it. The murderer was never in the room" (Thomas, 1973, p. 36). Here, the premiss, intermediate conclusion and conclusion are presented in sequence.

With respect to extended arguments, Thomas noted that any number of combinations of convergent, serial, linked, or divergent argument structures may be found, each meshing at different stages in the course of the overall argument, in the most complicated manner (p. 39).

2.4.3 Meaning

Informal logicians have also recognised that the content of everyday arguments is not always clear. Informal arguments can contain words, phrases or sentences that are ambiguous, imprecise, obscure, or just generally lacking in clarity. This is to be expected of course, since not all people who produce everyday arguments will be perfect in their use of language.

In order to deal with these problems, informal logicians have sought to develop strategies to assist the argument analyst in clarifying the meaning of an argument.

Scriven (1976) was one of the first to make a significant contribution to this matter. In his text, Scriven devoted an entire chapter to clarification of meaning. In this chapter, instruction is provided through example, and the reader is encouraged to develop an attitude or habit of thought which is sensitive to imprecision in assertions. One technique

recommended by Scriven (1976) is to decide what a claim excludes, and what contrast it draws.

Like Scriven, many other informal logic writers have attempted to equip the reader with skills of clarification of meaning through provision of negative examples (i.e., examples of phrases and statements that are poorly clarified).

Moore and Parker (1986) have provided quite a thorough treatment of strategies which can bring greater clarity to the meaning of an argument. In this treatment, plentiful examples are given of ambiguity, vagueness, the use of unfamiliar words, and the incidence of unnecessarily complex sentences as impediments to understanding the meaning of an argument (pp. 21-43).

One novel approach to the interpretation of meaning has been proposed by Wright (1989). He has suggested that interpretation is akin to inductive reasoning, and that an analyst should, ideally, consider the words, non-verbal signals, circumstances, and background involved in the making of an assertion. The analyst should then use these four considerations (premisses) to arrive at an interpretation (conclusion) (p. 294).

Wright (1989) has described in some detail how these various factors (considerations) can play a role in assisting the process of clarifying and interpreting meaning, and has spent some considerable space discussing other aspects of the use of language that assist the process of interpretation.

For all of this, however, Wright also recommended the Principle of Charity: when a passage is unclear, "make the best sense possible, given everything [you] know." (p. 301).

Informal logicians have also recognised that much advantage can (and should) be taken of situations in which the person who produced an argument is available or contactable for questioning (e.g., Brown and Keeley, 1990, p. 37).

2.4.4 Unstated premisses or conclusions

Informal arguments are not always stated in their entirety. As Johnson and Blair (1980) have pointed out:

> Natural arguments are usually incomplete. They make leaps from supporting reasons to claims based on them that would be plausible only if certain other assertions, which they do not mention, were also accepted. Or they list reasons which, given all the contextual signals, are supposed to lead one to accept some claim, but they don't state that claim. (p. 18)

Such incomplete arguments are often known as 'enthymemes'. While Johnson and Blair recognised that arguments may have missing *conclusions*, as well as missing premisses, informal logicians seem to have mainly (if not exclusively) concerned themselves with the problem of missing *premisses*.

One of the first informal logicians to treat this issue was Angell (1964). He suggested that premisses may be unstated for the following reasons: they may be regarded as obvious to the listener, the arguer may not even be conscious of them, or they may be unstated as an attempt to 'hide' less tenable propositions from being attacked (p. 384).

Informal logicians have recognised the many difficulties involved in attempting to identify missing premisses. Angell (1964) alluded to these when he asked: "how, precisely, do we go about discovering an unexpressed reason or conclusion? Must we have a mysterious ability to see into the thoughts of the speaker? If so, our topic should be relegated to the realm of clairvoyance" (p. 386).

Although the process of identifying missing premisses is inevitably a difficult one, various logicians have formulated different approaches to best tackle this task.

Angell (1964) advocated that the argument analyst proceed on the assumption that "the argument he is dealing with is implicitly more logical and well constructed than it appears to be when strictly taken" (p. 386). This recommendation resembles the Principle of Charity discussed previously - except applied in a different context. Operating on this basis, Angell recommended that the analyst should first identify the premisses and conclusion, and then determine what additional reasons would make the given premisses relevant, and the argument acceptable or valid (pp. 387-388).

Scriven (1976) regarded 'imagination' and 'originality' as playing a role in the identification of missing premisses, but said that the process of identification requires the consideration of three points:

> First, the assumptions have to be strong enough to make the argument sound. Second, they should be no stronger than they have to be .... Third, a considerably more subtle point, you also want to try to relate the assumptions as you would formulate them to what the arguer would be likely to know or would believe to be true. (p. 85)

Here also, the Principle of Charity has been applied.

The following example of an enthymeme can be used to illustrate the difficulties in identifying missing premisses. In this example, the person is arguing in favour of the de-regulation of oil prices:

> The main reason for this is, of course, that we have just got to provide enough incentive to the oil companies to explore new fields, given the fact that the cost of explorations in the marginal areas has now gone up considerably. (Scriven, 1976, p. 86)

Scriven identified three missing premisses in this argument: that if oil prices are de-regulated, the price will increase; that the prices will increase enough to provide the necessary incentives; and thirdly, that the oil companies will use the money for further exploration (p. 87).

There is, however, another missing premiss that Scriven did not identify: that new exploration of oil fields is a worthwhile endeavour. (At this point, it should be stated that missing premisses are not necessarily questionable propositions.)

Thus, the identification of missing premisses is subject to human fallibility. There is certainly no algorithmic process that may be used that guarantees the identification of all missing premisses.

Although it might be thought to be effective to ask an arguer to supply his or her missing premisses, this is not necessarily the case. As noted by Scriven (1976), the arguer "may not be very good at detecting his assumptions" (p. 86). Further, the arguer may not even be aware of them (as mentioned previously). There will often be times, as well, in which an arguer is not present or contactable to be asked such questions.

One particularly significant contribution to the topic of missing premisses was that of Ennis (1982). This was a most important paper in that it was one of the first in the informal logic literature to examine assumptions from a *theoretical* perspective as well as a practical one (i.e., it dealt with the nature of assumptions as well as the process of identifying them). It should be noted here that in the informal logic literature, the terms 'missing premiss' and 'assumption' tend to be used interchangeably, along with some other terms, such as 'hidden premisses'.

In this paper, Ennis (1982) listed and explained some improper lay-usages of the term 'assumption' (pp. 61-62). The first of these involves using the term 'assumption' in the sense of 'conclusion', for example, a person may state that 'I assume you have finished,

because you are packing up'. The second of these involves using the term 'assumption' when referring to a proposition whose truth or acceptability is not completely verified. An example given by Ennis (1982) is that of a person's retort: "That's only an assumption. You don't know it" (p. 61). The third mis-usage identified by Ennis (1982) relates to the term 'assumption' being used in the sense of 'adoption', for example, "His assumption of an air of humility was quite unbecoming" (pp. 61-62).

Ennis' main contribution, however, was to distinguish between two types of assumptions: unstated premisses and pre-suppositions; the former being divided into two types: 'back-ups' and 'gap-fillers'. Ennis defined 'back-ups' as assumptions which "provide backing for a proposition already thought to be part of an argument" (pp. 62-63), and 'gap-fillers' as assumptions "that join with one or more other premisses in giving support to the conclusion" (p. 63).

Ennis illustrated these two types of unstated premisses by using the following traditional type of argument:

> If Mike is a dog, then Mike is an animal
> Therefore, Mike is not a dog

According to Ennis, this argument contains the assumption 'All dogs are animals'. This is a back-up assumption because it backs up the first premiss. The other assumption in this argument is 'Mike is not an animal', which is a gap-filler assumption because it joins with the premiss to support the conclusion.

In the context of these two types of hidden premiss, Ennis has made a distinction between 'needed' assumptions and 'used' assumptions. Needed assumptions are those assumptions "that an argument or action needs" (p. 64) - that is, they "are *needed* to support the conclusion, to make the argument a good one, to make a position rational, etc." (p. 63).

Ennis described used assumptions as assumptions that an arguer has actually used; they are "unstated reasons that a person actually use[s] consciously (or subconsciously, if you believe in unconscious reasons) as a basis of argument or action" (p. 63). Ennis further asserted that "claims that a used assumption has been identified are empirical mental-event-or state claims about the thinking of a person" (p. 64). Interestingly, Ennis stated that used assumptions are "like beliefs, if not always beliefs" (p. 67).

He also noted that a person might need a certain assumption, but not use it, or, a person might use an assumption, but not need it (p. 63). Further, a person might use and need the same assumption in an argument.

It is now appropriate to examine Ennis' other type of assumption: pre-suppositions. As shall be seen, these relate to specific statements (or questions) rather than entire arguments (although of course, such statements or questions may be used in an argument).

Ennis observed that there are at least two types of pre-suppositional questions: those that require a 'yes' or 'no' answer, and 'why' questions that contain a proposition. A pre-supposition of a yes/no question "is a proposition that, if false, would make both 'Yes' and 'No' answers to a question inappropriate" (p. 80). One such example given by Ennis is as follows: 'Has Jones stopped beating her husband?'. This question contains the pre-supposition that Jones at one time did beat her husband. Hence, if this proposition is false (i.e., Jones has never beaten her husband), then one cannot answer 'yes' (i.e., Jones has stopped), or 'no' (i.e., Jones has not stopped). Both answers are inappropriate.

Ennis (1982) defined 'why' types of pre-suppositional questions in the following way, using 'X' to represent a proposition: "a pre-supposition of a "Why X?" question is X (with subject-verb order reversed)" (p. 80). One example given by Ennis is as follows: 'Why does Jones beat her husband?'. This contains the pre-supposition that Jones beats her husband. To give a different example, a person might ask the question: 'Why is the

government cutting back on expenditure in education?'. This question pre-supposes that the government *is* cutting back its expenditure on education.

With respect to pre-suppositional *statements*, Ennis offered the following definition: "a pre-supposition of a statement is a proposition that if false, would make the statement neither true nor false" (p. 80). An example given by Ennis is that the statement "The missile gap will take five years to eliminate". This statement contains the pre-supposition that there is a missile gap. Hence, if there is no missile gap (i.e., it is false that there is a missile gap) then it is neither true that the missile gap will take five years to eliminate, nor is it false that the missile gap will take five years to eliminate. The statement is rendered neither true nor false.

Although Ennis (1982) spent some considerable time defining and illustrating back-up and gap-filler unstated premisses, used assumptions and needed assumptions, and pre-suppositions, he also offered some quite elaborate criteria for identifying each of these types of elements in an argument.

Another contribution to the topic of assumptions was that of Gough and Tindale (1985). Like Ennis, they spent some time addressing terminological matters - although different ones. They argued very convincingly that the term 'hidden premiss' is more correct than 'missing premiss' because the term 'hidden premiss' implies that there is something present in the argument (albeit unstated), while the term 'missing premiss' implies that there is something actually missing from the argument, in the sense of an absence. On this basis, they argued that the process of identifying hidden premisses should take the form of 'extraction' from the argument, rather than 'adding' material.

Gough and Tindale also argued that 'assumptions' and 'hidden premisses' are two distinct entities. It is worth quoting the entire passage in which this claim was put forward:

> Some mention of assumptions is required here, since they are often identified with hidden premisses. Obviously in any argument there are many points assumed by the

> author, some of which are quite trivial; the activity of arguing presupposes such a base of beliefs which are simply assumed. Assumptions, then, are the *underlying beliefs* that an author does not recognise as there or takes to be too obvious or commonplace to mention explicitly...we would want to keep them distinct from the actual premisses (whether they be stated or hidden). Hence we shy away from calling any hidden premiss an assumption because it is neither helpful nor always true: Often the hidden premiss is simply an unstated point, integral to the argument, but not at all an assumption in the sense defined above. (p. 100)

This asserted difference seems to be in need of further explication, since it is not clear how an 'unstated point' that is 'integral' to an argument cannot be regarded as underlying that argument. It is perhaps for this reason that the distinction does not seem to have been embraced by other informal logicians.

For this reason, the various terms of 'assumption', 'hidden premiss', 'implicit assumption', and 'unstated premiss' and so on will be regarded as one and the same in this dissertation, and for convenience, the single term 'assumption' shall be used. This, however, is not to dismiss Gough and Tindale's distinction, but simply to adopt a conservative stance on an issue that may be in need of considerable theoretical development.

From the preceding discussion, it is clear that there are many issues and difficulties that informal logicians have had to tackle in their study of assumptions in everyday arguments. These may be considered to be of even greater magnitude when extended arguments are considered (compared with the relatively simple examples given by Ennis, for example). Other work has also been conducted that illustrates further the complexities of this aspect of informal argumentation (e.g., Burke, 1985; Donn, 1990; Gilbert, 1991; Grennan, 1994; Hitchcock, 1985; Levi, 1995; Van Eemeren & Grootendorst, 1982a, 1982b). As will be reported later, three psychologists have also examined the nature of assumptions (Delin, Chittleborough, & Delin, 1994).

2.4.5 Premiss-conclusion relationships

In the previous chapter, it was noted that formal deductive arguments involve the claim that the premisses provide absolutely conclusive grounds for the truth of their conclusions.

Kahane (1971) has argued that "it is rare in daily life to claim deductive certitude for the conclusion of an argument" (p. 32), and that most informal arguments are inductive. As may be recalled from Chapter 1, "inductive arguments involve the claim only that their premisses provide *some* grounds for their conclusions" (Copi, 1979, p. 3).

Thomas (1973) has proposed a scheme that is consistent with Kahane's belief in the dominance of inductive arguments in everyday life (pp. 72-79). He argued that all arguments can be located on a continuum, with deductively valid arguments at one extreme of the continuum, and all remaining arguments occupying the remainder of the continuum, possessing different degrees of support for their conclusion - except for arguments having no support for their conclusions, which fall at the opposite end of the continuum. According to Thomas (1973), "empirical study of undoctored examples of reasoning in natural language seems clearly to show that in different arguments, the reasons lend different degrees of support for the conclusion" (pp. 72-73).

Implicit in the comments made above by Kahane (1971) and Thomas (1973) is the view that *some* everyday arguments (albeit a small proportion) may actually take the form of formal, deductive arguments. Indeed, there seems to be no reason why a doctor, for example, would not employ a formal, deductive argument in the course of explaining a certain diagnosis to a patient.

At this point, it should be said that this deductive-inductive distinction has not been accepted by all informal logicians. The most severe (and extreme) response has come from Weddle (1979, 1980, 1987) who argued that the deductive-inductive distinction cannot be satisfactorily maintained at all. Weddle offered three reasons for this view. The first of

these was that inductive arguments actually become deductive arguments if the missing premisses are filled in. The second reason was that the 'hedging' of a conclusion of an inductive argument (e.g., using terms such as 'likely') actually makes the argument deductive. Weddle's third reason was that some invalid deductive arguments are actually inductive (because they give some grounds for their conclusion).

Weddle's views have been vigorously opposed and criticised by others (e.g., Fohr, 1980; Freeman, 1983; Hitchcock, 1980). Specifically, Hitchcock (1980) provided some counter-examples to the claim that inductive arguments become deductive by supplying missing premisses (p. 9). Freeman (1983) rejected the truth of Weddle's claim that the hedging of an inductive argument's conclusion makes the argument deductive, and criticised the examples that Weddle uses in arguing that some invalid deductive arguments are inductive (pp. 4-5).

More interestingly, another criticism of the deductive/inductive distinction is not actually of this distinction *per se*, but of the associated claim that this is an exhaustive categorisation, into which all arguments can be assigned. The main proponent of this view is Govier (1980a, 1980b, 1980c, 1987) who proposed a third category of arguments.

Govier (1980c) gave the following example of an argument that is neither deductive nor inductive: "Assisted euthanasia should not be legalised, because (1) the danger of abuse is too great, and (2) medical advances being possible, we never know for certain that a particular patient is incurably ill" (p. 3).

Govier argued that this argument cannot be regarded as deductive or inductive because there is a different kind of relationship between the premisses and the conclusion. The conclusion cannot have truthhood *or* likelihood ascribed to it. When this example is studied, it is clear that the conclusion is not a factual statement, but rather, a statement of recommendation - a 'should' statement (or, in this case, a 'should not' statement). Such instances of recommendation cannot be regarded as 'true', or 'likely', but rather, as 'wise', or 'advantageous', or something similar.

Although Govier proposed a term for arguments such as this ('conductive' arguments), this term will not be used here, since some confusion is apparent in Govier's later discussion of the nature of these arguments (see Appendix A). For the sake of convenience, these arguments shall be described here as 'prescriptive' arguments, since they 'prescribe' or recommend something.

Despite Govier's confusion, it is clear that she has identified a category of arguments that cannot be regarded as either deductive or inductive. When one considers the various topics of argumentation in everyday life, it seems reasonably evident that a large proportion of arguments contain 'should' conclusions.

Numerous examples abound: advertisers present the message that the reader or viewer 'should' buy a certain product or service; entire committee meetings may be taken up with arguments and counter-arguments as to what 'should' be done about various problems within the organisation; politicians may argue about what a certain piece of legislation 'should' dictate; community lobby groups may argue that traffic lights 'should' be installed; academics may propose that a course 'should' contain certain specific topics; and so on.

In light of the above remarks by Kahane (1971), Thomas (1973) and especially by Govier, it is clear that evaluations such as 'valid' or 'invalid' are not appropriate for most everyday arguments. As Johnson and Blair (1980) have commented, "such unqualified judgements are too simplistic to be significant or interesting verdicts about most everyday argumentation" (p. 21). The relationship between the premisses and the conclusions in most real-life arguments requires a more complex vocabulary of evaluation.

2.4.6 Types of support and persuasion

A great deal of work has been conducted by informal logicians in an effort to develop standards and methods for evaluating everyday arguments. The almost exclusively favoured

approach focuses on 'fallacies'. Almost every textbook on informal logic contains at least one chapter on fallacies, with Thouless (1953) being perhaps the earliest.

The term 'fallacy' is used very loosely by informal logicians. In the writer's view, there are two major types of 'fallacy' in the literature. The first of these corresponds to those arguments in which the conclusion cannot or should not be accepted on the basis of the support offered and/or the persuasive means that are employed. Such fallacies may be described as 'Faulty Argument Forms'. The second category of 'fallacies' are less traditional in their nature. These correspond more to *procedural* tactics or strategies used by an arguer in order to attack another argument, or to defend an argument, or to avoid dealing with criticisms of a proposed argument. These may be described as 'Faults in Argument Conduct'.

In the informal logic literature, the favoured approach to argument evaluation is to examine the argument in question for any example(s) of the various 'fallacies'. If any such examples are found, then an appropriate evaluation can be made of the argument under scrutiny.

It is perhaps only when this literature on fallacies is studied that one gains the fullest appreciation of the nature of informal arguments. When such a study is conducted, it soon becomes apparent that everyday argumentation contains several types of support or persuasion that are not present in formal arguments.

The first of these is the use of emotional forces. There are several fallacies that illustrate this. The first of these to be discussed here is known as 'Appeal to Pity', which is also known as 'Argumentum ad Misericordiam'. (This is one of several fallacies that are often still referred to by their Latin names).

Barry and Rudinow (1990) defined this type of argument as a "fallacious but often effective strategy that attempts to persuade people by making them feel sorrow, sympathy, or

anguish, where such feelings, however understandable and genuine, are not relevant to the issue at stake" (p. 240).

In the informal logic texts, a popular example is that of students attempting to persuade lecturers to increase the mark awarded for an assignment by directly or indirectly appealing to the lecturer's pity (e.g., Barry & Rudinow, 1990, p. 240; Munson, 1976, p. 268). A student might, for example, indicate that he or she will have to repeat a whole year of study if the assignment is not given a pass. Alternatively, a student may express feelings of great disappointment - and even deliberately shed tears. Such appeals to pity are irrelevant: a student's mark is, or should be, a reflection of the quality of the work.

It cannot be asserted, however, that all appeals to pity are necessarily fallacious. Some appeals to pity by students may be regarded as entirely valid. It may be judged, for example, that very recent tragic circumstances in a student's life would have detrimentally and significantly affected that student's performance in an examination, and that the student should be granted a supplementary examination on compassionate grounds. Walton (1992) in fact has strongly argued that there are many circumstances when emotional appeals are sound (whether these be appeals to pity or any other emotion).

This itself illustrates another complexity of everyday argumentation: an argument may be fallacious under some conditions, but not others. In contrast, formal arguments that take the form of 'Affirming the Consequent' (or any other formal fallacy) are always fallacious.

Another fallacy that involves the use of emotional forces is 'Argumentum ad Metum' which involves an appeal to fear. Moore and Parker (1986) have illustrated this with the example of the common sales strategy of attempting to elicit a fear in prospective buyers of missing out on a good opportunity (p. 131).

A more subtle fallacy that relies upon emotional factors is the fallacy of 'Argumentum ad Populum' which involves an 'Address to the Passions' of the people being addressed

(Hamblin, 1970, p. 164). A speaker may make use of this technique by appealing to any one or more of the attitudes or sentiments that an audience is known to have, as a means of fallaciously persuading them to a certain conclusion (Munson, 1976, p. 271).

As noted by Munson, a speaker may appeal to the audience's sense of patriotism, dislike of change (or liking for the 'old ways'), or even specific racial or social prejudices. A speaker may use certain words (like 'outsiders' or 'minority groups') that are deliberately intended to trigger an audience's prejudices (such as racial intolerance), and thus assist in the process of persuasion (Munson, 1976, pp. 271-272).

Although not all fallacies employ emotional factors, their mere existence only serves to heighten the possible differences between informal arguments and formal arguments. In the latter, conclusions are put forward *only* on the basis of 'factual' reasons (premisses), which provide 'logical' grounds for the conclusion.

There is another feature of the informal fallacies of emotional appeal, and informal arguments generally, that is worth discussing. In everyday life, it seems, few arguments are presented without consideration of the recipient(s) - in fact, it could be said that most arguments are presented for a specific recipient (or group of recipients, such as an audience, or an electorate). The examples of the fallacies of emotional appeal considered above are cases in point. In contrast, the kind of arguments studied in formal logic often seem to exist in isolation from any kind of inter-personal context - or at least these contexts play a minimal role.

The use of emotional influence is only one way in which everyday arguments contain types of support or persuasion that is not found in formal argumentation. A second type of support or persuasion that may be found in everyday arguments (but not in formal arguments) is the use of non-verbal elements.

This may be exemplified by the fallacy known as 'Confident Manner'. This has been described by Michalos (1970) as a strategy in which an arguer deliberately adopts a manner which exudes confidence, as a means of increasing his or her persuasive influence (p. 36). The fallacy takes place when a person is persuaded towards the conclusion because of the confidence with which it is asserted - and not because of the content of the argument. It is worth noting that sometimes an arguer will use a confident manner in an attempt to make a weak argument appear stronger.

A confident manner is obviously a function of various non-verbal signals. Non-verbal signals may be divided into two types: those that are linked to speech (such as timing, pitch, and emphasis), and those that are independent of speech (Argyle, 1988). There are many ways in which a person may convey confidence through speech-linked non-verbal signals: speaking with vigour, and placing emphasis on certain words, for example.

Non-verbal signals that are independent of speech may also convey confidence. A person's posture can convey much confidence. The use of forceful hand movements to accentuate the words spoken can also add considerable impact to a speaker's message.

All of these non-verbal expressions of confidence can add to the persuasive force of an argument, and these alone may be sufficient to cause a listener to be persuaded by the accompanying argument - even if it is poorly reasoned.

2.4.7 Arguments in dialogue

In the above section, it was shown that informal arguments contain some types of support or persuasive influence that are not present in formal arguments. This observation was the result of a consideration of the informal logic literature on fallacies. There is, however, another observation that can be made about the nature of informal arguments - again from this literature.

This observation stems in particular from some of the fallacies that have been described previously as 'Faults in Argument Conduct'. One good example is the fallacy known as 'Red Herring'. The name of this fallacy is derived from the practise in fox hunting of trailing a red herring across (and away) from the path of the scent of a fox, thus diverting the hunting dogs away by the stronger scent (Johnson & Blair, 1977, pp. 53-54). This was carried out at times in order to save a fox for another day, or to call off the dogs being trained. A somewhat analogous process takes place when a person uses the 'Red Herring' in argumentation.

This fallacy involves a person responding to a criticism or a claim by introducing an issue into the discussion that is not strictly relevant, but which acts to shift the focus of discussion away from the original criticism or claim (Johnson & Blair, 1977, p. 55). In the following example, a Senator is defending a criticism he had read of the city of Windsor being 'grimy' and 'ugly':

> When I read this I was incensed ... Those of us who live there know that [Windsor] is not a grimy city. It is a city that has one of the best flower parks in Canada. It is a city of fine schools, hard-working and tolerant people. (Johnson & Blair, 1977, p. 54)

As indicated by Johnson and Blair, the first response is relevant, in that it tackles the issue of beauty, but thereon introduces the issue of other aspects of the city by pointing to its good people and schools. Such considerations are irrelevant to the original claim.

Pirie (1985) has noted that the closer the 'red herring' is to the original issue, the more effective it is. Further, if the red herring is particularly interesting, the original arguer will be more likely to forget the original proposition he or she was arguing towards (p. 144).

This fallacy illustrates how everyday arguments are not always presented in a single episode. The overall argument is presented in the response, but elements of it are also contained and

referred to in the original criticism by the first arguer. This point is made even clearer by reference to another fallacy, known as Tu Quoque (or 'You also').

This fallacy consists of a person responding to a criticism by making a counter-criticism of the original person - it is "a change of subject from a claim made by a proponent to one made against him" (Pirie, 1985, p. 167). Munson (1976) has given an excellent example:

> Senator Dawson has accused me of misappropriating campaign funds, of turning them to my own private use. The charge is a grievous one, and to answer it I need only say to you that a careful look at Dawson's own practice will make it clear that why he makes such an accusation. His own financial dealings are not beyond reproach, and like the cornered snake, he strikes out at me. (p. 288)

It can be seen here that part of the speaker's argument is contained in the attack by Senator Dawson. The speaker's argument of defence refers to material contained in Dawson's attack, but does not specify all the details of that material. The speaker's response, then, joins with some of what Dawson stated, in constructing the argument.

Thus it can be seen that in everyday life, some arguments may be 'spread' across several exchanges with another person - and not be neatly contained in any one piece of communication. The above is one such example. Other examples may include a person gradually building up a series of reasons for putting forward a certain conclusion - over a relatively lengthy number of exchanges with another person.

2.5 Conclusion

This chapter has sought to characterise the principal characteristics of informal arguments and to highlight some of the theoretical and practical issues that informal logicians have had to deal with.

The characteristics of everyday arguments (or at least their potential characteristics) may be summed up as follows. Everyday arguments are expressed in all the variation that a language permits, including ambiguity, imprecision, lack of clarity, and general vagueness. Everyday arguments may contain their premisses and conclusions in a jumbled order, and may be difficult to identify. Informal arguments may also be extremely long (extended arguments), and may have a very complex structure. Informal arguments are often incomplete, with either conclusions or premisses left unstated (particularly the latter). Everyday arguments are rarely deductive in nature, but may be inductive. Many everyday arguments are prescriptive (i.e., their conclusions prescribe or recommend something). Informal arguments may also employ the use of emotional influences in the course of persuasion, and may also involve the use of non-verbal elements in this process. Finally, the full content of an everyday argument may be 'spread' over several exchanges in a dialogue.

When the characteristics of these arguments are compared to the characteristics of formal arguments (as described in Chapter 1), it can be seen that they are substantially different. It may also be argued that very many, if not the majority, of the arguments encountered in real-life appear to be more like those studied in informal logic than those studied in formal logic. Although it is not possible to numerically establish this preponderance, the nature of the two types of arguments would seem to warrant such an assertion.

It is upon this basis that informal arguments will be the subject of study in this dissertation.

CHAPTER 3

DEFINING AN ARGUMENT

3.1 Overview

Given that informal arguments will be the subject of study in this dissertation, it only seems proper that a definition of an informal argument be provided. The definition to be used here is that which has been proposed by Chittleborough and Newman (1993) who argue that previous definitions generally fail to allow for, and refer to, the complex and varied nature of informal arguments. In this short chapter, this definition is presented, followed by a short discussion.

3.2 Introduction

For reasons given previously, this dissertation will focus on informal arguments. Given this focus, it only seems proper that a definition of these kinds of arguments be formally set out. To this point, attention has only been drawn to the different possible aspects of these arguments.

The definition of informal argument that will be adopted here is that of Chittleborough and Newman (1993), who argue that past definitions are not adequate and, accordingly, they develop and argue in favour of an improved definition. The extent to which this definition has been accepted in informal logic cannot be easily ascertained; however, there has not been any negative (or positive) response to it in the journal literature in the ensuing six years (according to a citation search); nor does there appear to be any definitions that seek to compete with it or replace it.

Before developing and presenting their definition, Chittleborough and Newman clarify a terminological issue relating to arguments. They cite the work of O'Keefe (1977), who

indicates that the term 'argument' has at least two meanings. The first of these is intended to refer to reasoning or persuasion towards a certain proposition. The second of these is used to refer to interactions in which participants 'argue about' something (in the sense of a dispute). O'Keefe labels the former as 'argument$_1$', and latter as 'argument$_2$'. Chittleborough and Newman suggest that these be respectively referred to as 'type 1 arguments' and 'type 2 arguments' in cases of plural expression.

As mentioned in the Introduction, this dissertation is concerned with type 1 arguments (although they were not referred to in this way). This is not to say, however, that type 2 arguments will be ignored. As Chittleborough and Newman note, O'Keefe (1982) states that type 1 arguments may be employed in type 2 arguments. It requires little imagination to realise that if two people are disputing a claim (i.e., they are having a type 2 argument), then they will probably be offering support for their position on the matter (i.e., they will be using type 1 arguments in the context of their type 2 argument). Examples of this were observed in the previous chapter when the fallacies of 'Red Herring' and 'Tu Quoque' were mentioned.

According to Chittleborough and Newman, existing definitions of type 1 arguments in the literature are inadequate in that none of them adequately refer to, or allow for, the wide variety of characteristics that informal arguments often possess. The characteristics they mention include those discussed in the previous chapter - unstated premisses, prescriptive conclusions ('should' conclusions), the use of emotional appeals, the involvement of non-verbal signals, and so on. These claims are made on the basis of an examination of 27 definitions of type 1 arguments in informal logic and other scholarly literature (see Appendix B).

It is for this reason that they address themselves to the task of developing an improved definition of type 1 arguments - a definition which shall now be cited and discussed.

3.3 The proposed definition

Chittleborough and Newman set out their definition in two parts, but strongly emphasise that they cannot be considered in isolation of each other. The first part of the definition sets out the basic minimum conditions that must be fulfilled in order for an argument to exist. The second part builds upon this by elaborating on the various components of an argument. This definition is as follows:

> An argument has been put forward when there has been an intention to either establish a proposition, or persuade one or more people to accept a proposition (where such an acceptance would involve a change in belief, strength of belief, or a change in behaviour).
>
> The object-matter of an argument's intention (to establish or persuade) is its conclusion. A conclusion will be either a prescribed action, or an assertion, and this conclusion may or may not be stated. Attempts to achieve an argument's intention will involve the use of at least one supportive and/or at least one persuader (but cannot solely employ non-verbal persuaders), and these attempts may involve consciously or unconsciously used assumptions. (p. 202).

Quite apart from the use of some unfamiliar terms, this definition is in need of some further explanation and discussion. This will take place by considering each part of the definition separately.

3.4 The purpose of argument

As stated above, the first part of the definition specifies those minimum conditions that must be fulfilled in order for an argument to exist. As will be noticed in the definition above, the criterion offered is one of intention or purpose.

This of course is a psychological principle. Chittleborough and Newman argue that this is a vital starting point for defining an argument, since the source of arguments, ultimately, is human. In this context, they quote Brockriede (1975) who elaborates further, asserting that: "arguments are not in statements, but in people" (p. 179), and that "argument is a human process" (p. 179). It is not possible to determine whether or not an argument has been produced without first considering human intention in communication.

From their review of existing type 1 definitions in the literature, Chittleborough and Newman identify two possible purposes for which a person will put forward an argument: to *establish* a proposition, or to *persuade* someone to accept a proposition. The concept of persuasion needs no explanation, but the concept of 'establishing a proposition' is less clear. The authors make it clear that here, they are referring to the intention to 'arrive at' a conclusion - usually a new conclusion. A detective, for example, may attempt to determine whether a murder victim knew his or her murderer, by reasoning out aloud with some colleagues.

While intention is a necessary part of defining an argument, it is not sufficient. Some reference needs to be made to the components that may be found in an argument. This of course is addressed by the second part of the definition.

3.5 Components of arguments

Given that arguments exist to either establish or persuade, Chittleborough and Newman ask the question: "to persuade or establish what?". The answer is of course: conclusions. There are two types of conclusion identified by these authors: prescriptive and assertive.

The former are conclusions that prescribe or recommend something - that is, they are 'should' conclusions. These types of conclusions were mentioned in Chapter 2. Examples include statements such as "greater incentives should be provided for people to take out

private health insurance cover" and "there should be an introduction of annual roadworthiness tests on all vehicles".

Assertive conclusions, in contrast, are just that - conclusions in which something is asserted, for example, a fact, value, opinion, or feeling might be asserted.

In the definition, it is stated that an argument's conclusion may or may not be stated. This was specified so as to allow for those enthymemes described by Johnson and Blair (1980) in which an arguer gives reasons that are intended to lead to a certain claim, but that claim is not stated.

The remainder of the definition sets out the means that might be used by an arguer in attempting to establish a conclusion or persuade one or more people to a conclusion. The definition states that 'attempts to achieve an argument's intention will involve the use of at least one supportive and/or at least one persuader (but cannot solely employ non-verbal persuaders)'.

Chittleborough and Newman define a 'supportive' as "reason or item of information presented in an argument which is intended to provide support for a conclusion" (p. 198). Whilst such reasons or items of information might be termed 'premisses', the authors deliberately avoid the use of this term. They point out that the term 'premiss' is usually understood as referring to a written or verbal reason for a conclusion - and then indicate that some supporting reasons are *not* verbal. They give the example of charts or photographs being used to support a claim. Hence, a sales representative may display a graph of plummeting sales figures (supportive), and state that the company's marketing strategy needs to be improved (conclusion).

The concept of a 'persuader' is entirely new. The authors define a persuader as a "psychologically manipulative technique used by an arguer with the intention or hope of increasing the chances of the conclusion being accepted by a recipient" (p. 196). They

divide these persuaders into three categories: verbal persuaders, non-verbal persuaders which relate to the arguer, and non-verbal persuaders independent of the arguer.

Examples of verbal persuaders include using words in such a way as to elicit emotions in a recipient such as pity or fear - emotions that will make the recipient more likely to accept a conclusion. Examples of arguments that use this type of strategy have been given in Chapter 2.

The authors identify two types of non-verbal persuaders that *relate to the arguer*: those that are linked to speech, and those that are independent of speech. This distinction is based upon the work of Argyle (1988) on non-verbal communication. One example of a non-verbal persuader that is linked to speech is the use of a confident tone of voice in order to lend greater effect to an argument. This specific example was also given in the previous chapter. Non-verbal persuaders that relate to the arguer, but which are independent of speech might include the use of certain facial expressions, or other 'body language'. Chittleborough and Newman give the example of a person adopting a forlorn facial expression, hoping to elicit pity (perhaps as an adjunct to using verbal attempts to elicit pity).

Non-verbal persuaders that are *independent of the arguer* include all strategies that are not expressed in written or verbal form. Chittleborough and Newman maintain that the majority of these take a visual form, but allow for other sensory modalities. They give the example of an advertisement in which the manufacturer's brand of mattress is displayed in attractive, cosy-looking bedroom - a strategy intended to increase the likelihood that viewers will purchase that brand of mattress.

In the definition, it was stated that an argument will employ the use of at least one supportive and/or at least one persuader - but specified that an argument cannot solely employ non-verbal persuaders. The reason given for this qualification is that it rules out instances such as the following: a person threatens another with a knife and demands money. Here, it

could be said that the 'conclusion' is essentially a prescriptive one - 'You should give me your money' (although it undoubtedly would not be expressed this way). The non-verbal persuader is the presentation of a knife - with the hope that this elicits fear in the victim. In the view of Chittleborough and Newman, this does not count as an argument, although they do concede that with borderline cases, mere opinion will dictate whether or not something corresponds to an argument.

The last part of the definition states that attempts to establish or persuade 'may involve consciously or unconsciously used assumptions'. This reference to assumptions that have been 'used' is not a casual one. The authors make it clear that they are referring to the work of Ennis (1982) in which he distinguishes between 'used' assumptions and 'needed' assumptions (as discussed in Chapter 2). Whilst used assumptions might also be needed assumptions, needed assumptions might not be used (as noted by Ennis), hence the definition refers only to *used* assumptions.

Whilst discussing terminology, it should be stated here that Chittleborough and Newman use the term 'assumption' in a very general sense, referring to "any unstated component of an argument ... that an arguer uses in the course of attempting to persuade or to establish (apart from ... non-verbal aspects of supportives or persuaders)" (pp. 199-200). As an example of this broad usage, they regard pre-suppositions as being assumptions.

This completes a discussion of the definition offered by Chittleborough and Newman (1993) for the term 'argument'. It should be quite clear that it allows for a wide variety of aspects of arguments that are encountered in everyday life.

Despite this strength, Chittleborough and Newman recognise that it is likely that further refinements could be made to their definition. The task of attempting to fully encapsulate the variety of form and content of informal arguments is not an easy one, and may even prove impossible. Nonetheless, they offer this definition as a significant improvement on other definitions in the informal logic literature, and accordingly, will be adopted here.

CHAPTER 4

PSYCHOLOGICAL RESEARCH ON ARGUMENTS

4.1 Overview

In this chapter, a review will be provided of theory and research that has been generated by psychologists on arguments, or, more specifically, on the generation and evaluation of arguments. This will be presented with a view to determining the extent to which psychologists have examined informal arguments.

4.2 Introduction

As indicated in the introduction to this dissertation, arguments are not only of interest to logicians. With the exception of computer-based reasoning, most arguments have a human source, being a product of mental events.

It should come as no surprise then, that psychologists have studied arguments and argumentation in a great deal of detail. One would hope that this effort would have been focused upon informal arguments at least as much as formal arguments, given the preponderance of the former (as argued in Chapter 2).

In order to determine this, the writer conducted an extensive computer literature research. This included databases in philosophy as well as psychology, in order to be thorough.

In this chapter, the outcome of this literature research will be given. Since a detailed review is not seen as necessary, or appropriate, the review shall focus on major areas of investigation. Through this review, conclusions may be drawn as to the extent to which psychologists have studied informal arguments.

4.3 Early experimental work: errors in reasoning

The earliest experimental psychologist to examine human reasoning appears to have been Wilkins (1928), who focused on the types of arguments studied in predicate logic (one of the sub-fields of formal logic). It may be recalled from Chapter 1 that these arguments are composed of statements that take either an A, E, I, or O form. These statements are expressed below in their respective written form:

All A are B

No A are B

Some A are B

Some A are not B

Wilkins (1928) investigated the extent to which participants could correctly judge whether certain conclusions follow from the stated premisses of various categorical syllogisms. (Naturally, a range of specific propositions were used, rather than generic ones such as presented above). As would be expected, he found that the participants made a number of different kinds of errors.

For the next 40 years (approximately), psychologists examined error patterns in predicate reasoning, and attempted to explain why these errors take place. These explanations generally fall into two categories. The first of these may be described as relating to the participants' subjective impressions of the statements. The second category of explanations relates to the role of the participants' personal beliefs.

4.3.1 Errors due to 'subjective impressions' of statements

Woodworth and Sells (1935) proposed that the various errors observed by Wilkins (1928) could be explained in one of three possible ways (or in their terms, by one of three 'hypotheses').

The first of these was the 'ambiguity' hypothesis which related to the meaning of the word 'some'. They argued that the word 'some' in 'Some A are B' could be interpreted by participants as meaning 'at least one, but not all', when it is actually meant as 'at least one, and, perhaps all' (at least in formal logic). (It may be recalled from Chapter 1 that the above existential proposition may be translated as saying that 'There is at least one x, such that x is A and x is B' - or, in other words, 'at least one, and, perhaps all A are B').

This highlights another difficulty with the applicability of formal logic to everyday argumentation. It would seem that when most people state, for example, that 'Some police officers are corrupt', they are stating that *only some* police officers are corrupt (i.e., believing that there are also some who are not corrupt).

The second hypothesis was the 'wariness' hypothesis, which was that participants are generally less willing to accept universal conclusions (e.g., 'All A are B') than particular conclusions (i.e., existential conclusions such as 'Some A are B'). The suggested reason for this was that the former are seen as more substantial and significant, and in greater need of support from the premisses.

The 'atmosphere effect' was the third explanation offered by Woodworth and Sells (1935) for errors in predicate (categorical) reasoning. According to this hypothesis, the 'A' statement has an 'all-yes' atmosphere, the 'E' statement has an 'all-no' atmosphere, the 'I' statement has a 'some-yes' atmosphere, while the 'O' statement has a 'some-no' atmosphere. They proposed that when participants do not understand the strict logical meaning of these statements, they are influenced by the general 'atmosphere' of the statement, as just described.

When Woodworth and Sells tested their hypotheses against experimental data, they concluded that when participants do not accept conclusions predicted under the atmosphere

hypothesis, nearly all of the exceptions could be explained by the other two hypotheses of 'caution' and 'ambiguity' (of the word 'some') (p. 456).

Shortly after this work, Sells (1936) proposed a modified hypothesis, representing a combination of the 'atmosphere effect' and 'cautiousness' hypotheses. He tested this hypothesis using 169 syllogisms and reported that it was completely successful in predicting the error tendencies of the participants.

It was not until 1959 that work re-commenced on this line of research. Chapman and Chapman (1959) argued that Sells' modified atmosphere hypothesis should apply to the *completion* of syllogisms as well as the *evaluation* of entire syllogisms. Accordingly, Chapman and Chapman presented their participants with two premisses, and invited them to decide, under multiple-choice conditions, which conclusion followed from the presented premisses. They found that the results did not support either the original atmosphere hypothesis, or the modified atmosphere hypothesis (p. 224).

Chapman and Chapman offered two explanations for the error patterns they observed. The first of these related to the manner in which the participants interpreted the statements, in terms of their converse form. This has become known in the literature as the 'conversion' hypothesis. Chapman and Chapman argued that the participants tended to regard the converse of A and O statements ('All B are A', and, 'Some B are not A') as true, whereas they are actually false. In contrast, only the converse of E and I statements ('No B are A', and, 'Some B are A') are still true (p. 224).

The other errors observed by Chapman and Chapman were explained as being due to the participants employing inductive probabilistic reasoning of the form: "things that have common qualities or effects are likely to be the same kinds of things" (pp. 224-225). Chapman and Chapman illustrated this by saying that it is easy for participants to produce the following invalid syllogism:

Some X are Y

Some Z are Y

Therefore, some X are Z

Chapman and Chapman asserted that the majority of errors they observed could be explained in either of these two ways (p. 225).

Some time later, Begg and Denny (1969) compared Sells' (1936) atmosphere hypothesis to the conversion hypothesis, and concluded that the atmosphere hypothesis best explained their results.

It is perhaps due to the conflicting results that researchers were obtaining that this entire line of investigation ended with the work of Ceraso and Provitera (1971). They found, in contrast to Begg and Denny, support for the conversion hypothesis.

4.3.2 Errors due to personal beliefs

The second line of research that arose from the work by Wilkins (1928) related to the role of personal belief. Janis and Frick (1943) appear to have been the first to make these investigations, seeking to experimentally test the "widely-held belief that people are likely to be satisfied with unsound arguments if they accept the conclusion to which the arguments lead" (p. 73), and vice versa.

Like Woodworth and Sells (1935) and their successors, Janis and Frick (1943) also studied Aristotelian syllogisms. By using Chi-Square tests, they found significant patterns: when participants agreed with the conclusion of an invalid argument, they tended to judge that argument as being valid, and when participants disagreed with the conclusion of a valid argument, they tended to regard that argument as invalid (p. 76).

Similar results were obtained by Morgan and Morton (1944) in their second study (the first involved a test of the atmosphere hypothesis). The participants were given 15 Aristotelian syllogisms on emotional topics (mainly relating to the Second World War) and 15 equivalent syllogisms expressed in symbolic form. The participants were offered five possible conclusions that could be drawn from the two premisses; one of which they had to select as logically following from the premisses (somewhat like a multiple choice question). They found a significant difference in the number of errors in deduction between the two sets of data, in the expected direction. When examining the emotional syllogisms, they found that 36% of the conclusions chosen were consistent with personal beliefs.

Further results consistent with the hypothesis of 'emotional involvement' were found by Lefford (1946) who conducted a study similar to Janis and Frick (1943). Henle and Michael (1956), however, failed to obtain significant results when they replicated the study by Morgan and Morton.

4.4 Other investigations into reasoning

To this point, two research directions have been described that have stemmed from the work of Wilkins (1928). One was concerned with the 'atmosphere' hypothesis (and related hypotheses). The other was focused on the role of personal beliefs. Research effort along these two lines of investigation quickly dwindled away.

There was, however, one other line of investigation that attempted to explain errors in human reasoning. This did not arise from the work of Wilkins (1928), but rather, was initiated by Henle (1962). Strictly speaking, however, Henle was concerned with explaining what she regarded as *apparent* errors in human deductive reasoning.

Henle (1962) began by asking the question: "do errors in deductive reasoning mean that the logical process has been violated?" (p. 369). To this point, one would be inclined to state

that there is little doubt that participants can be *shown* to employ invalid and irrational thinking sequences on different occasions.

In the view of Henle, however, errors in deductive reasoning do *not* mean that the principles of logic have been violated - at least, not necessarily. On the basis of her experimental work, she argued that:

> where the thinking process results in error, it can often be shown that it does not violate the rules of the syllogism. Many errors [can be] found to be accounted for not in terms of a breakdown of the deductive process itself, but rather in terms of changes in the material from which the reasoning proceeds. (p. 377).

This conclusion was drawn on the basis of an experiment in which participants were given deductive arguments to evaluate (again, these were Aristotelian syllogisms). Following this evaluation, the participants were asked to provide grounds for their evaluation.

Henle (1962) identified several processes which accounted for the 'errors' observed. The first of these was the participant failing to accept a logical task - by evaluating the conclusion, and not the inference (p. 370). This failure to accept a logical task may have been operating in the experiments of Morgan and Morton (1944) and Lefford (1946).

Another process identified by Henle (1962) was the "re-statement [by the participant] of a premiss or conclusion so that the intended meaning is changed" (p. 371). This was presumably an accidental process. She also found that some participants only considered one of the premisses that was presented (p. 371). Finally, Henle found that participants sometimes added an additional premiss to the presented arguments, although this was infrequent (p. 372).

The main conclusion that Henle drew from these findings was that "if we ... consider only the material actually used in reasoning, the subjects' deductions are seen to be correct" (p. 372).

It is important to note that Henle did not conclude that participants do not ever commit reasoning errors. She only asserted that many are not violations of the rules of logic. Nevertheless, she did claim that "the data tend ... to support the older conception that these laws [of logic] are widely discernible in the thinking process" (p. 373). It is worth noting at this point that George Boole believed that thinking corresponds to the laws of logic (as mentioned in Chapter 1).

Stewart (1961, 1965, 1966) was also interested in the same questions as Henle, but from a different perspective. Stewart was interested in answering the question of whether people *can* reason in a manner consistent with the laws of logic. In the first of his set of experiments, Stewart (1961) stated that he was interested in whether "a given number of logical laws ... [are] actually present among ... college students" (p. 297). When Stewart referred to the laws being 'present', he appeared to mean whether the participants regarded such laws as 'reasonable' (p. 301). The logical laws he presented to participants were Modus Ponens, Modus Tollens and what he called 'Syllogism' (there does not seem to be any modern equivalent of the form he described this as taking).

Although Stewart (1961) manipulated other variables, his main results were concerned with the participants' ability to recognise these valid rules of inference as indeed valid. His findings were favourable, hence he reports that "what has been shown is that certain deductive forms of inference are existent in the population" (p. 305). Stewart concluded that:

> by indicating the existence of valid forms of inference, the basic research has been provided for confirming the hypothesis that the communication of ideas from one mind to another is a function of various validity patterns existent in those minds ... for

> it is our contention that the communication of ideas from one mind to another takes place via deductive systems-of-thought, and, validity patterns, of course, constitute the basis of such systems. (p. 305).

The later studies by Stewart (1965, 1966) very closely mirrored his earlier study, except that he explored some variations in the material that the participants were confronted with - namely, negated propositions (Stewart, 1965), and arguments of greater complexity (Stewart, 1966).

4.5 Negation and hypothetico-deductive reasoning

After approximately 40 years of studying deductive reasoning, psychologists found more and more specific matters to investigate. It is not necessary to identify them all; the main point of interest is that psychologists were continuing to exclusively study deductive arguments. This may be exemplified by briefly considering two large areas of investigation: processing of negative statements, and hypothetico-deductive reasoning.

The first psychologist to study negative statements was Wason (1959). Wason presented his participants with a series of squares divided into four quadrants, with a star in each quadrant. The stars were coloured green, red, yellow, and black. The quadrants were also numbered from one to four. The participants were given two sets of 24 different squares, with the coloured stars in different positions. The 24 squares were appropriately balanced.

Below each square was a statement concerning the nature of the colours in two of the quadrants. These statements were either affirmative (e.g., 'There is both Yellow in 4 and Red in 3') or negative (e.g., 'There is NOT both Green in 4 and Black in 3'). For the first set of squares, Wason asked the participants to "adjust the statement so that it agrees with the situation" (p. 94). For the second set of squares, Wason asked the participants to "adjust the statement so that it conflicts with the situation" (p. 94). This design resulted in

four conditions in which participants were processing propositions that were either false negatives, false affirmatives, true negatives, or true affirmatives.

Wason found that the mean response times were fastest for the true affirmatives condition, then false affirmatives, and then true negatives. The slowest response times were found with the false negative propositions. The differences between each of these conditions were statistically significant. In sum, Wason found that participants were more easily able to evaluate and process affirmative propositions than negative ones.

Wason offered the following as a possible explanation for his results: people are geared towards processing positive information since it is "more vital to find out what is the case (usually expressed affirmatively) than to find out what is not the case (usually expressed negatively)" (p. 102).

In a subsequent study, Wason (1961) recognised that the previous study suffered from an asymmetry: the word 'red' denotes red, for example, but any of the words 'green', 'black', or 'yellow' negates 'red'. Accordingly, Wason used a different design in which the statements concerned either even or odd numbers (which are symmetrical in their implications).

In this study, two types of tasks were presented to the participants. The first was a construction task, in which participants had to state a number that either did, or did not, make a statement true or false. The statements were presented in an incomplete form, ending in, for example, ' ... is not an odd number'. The second task was an evaluation task, in which participants did not have to actually produce any number, but had to evaluate the truth or falsehood of statements such as 'Ninety-two is not an even number'.

The results of this study were the same as for the previous study. However, for the evaluation task, Wason found that the mean response time for the true negatives was slower than for the false negatives (rather than the reverse, as in the construction task).

These two studies by Wason generated considerable interest in negation on the part of other psychologists. Many studies followed that examined negation from several different aspects (e.g., Gough, 1965; Greene, 1970a, 1970b; Jones, 1966, 1968; Miller, 1962; Miller & McKean, 1964; Slobin, 1966; Wason & Jones, 1963).

At around the same time that these investigations were taking place, another area of interest was also receiving considerable attention: hypothetico-deductive reasoning.

This work began with a study conducted by Wason (1966) who presented participants with a deceptively difficult task. The participants were presented with several cards, and were told that the cards were two-sided, with a number on one side, and a letter on the other. The task required of the participants was "to decide which cards they would *need* to turn over in order to determine whether the experimenter was lying in uttering the following statement: *if a card has a vowel on one side then it has an even number on the other side*" (p. 146).

As noted by Wason, the correct method was to choose cards with vowels, and cards with odd numbers, since a card displaying a vowel with an odd number on the reverse side would disprove the statement, as would a card displaying an odd number with a consonant on the reverse side (p. 146).

According to Wason, however, the most frequent response was to choose cards showing vowels, and cards showing even numbers (p. 146). He also found that while participants correctly tended to think that finding a vowel with an odd number would disprove the experimenter, they also tended *not* to think that a consonant with an even number would also disprove the statement (p. 146).

Wason then proposed the hypothesis that participants regarded vowel-even number cards as verifying the statement, vowel-odd number cards as falsifying the statement, but consonant cards (of any type) as being irrelevant in the task (p. 146). In addition, Wason proposed

that participants selected cards showing even numbers due to their inability (overall) to override the tendency to seek to establish the truth of a proposition.

This study by Wason generated an enormous amount of interest. With computer technology in the 1970s impacting on cognitive psychology, many information-processing models were developed that attempted to explain how participants set about addressing the Wason card-selection task (as it is called).

Johnson-Laird and Wason (1970) were among the first to produce such a model. (It is worth noting at this point that these two psychologists have contributed enormously to deductive reasoning research, and have been very influential.) This model was based, in part, on two observations. The first of these was that the card-selection task involves testing a conditional (if-then) statement ('if a card has a vowel on one side, then it has an even number on the other side'). The second, and related, observation was that participants need to employ 'if-then' reasoning when deciding which cards falsify the rule being tested.

The model proposed by Johnson-Laird and Wason employed the computer metaphor of the participant 'examining the rule', 'retrieving' the conditional truth table (as mentioned in Chapter 1), scanning the cards, deciding whether any fit the criterion of having an antecedent and consequent which would falsify the proposition being tested, and so on, until the participant 'exits' from the procedure (p. 143).

Johnson-Laird and Wason built into their model an explanation for the previously mentioned tendency for participants to choose cards that verify the proposition, rather than disconfirm it. This explanation, which was restated later by Wason and Johnson-Laird (1972), was simply that participants vary in their level of 'insight' into the fact that their task is to falsify the proposition, not verify it (the latter of which seems to be the most 'natural' process for participants) (Wason & Johnson-Laird, 1972, p. 188).

A great deal of further work has been carried out on this selection task, or variants of it. Johnson-Laird, Legrenzi, and Sonino-Legrenzi (1972) gave participants a more 'everyday' task, of testing the proposition that 'If a letter is sealed, then it has a 5 d. stamp on it'. They found that significantly fewer errors took place in the choice of envelopes than with a more abstract selection task (p. 397). Other researchers have found similar effects (Bracewell & Hidi, 1974; Gilhooly & Falconer, 1974). Nevertheless, others have not been able to replicate these results (Griggs & Cox, 1982; Manktelow & Evans, 1979). This line of research has continued with the work of others such as Griggs and Cox (1983), and Cheng and Holyoak (1985).

4.6 Theories of deductive reasoning

From about the 1970s onwards, psychologists became interested in developing models and theories of the three main types of deductive reasoning: propositional, predicate, and relational. As shall be seen, many of these theories attempt to explain successful reasoning sequences.

4.6.1 Schema theories of propositional reasoning

Whilst working to develop theories of propositional reasoning, some psychologists recognised that modern propositional logic is limited in its applicability to everyday *language*. Johnson-Laird (1975), for example, noted that the truth-functional connective for conjunction is unable to be applied to propositions such as 'Mark and Anne make a splendid couple' (p. 16). He also noted that problems may be encountered when attempting to 'calculate' overall truth values for conditional statements, giving the example of 'If this picture is by Picasso, then it was painted in 1910'. Here, it does not make sense to determine the truth value of this conditional if in fact Picasso did not paint the picture; it simply becomes irrelevant (p. 25).

The response to observations such as this has been to propose that people use various 'inference schemata' which are similar to the rules of inference mentioned in Chapter 1 - except that the connectives are written in English, rather than in symbolic form. The purported advantage of this system is that it permits greater flexibility and applicability.

The first model of propositional reasoning was produced by Johnson-Laird (1975) who proposed that people possess two sets of inference schemata; a primary set, and an auxiliary set (pp. 27-28). An example of such an inference schemata is as follows:

Not both A and B

B

Therefore, Not A

Johnson-Laird (1975) incorporated these inference schemata into a model of propositional reasoning that drew strongly upon the computer flow-chart characterisation of processes that Newell and Simon (1972) made popular.

Soon after the work of Johnson-Laird (1975) and similar work by Osherson (1975), Braine (1978) developed a highly complex model of human propositional reasoning (p. 13). Braine intended that his model be a 'natural logic of reasoning', whose connectives "should capture [the] essential semantic and syntactic properties of the corresponding English words" (p. 5).

Following the above three works, Rips (1983) proposed a computer model of natural propositional reasoning named 'ANDS' (A Natural Deduction System). This, he maintained, extended the earlier models to a more powerful theory (p. 39).

In this model, Rips proposed the existence of a set of 14 'inference routines' in human propositional reasoning which operate in either a forward or backwards direction. Forward routines are those that are used to work from premisses to a conclusion, whilst backwards

routines are those that operate in reverse. An example given by Rips of a backwards routine is as follows:

If there is both an M and a P, then there is an R
There is an M
There is a P
Therefore, there is an R.

Here, it is necessary to refer back to the first premiss in order to draw the conclusion (p. 48).

Rips also argued for the existence of a set of 'supposition-creating rules' which are useful for situations in which it is necessary to assume a proposition in order to establish the truth of a conditional (p. 49).

Rips proposed that ANDS operates by scanning the available schemata in order to determine whether they can assist in meeting certain reasoning goals. If so, the appropriate inference routine is then brought into action to make a deduction (pp. 50-51).

Another model that should be mentioned is that of Braine, Reiser, and Rumain (1984), who set out to revise the earlier work of Johnson-Laird (1975), Osherson (1975), and Braine (1978). Braine et al. (1984) noted that due to recency, the work of Rips (1983) could not be incorporated into their model.

The most noteworthy aspect of the theory proposed by Braine et al. is that it did not just seek to explain successful sequences of reasoning, as all of the previous models have attempted to do. Braine et al. built into their model a series of explanations for errors in reasoning. These included comprehension errors (where premisses or conclusions are misconstrued) and processing errors which "comprise lapses [in] concentration, errors in

execution of the application of schemas, failure to keep track of information in working memory, and the like" (p. 318).

4.6.2 Theories of Aristotelian syllogistic reasoning

Given the large volume of early experimental work on Aristotelian syllogisms, it is not surprising that psychologists also attempted to develop models of predicate reasoning.

This work began with Johnson-Laird and Steedman (1978) who proposed a four-stage analogical theory of predicate reasoning that attempted to explain both successful and unsuccessful reasoning (pp. 76-82). According to this model, the first stage involves the semantic interpretation and representation of the 'A', 'E', 'I', or 'O' types of premisses.

With respect to this process, Johnson-Laird and Steedman suggested that "a class is represented simply by thinking of an arbitrary number of its exemplars" (p. 77) - for example, a person would represent the premiss of 'All the artists are beekeepers' by imagining a number of artists, and then tagging each of them as a beekeeper (p. 77).

In the second stage, the representations of each of the premisses are combined into a more complex representation. In the third stage, a conclusion is formulated. With respect to the latter, Johnson-Laird and Steedman set out the various paths and rules which govern the kinds of conclusions that can be drawn, depending on whether the premisses are positive (affirmative) or negative, or universal or existential.

The final stage involves a logical test. The process described by Johnson-Laird and Steedman appears to be analogous to a search for counter-examples. (It may be recalled from Chapter 1 that a counter-example is an instance in which the premisses are true but the conclusion false.) It is at this stage that Johnson-Laird and Steedman explained occurrences of unsuccessful reasoning: if the testing is not exhaustive, errors will occur.

This four-stage theory appeared to be the genesis of what was known as the 'mental models' approach to explaining predicate reasoning, as promulgated by Johnson-Laird and co-workers. This approach typically proposed a set of stages similar to that described above, and was most fully developed, to begin with, by Johnson-Laird (1983).

Soon after the publication of this book, Johnson-Laird and Bara (1984) extended and significantly modified the four stage 'analogical' theory of Johnson-Laird and Steedman (1978), but re-described it as a theory based on mental models (p. 27).

This theory only specified three steps. The first represented a combination of the first two stages described by Johnson-Laird and Steedman (1978). The last two steps remained the same. In this theory, greater attention was given to the way in which errors can take place. Johnson-Laird and Bara pointed out, for example, that errors can take place in the very first stage of interpretation of premisses - such as the error of regarding the statement 'All A are B' as equivalent to 'All B are A' (p. 32).

They also indicated that errors can take place in the stage where conclusions are formulated, due to limits in short-term memory. Such limits may cause certain conclusions to not be considered.

The model proposed by Johnson-Laird and Bara also elaborated on the final stage of searching for counter-examples. They proposed a rather complex set of five procedures which determine the number of "alternative models of the premisses which render putative conclusions false" (p. 36) (i.e., counter-examples). They commented that the greater the number of alternative models to be searched, the greater the load on short term memory, and hence the harder the task.

This same basic model has also been applied to more specific aspects of reasoning with quantifiers (e.g., Johnson-Laird & Byrne, 1989; Johnson-Laird, Byrne, & Tabossi, 1989).

4.6.3 'Image' and 'linguistic' theories of relational reasoning

In comparison with propositional and predicate reasoning, relational reasoning has attracted relatively little attention from psychologists. As may be recalled from Chapter 1, relational reasoning involves arguments that express some kind of relation between objects or people, for example, 'A is heavier than B; B is heavier than C; therefore A is heavier than C'. In the psychological literature, these types of arguments are known as 'ordering syllogisms', since they specify the order of items on some dimension, such as weight.

One of the most frequently cited theories is that which is proposed by Huttenlocher (1968). Huttenlocher put forward a 'spatial imaging' hypothesis to explain how people reason relationally. According to this hypothesis, people use their visual imagination to 'place' the position of objects referred to in the premisses (p. 555). This then facilitates the evaluation of a conclusion, or the generation of a conclusion that expresses a statement of order. Huttenlocher reported experimental support for this theory.

Very soon after this paper, Clark (1969) proposed a complex opposing theory. This was a linguistic theory that predicted reasoning performance on the basis of the way in which people understand the language of relational premisses and conclusions.

After experimentally testing his model, Clark claimed that the results were consistent with the predictions that follow from the theory. Clark also argued that Huttenlocher's data was actually consistent with this linguistic theory.

Each of the proponents of these two models have vigorously criticised their counterpart's theory (Clark, 1971; Clark, 1972; Huttenlocher & Higgins, 1971; Huttenlocher & Higgins, 1972), until the debate appeared to dissolve.

At a later date, however, Sternberg (1980) put forward a mixed linguistic-spatial model. Sternberg proposed that people first "linguistically decode the verbal information presented

in the premisses" (p. 126), and then "spatially recode the information into a form that permits the transitive inference to be made" (p. 126) (in a manner consistent with Huttenlocher and Higgins (1971)).

4.7 Research on inductive arguments

During the time that the above theories of propositional, predicate and relational reasoning were being developed, some work was being carried out on inductive arguments. As mentioned in Chapter 1, inductive arguments are distinct from deductive arguments in that the premisses only confer likelihood upon their conclusions. Deductive arguments assert conclusions with certainty.

The initial principal investigators of inductive reasoning were Amos Tverksy and Daniel Kahneman. These two psychologists were especially interested in the 'heuristics' that people use when assessing the likelihood of various propositions. In particular, they were concerned with faulty heuristics, or at least problematic heuristics, along with the accompanying biases and errors.

In their first (and less-cited) study, Tversky and Kahneman (1971) used research psychologists as participants. They presented them with information about several hypothetical studies. In these studies, the statistical information that was given was generally limited to sample sizes and 't' statistic values. Tversky and Kahneman found a significant tendency in these participants to regard small samples as representative of the population from which they are drawn. They concluded that there was "considerable evidence for the belief in the law of small numbers" (p. 109).

Very soon after this paper, Kahneman and Tversky (1972) described two other heuristics that they regarded as commonly employed when making probabilistic judgements: the 'representativeness' heuristic (p. 431) and the 'availability' heuristic (p. 451). These two heuristics were also given separate treatments by Kahneman and Tversky (1973) and

Tversky and Kahneman (1973), respectively, but the most thorough discussion of these was given in a later paper still (Tversky & Kahneman, 1974).

Tversky and Kahneman (1974) maintained that the Representativeness heuristic is typically used when people estimate the likelihood of object A belonging to class B. They described this heuristic as making this type of estimation on the basis of how representative A is of B.

As an example, Tversky and Kahneman presented participants with the description of 'Steve', who is shy but helpful, very tidy, organised and precise. The participants were then asked what occupation Steve is most likely to hold: a farmer, librarian, or sales representative (p. 1124).

It was found that the participants made their assessment on the basis of the extent to which 'Steve' is representative of librarians, farmers, and sales consultants who are known by the participants (pp. 1124).

Tversky and Kahneman identified five different errors that can result from the use of this heuristic (pp. 1125-1127). One of these is worth mentioning here: the lack of consideration of prior probabilities - for example, the number of farmers compared to librarians. As noted by Tversky and Kahneman, these figures need to be taken into account when they are very different.

With respect to the Availability heuristic, Tversky and Kahneman saw this as being typically employed when people are required to judge the probability of an event. They described this heuristic as basing this type of judgement on the availability of examples or instances in memory. Tversky and Kahneman identified four possible errors that may arise from the use of this heuristic. Two of these will be mentioned here.

The first of these relates to memory retrieval. Events that are recent or dramatic, for example, are more easily recalled than other events, and this can adversely affect the

judgement of the probability of having a road accident, or of being burgled, for instance. Such estimated probabilities may be inflated beyond the 'real' probability (p. 1127).

Another source of error relates the effectiveness with which people are able to search for information. As an example, Tversky and Kahneman asked participants to decide whether there are more English words starting with the letter 'r' than words that have 'r' as the third letter. They found that the participants incorrectly judged that there are more words with 'r' as the first letter than as the third. Their explanation for this was that search processes are more effective when seeking the first letter of words than the third (p. 1127).

Tversky and Kahneman (1974) also described a third heuristic that they had not mentioned in any of their previous papers. They maintained that this heuristic is typically involved when people are required to make an estimate which can be adjusted from a given figure. This heuristic, which they called Anchoring, involves making an estimate that is biased towards the provided figure.

To illustrate, Tversky and Kahneman asked some participants to estimate the proportion of African countries in the United Nations. The participants made their estimate, and were then presented with a random number between 0 and 100. They were asked whether this percentage figure was higher or lower than their estimated percentage. They were then invited to adjust their estimate. Tversky and Kahneman found that the participants who were given the figure of 10% had a median estimate of 25%, while participants who were given the figure of 60% had a median estimate of 45%.

This type of research on heuristics was continued for some time afterwards (Kahneman & Tversky, 1982a; Kahneman & Tversky, 1982b; Nisbett, Krantz, Jepson, & Kunda, 1983; Nisbett and Ross, 1980; Tversky & Kahneman, 1983).

The work of Nisbett and Ross (1980) was especially noteworthy in that it built upon and extended this work on heuristics and biases, with particular application to the making of

social judgements and causal attributions for behaviour. This particular work appears to be the first indication of an attempt by psychologists to examine everyday reasoning - at least, one very specific aspect of it.

4.8 More recent work on reasoning

From the foregoing review, it can be seen that until about 1980 psychologists almost entirely neglected the study of everyday arguments and reasoning, focusing instead on formal, deductive arguments, with some work on inductive reasoning. From around that time onwards, interest in deductive arguments continued, with some new areas of attention; however, there were some signs of greater interest (albeit relatively small) in everyday argumentation.

4.8.1 Deductive reasoning

It is very clear that there has been a continuation of the many areas of previously described research on deductive reasoning. This can be seen in the research reviewed by Evans (1982, 1983), and Manktelow and Over (1990). Manktelow and Over cite current work in the areas of negation, conditional logic (if-then arguments), Wason's selection task, predicate logic, and some of the non-classical logics such as deontic logic and intensional logic.

With early and current work showing limits and deficiencies in human thinking, psychologists have raised questions relating to the rationality of human thinking (and the nature of rationality itself). One of the catalysts for research and discussion in this area was Cohen (1981) who argued that human irrationality cannot be experimentally demonstrated. The topic of rationality has gained increasing interest in recent years, as noted by Manktelow and Over (1993) who survey these developments.

Another new area of interest has related to attempts to develop *general theories of reasoning* that apply to all types of deductive reasoning - not just specific forms such as propositional or predicate reasoning. These theories generally fall into three main classes: the rule or schema theories, the content-specific rule theories, and the mental models theories (Johnson-Laird & Byrne, 1991, p. 23).

Of these three theories, Eysenck and Keane (1990) claimed that "the weight of the evidence points at present to some form of model theory of reasoning" (p. 454). These theories were originally applied to predicate reasoning by Johnson-Laird and his co-workers.

In a major work, Johnson-Laird and Byrne (1991) took their earlier mental model theory, developed it further, and applied it to propositional reasoning, predicate reasoning, and relational reasoning. They argued that their model successfully accounts for patterns of human performance in all three domains of deductive reasoning (p. 147).

4.8.2 Everyday and inductive arguments

From about the time of 1980 onwards, psychologists have paid more attention to genuine, everyday arguments, as mentioned previously. This work, however, has still been quite limited in its extent.

Perkins, Allen, and Hafner (1983) appear to be the first psychologists to have focused their work on typical everyday arguments in a relatively unrestricted way (as opposed to Nisbett and Ross (1980) who were interested in some very specific types of everyday reasoning).

As has also been argued in this dissertation, Perkins et al. (1983) maintained that everyday reasoning is much more complex than deductive reasoning (pp. 178-179), and that "in everyday situations, ... strict deduction is a rarity and the more esoteric syllogistic forms hardly ever appear" (p. 189).

Their declared purpose was to investigate the kinds of difficulties or errors that most often arise in everyday reasoning. Accordingly, they presented participants with an issue to think about, such as whether violence on television significantly increased the likelihood of violence in real life, or whether a five-cent deposit on bottles and cans would significantly reduce litter. The participants were required to reach a tentative position on the issue, if possible, after five minutes of considering it. They were then asked to state their position, and their reasoning towards that position. If participants were unable to reach a position, they were asked to explain the reasoning on both sides of the issue that made drawing a conclusion difficult (p. 180).

After this, each participant was asked to object to two aspects of the argument they had produced. Also, depending on the course of the interview, the experimenter usually made an objection. In addition to this process of collecting objections, two investigators listened to a large proportion of the audio-taped recordings of the participants' arguments, and wrote down their own objections to the arguments put forward by the participants.

Perkins et al. (1983) acknowledged, however, that they could not be fully confident that the objections made by these investigators were necessarily sound. As they noted, "we do not believe that the soundness of an objection to an informal argument can be defined in any more rigorous way than through the evaluation of other human judges" (p. 181). Nonetheless, they regarded the investigators' objections are likely to be reasonably sound, since they were very familiar with the issues.

Perkins et al. gathered approximately 2,000 objections from their study, which were categorised by two judges. They reported a degree of inter-judge agreement that was 'adequate', although not very high (p. 181). The outcome of this process was the identification of 55 categories.

When Perkins et al. examined the frequency of objections, they found that 80% of the objections fell into only 8 of the 55 categories (p. 181). These included, amongst others,

'Contrary Consequent' (the objection that something opposite to the asserted consequence of an action could occur), 'External Factor' (the objection that something has been overlooked), and 'Counter-examples' (the identification of actual examples or cases that run counter to an inference).

After reporting these categories of objections, Perkins et al. completed their discussion by presenting a characterisation of the qualities of 'naive thinkers' as opposed to 'critical thinkers' (pp. 186-188) - with a view (at least in part) to explaining the kinds of errors that were found in the arguments they studied.

They described the former (naive thinkers) as essentially operating according to a 'makes-sense' epistemology: "such reasoners act as though the test of truth is that a proposition makes intuitive sense, sounds right, rings true. They see no need to criticise or revise accounts that do make sense - the intuitive feel of fit suffices" (p. 186). Perkins et al. exemplified this by referring to some participants in their study who thought that it 'made sense' to suppose that people will return bottles with deposits on them.

In contrast, they characterised the critical thinker as having a knowledge of the potential errors and problems involved in attempting to draw conclusions; as seeking to actively challenge ideas and conclusions; and as having a repertoire of logical sequences and heuristic forms that can be used in reasoning (pp. 187-188).

Since this work by Perkins et al. was conducted, several other studies have sought to examine different aspects of everyday reasoning. Some of these studies, however, have actually examined everyday examples of *formal* reasoning, rather than genuine everyday reasoning itself.

Lave, Murtaugh, and de la Rocha (1984) was one example of such a study. These investigators examined arithmetic reasoning in the everyday context of grocery shopping. Ceci and Liker (1986) was another example. Ceci and Liker studied the reasoning processes

used by experts and 'lay people' in handicapping horse races, finding that experts consider the variables involved in a multiplicative way, while lay people use a model of computation that treats variables independently. Both of these types of reasoning may be regarded as formal, deductive reasoning, or at least a very rigid type of reasoning.

Other studies have had an education-based orientation, such as that of Perkins (1985) who presented secondary and tertiary students (both undergraduate and graduate) with a task almost identical to that used in his previous investigation (Perkins et al., 1983). Judges were asked to score the quality of the produced arguments according to the criteria of the number of sentences (reflecting elaboration), the number of lines of argument, the arguer's ability to recognise objections to his or her own argument, their ability to focus on the issue, and their ability to explain how a reason (selected by the investigator) served to support the conclusion.

After collecting these data, Perkins sought to determine the role that education played in the quality of arguments. He found minimal differences in the quality of arguments across the education levels (p. 566). He concluded that formal education seems to do little to develop informal reasoning skills, and that the students included in the study were not, in general, particularly competent in informal reasoning (p. 567).

Lehman, Lempert, and Nisbett (1988) also conducted a study on reasoning that had an education-based orientation, however the reasoning was primarily formal in its nature. The participants in this study were students of law, medicine, psychology, and chemistry at the University of Michigan.

Lehman et al. tested each of these groups of students on four measures: statistical reasoning, methodological reasoning, conditional reasoning (if-then arguments), and verbal reasoning (focusing on ability to detect analogies, evaluate evidence, and recognise arguments) (p. 435).

The students were tested in their first year of study, and then again in their third year. Overall, little difference was found between the different student disciplines in the first year of study, although some significant differences were found on particular measures.

When the students were tested again in their third year, some more noticeable changes were observed. Amongst other results, it was found that psychology and medicine students improved significantly in statistical and methodological reasoning, whilst psychology, medicine and law students showed significant improvements in conditional reasoning. Chemistry students showed no significant improvement in any of the measures.

These results, along with those of Perkins (1985), suggest perhaps that formal education provides or facilitates the development of formal reasoning skills at the expense of informal reasoning skills.

Other researchers have studied everyday thinking from a different perspective. Wagner and Sternberg (1985) were two psychologists interested in practical intelligence. Practical intelligence is regarded as a subset of the larger domain of intelligence (Ford, 1986, p. 183), and is concerned with intelligence on the job, in daily life, and in the everyday world generally - as opposed to the more abstract and academic thinking abilities that tend to measured in traditional intelligence tests (Sternberg & Wagner, 1986).

Wagner and Sternberg (1985) proposed that "an aspect of practically intelligent behaviour important for success in professional or managerial careers is tacit knowledge" (p. 439). They divided this tacit knowledge into knowledge about managing self, managing others, and managing career.

In order to investigate this matter, Wagner and Sternberg conducted three studies, each relating to different careers: academic psychology, business management, and local bank management. The participants were either studying for, or employed in, one these careers. They were presented with a range of hypothetical scenarios that related to success in their

corresponding career, followed by a list of options that they were to rate in importance in achieving success in the given scenario. This task was used to measure tacit knowledge.

In each of the three studies, Wagner and Sternberg also obtained objective performance measures for each participant with respect to their chosen career (adapted measures were used for those who were studying).

Overall, the results showed strong relationships between the level of tacit knowledge and job performance measures in each of the examined careers. It was also found that tacit knowledge was not related to verbal intelligence (as traditionally defined and measured). Wagner and Sternberg concluded that theories of practical intelligence must give significant weight to the role of tacit knowledge.

Earlier in this chapter, reference was made to research by Kahneman and Tversky on heuristics and biases in inductive reasoning, particularly in the making of judgements. Also mentioned was the work of Nisbett and Ross (1980) on the heuristics and common patterns of error that occur when people make social judgements and causal attributions for behaviour.

There has been a continuation, to some extent, of these areas of research in more recent times. Galotti, Kossman, and Sabini (1990), for example, were interested in people's causal explanations for social and non-social events.

They presented participants with two booklets: a social events booklet and a non-social events booklet. These each contained five brief statements of events (either social or non-social). The participants were asked to write down as many different explanations for these events as they could, with a time limit of 15 minutes per booklet. The order of book completion was counter-balanced.

The participants' responses were scored according to several measures: fluency (the number of different explanations), flexibility (the number of different *types* of explanations), originality (the number of less obvious explanations), elaboration (the amount of extra detail added to an explanation), and the number of times the explanations changed category.

Galotti et al. reported significantly higher levels of flexibility, originality, elaboration, and category switching in response to the social stimuli compared to the non-social stimuli. Fluency and flexibility were found to be highly correlated, and originality correlated highly with both fluency and flexibility. Category switching was found to correlate with fluency, and, contrary to the investigator's predictions, elaboration was not negatively correlated with fluency.

Some psychologists, particularly Antaki and his associates, have been interested in the *kinds* of explanations that people will offer for their behaviour or for events, as well as the dimensions and processes involved in making such explanations. Antaki (1985), for example, was interested in the way in which university lecturers and students explained (in a causal sense) various political events. He found that reasonably elaborate causal arguments were used.

In another study, Antaki and Naji (1987) examined a large number of 'because' statements in unobtrusively recorded everyday conversations, and found that the kinds of events that speakers tend to bring up for explanation were general states of the world, events involving speakers or their groups, and events involving other people (rather than explanations for single actions of others, as typically studied in social psychological attribution theory).

Antaki and his associates have also studied explanation from a clinical perspective. In one study, Norman and Antaki (1988) found that undergraduates' scores on internal, stable, and global attributions for real negative events was significantly correlated with a measure of depression. In the same year, Munton and Antaki (1988) reported the results of research on the attributional style of families undergoing family therapy. They found that those who

were not considered to have changed over a period of time tended to make stable attributions for negative outcomes compared to those who had changed.

In the early 1990's, Antaki and an associate, Leudar, addressed more theoretical issues - in the context of argumentation. Antaki and Leudar (1990) argued that 'claim-backing' (attempting to support a claim) is different from 'ordinary explanation' (defined as causal attribution, reason-giving, excuse, and justification) in that it involves the use of explanation to warrant the truth of what has been said. When the work of Ennis (1982) on assumptions is considered (see Chapter 2), this claim seems relatively unremarkable, and perhaps illustrates a lack of awareness of work in other disciplines on similar areas.

More significantly, Antaki and Leudar (1992) analysed ordinary conversations and found that the majority of what first appeared to be causal attributions were actually argumentative claim-backings. They concluded that the factors that determine whether a given utterance is an argument or a causal explanation is best decided on the basis of an examination of the speaker's intention (a central point made a year later by Chittleborough and Newman (1993)) and the projected relationship between clauses.

The line of enquiry pursued by Antaki and Leudar (1990, 1992) does not seem to have been continued, with subsequent work focusing on more general issues in discourse analysis (e.g., Antaki, Diaz, & Collins, 1996; Leudar & Antaki, 1996).

With respect to heuristics and biases, more recent work has been conducted by others such as McNeil, Panker, and Tversky (1988) who investigated medical judgements and decision-making. They found that doctors varied in their expressed willingness to recommend an operation, depending on whether they were told that 7% of patients die, or that 93% survive.

In the general context of judgement-making, Piattelli-Palmarini (1994) has used the term 'tunnels' or 'cognitive illusions' rather than the terms 'heuristics' and 'biases', and has documented a range of these.

Work on these biases or cognitive illusions has been criticised by Gigerenzer (1991) who argued that the cognitive illusions observed are simply an outcome of 'unnatural presentations' of the tasks. Gigerenzer, Hoffrage, and Kleinbolting (1991) have offered a probabilistic mental model to explain people's performance in these specific kinds of judgement tasks.

With respect to the subject matter of informal arguments generally (as opposed to inductive arguments and judgement making), Furlong (1993) has added to the education-oriented research that has been mentioned previously.

Of special interest to Furlong (1993) was the topic of the US federal budget deficit. After gathering information about the participants' level of knowledge of economics and of the deficit problem specifically, Furlong presented his participants with two reasoning tasks.

In one of these, the participants were asked to present "the best way to enhance income tax revenue for the federal government" (p. 173) - in the context of improving the budget deficit problem. In the other task, a similar question was asked, except with respect to reducing spending by the government. The participants had to explain why their recommendations would be effective. The order in which these tasks were presented was counter-balanced.

Those who were assigned to an experimental group were given two prompts after producing the first argument. The first prompt simply reminded them of the need to provide reasons for their proposal if they had not already done so. The second prompt involved telling the participants that "a sound argument of any complex issue should include a discussion of other acceptable viewpoints", and then asking them to "present an alternative point of view,

or solution, that is important to the consideration of this issue" (p. 174). Reasons to support this view were requested.

Those who were assigned to a control group were also given two prompts, but these were neutral in nature (simply inviting further comment). No prompts were offered following the second argument.

Furlong then measured the quality of the arguments generated according to several criteria (number of relevant premisses, number of independent lines of reasoning towards the recommendation, number of budget solution claims, soundness, and quality of counter-claims).

The results showed that the prompts given (whether specific or neutral) yielded superior performance in the first argument compared to the second argument on four of the five measures (no prompts were provided after the second argument). Group comparisons on the first task showed no significant differences on any of the five measures, with the exception of counter-argument generation (p. 177).

Other analyses showed that level of education and level of knowledge of economics had no significant effect on argument performance; however, knowledge of the budget deficit problem was significantly related to three of the measures of the quality of argument.

Furlong (1993) concluded that exercises in small groups, such as classrooms, have the potential to bring about improvements in thinking and reasoning; however, periodic prompts or challenges may be required for some time until the skills entailed become internalised.

As can be seen from the above review, there has been an increase in interest in everyday reasoning (or thinking) in more recent times. This work has been very diverse in its nature. Some researchers have been interested in studying everyday reasoning or thinking with a hope to learning more about *improving* these qualities. For others, the interest has been on

very specific types of everyday reasoning, such as judgements of probability, causal attributions for events, or explanation. Yet others have seen everyday thinking as part of a wider area of interest, such as practical intelligence.

Despite this increase in interest, there appears to be a lack of work that examines how people respond to, and evaluate, everyday arguments - and not just specific types of everyday arguments, but informal arguments in all their diversity of potential attributes (as discussed in Chapters 2 and 3). A great deal of work was conducted by psychologists in early times on the ability of people to detect invalid deductive arguments, and on the factors that affected people's evaluation of both valid and invalid arguments. Equivalent types of study with *informal* arguments appear to be missing. Another area that seems to be neglected is the study of actual psychological processes involved in generating everyday arguments - much of the recent research on real-life argumentation has focused on informal arguments as an *end-product* (with the exception of a small amount of work by Antaki and his associates).

It seems, then, that there is considerable scope for some important, and in some respects fundamental, research to be carried out.

4.9 Conclusion

In this chapter, a review has been presented of the research that psychologists have conducted on reasoning. From this, it is clear that psychologists have very strongly focused their interest on formal, deductive reasoning. Attention to genuine informal, everyday argument (as portrayed in Chapters 2 and 3) has been relatively minimal.

There are at least two possible reasons for this. The first of these is that the historical dominance of formal logic may have led psychologists to regard deduction as the most common type of reasoning. Relatedly, limited inter-disciplinary communication and awareness may have contributed to the slow response by psychologists to the emergence of informal logic.

Another possible explanation is that formal arguments are well-suited to research: they are well-structured, easy to manipulate, and simple to evaluate (either 'valid' or 'invalid'). Informal arguments, on the other hand, can present numerous problems for a researcher. These arguments can be interpreted differently by different people, and are often complex. They are sometimes ambiguous, and usually cannot be evaluated in a simple manner. They may involve emotional appeals, and often contain unstated assumptions. In order to exert maximum experimental control, and to minimise threats to internal validity, formal arguments are a good choice for the researcher. Ironically, greater concern with *external* validity may have led to more work on everyday arguments.

Regardless of the reasons for the focus on formal arguments, the view expressed in Chapter 2 is worth repeating here: a study of the true nature of informal arguments would suggest that they are the most common type of argument encountered in everyday life, and, on this basis, are perhaps more worthy of investigation than formal arguments.

With respect to these informal arguments, it is clear that there is a need for psychologists to study certain fundamental issues that even in recent times do not appear to have been examined.

CHAPTER FIVE

STUDY 1

5.1 Introduction

When experimental psychologists first began to study arguments - formal arguments - one of their major interests was the way in which participants evaluated those arguments. In particular, they were interested in whether the participants would correctly judge arguments to be valid or invalid.

As argued previously, there is a great need for fundamental research to be conducted by psychologists on informal arguments. In particular, there is a need to examine the same kinds of issues that psychologists first examined, (whilst recognising that informal arguments are distinctly different from formal arguments). How do people evaluate informal arguments? What criteria do they use? Answers to these kinds of questions were pursued in the following study.

Although the study was mainly exploratory in its purpose, two hypotheses were proposed. The first of these stemmed, in part, from the characterisation of the naive thinker, as described by Perkins et al. (1983). It was noted in Chapter 4 that such a thinker operates according to a 'makes-sense' epistemology. The test of truth utilised by such thinkers involves deciding whether the information 'seems right' or 'rings true'.

It was also noted in Chapter 4 that early psychological research on syllogisms found that there was some evidence to support the theory that people who have a personal belief in the conclusion will tend to evaluate such syllogisms as valid (even if the syllogism is not valid).

On the basis of these early findings, and the previous characterisation of the naive thinker, it was hypothesised that if participants are presented with informal arguments, both 'sound'

and fallacious, that there will be at least some occasions in which the criterion used to evaluate those arguments will relate to agreement or disagreement with the conclusion. An argument whose conclusion meets with personal agreement might be regarded as 'ringing true' (a good argument). The converse will also be true.

A second hypothesis was also proposed. If one group of (experimental) participants are instructed to identify the premisses and conclusions of the arguments they are presented with, and to think about whether the premisses provide adequate support for the conclusions, this should stimulate a certain amount of critical thinking that otherwise might not be present.

If this experimental group were to be compared with a group of control participants who are not given any such instructions, but asked merely to evaluate the arguments, it could be predicted that the experimental group would be correct in their evaluations of the arguments on more occasions than the control group, and that they would be incorrect in their evaluations on less occasions than the control group.

It should be emphasised, however, that the primary purpose of this study was one of exploration - of the ways in which people evaluate informal arguments. To some extent, this study also constituted an opportunity to explore a suitable methodology for research in this area - given the lack of prior research to provide a model.

5.2 Method

5.2.1 Participants

There were thirty-eight participants in the study; 26 female, and 12 male. Thirty-five of the participants were undergraduates studying psychology at first-year level at the University of Adelaide. These students were volunteers who responded to a letter of invitation to participate. This letter was distributed at random to the majority of the first-year class.

Accordingly, the majority of the participants were between the ages of 17 and 20. Of the remaining three participants, two were studying psychology at postgraduate level at the same university, and the other was self-employed.

5.2.2 Materials and Procedure

Thirty short informal arguments were used. This number was considered a suitable balance between being able to use a wide variety of arguments and minimising fatigue in the participants. Twenty four of the arguments were examples of different fallacies, while the remaining six were 'sound' arguments.

The fallacies selected were intended to be as representative as possible of those found in everyday life. It is very difficult, if not impossible, to determine which fallacies occur, and in what proportion, in the natural world. Nevertheless, the informal logic literature was carefully studied to identify those that are most frequently mentioned. There are, of course, dangers in regarding these fallacies as representative of those occurring naturally, since informal logicians have undoubtedly depended on, or consulted, earlier works, and these may have been biased in their selection - perhaps in favour of those of most academic interest, for example. Despite this, the number of fallacies used (24) is quite large, and was hoped to represent a reasonable proportion of fallacies commonly used in everyday life.

It was regarded as of utmost importance that the arguments presented to participants be as 'natural' as possible - in content and in form - so that the arguments be as close as possible to those encountered in everyday life. Great care was taken to ensure the examples were as 'everyday', realistic, and uncontrived as possible. Some of the arguments were devised by the writer; but most were modifications of examples from informal logic texts. A few of the arguments were encountered by the writer. The actual arguments used are listed in Appendix C, with a brief explanation of the nature of the fallacy, if applicable.

Participants were randomly allocated to one of two conditions. They generally took part in the study in small groups (of the same condition). The participants worked in a quiet environment, and were encouraged to complete their task within an hour.

For both conditions, the participants were given a booklet which they were told to work through. They were asked initially to read a cover note on the booklet before proceeding. Every effort was made to ensure there was no confusion about the task or how to perform it.

In the first condition (control group), the covering note on the booklet stated:

"Each of the following items is, or contains, an argument. Some of them are good arguments, some of them are bad arguments. State whether you think the argument is good or bad, and state why you think this is the case."

On the following pages, the participants in this control condition were presented with the 30 arguments. After each argument was read, the participants were asked to circle whether they thought the argument was good or bad, and to say why they thought so.

In the second condition (experimental group), the covering note on the booklet read:

"An argument is a verbal sequence in which, on the basis of one or more statements or propositions (the premisses), another statement or proposition is made or regarded as supported (the conclusion). Some premisses or conclusions may not be openly stated."

"A good argument is one in which the premisses provide adequate support for the conclusion. A bad argument is one in which the premisses fail to provide sufficient support for the conclusion."

"Each of the following items is, or contains, an argument. Some of them are good arguments, some of them are bad arguments. For each item, first state what you perceive the conclusion to be, and what statements or propositions are used to support it."

"Then, on the basis of the above descriptions of what a good or bad argument is, decide whether you think the argument is good or bad. Whatever you decide, state your reasons why".

Although this portrayal of the nature of an argument is somewhat inconsistent with that argued for by Chittleborough and Newman (1993), it was decided that it was best to use that terminology and conceptualisation that is familiar to most people.

On the following pages, the participants in this experimental condition were presented with the 30 arguments. After each argument was given, the participants were asked "What is the conclusion and what are the premisses?", and were given room to write their response. They were then asked to circle whether they thought the argument was good or bad, and to state the reasons why they thought so. At the top of each page, participants were reminded: "In evaluating the arguments, remember to decide whether the premisses provide adequate support for the conclusion".

5.3 Results

Before presenting the main results (the criteria used by the participants to evaluate the arguments), some data analysis issues will be reported, in conjunction with the results of statistical testing of the second hypothesis.

5.3.1 Statistical results

Before commencing the statistical analysis, seven arguments were removed from consideration. Three of these were fallacious arguments, and four were sound arguments.

The former three arguments were excluded because participant responses led the experimenter to recognise that the arguments were not clear-cut illustrations of the fallacies in question. The four sound arguments were excluded because participant responses made it clear that these arguments were not entirely free of flaws. Appendix C indicates which arguments were excluded from the statistical analyses. Twenty three arguments remained in the analysis, 21 being fallacious, and 2 sound.

In testing the second hypothesis, analyses were only performed with respect to correct and incorrect evaluations of the *fallacious* arguments. These results are presented separately below. In both cases, significance testing was performed using unpooled two-tailed t-tests, since the homogeneity of variance assumption could not be sustained. Using the F test in testing this assumption (Hopkins, Hopkins, & Glass, 1996), the respective results were $F(18,18) = 3.27, p < .05$ and $F(18,18) = 3.19, p < .05$.

The mean number of correct evaluations of fallacies for the control group was 18.57 (SD = 1.67), while the mean for the experimental group was 16.89 (SD = 3.03). This difference (in favour of the *control* group) was significant, with $t(29) = 2.21, p < .05$.

The mean number of incorrect evaluations of fallacies made by the control group was 2.42 (SD = 1.67), while the mean for the experimental group was 3.89 (SD = 2.99). The higher number of incorrect evaluations in the *experimental* group was not significant, with $t(31) = -1.93, p > .05$.

5.3.2 Content analysis results

The main results of this study relate to the criteria that participants used in evaluating arguments. The identified criteria were based upon an analysis of the control group participants only. The reason for this was twofold.

Firstly, it was noticed that several participants in the experimental group tended to evaluate the arguments in an 'inappropriate' manner, being quite dispassionate and mechanical. This observation is best illustrated by some examples.

One of the fallacies in the study read: "Couldn't you bring Tim's mark for maths up to a pass? You've always been a good friend of the family, and you know the difficulties we have in supporting him through his studies".

In this example of a fallacious appeal to pity (the grounds are also irrelevant), one participant responded with: "There is an implied premiss that a true friend would alter Tim's mark. This needs to be stated to make the argument valid". It would seem that this participant thought that if the above premiss were added to the argument, then it would be 'valid', in some formal or theoretical sense. Another participant responded to the same argument by saying "Right or wrong, it supports the conclusion".

In a similar vein, another participant evaluated 12 fallacious arguments as 'good' arguments, and justified each of these evaluations with the simple statement "Premisses support the conclusion". At least three interpretations are possible here. Possibly, the participant may have regarded the arguments as 'good' in some theoretical sense, regardless of the 'implied premisses' or whether the premisses are 'right' or 'wrong'. Alternatively, the participant may have thought that any degree of support made an argument good. Yet again, the participant may have misread the instructions, and not realised that a decision needed to be made as to whether the support was 'adequate'. It was due (in part) to these kinds of responses that the responses from the experimental group were not included in the content analysis. Whilst there were quite a number of these kinds of responses, they did not constitute the majority. Most were reasonably similar to the control group responses.

The second reason for excluding the experimental group from analysis was that the control group's responses were considered to be more likely to resemble natural everyday responses to arguments: the participants were simply asked to evaluate the arguments and to explain

their decision. No assistance was offered, and the participants were forced to rely on their own natural skills. Studying responses under these conditions may be regarded as more appropriate for the current type of investigation.

One final point needs to be made concerning the nature of the content analysis. Unlike the statistical analysis, all 30 arguments were included, since the problematic nature of the seven previously rejected arguments was not an issue in this analysis: the only matter of concern was that of the criteria used to evaluate them.

The process of analysis involved examining each of the reasons given for the evaluation of an argument, and attempting to attach a label to that reason, this label being general enough to be relatively brief, yet specific enough to be descriptive. All instances which fell under the same label or category were examined to ensure that they did not differ from each other in their essential, overall nature. Sometimes, particular instances were regarded as better fitting a different category. As more and more categories (labels) were identified, and as the experimenter became more skilled, the entire process tended to fine-tune itself. The process of analysis was extremely complex, and involved a great many repeated considerations of previous analyses.

A number of general categories emerged on the completion of analysis, as reported below. Examples of unedited participant responses are given in order to illustrate the criterion being discussed. These responses take the format of the participant's evaluation, followed by the reason given. Where participant comments are awkwardly expressed, clarification is given in square brackets, for ease of reading.

5.3.2.1 The identified categories of evaluative criteria

(1) Assessing the Conclusion

The first hypothesis of interest in this study proposed that there will be at least some occasions in which participants would evaluate arguments on the basis of their agreement or disagreement with the conclusion.

In performing an analysis of the reasons given for argument evaluations, one criterion that appeared, on occasion, did in fact relate to the conclusions of arguments - in fact, two sets of conclusion-related criteria were identified. One related to the agreement or disagreement with conclusions, and the other related to a consideration of the practical consequences of accepting a conclusion. Examples of both of these conclusion-oriented criteria are given below.

(a) Agreement or Disagreement with the conclusion

One of the fallacies read as follows: "In future, I will go to the movies or just relax on the night before an exam, because normally I study then, but this time I didn't, and did much better than I ever have before". In response to this, one participant stated: "Good [good argument]. Last minute cramming never seems to help, so it is better to relax". This was interpreted as a statement of personal experience in favour of the conclusion, in fact, a slightly more general version of the conclusion - that for anyone, relaxing the night before an exam is a good idea (the original argument relates to the speaker personally).

Another participant responded to the same argument with "Good. Because I believe relaxing shortly before an exam is better than studying a lot". Here, the participant has made a statement of personal belief in favour of the conclusion, again, a more general version than that originally stated.

Another fallacy used in the study was as follows: "Students should be allowed to use their texts during exams because lawyers can use their law texts in preparing a case and doctors can use their medical books in making a diagnosis". One participant responded with: "Good. Yes!! Exams should be designed to show students understanding of texts, not that they can rote learn texts". Clearly, this participant found the conclusion to be an agreeable one, and consequently evaluated the argument as good, whilst completely overlooking the faulty analogy, and its use as a justification for the conclusion. Another participant responded to the same argument with "Bad. The object of exams is to test the knowledge of a text, what is the point if the answers are already provided". This participant, as opposed to the previous one, clearly disagrees with the conclusion, and, rejects the argument on this basis - and not because of the faulty analogy, or its justificatory usage.

(b) Practical consequences of accepting the conclusion

Sometimes the participants gave reasons for their evaluation which differed in their essence from those illustrated above, but were nevertheless still oriented towards the conclusion.

As mentioned previously, one of the fallacies read as follows: "Couldn't you bring Tim's mark for maths up to a pass? You've always been a good friend of the family and you know the financial difficulties we have in supporting him through his studies". One participant stated (somewhat awkwardly): "Bad. It may be that later when in work, if he needs to understand maths, but can't, that worse effects i.e., being fired will happen". In a similar vein, another participant responded "Bad. He may be disadvantaged in future maths courses".

These participants have identified some undesirable practical consequences that would occur if the prescriptive conclusion is accepted or acted upon (it will be remembered that the term 'prescriptive conclusion' was introduced in Chapter 2 to describe conclusions which prescribe some action - such as passing Tim in maths). In the above cases, the participants

have not been concerned about reasons given for passing Tim in maths; they have focused on the consequences of that argument being accepted.

A slight variation on these responses was observed in connection with the fallacy "The existence of God should be accepted, because there is absolutely no proof that God doesn't exist". One participant responded "Good. God should be accepted because it gives hope to some, but it may not be accepted by all". Here, once again, this response identifies some practical consequences of accepting the conclusion (this time positive), and on this basis, the argument is favourably evaluated. This participant has not commented on whether the existence of God can be argued for on the basis of the absence of proof otherwise.

Quite clearly, then, one way that participants may evaluate an argument is by assessing the conclusion, either on the basis of agreement or disagreement with it, or on the basis of a consideration of the practical consequences of the conclusion being accepted.

(2) Accepting or Rejecting 'Evaluative' Attitudes Contained in Arguments

During analysis, it was also found that participants sometimes evaluated arguments on the basis of certain 'attitudes' that were identified within some of the arguments. Some of these were true attitudes, in formal psychological terms, while others corresponded more to the lay person's conceptualisation of an 'attitude'. The latter are discussed later, as a separate category.

In formal psychological terms, attitudes have three components: cognitive, affective, and behavioural (Breckler, 1984). One example given by Breckler relates to snakes: a person may evaluate or appraise snakes as dangerous (cognitive component), feel afraid of them (affective component), and try to avoid them (behavioural component). Clearly, the affective and behavioural dimensions of attitudes are outcomes or manifestations of the evaluative component. It is the latter that is of primary relevance here.

To distinguish this concept of attitude from the lay concept of attitude, the term 'evaluative attitude' will be used in the following discussion. An example of an evaluative attitude can be found in the following argument used in the study: "I don't fancy the idea of getting married, because my chances of getting divorced, according to the official figures, is somewhere around 38%". Here, it is clear, even if implicit, that divorce is appraised as very unpleasant (unpleasant enough to have significant reservations about marriage).

Analysis of participant responses made it clear that a second category of criteria used in evaluating arguments related to the acceptance or rejection of evaluative attitudes contained in some of the arguments. Some examples are given below.

With respect to the marriage argument, it was mentioned previously that the underlying evaluative attitude is that divorce is a very negative event. One participant did not accept the degree of negativity implied in the argument, stating: "Bad. Even if the marriage does end up in divorce, what does that matter?". This seems to be a most clear-cut rejection of the implied evaluative attitude.

Another participant responded by affirming: "Bad. If someone wanted to get married, then the least thing that should worry them is a future divorce". At least two interpretations are possible here: this participant could be saying that a person shouldn't even think about divorce when wanting to get married. On the other hand, the participant could be stating that it is not worth worrying about divorce because it is not a particularly negative event. Which of these interpretations is correct (if either) cannot be confidently determined.

One of the arguments in the study was an example of the Gambler's fallacy, which read as follows: "You've thrown four 3's on the dice in a row, so I suggest you leave it at that because your chances of throwing another 3 is considerably less now than before". In this example, there is an implied negative evaluative attitude towards losing. This, of course, is part of the basis for attempting to persuade the recipient of the argument to stop gambling

(the other reason - a faulty reason - is that the chances of throwing another 'three' on the dice is less, which is not the case, unless the dice are loaded).

One participant clearly accepted the evaluative attitude: "Good. Quitting while you're ahead is a good suggestion" (i.e., it is not good to lose). In contrast, another participant wrote "Bad. If you don't throw you cannot win either - you must throw to have the chance to win". This participant did not appear to view losing as negatively as the producer of the argument.

(3) Acceptance or Non-acceptance of 'Mental' Attitudes Implicit in Arguments

As stated previously, not all of the 'attitudes' identified by the participants were true evaluative attitudes, in the formal sense of the term. These other 'attitudes' corresponded more to the lay sense of the term - beliefs, prejudices, perspectives, biases, and so on. To aid in distinguishing these 'attitudes' from evaluative attitudes, they shall be referred to as 'mental' attitudes. This term should not be seen as a completely satisfactory label for distinguishing these kinds of attitudes from evaluative ones; it is simply a convenient label. The acceptability of the identified 'mental attitudes' formed the basis for another category of criteria used in evaluating arguments.

One of the arguments used in the study read: "Women shouldn't be permitted to be politicians because they weren't in the past, and even if they were able to contribute in this regard, this would have been recognised". Predictably, this was met with responses such as the following: "Bad. Too sexist" (i.e., a sexist attitude).

In response to the marriage argument, two participants negatively evaluated the argument on the basis of one implicit perspective in particular: "Bad. Pessimistic attitude" and "Bad. All negative as there is a 62% chance of staying married". Another participant responded with: "Bad. Not very committed or romantic, besides the chances are better for happy marriage".

In addition to the reference to pessimism, this participant has commented on the arguer's general thinking about marriage (lacking in commitment and romance).

(4) Responding to Perceived but Questionable Connotations of an Argument

The analysis of participant responses made it clear that when a person considers an argument, that person brings with him or her an array of personal and social experiences, beliefs, opinions and so on. These may exert a strong effect on the manner in which the argument is seen, and responded to. People will perceive some arguments as having certain connotations. Sometimes these can be quite reasonably inferred from the wording of the argument (a number of people will agree that a certain connotation is present). Sometimes, though, it is questionable whether a connotation is actually present in an argument. In such instances, the matter might only be settled by asking the person who produced the argument, if possible.

One of the fallacies used in the study read as follows: "The Minister said he was opposed to free tertiary education, as experience shows people do not properly appreciate what they get for nothing". Several points need to be made in relation to this argument.

Firstly, at the time of the study, the issue of introducing tertiary education fees in Australia was an ongoing heated debate. Given that all but one of the participants were university students, it is almost certain that they had strongly unfavourable views about the issue.

Secondly, the context of the argument makes it clear that the main premiss of the argument is that, supposedly, people do not properly appreciate getting their tertiary education if they don't pay fees for it - i.e., getting their education in financial terms 'for nothing'; for 'no payment'.

Two of the participants responded with: "Bad. Education is attained through study and hard work - that is not nothing" and "Bad. Education involves hard work - that is not nothing".

The original argument never asserted that a tertiary education wasn't hard work, or that it doesn't require it. For these participants, it seems, the phrase 'for nothing' elicited the connotation of 'for no work', and this is what they responded to, rather than the meaning implicit in the argument of 'for no payment'. Here, it seems reasonable to suppose that if the Minister were quizzed about the meaning of his argument, he would deny that he was implying that a tertiary education does not require hard work. This perceived connotation of the argument is not just questionable; it is probably not even present.

A less clear-cut instance may be given in relation to the following example of the fallacy of hasty generalisation: "University professors really have it pretty easy. My parents have a cottage next door to a professor from one of the universities, and he's there from late April right through to September, fishing and relaxing".

In response to this, one participant wrote "Bad. Teachers holidays are spent preparing the year ahead. The holidays are also needed after working hard all year".

At least two possible interpretations can be made here. It will be noticed that this participant uses the term 'teachers' rather than 'professors'. This may have been simply an unintentional change of terminology.

On the other hand, it may be no mistake that the terminology changes to 'teachers'. It may be that the participant knows one or more school teachers (possibly having a parent who is a teacher), and has strong feelings about the amount of time and work that teachers are required to spend. The argument may have been perceived as an attack on educators in general (including teachers), rather than university professors only, hence the response. This interpretation of the participant's response, however, cannot be asserted with complete certainty. It is interesting to note, however, that the hasty generalisation involved in the original argument is not noticed, or at least, not addressed.

(5) Assessing the Premiss

Another category of responses was those directed towards the premiss(es) of the arguments. The university professor argument, stated above, was based on the premiss that one professor has extensive holidays or free time from April to September. One response clearly challenged the premiss: "Bad. April to September ? Don't believe it!".

Another of the fallacies presented to the participants read as follows: "We should reduce the amount we spend on foreign aid because it has to be remembered that about three quarters of all aid goes into the pockets of corrupt politicians and black marketeers". In this example of the fallacy of Questionable Premiss, the premiss is that three quarters of all aid is not received. Several participants clearly challenged this premiss: "Bad. It has never been proven, to me at least, that three quarters goes to the pockets of corrupt policemen and black marketeers, so the statistics are wasted on me", and, "Bad. I do not agree with the premiss of the argument", and even "Bad. Unsubstantiated speculation".

In the tertiary fees argument described earlier, the conclusion is that free tertiary education should be opposed, and this was asserted on the basis of the premiss that experience shows people do not properly appreciate what they get for nothing. This premiss was attacked by several respondents: "Bad. People can still greatly appreciate what they get for nothing" and "Bad. Experience is not always an accurate method of acquiring knowledge", and "Bad. I disagree. I think people do appreciate a free education".

(6) The Suitability of the Argument

It was observed during analysis that participants occasionally responded to the arguments by questioning or rejecting the 'suitability' of the premisses in arguing towards the conclusion.

With respect to the argument in favour of the existence of God (because there is no proof otherwise), one respondent wrote: "Bad. There is absolutely no proof God does exist.

Acceptance of God is purely personal, for personal reasons". After addressing the issue of proof, this participant appears to challenge the way in which God's existence was argued for, claiming that it is a matter of personal belief, rather than solid evidence.

One of the arguments excluded from the statistical analysis read: "We will not grant you a 3% pay rise, since you received a 5% rise less than a year ago, and even then you were well paid by relative standards". One participant seemed to attack the suitability of the way in which the pay rise was rejected by saying: "Bad. The decision to give pay rises should be judged according to productivity and hard work, not according to when the last pay rise was given, or what one's pay is relative to others".

These are two of the best examples of instances where participants evaluate an argument on the basis of the 'suitability' of the premisses in arguing towards a conclusion.

(7) Accepting an (Undetected) Fault

Not surprisingly, some of the participants accepted the fallacious arguments, either because they regarding them as good arguments, or because they were seen as having at least some merit. These constituted the two sub-categories of this criteria. These responses were particularly fascinating, and are documented to a greater extent.

(a) Seeing an (undetected) fault as a strength

Many informal logicians provide or cite definitions of fallacies as being bad arguments that appear to be good. As mentioned previously, the experimenter attempted to construct or modify examples of fallacies so as to be as convincing as possible (although this was not always possible). As was expected, there were many occasions when the fallacious arguments appeared to the participants to be 'good' arguments.

One argument previously mentioned read as follows: "In future, I will go to the movies or just relax on the night before an exam, because normally I study then, but this time I didn't, and did better than I ever have before". This was an example of the Post Hoc Ergo Propter Hoc fallacy (the fallacy of arguing that because B follows A, that A caused B). Clearly, the improved examination performance may have been due to any one factor or combination of factors (such as the exam having been easier than others, or the student having received extra help in that subject, or having studied much more for that exam, overall, than for others). This argument was positively evaluated by several participants, such as the following two who stated: "Good. It is logical", and "Good. Takes past experiences, proves what works".

With respect to the marriage/divorce argument, some respondents wrote "Good. Shows reasons that are statistical facts" and "Good. Uses proof/statistics, to be realistic". These participants have clearly accepted that any one person's chances of getting divorced are 38%, and do not appear to see that a person's chances are dictated by specific circumstances.

The argument towards the existence of God, on the basis of there being no proof otherwise, was responded to by some participants as follows "Good. The argument is good because there is no proof that God doesn't exist. The argument is logical". This participant apparently has failed to see that equally it could be argued that God does not exist because there is no proof that God does exist.

In response to the previously mentioned Gambler's fallacy "You've thrown four 3's on the dice in a row now, so I suggest you leave it at that because your chances of winning again by throwing another three is considerably less now than before", one participant clearly accepted the fault, stating "Good probability thinking" (in contrast to another who wrote: "Wrong - the chances of another 3 is still 1/6").

Another fallacy not previously mentioned stated: "My friend who's in hospital, seriously ill, says that he'll recover if he gets a certain serum. I got a letter from him saying he's now recovered, so he must have got the serum". This is an example of the formal fallacy of Affirming the Consequent ('If P, then Q; Q; Therefore P', or, more fully: 'If the serum is given, the person will recover; The person has recovered; Therefore the serum was given'). Obviously, this argument does not recognise the fact that the person could have recovered for other reasons - the serum was one way the person would have recovered. One participant saw this argument as totally satisfactory: "Good. An event will occur if another event happens, and first event has occurred, so other event must have happened".

Another argument not yet mentioned was an example of Hasty Conclusion. It read as follows: "In recent World Cup tennis, the Australians won six matches, and the U.S. one. This is not surprising when you consider that on interview, the Australians said they were keyed up for playing for their country, while the Americans said they were playing mostly for personal success or money". The following are examples of participants who clearly accepted the line of argument, often enthusiastically: "Good. The power of believing they [the Australians] are important to their country means they will try harder as failure will bring a population of people to dislike them" and "Good. Psychologically, they [the Americans] weren't psyched up enough. The Australians had the edge because they had a team and country to back them up", and "Good. There is a reason given for their level of motivation which yielded the result".

In the argument "Every opinion poll shows that public whipping is the best remedy for those who commit crimes of violence", one participant stated: "Good. Presents evidence to support statement". This person seems to have accepted that public whipping is the best remedy for those who commit crimes of violence, since this is what opinion polls have shown.

Another formal fallacy is the fallacy of Denying the Antecedent (If P, then Q; Not P; Therefore Not Q). This was included in the study by using the following example: "If I eat

too much, I'll be ill, but since I haven't eaten too much, I won't be ill". Clearly, there is no acknowledgement that a person could become ill for any number of reasons, such as food poisoning. One participant clearly accepted the fault, stating: "Good. Argument is in logical form - if P, then Q, not P, therefore not Q".

In response to the argument stating "The Minister said he was opposed to free tertiary education, as experience shows that people do not properly appreciate what they get for nothing", one participant saw no fault with the argument, stating "Good. Evidence (experience) proves a point. Along lines of - something should not happen as negative effects are incurred".

In each of the above cases, the actual fault of the argument is seen as the strength of the argument. The other sub-category of responses involved recognising how an undetected faulty aspect of an argument could be acceptable, or even a strength of the argument.

(b) Seeing how an (undetected) fault could be a strength

The following argument was an example of the fallacy of Appeal to Popularity: "Chris must be an effective teacher. We know that he is well liked by his students from a student-run evaluation survey". This was accepted by one participant who stated "Good. If students like a teacher, he may be able to teach his students easier". This respondent appears to have seen how the argument could follow - that is - how it is possible that being a well-liked teacher could mean that the teacher is effective. While it is possible that being well-liked could mean that a teacher is effective, this participant was overlooking the whole question of whether it can be asserted that a person is an effective teacher simply on the basis of whether he or she is well liked - as another participant indicated "Students may like him because he is not effective and takes these students on excursions all the time, or does not give them tests".

Another example relates to the argument opposing free tertiary education on the grounds that "people do not properly appreciate what they get for nothing". This was evaluated by one participant as "Good. Could be true".

(8) Identification of a Fault

In contrast to the above category, the participants also sometimes succeeded in identifying various flaws in the arguments, and rejected the arguments on this basis. These flaws were specific to the fallacies used in the study.

Time need not be spent given examples of these, for the faults in the fallacies have already been discussed here, and in Appendix C; however, it was noticed that there was considerable variation in the extent to which the participants were able to explain the fault accurately.

With respect to the argument attributing the Australians' World Cup Tennis success to patriotic motivation, some participants very clearly and precisely expressed the fault, for example: "Bad. Arguer has isolated one factor which probably has some influence. There may be others - ability, previous tournaments form etc that should be considered". Others were very vague and clumsy in expression of the fault, for example: "Bad. Doesn't state that different types of motivation depend on success. No evidence".

In relation to the argument using an opinion poll to argue for public whipping to remedy crime problems, some participants clearly explained the error, for example: "Just because most people who answered the poll said this, that doesn't mean that it is true". Other responses, while correct, were less precise in pin-pointing the error - such as the following: "Evidence shows public opinion as believing in whipping, no statistics on those committing the crimes".

(9) Ethics Relating to the Means Used in an Argument

Another criterion for evaluating arguments came from just one of the arguments used in the study. One of the fallacies read: "Couldn't you bring Tim's mark for maths up to a pass? You've always been a good friend of the family, and you know the difficulties we have in supporting him through his studies". A number of participants evaluated this argument negatively on the basis of the means that were used in this attempt to persuade.

Three of the clearest examples are as follows. One participant wrote "Bad. It is immoral, unfair, and unjust to use emotional blackmail to increase marks". Another responded "Bad. Unfair to Tim and marker", and another wrote "Bad. Parent is trying to manipulate a favour which involves dishonesty and injustice to Tim's fellow students".

(10) Minor criteria

The vast majority of responses fell into the above major criteria. Sometimes only two or three responses were of the same criterion. These were regarded as too infrequent to be regarded as significant. Other criteria occurred only once.

One particularly interesting example of a singly occurring criterion occurred in relation to the World Cup argument: "In recent World Cup tennis, the Australians won six matches, and the U.S. one. This is not surprising when you consider that on interview, the Australians said they were keyed up for playing for their country, while the Americans said they were playing mostly for personal success or money". One participant responded with: "Good. Playing for success or money invokes negative feelings, so the reader will think they [the Australians] deserved to win because they [the Americans] were playing for the wrong reasons".

These remarks seem to imply that the argument was positively evaluated because it was regarded as likely to generate positive sentiments in a reader. In other words, the criterion

here might be described as 'Argument leads to satisfying feelings for recipient'. Another argument might be evaluated negatively, using this criterion, because it does not lead to satisfying feelings on the part of a recipient.

(11) Miscellaneous possibilities

Unfortunately, it was not always possible to identify criteria by which the participants evaluated the arguments. This was due to difficulties in interpreting some of the participants' responses. On some occasions, several competing criteria seemed possible, while on others, a criterion could only be tentatively identified. On yet other occasions, a criterion appeared to be present, but its essence could not be satisfactorily captured. A sampling of some of the uncertain and difficult cases now follows.

One of the arguments mentioned before involved a student attributing unprecedented exam success to simply relaxing on the previous night. In response to this, one participant stated: "Good. Emphasises the importance of relaxation". One possible interpretation of this response is that the participant has accepted the fault in the argument (that it was the relaxation that caused the improved performance), and has merely re-stated the causative factor, and how significant it can be. Another possibility is that the participant considers relaxation to be very important in all spheres of life, and regards this as a good argument because it supports this personal belief.

One participant responded to the marriage/divorce argument with the following: "Good. The divorce rate is high, so being hesitant about marriage is wise". This particular participant may have interpreted the conclusion as stating that one should be careful about getting married (as opposed to the original conclusion of 'I don't fancy the idea of getting married'). If this was the interpretation, then this response possibly constitutes an acceptance of the reasoning. Another possibility is that the participant accepted that divorce is as negative as expressed by the arguer - in other words, the evaluative attitude was accepted. If this is

true, the participant's response could have been an attempt to convey agreement with this evaluative attitude, whilst also poorly re-expressing the argument.

With respect to the argument "Every opinion poll shows that public whipping is the best remedy for those who commit crimes of violence", one participant responded "Bad. Lowers judgers to criminal's level". The meaning of this comment seems quite clear - that those who support public whipping are just as bad as those who commit the crimes of violence because they are advocating violence themselves. What is not so clear is the criterion being used here. Attempting to capture the essence of the criteria (in a general label) was found to be extremely difficult in this case.

5.3.2.2 Possible non-justificatory responses

Although the participants were asked to explain why they evaluated the arguments positively or negatively (i.e., the criterion they used), not all of the responses seemed to constitute explanations or justifications for the evaluation given to an argument. These may be termed 'non-justificatory' responses. Sometimes, however, a participant's initial response seemed to constitute some kind of explanation, but the remainder of that response seemed non-justificatory.

These types of responses occurred sufficiently frequently that it seemed appropriate to recognise them as categories - categories of non-justificatory responses. Two such categories were observed. One point needs to be made before exemplifying these categories: it was stated above that these responses seemed not to constitute explanations for accepting or rejecting an argument. In each case, a justification could be extracted from these responses (or 'read' into them), hence, they are only possible non-justificatory responses, as indicated by the title of this section.

(1) Identifying Characteristics of the Arguer

This type of response occurred primarily in connection with the marriage/divorce argument. Two responses illustrate this category particularly well: "Bad. If a person really believed this argument against marriage, their chance of a divorce would be something around 70%", and "Bad. This shows the person has a lack of confidence in themselves and the person they have the relationship with". As can be seen, it is difficult to determine how these comments constitute justifications for evaluating the argument negatively, although there is some possibility that the participants regarded these arguments as bad arguments because they were a product of someone lacking optimism or self-confidence - qualities the participants regarded as important in a person who is discussing this issue.

(2) Free Responses

This category was so-named because it was occasionally observed that the arguments seemed to trigger responses from the participants in a manner similar to the process of 'free association' in psychoanalysis. In other words, the arguments sometimes triggered off opinions, experiences, viewpoints, and so on - which the participants voiced.

With respect to the marriage/divorce argument, one participant stated: "Bad. I'll get married if I feel that is what I want, not because some stats say it is wrong". This participant could be interpreted as stating that although other people might be discouraged from marriage because of the divorce statistics, he (the respondent was male) would not be, if he wanted to get married. Thus, in essence, this participant has free responded. As a counter to this interpretation, there is the possibility that the participant is awkwardly stating that divorce statistics shouldn't play a role in deciding whether one wants to get married or not - hence providing an explanation for rejecting the argument. Nevertheless, it still remains possible that the argument merely triggered off a statement of personal opinion on the topic of divorce statistics and the desire to get married (or not).

In response to the argument that "Every opinion poll shows that public whipping is the best remedy for those who commit crimes of violence", one participant answered "Bad. Remedy for what ? To make the public feel better or to reform criminal? While I believe in punishment, I also believe in reform and rehabilitation - punishment is nothing without reform". While this response contains a tinge of disagreement with, or disapproval of, that which is being proposed in this argument, it seems that there is also a triggered personal opinion on the topic of how to best deal with those who commit crime.

5.4 Discussion

Although this study was intended to be essentially exploratory, there were two hypotheses of interest. The first of these was that if participants are presented with informal arguments, both 'sound' and fallacious, that there will be at least some occasions in which the criterion used to evaluate those arguments will relate to agreement or disagreement with the conclusion. This was hypothesised partly on the basis of early experimental work by psychologists on formal arguments, but also on the basis of the characterisation of naive thinkers by Perkins et al. (1983).

This hypothesis received unqualified support from the content analysis. It was clear that there *were* occasions in which participants directly asserted that the reason they evaluated an argument in a certain way was because they agreed or disagreed with the conclusion.

Results of this type can be regarded as providing more direct support for an hypothesised connection between argument evaluation and conclusion agreement than a statistical test such as a Chi-Square test. The latter type of test would only be able to establish a *relationship* between argument evaluation and agreement or disagreement with a conclusion, and would not be able to demonstrate that agreement or disagreement with the conclusion was necessarily responsible for the argument evaluation (for example, a participant might disagree with a conclusion, but evaluate an argument negatively for other reasons).

The second hypothesis of interest was that if a group of participants were instructed to identify the premisses and conclusions of the informal arguments, and to think about whether the premisses provide adequate support for the conclusions, then this group would be stimulated to be more critical of the arguments they were presented with - and hence correctly identify more fallacies than another group of participants who were given no such instructions, but merely asked for their evaluation.

This hypothesis was not supported. The *control* group correctly identified significantly more of the fallacies as fallacious compared to the experimental group, and also made fewer errors in incorrectly evaluating fallacies as good arguments (but not to significance).

There are a number of possible explanations for this result. It is possible that the instructions to the experimental participants simply served to complicate the task for them, and possibly even confuse them, thus dampening or interfering with their natural skills of argument evaluation. This seems a reasonable explanation, since most undergraduate students are unfamiliar with the terminology and methods of argument analysis - in fact, most people are. Although the instructions were very basic, they possibly still represented a new, formalised way of thinking that the participants had to grapple with. It might be surmised that the participants found themselves abandoning their usual skills of argument evaluation, and were trying this 'new' approach and, as is often the case when learning a new skill, were fairly clumsy in doing so.

A related explanation concerns the requirement of the experimental group to identify and formally set out the premisses and conclusions of the arguments. It is possible that when the arguments were re-written in this way, some of the qualities of the original arguments were lost in the process, thus reducing the participants' ability to detect certain flaws and problems. It could also have made the process of argument evaluation somewhat channelled and algorithmic in nature, and not at all flexible and 'holistic'. If this requirement of the experimental group could be shown to have had this effect, a strong case could be made for

the inadequacy of the formal logic type of approach to evaluating arguments when applied to informal arguments.

Another possibility is that the experimental participants did not fully understand (or read) the instructions, and believed that if the premisses of an argument provide support for the conclusion (no matter how little) then the argument is a good one. Certainly, some participants provided quite peculiar justifications for evaluating some of the fallacies as good arguments, for example, "Right or wrong, it [the premisses] supports the conclusion", or "There is an implied premiss that a true friend would alter Tim's mark. This needs to be stated to make the argument valid". As mentioned in the results, it was due in part to responses such as these that the experimental group's responses were not included in the content analysis. Not all of the participants gave responses such as these. However, it is possible that many of them operated under the understanding that if the premisses provide any degree of support for an argument, then it is a good argument. Even if the participants did not think this, it is possible that they were unsure what constitutes 'adequate' or 'sufficient' support for a conclusion (as the instructions read), and that this contributed to the tendency not to evaluate as many arguments as fallacious as did the control group.

Prior to conducting the above analyses, seven arguments were excluded from statistical analysis, as mentioned in the results section. Three of these were excluded because participant responses led the experimenter to recognise that the arguments were not clear-cut illustrations of the fallacies they were supposed to represent, even though they were still fallacious. The other four were intended to be examples of sound arguments, and were excluded because participant responses made it clear that these arguments were not entirely free of flaws.

The writer regarded the latter four exclusions as constituting an important 'result' itself - from two points of view. Firstly, it was the status of the four 'sound' arguments that was brought into question. Conversely, the experimenter never had cause to doubt the status of

the fallacies as 'bad' arguments. Secondly, the flaws in the 'sound' arguments were detected by the *participants*, not the experimenter.

This highlights the fact that there will always be limitations on an individual's ability to correctly assess argument quality - even after careful thought. Future researchers in this field must exercise great caution in these circumstances.

The above two observations also suggest that it is much more difficult to construct a good argument than it is to construct a bad argument. Some of this difficulty may be due to the fact that there do not seem to be any criteria for defining a good argument - apart from formal valid deductive arguments.

It may not even be possible to identify a set of criteria for defining good informal arguments. Such a set of criteria would need to consider broad-ranging and complex issues such as appeals to emotions, implicit human values, the context of the argument, and so on.

To this point, matters relating to hypothesis testing have been discussed, as well as some other related issues. The discussion will now turn to the main results of the investigation: those criteria that participants used in evaluating the arguments.

In the results, nine main criteria were identified. The first-mentioned criterion (Assessing the Conclusion) took two forms: agreeing or disagreeing with the conclusion, and examining the practical consequences of accepting the conclusion. This criterion was interesting from the perspective of its appropriateness as a criterion for evaluating an argument.

In formal logic, it is never appropriate to evaluate an argument on the basis of its conclusion. As mentioned earlier, Copi (1979) indicates that a valid deductive argument may have a false conclusion (p. 4). This may take place if the premisses are all false. In formal logic, an argument is assessed on the basis of the relationship between the premisses and the

conclusion. Stated alternatively, it might be said that in formal logic, an argument is evaluated only on the basis of the reasoning process involved.

In informal logic, evaluating an argument on the basis of its conclusion can also be seen to be inappropriate. Even the most well-reasoned arguments may be rejected if their conclusions are at variance with a person's formed beliefs. Conversely, a badly-reasoned argument may receive a person's full endorsement, because its conclusion is consistent with a privately held belief or opinion.

This is not to say, however, that evaluating informal arguments on the basis of their conclusions is never appropriate. If an argument's conclusion is known by a person to be false - by someone with certain knowledge or expertise, then it seems most appropriate for that argument to be rejected on that basis. In a practical world, where facts must be gathered, decisions need to be made, and so on, an argument with a conclusion that is known to be false is an argument of little or no worth.

It also seems entirely reasonable to evaluate an argument on the basis of an examination of the practical consequences of accepting a conclusion. One of the arguments in this study involved a person attempting to emotionally influence a teacher to bring a student's mark up to a pass. Here, the participants seemed to be most justified in pointing out that if the student was given a pass, he or she could encounter perhaps insurmountable difficulties in a more advanced subject, because of an inadequate understanding of the preliminary material.

Thus, it seems that with everyday arguments, assessing the conclusion can sometimes be a most inappropriate criterion upon which to evaluate an argument, yet on other occasions it can be entirely justified or even necessary.

There was also another criterion that was interesting from the perspective of its appropriateness for evaluating an argument. This related to whether the participants accepted or rejected the 'Evaluative Attitudes' implicit in some of the arguments.

With the marriage/divorce argument ("I don't fancy the idea of getting married ...), many of the participants disagreed with the implicit evaluative attitude that divorce is an extremely undesirable event. They did this by making remarks such as "Even if the marriage does end up in divorce, what does that matter?". As a consequence, they evaluated the argument as a bad argument.

While the participants were entitled to express disagreement with the arguer's evaluative attitude, they technically could not dismiss the argument on that basis for two related reasons. The first of these is that the conclusion of the argument was self-directed, as opposed to an attempt to persuade others to avoid marriage. The second reason is that evaluative attitudes cannot objectively be shown to be correct or incorrect; they are entirely subjective in their nature, and valid for the person concerned.

To illustrate, the only occasion in which the respondents could have appropriately dismissed this argument would be if it read "*You* shouldn't get married, because your chances of getting divorced, according to the official statistics, is somewhere around 38%". In this case, the respondents would be able to negatively evaluate this argument if they did not share the same evaluative attitude towards divorce as the arguer.

Some of the other criteria that emerged in the study were consistent with some of the criteria of evaluation advocated by informal logicians. Thus, for example, one of the identified criterion was 'Assessing the Premiss'. Obviously, this is a most appropriate criterion in evaluating arguments: if the premisses are questionable, or even false, then the argument's value is immediately compromised. Also, another category of responses involved 'Identifying the Fault' implicit in the argument. These faults were as many and varied as the fallacies used in the investigation.

Similar to the latter criterion was the criterion of 'Accepting an (Undetected) Fault'. These were seen as strengths of the argument, or they were seen as potential strengths of the

argument. These were as varied as the faults and flaws in the various arguments. These kinds of responses might be explained by reference to a proposal by Perkins et al. (1983) that errors in everyday reasoning can be attributed to an inadequate model of the situations being reasoned about (pp. 183-184). Hence, the participant who responded to the Gambler's fallacy with "Good probability thinking" has an inadequate model of probability. The participants who accepted the fallacies of Affirming the Consequent and Denying the Antecedent were clearly lacking in their knowledge of logical and heuristic forms.

One less-than-satisfactory criterion was that of 'Responding to Perceived but Questionable Connotations of An Argument'. This was interesting from several perspectives. As noted in the results, when people are presented with arguments, they bring with them a host of personal and social experiences, beliefs, opinions, and so on. If a certain connotation is perceived in an argument, it may be evaluated in terms of its compatibility with a person's beliefs. In the case of the tertiary fees argument, one perceived connotation was that the arguer regarded an education as being gained 'without work'. The actual connotation within the argument was that in Australia a tertiary education is gained for nothing in the sense of 'no fees' (at the time of the study). Since the participants disagreed with the perceived (but false) connotation, they rejected the argument. In this regard, this criterion has some similarity to 'Assessing the Conclusion' (this criterion might also have been labelled 'Assessing the Connotations', except the concern is with those perceived connotations of questionable reality in an argument).

This criterion is also of interest from another perspective. Why did the participants occasionally misinterpret the connotations so substantially? It may be that some people hold their beliefs so strongly that they are very sensitive to attacks on those beliefs - to the point of falsely identifying such attacks when none exist.

Although this criterion is an inappropriate one (because the perceived connotations do not match the actual connotations of an argument), it must be pointed out that these kinds of

mismatches will not always be so clear. There will be times when the 'actual' connotations of arguments are not clear.

Perhaps more than any of the above criteria, the remaining three categories each illustrate how the evaluation of informal arguments is so different from the evaluation of formal arguments. They are each unmistakeably stamped as 'informal' or 'everyday' in their nature, yet most justified in their own way.

The criterion of 'Ethics Relating to the Means Used in an Argument' was a particularly interesting one. It involved evaluating an argument negatively because the arguer was attempting to persuade by means that the participants considered to be unethical or immoral. These evaluations occurred exclusively in response to the argument where a person is attempting to persuade a teacher to bring a student's mark up to a pass-level. Appeals to friendship and pity were used. The underlying criticism seemed to be that the argument is a bad argument in the sense that it is not the kind of argument that should be used. Hence, it can be seen that wider human issues of ethics and rules of interpersonal conduct can be introduced to the evaluation of arguments.

In a similarly unique, 'everyday' style, the participants sometimes rejected an argument because of the 'unsuitability' of the premisses used in arguing towards the conclusion. One of the arguments was a refusal to grant a pay rise on the basis of a recently given salary rise, and also the existing above-average pay level. One participant evaluated this argument negatively because she thought that pay rises should not be decided upon using the reasons given, but others instead (productivity and hard work). The reasons given in the argument seemed to be 'unsuitable' to the participant. Similar responses were observed in one of the other arguments. Here, the criticism seems to be 'I don't approve of the type of grounds you offer'.

Finally, the participants also accepted or rejected arguments on the basis of 'Implicit Mental Attitudes'; these attitudes being beliefs, prejudices, and so on. If an arguer was perceived to

be sexist or negative/pessimistic, then the participants sometimes evaluated the associated argument negatively. This is an interesting criterion in that it is more accurate to say that the argument itself is not criticised, but rather the kind of thinking that produced it. Naturally, an argument may be criticised because it contains elements of unacceptable thinking, but the participants were addressing the mental attitudes which were responsible for the argument - for example, a discriminatory sexist attitude towards women was attacked, rather than the recommendation that arose from that (that women should not be permitted to be politicians).

It is clear from the three previously mentioned categories that people may evaluate informal arguments as being 'bad' in several different senses. With formal arguments, however, the same is not true - they can only be 'bad' arguments in the sense of invalid.

When all of the above criteria were considered, the overall picture seems to be that of a genuine set of 'everyday' justifications for accepting or rejecting arguments. Some of them can be argued to be appropriate in some circumstances, but not others.

This is not to say, however, that the identified criteria were regarded uncritically. It was considered that some may have emerged only because of the nature of the arguments used in the study. Another study, using a completely different set of arguments, might have generated quite a different set of criteria.

The content analysis results were also regarded with some caution for methodological reasons - mainly in relation to potential validity problems. It was possible that the criteria identified could have been partly a product of biases on the part of the experimenter. The most obvious possible bias was that the experimenter tended to examine the participants' justifications for evaluation from a logician's perspective (although not always). At least some of the participants' justifications may have related more to other aspects of the arguments, such as being social acts (in most cases), with reasons relating to premisses, for example, being incidental.

These potential validity problems ultimately relate to the fact that the criteria were identified on the basis of interpretation of and inference about the participants' perspectives and may not have matched the participants' exact thinking.

The above concerns need to be weighed against the fact that the experimenter approached the interpretation task with no particular expectations in mind, and that, on the basis of familiarity with informal logic's exploration of wider issues in argumentation, a broad-minded approach to the task was taken. Furthermore, the process involved was extremely fluid - as mentioned, many of the justifications had their associated descriptions of criteria revised several times before the analysis was finalised.

Although reliability concerns could be raised (e.g., the extent to which different analysts would agree on the criterion involved in a certain justification), they were not deemed applicable here, since the main point of interest was the kinds of criteria that the participants used in evaluating the arguments.

Despite the abovementioned limitations and possible problems, this investigative study served its purpose well. Some questions were answered with respect to the manner in which people may evaluate everyday life arguments - a matter that has previously received little attention.

CHAPTER SIX

STUDY 2

6.1 Introduction

Study 1 provided some very useful information on the kinds of criteria that people may use when evaluating everyday arguments. In that study, however, it was noted that the identified criteria could have partly been products of biases or expectations on the part of the experimenter. It was also noted that, significantly, the criteria were identified on the basis of the experimenter's subjective interpretations of the participants' remarks. Questions were also raised as to whether a different set of arguments would have generated quite a different set of criteria.

For these reasons, a second study was conducted with the principal intention of determining whether the evaluative criteria found in Study 1 would also be found with a different set of arguments, and under more rigorous methodological conditions. It was expected that at least some of the criteria would be found again.

This second study also sought to investigate some other matters. In Study 1, the participants were explicitly told that they were being presented with arguments. In everyday life, though, people do not generally preface their arguments with the statement that they are about to put forward an argument (although this may occur in some special occasions). Accordingly, it was thought to be of value to determine whether participants will regard, and respond differently to, items that are labelled as arguments, compared to those that are not.

One important aspect of studying people's responses to arguments is to ascertain the nature of their perception and representation of the presented arguments. Indeed, it could be argued that any study of people's responses to arguments can only do so effectively if the arguments as *perceived* are considered, rather than the arguments as *presented* (although the two may of

course correspond at times). Such investigations would be very difficult and would involve a great deal of intricate work. In this second study, it was decided that it would be worthwhile to make some preliminary investigations into the accuracy of argument perception. The results of such an investigation would help to indicate how necessary it is to study responses to arguments in terms of how the arguments are perceived.

A greater understanding of people's responses to arguments may also be gained from knowing the conditions under which an item of communication is regarded as constituting an argument. Hence, again, it was decided that in this second study, some preliminary investigations should take place regarding this matter.

With these objectives in mind, a methodologically stronger study was designed and implemented, with a considerably more complex procedure, as described below.

6.2 Method

6.2.1 Participants

Forty-four participants took part in the study, of whom 35 were female and 9 were male. All participants were undergraduates studying psychology at first-year level at the University of Adelaide. The majority were between the ages of 17 and 20 years. These participants were volunteers who responded to randomly distributed written invitations to participate in the study.

6.2.2 Materials (Session One)

In contrast to Study 1, only six arguments were presented to the participants (rather than 30). The experimenter decided to use this limited number of arguments in order to permit a more detailed examination of responses to them. Any larger number would have made the study too cumbersome and time-consuming. Extra care was exercised in this study to ensure that

the arguments were as typical as possible of everyday arguments - containing some subtle elements, and leaving a certain amount unstated, but implied.

The first argument was a constructed example which was used in Study 1, except slightly modified. It read as follows:

"There doesn't seem much point in getting married these days, because the official figures show that 38% of marriages end in divorce".

The second argument was, again, an constructed example. It read:

"Look Mrs. Johnson, how can you come here and make a complaint about sexual harassment when you dress so provocatively ?".

The third argument was condensed from a newspaper article, but contained a direct and complete quote. The argument read as follows:

In response to the information that, over the lifetime of the Bannon government, the crime rate in various categories of crime had risen by up to 182%, the Opposition Leader, Mr. Olsen said "The Bannon Government must accept a large share of the responsibility for rising crime in the community".

The fourth argument was a completely original item; a letter to the editor of a South Australian newspaper. The content of the letter was not altered, and was presented to the participants as follows:

Letter to the Editor, The Advertiser, February 4th, 1989:

"If Dr. Hopgood, Minister for Environment and Planning, wants to clean up the air, would he please start with space shuttle exhausts, spent rocket fuel, nuclear explosions and bomb

blasts before he deprives me of my pot belly stove and its comforting warmth used over a maximum of three months each year".

(Mrs) Y.M. Gurr,

Renmark.

The fifth argument was very brief:

"Before we pay out government benefits to Aborigines, we need to set some criteria to decide who, for this purpose, should count as an Aborigine".

The sixth and final argument was another directly quoted letter to the editor of a South Australian newspaper. It was written by a representative of a cigarette company, and read:

"By what stretch of the imagination was The Advertiser on July 22 able to headline an article about an out-of-court settlement 'Passive smoking victim gets $65,000'?
Nobody has been shown to be a "victim" of so-called passive smoking".

A.A. Wood,
Director of Industry Affairs,
Rothmans of Pall Mall
(Australia) Ltd,
Sydney, NSW.

These arguments were type-written on three pages, two arguments per page. After each of the arguments, the participants were asked to either "Please comment", or "Please comment on this argument". The former 'control' condition represented the typical situation in everyday life in which arguments are not labelled as such. The latter 'experimental' condition represented the labelling of arguments *as* arguments.

Special care was taken in wording the instructions. The word 'comment' was used because it was regarded as the most open. The experimenter decided against asking the participants

to 'respond', as this may have tended to elicit counter-arguments (or agreement). The request to 'comment', however, permits responses of disagreement or agreement, and virtually any other thought that occurs to the participant. In other words, this request was regarded as most likely to elicit responses as close as possible to everyday situations (not withstanding the labelling of the items).

6.2.3 Procedure (Session One)

The participants were dealt with on an individual basis. Each was randomly assigned to either the 'control' or 'experimental' conditions before arrival. They were given the three-page document containing the arguments. They were told that the booklet contained several 'items' or 'arguments' (according to the group), and that they were simply required to comment on them in any way they saw fit and appropriate. They were told that the task did not constitute a test of any sort. No time limit was imposed, but it was found that most participants completed the task in 25-35 minutes.

After collecting the argument/response sheets from each participant, the experimenter examined the comments for any vagueness, ambiguity, or any kind of unclear or incomplete expression. If clarification was needed, the experimenter questioned the participant as seemed appropriate.

In doing this, the experimenter refrained from asking questions of the form "When you said ..... did you mean ..... ?". These kinds of questions were regarded as likely to be answered affirmatively by any participant who regarded a researcher as a authoritative figure. Instead, the questions were expressed in an open-ended and non-directive manner, for example "When you said ..... , what did you mean exactly?" or "What did you mean in your comment that ..... ?". These allowed the participant to clarify according to his or her own intended meaning.

Any clarifications given by the participants were recorded on paper by the experimenter. Each of the clarifications were then repeated back to the participants. They were asked if they were satisfied that they had conveyed to the experimenter exactly what they meant by their comments. They were also asked if they thought that the experimenter understood all of their comments for each argument.

Before continuing, the participants were asked if there were any comments they wished to add (in relation to the 'item' or 'argument'). Any such comments were recorded by the experimenter.

The next question in the interview dealt with the participants' understanding and perception of the arguments. The participants were asked to give their own account of what was being said in each 'item'. In order to avoid arousing suspicion of any sort in the participants' minds (e.g., that their reading and comprehension was being tested), they were told that their interpretation was to be compared with the experimenter's. The term 'interpretation' was used so that they would not think that there was a right or wrong answer. Again, as for all the interview questions, the responses were recorded.

The participants were then asked whether they regarded each item as constituting an argument. They were asked to provide reasons for their decision. For the experimental group, it was acknowledged that the items were labelled as arguments, but they were encouraged to express their own opinion, regardless of this fact. These questions were asked with the intention of determining the conditions under which the items were or were not regarded as arguments, and the reasons for this view. The questions also served to determine the effect, if any, of the differential labelling of the items.

At this point, the session concluded. The participants were asked not to discuss the study with anyone else until they had completed the second session of the study.

6.2.4 Intermediate analysis

After the completion of the above interview, the experimenter was able to examine the comments in detail. In most cases, there were two sets of comments - those initially written by the participant, and those elicited by the experimenter when seeking clarification. These two sets of comments were synthesised as well as possible. Most of the comments made in the interview were elaborations on the existing written comments, and thus could be put together, as one unified comment of two or more sentences. Other comments from the interview were clearly additional responses, and these were treated as separate comments.

This synthesised set of comments for each argument was then sorted by the experimenter into what were perceived to be separate 'points' being made by the participant. This process was achieved by taking advantage of the tendency for writers to use separate sentences or paragraphs to express different ideas. Observing the meaning of the comments also assisted this process. It was also intended that these 'points' be used as units in statistical analyses. Much of the time, the identified 'points' corresponded to the original sets of comments.

Once the above process had taken place, the experimenter then sought to very carefully assign to each 'point' a descriptive label that was as accurate as possible - labels such as 'Partially disagreeing with the conclusion', or 'Accepting the evaluative attitude'. In doing this, the experimenter had to guard against thinking that the responses necessarily constituted reasons for a certain evaluation of the associated argument (as in Study 1), since the participants were not asked to evaluate the arguments and give reasons for those evaluations (only to 'comment').

Nonetheless, it was recognised that at least some of the responses may have constituted implicit expressions of acceptance or non-acceptance of the presented arguments. This matter was to be clarified in a second interview.

The process of constructing a descriptive label for each point was assisted by the experience gained in Study 1, and by virtue of the fact that there was a range of potential labels already available. Nonetheless, the need for accuracy and precision made it a painstaking task, especially when there were many subtle distinctions that needed to be maintained. Care also needed to be exercised to prevent false positive identifications. As was to be expected, some points could not be satisfactorily described by the pre-existing labels from Study 1. In these instances, new descriptive labels had to be generated.

6.2.5 Materials and Procedure (Session Two)

Following the above intermediate analysis, the participants were asked to return for a second interview session. The purpose of this interview was to seek validation of the experimenter's interpretations and analyses of the comments. One unavoidable problem with this experimental arrangement related to the passage of time between interviews (this period was approximately one month).

It was recognised that by the time the participants returned, they would probably not accurately remember the nature of their thoughts at the time of the first session. Similarly, their frame of mind could have changed over that period of time. Nonetheless, it was hoped that when the participants were presented with the arguments, and their comments, this would refresh their memory of what they were thinking during the first session.

When the participants returned, they were presented with a document that contained a restatement of each of the original arguments, with their comments given underneath - but sorted into the experimenter's arrangement of points. They were told that their comments had been reorganised in this way by the experimenter. They were also told that they would be asked questions about their responses, for the purposes of 'clarification'. The experimenter was very careful at this point to avoid use of the word 'checking'.

The second interview session consisted of questions which were directed to each argument and the associated comments, in turn. Prior to being asked the questions, the participants were requested to read over the relevant argument and associated points that they had made. They were requested to listen and think very carefully before answering the questions, which were as follows.

Firstly, the participants were asked whether they thought that the 'points', as presented, were indeed separate and distinct, or whether they thought that they should be split up further, or combined, or left as presented. As with all the interview questions, the participants were requested to think carefully before answering. Any requested alterations were noted down.

For each point left intact by the above process, the question was asked: "Which of the following two statements would be more true about the purpose of your comment? Firstly, that you were expressing your acceptance or non-acceptance of what was being said, or secondly, that you were expressing some personal views on the topic generally. Or, were you doing something else?".

This was a difficult question (especially for first-year students), so if the experimenter noticed or suspected any signs of confusion, or lack of understanding on the part of the participant, the question was asked again in a simplified way (by putting forward each possibility individually, for consideration, then asking which statement fitted the best).

This was an important interview question. With this question, the experimenter could be quite confident in knowing what the participants' intentions were in making their comments, including the making of 'free responses'.

In the next stage of the interview, the participants were told that certain interpretations could be made of their points (these being the descriptive labels). They were told that the experimenter wished to check if these were complete and accurate. The experimenter

encouraged the participants to make it known if they didn't understand any of the suggested interpretations. They were also strongly encouraged to correct any misinterpretations and to offer any alternatives.

The participants were then presented with the interpretation of their first 'point' in response to the first argument. The following is an example of the format that was used: "This comment could be seen as you disagreeing with the conclusion that the Bannon government is to blame for the increase in crime. Do you think that is an accurate interpretation? Or, don't you think so?". They were also asked: "Would this capture the meaning of your comment, or is there some important aspect missing?".

It will be noticed that the questions were worded so as to not exert pressure on the participant to respond either way. The questions were also worded in such a way that an impersonal interpretation was presented ("This comment could be seen as ..." rather than "I interpret this comment as ..."). The participants might have been less willing to disagree with an interpretation that was clearly labelled as the experimenter's. In the event of any dissent, the participant was asked for a corrected and/or enlarged interpretation, and this was recorded.

If, during the intermediate analysis, the experimenter was unable to produce a descriptive label for a 'point', and the participant indicated that he or she was expressing acceptance or non-acceptance of the item, the participant was asked to explain how her or his point constituted such an expression (although not in these words). This response was later examined by the experimenter for a possible descriptive label. This could not be checked with the participant, as only two interviews were held.

If the experimenter judged a point to be simply the expression of a personal view, but was told that its purpose was to express acceptance/non-acceptance of the item, then the same kind of question was asked (as to how it constituted such an expression). Again, later consideration of a suitable descriptive label could not be checked with the participant concerned.

These questions were then repeated for all the remaining 'points' for each of the arguments. Although these interview questions appear to be very laborious, the proceedings were actually relatively rapid.

After the completion of the interview, the participants were thanked for their involvement in the study, and asked not to discuss the study with anybody else until they were sent information about the general nature of the obtained results.

6.3 Interview results

Several events took place during the study that affected the quantity of information that could be collected. The first of these was that ten of the participants did not return for the second session, despite receiving two invitations to do so. This left 34 participants; 16 in the control group, and 18 in the experimental group.

The second of these was a fatigue effect that was noticed in the first few participants during the second interview. The demanding nature of the questions began to take its toll on the participants by the time the fifth and sixth arguments were considered. In particular, the experimenter observed that the participants were beginning to find it difficult to answer the questions which they were previously addressing with little difficulty. Accordingly, the experimenter limited the questions in the second interview to the first four arguments (after these first few participants).

One minor event was one participant's failure to respond at all to the fourth argument. This meant that with the argument-related questions, there were a total of 135 actual responses, instead of the 136 total possible responses (34 participants multiplied by 4 arguments). Some of the results reported below make reference to these 135 occasions in which responses were given.

6.3.1 Effect of labelling

One of the investigations of this study related to the issue of whether participants will regard differently, and respond differently to, items that are labelled as arguments, compared to those that are not.

An analysis of the data showed that there was no significant relationship between the experimental conditions, and whether or not the items were regarded as constituting arguments. This analysis was carried out on each of the four arguments, yielding, respectively, $\chi^2(1, N = 30) = 2.31, p > .05$; $\chi^2(1, N = 30) = 3.33, p > .05$; $\chi^2(1, N = 31) = 0.0005, p > .05$; and $\chi^2(1, N = 28) = 1.22, p > .05$.

It was concluded, therefore, that it made no difference to the participants whether the arguments were labelled as 'items' or 'arguments' - both groups had varied opinions on whether any one argument did actually constitute an argument.

As indicated below, the participants had their own ideas as to what constitutes an argument, and *this* determined their view of the items, rather than the labelling.

As reported later, an analysis of the actual responses showed an almost identical pattern and distribution across the two groups. For these reasons, the two groups were combined for most of the analyses.

6.3.2 Participant conceptualisations of 'argument'

During the first interview, the participants were asked whether or not they regarded the presented items as being arguments. Of the 135 instances in which this question was asked, there were 72 occasions (53%) in which the participants stated that the items *were* arguments, 47 occasions (35%) in which they stated that the items were *not* arguments, and

16 occasions (12%) in which other responses were given. Examples of the latter responses included: 'Don't know', 'Hard to tell', and 'Not sure'.

The participants were asked for reasons for their views. These reasons were regarded as helpful in identifying some of the conceptualisations of 'argument' (or 'non-argument') that the participants had.

6.3.2.1 Reasons for items being regarded as arguments

Of the 72 instances in which the participants agreed that the items *were* arguments, there were 70 occasions in which a reason for that view was successfully elicited. Several categories of reasons were identified. These are listed below, with examples, along with their incidence of occurrence (as a percentage of the 70 cases).

(a) Arguing to a proposition (28%)

There were three types of closely related reasons given by the participants which were amalgamated by the experimenter into one basic criterion: that some kind of basis was given for putting forward a proposition. This was the most frequently occurring reason for the participants to consider that the items were arguments.

The three composite reasons were as follows: 'arguing to a proposition' (14%), 'providing support for a proposition' (11%), and 'giving a reason for a proposition' (3%). All three reasons may be collectively described as 'arguing to a proposition', as above. In a sense, it was a somewhat circular for some of the participants to say that an item was an argument because it 'argued towards a proposition', but the experimenter gave them the benefit of the doubt and assumed that they meant that some kind of basis was given for propositions contained in the items.

These three variants of arguing to a proposition may be exemplified respectively by the following three examples. One participant regarded the Sexual Harassment argument as an argument because "He's arguing it [the harassment] is her fault". Another regarded the Marriage argument as an argument "Because it's a conclusion (that 38% of marriages end in divorce) offered in saying why people shouldn't get married". It may be noted parenthetically here that this participant incorrectly regarded the premiss (the 38% divorce rate) as the conclusion. In terms of giving reasons for a proposition, one participant stated that the Sexual Harassment argument was an argument because "He's said you could argue the clothes you're wearing is the reason you were sexually harassed".

(b) Presentation of a proposition (19%)

This reason was also constructed by the experimenter by amalgamating three types of closely related reasons given by the participants. These were as follows: 'a proposition was put forward' (13%), the person was 'saying a proposition' (3%), and the person was 'stating something' (4%). These three reasons may be reasonably grouped together under the general reason that a proposition has been presented.

These three variants of arguing to a proposition may be exemplified respectively by the following three examples. One respondent regarded the Pot Belly Stove argument as an argument because "She's putting forward her side of the situation". Another regarded the Crime Rate item as an argument "Because he asserts the Bannon government is at fault, concerning the crime rate". One participant agreed that the Marriage argument was an argument because "It's a statement claiming something".

(c) Debatability (11%)

To this point, the participants' conceptualisation of 'argument' has roughly approximated that of a 'type 1' argument (after O'Keefe (1977, 1982)). Some participants, however, clearly subscribed to the view that an argument is some kind of interactive disputation or

exchange, or in other words, a 'type 2' argument. There were variations on this theme, however.

One straightforward example came from a participant who agreed that the Sexual Harassment item was an argument "Because the person was disputing what the lady was trying to tell him/her". In a slightly different vein, another respondent regarded the same item as an argument "Because he's saying that there's nothing I can do because of the way you dress, but she's complaining, so its a conflict situation".

One response to the Crime Rate argument was as follows: "It's an argument because it's in the context of the government. They're looking for an argument from it". Here, the participant seems to regard the item as an argument because the assertion can and will be debated by the Opposition party. In a similar style, another participant also agreed that this item was an argument "Because if I heard that said in parliament, there'd be someone on the other side who'd jump up about it".

The above constitute the three most frequently mentioned reasons for regarding the items as arguments. The remaining instances occurred in less than 10% of the instances. There were, nevertheless, some very interesting reasons that were repeated a few times.

(d) Involves persuasion (4%)

In 4% of the cases, the items were regarded as arguments because they entailed persuasion, for example, one participant agreed that the Crime Rate item was an argument because "It's an attempt to have people believe one thing followed from the other".

(e) Positively evaluated (4%)

When the participants were asked whether each item 'was an argument', some appeared to interpret this to mean 'was it a good argument?'. In 4% of the cases, this provided the basis

for agreeing that the items were arguments. One respondent said "Yes" that the Crime Rate item was an argument "Because the Bannon government *should* [italics added] take responsibility because since they've been in power, the crime rate has risen". In other words, the participant thought that it 'was an argument' in the sense of it being a good argument.

Another example may be given with respect to the Pot Belly Stove argument. One respondent stated that this was an argument "Because a lot of people would agree with what that person is saying".

(f) Miscellaneous (7%)

Apart from two instances where double reasons were given (the item was regarded as putting forward a proposition *and* being debatable), the remainder of the reasons for agreeing that the items were arguments were singly occurring.

(g) Unclear reasons (24%)

In a manner similar to Study 1, not all of the responses could be confidently understood or interpreted. Unfortunately, the proportion of cases like this was quite high, as designated above.

One example of an unclear response came from a participant who said that the Sexual Harassment item was an argument "Because people will think that because she dresses that way that she will get sexually harassed, but the other point of view is that she may not". The experimenter identified at least two possible interpretations of this response.

The first of these was that the response fell into the category of 'debatability' since the participant seemed to be implying that the issue could be debated ("the other point of view is that she may not").

The second of the interpretations was that the participant regarded the item as an argument because it entailed persuasion - the item was seen as something that would persuade others to think that certain modes of dressing will lead to sexual harassment ("people will think that..."). The comment about the "other point of view" may have simply been a side-issue. This case, and many others, were difficult to interpret because the participant's intentions in making various remarks could not be confidently determined.

Not all of the unclear reasons were unclear in such a complex way. One participant said that the Pot Belly Stove item was an argument because "It's being compared to a different type of situation". Here, the participant was referring to the comparison made between the pollution of the pot belly stove, and other sources (spent rocket fuel etc). In this case, it was not really clear whether the item was regarded as an argument because a comparison was made, or because the comparison was used as a basis for making a claim. While the latter seemed the most appealing interpretation, it involved interpretation beyond what was written, and hence was more hazardous. The experimenter tended to err on the side of caution when responses such as these were analysed, since such analyses amounted to attempts to 'read' the participants' minds.

6.3.2.2 Reasons for items not being regarded as arguments

Of the 47 instances in which the participants disagreed that the items were arguments, there were 45 occasions in which a reason was for that view was successfully elicited. These reasons fell into several categories which are listed below, with examples, along with their incidence of occurrence (as a percentage of the 45 cases).

(a) Just a statement (47%)

It was considered ironical that some items in the previous analysis were regarded as arguments because they involved the presentation of a proposition, but in this analysis, the

same basic reason was given as a basis (on occasion) for *disagreeing* that certain items were arguments: they were regarded as being 'just a statement'. In the previous analysis, participants regarded items *as* arguments because 'a proposition was put forward', or because a person was 'saying a proposition', or because the person was 'stating something'.

One participant disagreed that the Marriage item was an argument because "It's just putting forward a statement that it's not worth getting married". Another also disagreed, saying that the item was "Just stating a fact" (presumably that 38% of marriages end in divorce). Yet another respondent expressed himself slightly differently by saying "More of a single comment rather than an argument - there's no balance, it stopped dead".

An even more subtle expression of an item being 'just a statement' related to the Pot Belly Stove argument: one participant said "She's not putting forward an argument - she's just saying leave me at home alone with my pot belly stove". In other words, the participant believes the writer of the Pot Belly Stove item is just making a statement to the effect of 'leave my pot belly stove alone'.

(b) Negatively evaluated (13%)

In the previous analysis, some participants thought that an item 'was an argument' in the sense of it being a good argument. A similar observation was made in this analysis, except in reverse - much the same as the everyday retort "That's not an argument!", meaning, "That's not a good argument".

Perhaps the clearest illustration of this was in relation to the Crime Rate item. One participant said "No", it was not an argument, because it was "Not adequately backed up". In another case, a participant disagreed that the Crime Rate item was an argument because "It didn't take into account any other factors".

The Sexual Harassment item was not regarded as an argument by one participant because "I really disagree with it. Not many people would see it as correct". Another said "No", it was not an argument, "Because it seemed like rubbish, not up to date with what's going on in the 80's".

(c) Miscellaneous (21%)

There were three cases where double reasons were given, and in each of these instances, the two reasons were the same: the item was not regarded as an argument because it was 'just a statement' and also because 'there was no support'.

All the remaining reasons given by participants were specific and individual, and were not repeated. To provide an indication of some of these miscellaneous reasons for disagreeing that items were arguments, the following examples are provided. One participant stated that the Marriage item was not an argument because "It's not aggressive enough to be an argument". Another rejected the Pot Belly Stove item as an argument because "He's whingeing".

One of the categories of reasons given previously for regarding items as *being* arguments was because some kind of debate was taking place, or could take place. In one instance here, a participant disagreed that the Pot Belly Stove item was an argument because "It's hard to be an argument - you haven't got 2 people having a go at each other".

(d) Unclear (11%)

As before, not all of the 'No' reasons could be confidently understood or interpreted, for example, one participant said that the Sexual Harassment item was not an argument because "It doesn't really say what side of the fence the person [the observer] is on".

6.3.3 The accuracy of argument perception

Soon after clarifying the participants' comments in the first interview, the experimenter asked the participants to give an account of the argument, as they perceived it. There was no doubt that some of the participants' perceptions of the arguments were substantially different from the arguments as actually presented.

Since it was very difficult to assess objectively and precisely the extent of these differences, the experimenter used three broad categories: 'Not differing to any significant degree', 'Differing to a moderate extent', and 'Differing substantially'. To illustrate these categories, examples are given here in relation to the Pot Belly Stove argument, which is restated below for convenience:

Letter to the Editor, The Advertiser, February 4th, 1989:

"If Dr. Hopgood, Minister for Environment and Planning, wants to clean up the air, would he please start with space shuttle exhausts, spent rocket fuel, nuclear explosions and bomb blasts before he deprives me of my pot belly stove and its comforting warmth used over a maximum of three months each year".

(Mrs) Y.M. Gurr,
Renmark.

One example of the 'minor discrepancy' category was as follows: "If Dr. Hopgood wants to clean up the air, why doesn't he get rid of bombs etc instead of my pot belly stove that would warm me up for 3 months a year". Although the account is incomplete, it captures the essence of the argument.

The following was an example of the 'moderate discrepancy' category: "They should concentrate on cleaning up fuels and all that, rather than worrying about the general public's pollution". Although some of the force of the original argument is present, quite a few

details have been omitted - it no longer targets Dr. Hopgood, and does not refer to pot belly stoves in particular.

Two examples of the 'substantial discrepancy' category are as follows: "Why are they asking to take away my pot belly stove ? Its not my fault the pollution is so bad" and "The State government doesn't have a lot of power over the things mentioned, but does have power over pot belly stove use". This clearly shows a very poor level of correspondence to the original argument.

While effort was made to be as consistent as possible in applying the criteria, the results of the analysis were inescapably subjective, and could only provide a general guide.

Both groups of participants were combined in the reporting of the results below, since no statistically significant relationship was found between accuracy and group. Table 1 reports the results of analysis.

Table 1

Incidence (as %) of different degrees of discrepancy between arguments as presented and arguments as perceived

	Extent of discrepancy		
Argument	Minor	Moderate	Substantial
Marriage argument	56	29	15
Sexual Harassment argument	38	41	21
Crime Rate argument	53	35	12
Pot Belly Stove argument	39	33	27

As indicated before, however, these results should only be taken as a guide, due to the subjective nature of the criteria used, and possible problems of consistency of application of those criteria. Caution should also be exercised in accepting these results too confidently, since some of the inaccuracies could be due to problems of expression on the part of the participants, rather than their perception of the arguments.

6.4 Response analysis results

Following the first session of the study, the experimenter organised the participants' comments, clarifications, and elaborations into what seemed to be free-standing, separate 'points'. In total, 385 points were identified by the experimenter (both groups combined).

For each of these points, the experimenter very carefully assigned a descriptive label that was as accurate as possible. These labels took the form of statements such as "Partially disagrees with the conclusion".

The participants in the second session were requested to read each of the arguments again, and the points that they had made (as organised and presented by the experimenter). They were asked whether they regarded the points as indeed separate and distinct, or whether they should be further divided, or combined, or left as they were.

Responses to these questions led to 49 of the 385 points being excluded from analysis. Twelve of these 49 points were excluded because the participants wanted to divide the points into two separate points. Other points were excluded because the participants wanted to combine them with other points. When these points were considered, along with those that were to be combined with them, 37 points were involved. These were excluded along with the above-mentioned 12, totalling 49 points.

The reason for these exclusions was that the experimenter did not have a chance in the second session to consider descriptive labels for the alterations. These exclusions meant that, in the participants' eyes, the experimenter was successful in organising the participants' comments into separate points for 87% of the cases (336 of the 385 points).

For 2 of these 336 points, the experimenter had previously been unable to construct a satisfactory descriptive label. This left 334 points whose interpretations could be checked.

With respect to these points, the experimenter asked the participants in question whether the purpose of their point was to express acceptance or non-acceptance of what was being said in the argument, or, whether the purpose of the comment was to express some personal views on the topic. Allowance was made for the possibility that the participant's purpose may not have fallen into either category. The participants were then presented with the experimenter's interpretations of their comments (i.e., the descriptive labels) for checking. The participants were required to indicate whether the descriptive label completely and accurately described their response.

For 29 of the 334 points (9%), the participants disagreed with the interpretations offered. The reason for their disagreement was simply that the interpretations were inaccurate. In 10 of these 29 cases, the interpretation was of a 'free response'. Thus, the experimenter was accurate in assigning descriptive labels in 91% of the cases (305 of the 334 points).

Listed below are the confirmed categories of responses to the arguments. The associated descriptive labels are listed in two sections: those that were also found in Study 1 ('replicated response categories') and those that were newly identified ('newly identified categories'). Following this, a report is given on the incidence of all of these categories.

It should be noted here that for all of the descriptive labels reported below (with the exception of 'free responses'), it was verified that the purpose of the participants' comments

was to express acceptance or non-acceptance of the argument. As with Study 1, the most typical cases are reported to illustrate the categories of descriptive labels.

6.4.1 Replicated response categories

(1) Assessing the Conclusion

Study 1 only yielded two types of conclusion-oriented responses - agreement/disagreement, and practical consequences of accepting the conclusion. In this study, a substantial number of extra sub-categories were found.

(a) Agreement

(i) Without giving reasons

This category of response was occasionally expressed as simple agreement, for example, in response to the Pot Belly Stove argument, one participant explicitly agreed with the conclusion, saying "I agree with this argument. Why can't they start from the top and get rid of those things [space shuttle exhausts etc.] that are really harming the atmosphere before depriving the average person of their things [pot belly stoves]. They should be dealt with first".

(ii) Giving reasons

It was frequently the case that when participants expressed agreement with a conclusion, that they also provided reasons for that agreement. One participant, for example, responded to the Crime Rate argument with: "I think the Bannon government must accept a large share of the responsibility because maybe many of their policies instigated the rising crime rate." This participant agreed that this comment was an expression of her agreement with the proposition that the Bannon government must accept a large share of the responsibility for

rising crime in the community (i.e., the conclusion of the argument) and that she was also explaining why she agreed with this.

(iii) If certain facts are established

One participant agreed that her response amounted to an expression of agreement with the conclusion, but only if certain facts are established first. Again, the example relates to the Crime Rate argument: "If it can be shown that the Bannon government have (1) not attempted to deter crime or (2) that their attempts to deter crime have been ineffectual, then some of the responsibility for rising crime in the community must be accepted by the Bannon government".

(b) Disagreement

(i) Without giving reasons

Some responses were simple statements of disagreement, for example, one participant responded to the Crime Rate argument with "Rubbish. Changes in society [the crime rate] cannot all be directly related to the government, in fact the government has little to do with it".

(ii) Giving reasons

A more subtle example of disagreement with the conclusion of an argument, with reasons provided, is illustrated by the following response to the Sexual Harassment argument: "No-one has the right to sexually harass or in any other way harass anyone and so [the woman] does have the right to complain." The original argument argues towards the conclusion that the woman could not complain about sexual harassment (the reason provided was that she was provocatively dressed). The participant in question agreed that she was disagreeing

with the proposition that the woman could not complain about being sexually harassed, and agreed that she was giving reasons why.

(iii) Expressing opposite conclusion

Some participants, in expressing their disagreement with the conclusion, also expressed a proposition clearly contrary to the original conclusion. In response to the Marriage argument, one participant stated "I don't agree with this statement, that there's not much point in getting married. I believe there is a great amount of importance in getting married".

(c) Partial agreement

In Study 1, the participants either agreed or disagreed with the conclusion. In this study, the participants were not always so absolute in their responses.

Some participants were only willing to agree partly with the conclusion, for example, in response to the Crime Rate argument, one participant stated " 'A large share' is probably a bit exaggerated. Although I agree that the Bannon government must accept some share due to increases in taxes and inflation, I doubt whether a large share of the responsibility is fair". In other words, the participant agreed, but not completely. As with all responses reported in these results, the participants agreed entirely with the experimenter's analysis and interpretation.

(d) Partial disagreement

Other participants partly disagreed with the conclusion, for example, one response to the Crime Rate argument was as follows: "I don't think the Bannon government should accept a large share of the responsibility, but some of the share should be theirs. It is not only the governments that have 'control' over crime rates, there are many other factors. It's not only the State government, it's the Federal government and the country as a whole - the economic

condition of the country that's not due to the State government. The Bannon government shouldn't accept a large share because of the other things". In other words, this participant disagreed, but not entirely ("some of the share should be theirs").

(e) Agreement with part of the conclusion

As would be expected in everyday responses to arguments, people may agree with only *part* of a person's conclusion. In response to the Pot Belly Stove argument, one participant commented "Bombs and nuclear explosions don't achieve anything and probably do the most damage - they are probably the most damaging and futile - they should be concentrated on".

This participant agreed that his response constituted an agreement with part of the conclusion - that nuclear explosions and bomb blasts should be dealt with before pot belly stoves, because (he thought) the former generate more pollution. This is only part of the conclusion, since space shuttle exhausts and spent rocket fuel was also mentioned in the original argument (and by the participant in his account of it).

(f) Disagreement with part of conclusion

As would also be expected, some participants *disagreed* with part of the conclusion of an argument. The Pot Belly Stove argument especially yielded responses of this nature. One participant stated "Space shuttles and rockets are used for positive research. They are probably almost as damaging [as bomb blasts and nuclear explosions] but have a positive aspect". This participant agreed that this response reflected a disagreement with part of the argument's conclusion - that space shuttles and rockets should be dealt with in order to do something about pollution. The disagreement was only directed towards those elements of the conclusion.

(g) Good practical consequences of accepting conclusion

One category of responses which was observed in Study 1 was found again in this study. In response to the Marriage argument, one participant commented that "By not getting married, people who live together have less hassles if things don't turn out as expected, no divorce is needed, and thus no traumatic drawn out court cases etc. By not getting married, if things don't work out, there's not all the hassles and court cases".

This participant agreed that her comment was indicating some good practical consequences of accepting the conclusion that it is not a good idea to get married. Although it may be pointed out that the original conclusion was "There's not much point in getting married these days", rather than "It's not a good idea to get married", the participant perceived the conclusion to be the former, and it is the participants' perception of the argument that is of relevance in this study.

This response type was also found in relation to the Pot Belly Stove argument. One participant stated: "But if a major cause of the pollution was reduced, then perhaps the environment would be a much better place to live in". It was clear from this participant's other comments that she accepted the claim that space shuttle exhausts and so on were a greater source of pollution than pot belly stoves. This participant agreed that she was pointing out good practical consequences of accepting the (perceived) conclusion that reductions should be made in space shuttle exhaust (and so on) before limiting the use of pot belly stoves.

(h) Bad practical consequences of accepting the conclusion

The Marriage argument elicited some responses which participants agreed were best described as pointing to bad practical consequences of accepting the conclusion. One participant wrote: "If people thought this way then no-one would be married, or provide a loving, caring environment for their children. If people thought like this, there wouldn't be a

loving caring environment for their children because you need the mother and father living together with their kids".

(2) Responding to Implied Propositions

In Study 1, this category of responses was labelled as 'Responding to Perceived but Questionable Connotations of an Argument'. In this study, a similar set of responses were found, but were characterised as 'Responding to Implied Propositions'. This was due to the fact that the participants' responses related not so much to idiosyncratically perceived connotations as to 'actual' propositions that were contained in the arguments - albeit only implied.

With respect to the Crime Rate argument, one participant commented "It [the argument] sounds like the Bannon government encourages crime to exist, but the cause would be that they've not addressed the problem, they've let it lie". It was acknowledged that this response was a disagreement with an implied proposition that the Bannon government had actually caused the crime to increase. Another participant made a similar comment: "It would be absurd to suggest that the government causes crime", and agreed that this response consisted of a rejection of the implied proposition (that the government causes crime).

The Sexual Harassment argument elicited several responses which related to implied propositions within the argument. One participant stated (somewhat awkwardly) "Her mode of dress is chosen by her maybe as what she sees comfortable, attractive or as self-expression. Why should she give up these rights because of someone else? I don't think I should have to wear longer dresses to stop people making comments".

During the initial analysis, at first glance, the experimenter regarded this comment to be a free response (i.e., an expression of triggered personal views), however, on further consideration, it was suspected that there was more involved. One proposition which is very clearly implied in the Sexual Harassment argument is that the woman should dress less

provocatively if she does not wish to be sexually harassed. The experimenter later suspected that this participant was disagreeing with this implied proposition. Even though the latter analysis seemed consistent, there was still some possibility that the response was an expression of personal views. It was with examples such as this, and many more, that the tremendous value of checking interpretations was highlighted.

In the second interview, this particular interpretation was confirmed: the participant agreed that her comment constituted an expression of disagreement with the implied proposition that the woman should dress less provocatively if she does not wish to be sexually harassed. This perhaps was most evident in the second sentence of the participant's point: "Why should she give up these rights [to dress as she likes] because of someone else?".

It was also found that some implied propositions were met with acceptance. Another implied proposition within the Sexual Harassment argument is that the woman cannot expect help for having been sexually harassed if she dresses provocatively. One participant responded to this argument in the following way: "But she can't expect help from others unless she tries to protect herself in the beginning". The experimenter interpreted this participant's comment as agreement with the above-mentioned implied proposition. When this was checked with the participant, she indicated that it was an accurate and complete interpretation of her comment.

(3) Assessing the Premiss

As with Study 1, there were some responses which dealt with the premiss(es); however, in this study, they were few in number. Although it was difficult to determine why, it was thought that the nature of the arguments in this study may have been a factor.

One participant made the following very lengthy point in relation to the Crime Rate argument: "I'm unsure about what the variables are - there may be more crime because people are poorer or because there is improved security and surveillance systems which catch people red handed. How does this compare with the population increase etc? I would need more

information than just the crime rate has risen - shoplifting may have increased 182%, drink driving may have increased, now does this mean there are more crimes, or just more apprehended ? If we were talking about things that can be accurately reported, e.g., murder, it would be O.K., but not here".

This response may be seen as challenging the arguer's premiss that the crime rate has increased 182%. This participant agreed that her response constituted an examination of the premiss of this argument - in the sense that she did not necessarily accept that the actual crime rate had increased by 182%. She emphasised that the crime rate may have actually remained the same, but the number of successful apprehensions had increased.

(4) The Suitability of the Argument

In Study 1, this category of responses involved expressions of the 'unsuitability' of the basis used for arguing towards the conclusion. The number of responses falling into this category were not at all frequent. They were only observed in relation to the Marriage argument.

One participant stated that "Getting married is a decision that should not depend on such a [divorce] statistic, but rather to an individual's or couple's perception of what marriage is", and another commented "As marriage is based on feelings, I don't see how official figures can affect anyone's decision to proceed with marriage. If people truly want to get married, anyone with that commitment wouldn't be swayed by those figures". In both of these cases (and others), the participants agreed that they were saying that the basis used for arguing towards the conclusion was 'unsuitable'.

(5) Accepting an Argument

This category of responses was known as 'Accepting an (Undetected) Fault' in Study 1. Since the current study was not at all concerned with whether the participants detected

fallacies, this category was re-named simply as 'Accepting an Argument' (even though the arguments *did* contain some faults and flaws).

For some reason, the responses exemplifying acceptance of an argument were only found in the Sexual Harassment argument. This was regarded as quite peculiar, given the controversial nature of the argument. It might have been expected that the Pot Belly Stove argument would be the most likely to be accepted, despite its flaws.

In response to the Sexual Harassment argument, one participant (a male) was clear in his acceptance: "This is true - females shouldn't complain if they're virtually asking for it. They shouldn't complain if they know they're going to be looked at". This participant agreed that he was expressing his acceptance of the argument that women cannot, or should not, complain of sexual harassment when they are 'asking for it' (this is how the participant perceived the argument).

Whilst the above example (and indeed this entire category) could be seen as really just the same as 'agreeing with the conclusion', this is not actually true. In the above example, the participant is accepting the argument that the woman cannot complain about sexual harassment (the conclusion), *on the basis* of the premiss that she is provocatively dressed (and that such dress 'invites' sexual harassment). This is different from simply agreeing with the conclusion that the woman cannot complain of sexual harassment. This example, and this category of responses, stands on its own as separate and independent of 'agreeing with the conclusion'.

Although it might be thought that female participants would not be sympathetic to the Sexual Harassment argument, there was one exception. One female participant accepted the argument, stating: "I mean, there is a time and a place for everything and if you are going to complain about sexual harassment, then it would follow that you don't dress provocatively. It's tasteless to complain about something if you're just asking for it". This participant agreed that her comment was expressing acceptance of the argument that a woman cannot

complain about sexual harassment when provocatively dressed *because* this style of dressing 'invites' sexual harassment.

(6) Argument Fails to Lead to Conclusion

This category was referred to as 'Identification of a Fault' in Study 1, but was re-named here as 'Argument Fails to Lead to Conclusion' for reasons similar to the above (this study was not at all interested in whether the participants detected faults or fallacies).

The descriptive title of 'Argument Fails to Lead to Conclusion' allowed for instances where participants identified a specific fault, and also for instances where the participant simply did not regard the conclusion as following from the premisses. One good example of the latter is as follows, in relation to the Marriage argument: "This argument is not justified just by the official figures that show 38% of marriages end in divorce. You can't say that because 38% of people are getting divorced, and that therefore getting married is not worth it". This participant agreed this response was expressing the view that the argument fails to lead to the conclusion that getting married is not worth it. In this example, the actual reason *why* the argument failed to lead to the conclusion (i.e., the specific fault) was not identified.

Another example may be given with respect to the Sexual Harassment argument. One participant stated: "You can't say that because of the way she was dressed, that her claim can be discounted". This participant agreed that her response consisted of pointing out that the woman's claim of sexual harassment cannot be rejected purely on the basis that she was provocatively dressed. In other words, this participant regarded the argument as failing to lead to the conclusion that the claim of sexual harassment could be dismissed.

With respect to the Crime Rate argument, one participant stated "The statistics are not enough alone to say whether a large share of rising crime is due to the Bannon government". This participant confirmed that this comment was expressing the view that the mere stating of

statistics is not enough to claim that the Bannon government is largely to blame (i.e., that the argument fails to lead to the conclusion).

(7) Describing Characteristics of the Arguer or Involved Parties

In Study 1, the participants sometimes perceived the arguer as having certain characteristics, which they described. These descriptions were given at a point when the participants were requested to give reasons for their evaluation of the argument. Notwithstanding the latter fact, the experimenter nevertheless suspected that the participants in that study were simply giving 'free responses' - that is - verbalising any reactions or thoughts that were triggered off by the argument, such as perceptions they had of the arguer. For this reason, this category of responses in Study 1 were regarded as possibly non-justificatory in their nature (i.e., it was possible that they were actually *weren't* justifications for a given evaluation).

On some occasions, however, the experimenter suspected that the participants were describing and attacking a perceived characteristic of the arguer (e.g., being sexist), and that this *was* a justification for their (negative) evaluation. In that study, these types of responses posed especially difficult interpretive problems, since all that the experimenter could do was to 'suspect'.

In this second study, however, the carefully-worded and detailed questions in the follow up interview permitted a more confident analysis of these kinds of comments (and all others). The experimenter's 'suspected' interpretation was checked after the participant was *first* asked what the purpose of his or her comment was (to express a 'free response', or to express acceptance/non-acceptance of the argument through that comment). As mentioned previously, all of the response categories identified in this study were verified as expressions of either acceptance or non-acceptance of the items (with the exception of 'free responses').

Through this process, it was determined that participants may indeed point to certain perceived characteristics of the arguer with the purpose of expressing acceptance or non-

acceptance of the argument (although the connection was not always clear). In this study, all of these kinds of comments were expressing non-acceptance.

(a) Characteristics of the arguer

One participant responded to the Sexual Harassment argument by saying "Obviously a comment made by a male or unattractive female who was 'jealous'." This participant agreed that she was describing a characteristic that she perceived the arguer to have (being jealous).

Another example came from one response to the Pot Belly Stove argument: "Obviously a letter from someone with an interest in and bias towards pot belly stoves". This participant agreed that this comment was an expression of a perceived characteristic of the arguer, and said "I'm also implying that what she says isn't very valid".

(b) Characteristics of another involved party

Another response to the Sexual Harassment argument was as follows: "She's not that worried about being sexually harassed if she's dressed provocatively." The participant who gave this response agreed that it was a description of some characteristics she perceived the woman to have (who was the initiator of the arguer's argument). This comment was an expression of non-acceptance of the argument in the sense that the participant agreed with the arguer's 'dismissal' of the complaint on the grounds that someone dressing provocatively is at some level expecting or desiring sexual attention.

(8) Acceptance or Non-acceptance of Mental Attitudes Implicit in Argument

In Study 1, some arguments were evaluated on the basis of the participants' acceptance or non-acceptance of the arguer's 'attitude'. Some of the 'attitudes' the participants referred to were true attitudes, in the formal psychological sense of the term, and others corresponded more to attitudes in the lay sense of the term - beliefs, prejudices, perspectives, biases, and

so on. In that study, the term 'evaluative attitude' was coined by the experimenter to refer to the former type of attitude, and 'mental attitude' to refer to the latter type.

In this second study, some of the comments on the arguments made reference to 'mental attitudes', for example, one participant had the following to say about the Marriage argument: "It wouldn't say much for you if you didn't attempt something if the failure rate looks high. A defeatist attitude". As was expected, this participant agreed that this response amounted to pointing out an attitude the arguer was perceived to hold.

The Sexual Harassment argument elicited the following response from one participant: "Very chauvinistic comment". Another responded with "A pretty sexist comment". Both participants acknowledged that their responses were essentially pointing to an attitude they perceived the arguer to hold.

(9) Accepting or Rejecting Evaluative Assumptions

In Study 1, there were occasions in which the participants evaluated some of the arguments on the basis of whether they accepted or rejected the evaluative attitudes that they identified in the arguer's thinking.

In this second study, some participants made comments that also expressed acceptance or non-acceptance of identified evaluative attitudes, however, the experimenter recognised that these evaluative attitudes were actually *assumptions* (of an evaluative nature).

In Chapter 2, the distinction between 'needed' assumptions and 'used' assumptions was made, as described by Ennis (1982). Needed assumptions were defined as those that "are needed to support the conclusion, to make the argument a good one, to make a position rational, etc." (Ennis, p. 63). In the case of the Marriage argument, for example, the argument 'needs' the assumption that divorce is a negative event in order to make the argument rational; this assumption is needed (along with the stated premisses) to support the

conclusion. Used assumptions were defined in Chapter 2 as those that are "actually used ... as a basis of argument or action" (Ennis, p. 63).

Although the distinction between needed and used assumptions was not made to the participants during the second interview, the experimenter suspected that the majority of the identified assumptions were *used* assumptions (or at least assumptions that they *perceived* the arguer to be using), rather than needed assumptions. It was still possible, however, for some participants to have expressed their acceptance or non-acceptance of assumptions that they recognised as needed in the argument in order that the argument be rational.

Regardless of this issue, the experimenter was able to verify that some comments made by the participants involved expressions of acceptance or non-acceptance of identified assumptions that were *evaluative* in their nature - that is, they involved an appraisal of something (such as divorce being a negative event).

Since plentiful examples of this type of response were given in relation to Study 1, and because most responses in this study occurred in relation to the Marriage argument, the following single example suffices. One participant stated: "Is there anything wrong with divorce ? I don't think there's anything wrong with divorce." This participant was in complete agreement with the interpretation of this comment as being a disagreement with the assumption that divorce is a bad thing.

6.4.2 Newly identified response categories

To this point, the only response categories reported have been those that were also observed in Study 1 (even though some of these categories were expanded). Quite a number of new categories of responses emerged in this study, as documented below.

(10) Accepting or Rejecting Factual Assumptions

Some participants responded to the arguments by expressing their acceptance or rejection of certain types of identified assumptions that the experimenter described as 'factual' assumptions (as distinct from 'evaluative' assumptions).

The term 'factual' assumption was used to denote assumptions that are non-evaluative and free of value-judgements in their nature, such as 'crime rates can be influenced by government action', or 'provocative dressing will lead to sexual harassment'. These do not involve evaluations of something as good or bad.

Quite a significant proportion of participant responses related to these factual assumptions, as will be documented later. The fact that this category only emerged in this study (and not in Study 1), was attributed to two main factors.

The first of these was that extra care was exercised in this study to ensure that the arguments were as typical as possible of everyday arguments, having some subtle elements, and leaving a certain amount unstated, but implied.

The second of these was that the participants in this study only had six arguments to consider and respond to (instead of 30, as in Study 1). Thus, they had a greater opportunity to consider and respond to the arguments, including the unstated elements.

Most of the identified factual assumptions related to the second, third, and fourth arguments. Examples of these are documented below, accompanied by a re-statement of the respective arguments in full.

The second item was the Sexual Harassment argument, which read:

"Look Mrs. Johnson, how can you come here and make a complaint about sexual harassment when you dress so provocatively?".

Some of the arguer's assumptions in this argument, as identified by the participants, were as follows: that other people share the speaker's view that Mrs. Johnson's dress is provocative; that dressing provocatively can lead to sexual harassment; and that the sexual harassment experienced was actually due to the provocative dress.

The third item was the Crime Rate argument, which read:

"In response to the information that, over the lifetime of the Bannon government, the crime rate in various categories of crime had risen by up to 182%, the Opposition Leader, Mr. Olsen said 'The Bannon government must accept a large share of the responsibility for rising crime in the community'".

Some of the identified assumptions in this argument were as follows: that governments can influence crime; that *much* of the crime rate can be influenced by the government (hence the government is 'largely' responsible); and that governments should try to reduce crime levels.

Although not identified by the participants, the experimenter noted that one *evaluative* assumption in this argument is that an increase in crime rate is undesirable (or, conversely, that a decrease is desirable).

The fourth item was the Pot Belly Stove argument, which read:

"If Dr. Hopgood, Minister for Environment and Planning, wants to clean up the air, would he please start with space shuttle exhausts, spent rocket fuel, nuclear explosions and bomb

blasts before he deprives me of my pot belly stove and its comforting warmth used over a maximum of three months each year".

Some of the arguer's assumptions in this argument, as identified by the participants, were as follows: that Dr. Hopgood has the ability to exercise control over the pollution caused by space shuttle exhausts and so on, and that more highly-valued items (pot-belly stoves) should be a lower priority for pollution control than items that are of a lower value (space shuttles, rockets, nuclear testing, etc). As with the Crime Rate argument, the experimenter noted that this argument also involves an *evaluative* assumption (two, in fact) regarding the value of the two types of polluting activity. These provide a basis for the above assumption.

Although the participants identified assumptions such as the above, they did not always recognise that they were assumptions in the technical sense of the term; these unstated aspects of the arguments were detected, and commented upon.

These comments took the form of several types of assessment, reflecting a similar pattern to those of 'assessing the conclusion', as documented and exemplified below.

(a) Agreement

One participant responded to the Sexual Harassment argument in this way: "Girls have to be careful with what they wear otherwise they could get sexually harassed". This participant agreed that this comment constituted an expression of agreement with the proposition that provocative dress can lead to sexual harassment (an assumption in the argument).

(b) Disagreement

Another participant responded to the same argument very differently, stating: "How you dress does not promote sexual harassment. Most of the sexual harassment and rapes I've heard about have not been when women are wearing mini-skirts and suspender belts, and

lots of people parade around that don't get harassed". This participant confirmed that she was disagreeing with the proposition that provocativeness of dress influences whether or not a woman will be sexually harassed.

With respect to the Pot Belly Stove argument, one participant stated that "The Minister is unable to alter any of the suggested items". In this case, the participant agreed that this comment constituted an expression of disagreement with the proposition that the Minister has the ability to exercise control over the items mentioned. As mentioned previously, this is an assumption underlying the argument.

(c) Partial agreement and partial disagreement

The participants' assessment of assumptions was not always a black-or-white matter: some were met with both partial agreement and partial disagreement.

Once again, the Sexual Harassment argument yielded some good examples. Two of these related to a slightly different assumption from that mentioned above: that sexual harassment is elicited by provocative dress. This is logically different from the proposition that provocative dress can lead to sexual harassment.

The two participants in question commented that: "Sexual harassment is partly provoked by clothing, but mostly not", and "The way of dressing has a contribution, but the people harassing her have a large role in it". Both of these participants agreed that they were partly agreeing, and also partly disagreeing, with the proposition that sexual harassment is elicited by provocative dress.

(d) Undesirability of an accepted fact

Even though some participants accepted certain assumptions (in the sense of agreeing that they were true), they sometimes expressed sentiments that it was unfortunate that they were

true. This particular sub-category was only found with respect to the Sexual Harassment argument.

One participant commented that "Sexual harassment shouldn't occur, no matter how provocatively one dresses", while another said "It shouldn't matter how people dress, but it does". Both participants confirmed that they accepted the fact that provocative dress can lead to sexual harassment, but did not think this should be the case (i.e., it was not seen as a desirable state of affairs).

(11) Indicating Information not Considered by Arguer

Some of the participants responded to the items by pointing out certain information that the arguer had not considered (in their view). These responses were recognised by the experimenter as being distinct from those in the category of 'Argument Fails to Lead to Conclusion', since they were not expressed in such a way as to regard the conclusion as lacking necessary support.

There were two types of response in this category; all of which were observed in connection with the Marriage argument.

(a) Indicating information not considered by arguer

Some participants simply pointed out that some information was not considered by the arguer, and said nothing further. One example of this was as follows: "But they don't point out that there are lots of successful marriages. After all, 62% of marriages do not end in divorce". This participant agreed that she was drawing attention to some information that wasn't considered by the arguer.

Another participant made similar remarks: "Negative comment. It doesn't look at the good things about marriage. Lots of marriages end in divorce, but lots work out. This person

doesn't look at the positive things about marriage either". This participant confirmed the experimenter's interpretation of this remark as falling into this category.

(b) Information not considered used to argue against conclusion

Some participants pointed to information that was not considered by the arguer, and used it to argue against the conclusion. One example of this was as follows: "If 38% are ending in divorce, it means 62% are successful. This figure shows that people are happy in their marriage - if they are happy as a result of marriage, therefore there is a point in getting married if one wants to. If there's a 62% who are still married, then they must be happy".

This participant agreed that she was arguing against the conclusion originally presented by using information not considered by the arguer. Her remarks (and others in this category) were not considered by the experimenter as expressions of the original argument lacking necessary support, but simply as characterised here - use of information that had not been considered to put forward a different view.

(12) Describing the Argument

Some participants responded to the items by simply restating the argument. As with all of the categories of responses (except 'free responses'), the participants stated that the intention of their comment was to express acceptance or non-acceptance of the associated argument. Despite this, the experimenter was not able to make any connections between these intentions and the practice of restating an argument.

In relation to the Pot Belly Stove argument, one participant responded in the following way: "She's saying don't stop me enjoying my pot belly stove - there's all these things that are more damaging to the environment so stopping pot belly stoves is too trivial to worry about." This particular participant agreed that this response was merely giving an account of what was being said in the argument.

In response to the Sexual Harassment argument, one participant commented that "The man that said it [the argument] just presumed she'd be sexually harassed because of the way she dressed, and that if she didn't want to be sexually harassed, she'd have to change her dress, rather than telling the person off." Again, this participant granted that this comment was essentially simply restating the speaker's comments.

In both of these typical examples, and all others in this category, the experimenter was unable to see how the comments reflected an intention to express acceptance or non-acceptance of the argument in question, since no judgement seemed present, or at least, clearly present.

One explanation that was considered for this anomaly was that the participants did not really know how to describe the purpose of their comment (as an expression of evaluation, or a free response, or some other kind of expression), and just decided to indicate the former without really thinking about the issue.

(13) Describing the Arguer's Purpose

Some of the responses to the items involved a description of the arguer's purpose. In contrast to the above category, though, it was clear how these responses were made with the intent of expressing acceptance or non-acceptance of an argument.

In response to the Crime Rate argument, for example, one participant made the following comment: "An Opposition Leader will usually attempt to discredit the government in power whenever a social problem can be directly attributed to the government in power". Another made the remark that: "This is for cheap political gain". Both participants acknowledged that their comments were descriptions of the purpose they perceived the arguer to have.

One participant responded (somewhat awkwardly) to the Pot Belly Stove argument in the following way: "It's a defensive rationalisation. She [the writer of the letter] is trying to defend her wrong actions by saying the person [Dr. Hopgood] trying to do this [control pot belly stove use] is also doing wrong things much worse, and she's trying to make what she's doing as insignificant". This participant was in complete agreement that her comment was an expression of the (perceived) purpose of the arguer.

(14) Pointing to Definitional Problems

Some of the participants responded to the items by making the point that certain key words in the corresponding argument needed to be defined, or were variable in their meaning. This particular response type only occurred with respect to the Sexual Harassment argument.

The following comment from one participant was a good example: "Provocative dressing is difficult to define however, and to one person, [that dress] may seem perfectly 'unprovocative'". This participant agreed that this comment was a simple expression of the existence of a definitional problem, concerning the word 'provocative'.

Another participant identified a different definitional problem, commenting simply (in an impersonal sense): "You need to define what harassment is". As was expected, this participant agreed that this remark was an expression of a definitional problem involved in the argument concerning 'sexual harassment'.

6.4.3 Other responses

All of the above categories of responses were made with the intention of expressing acceptance or non-acceptance of the arguments. There were, however, some responses that were judged by the experimenter (and confirmed by the participants) to be 'free responses' - that is, expressions of personal views that were triggered off by reading the item. Quite a large proportion of responses were of this type.

The following response to the Marriage argument was a typical example: "It may not be easy to feel attracted to your partner all the time - if she hasn't got her make-up on one morning, but it's a deliberate decision to stay with them - its a deliberate decision - you've decided 'I'm going to like this person'". This participant agreed that this comment was simply an expression of a personal opinion that was triggered off by the item (and that it did not constitute an expression of acceptance or non-acceptance of the item). The free responses were exceptionally varied in their content - as varied as the participants' personal opinions.

In addition to these free responses, there was a wide assortment of responses which did not occur sufficiently frequently to warrant being placed into a category. They also tended to be too specific to the arguments they were contained in to be found in other arguments in everyday life.

6.4.4 Response category prevalence

In addition to the above analysis of the *nature* of the participants' responses, the experimenter performed an analysis of the *prevalence* of responses in each category.

The results of this analysis were important in placing the above-mentioned categories into context. Table 2 (following) displays the complete set of results.

Table 2

Prevalence of Response Categories to the Four Arguments

Name of response category	Incidence	
	Total	%
Assessing the Conclusion	59	19.3
Accept/Reject Factual Assumptions	58	19.0
Free Responses	56	18.3
Argument Fails to Lead to Conclusion	27	8.8
Indicating Information not Considered	13	4.2
Pointing to Definitional Problems	9	2.9
Describing Arguer or Involved Parties	9	2.9
The Suitability of the Argument	9	2.9
Responding to Implied Propositions	7	2.2
Describing the Arguer's Purpose	7	2.2
Accept/Reject Evaluative Assumptions	5	1.6
Describing the Argument	5	1.6
Assessing the Premiss	4	1.3
Accept/Reject Implicit Mental Attitudes	4	1.3
Accepting an Argument	3	0.9
Miscellaneous	30	9.8
Total	305	100.0

Note. When the control and experimental groups were analysed separately, the prevalence pattern was almost identical.

6.5 Summary and Discussion

A very extensive set of results were generated from this study. These may be summarised as follows.

It was found that labelling arguments as either 'items' or 'arguments' made no difference as to whether or not they were actually perceived as arguments. It was also found that the pattern of responses to arguments labelled as 'items' or 'arguments' was almost identical.

About 15 minutes after the participants had read and responded to the items, they were asked to give an account of the contents of those items. The accuracy of those accounts was quite

poor. Reasonably accurate accounts of the four items only occurred in the following proportions: 56%, 38%, 53%, and 39%, respectively. These results, though, needed to be offset against the possibility of expressional deficiencies in the participants.

When the participants were asked whether the presented items were arguments, they responded in the affirmative on 53% of the occasions. On 35% of the occasions, they responded in the negative. On 12% of the occasions, uncertain responses were given.

Many different reasons were given by the participants for saying that an item was, or was not, an argument - reflecting different conceptualisations of the characteristics or properties of an argument.

In 28% of the instances in which the participants *did* regard an item as an argument, they said that this was because they regarded it as arguing towards a claim. In 19% of the instances, the reason given was that a proposition was being presented. In only 4% of the instances, the reason given was that 'persuasion' was involved. The more popular understanding of an 'argument' as a 'dispute' also arose (in 11% of the instances). Significantly, in 24% of the instances in which the participants said that the item was an argument, no clear reasons were given - or at least, no reasons that could be confidently understood or interpreted.

When the participants did *not* regard the items as arguments, this was often because they were perceived as 'just a statement' (47% of the time). In 21% of the cases, a variety of reasons were given, each reflecting the participants' idiosyncratic views. In another 11% of the instances, the reasons given were unclear. In 13% of the cases, the participants did not regard the item as an argument in the sense that the item was not a *good* argument.

When the participants' responses to the arguments were analysed and checked, it was found that there were three distinct major categories: Assessing the Conclusion, Accepting or Rejecting Factual Assumptions, and Free Responses. The prevalence of each of these

categories was almost the same, and together made up 57% of the responses. The next two most prevalent categories were: Argument Fails to Lead to Conclusion, and Indicating Information Not Considered by Arguer. These, in conjunction with the first three categories, made up 70% of the responses. The incidence of the remaining categories was quite small (no more than 3% each).

Although a great deal of care was taken in obtaining the results in this study, they cannot all be accepted at face value without some qualifications. There are also a number of significant implications of the results, and other points that arise from them.

With respect to the findings regarding accuracy of argument perception, it is important to take into consideration the fact that the participants were not specifically asked to give an accurate and complete account of the arguments; they were simply asked to give an account of what was being said in the argument. The latter may be regarded as a somewhat less demanding task than the former. Nonetheless, it would seem reasonable to suppose that the participants would have applied themselves to the task to a moderately satisfactory degree, at least.

Clearly, further research in this area is necessary. Such findings would shed some valuable light on the extent to which *received* arguments correspond to *presented* arguments. The results obtained in this study suggest that there may be quite significant discrepancies. If this is true, then there are at least two implications.

The first of these is that researchers in this area will need to seriously consider the need to study arguments as perceived rather than arguments as presented.

The second implication relates to studies of arguments in dialogue. In Chapter 3, reference was made to O'Keefe (1977), who identified two different senses of the term 'argument': 'argument' in the sense of reasoning or persuasion towards a proposition, and 'argument' in

the sense of a dispute between two parties. These were labelled as 'argument$_1$' and 'argument$_2$' respectively.

There are several contexts in which type 1 arguments may be exchanged within an overall type 2 argument (i.e., the type 1 arguments are counter-arguments to each other). Such exchanges may be better understood by examining how each party perceives the other's argument.

In more general terms (that is, not necessarily in the context of argumentation), it may be that a significant proportion of disagreement and conflict between two parties may be attributed to a decay in the accuracy of understanding of the other's communication.

With respect to the issue of whether or not the participants regarded the items as constituting arguments, the results made it clear that there was no consensus of opinion. This lack of consensus could be explained by the wide variety of reasons for these opinions. These reasons provided information on how the participants conceptualised 'argument'.

Relatively few of these reasons were regarded as reasonably clear *and* correct expressions of the most basic nature of argument (putting forward a proposition on the basis of other propositions): in only 28% of the instances in which the participants *did* regard the items as being arguments, the reason given was consistent with the type 1 conceptualisation of an argument, as described by O'Keefe (1977). Some of the participants saw the items as arguments because they involved, or could involve, a type 2 argument (in 11% of the cases).

Of interest to the experimenter was the fact that some participants regarded some items as constituting an argument because they only involved presenting a statement, yet other participants did *not* regard some items as being arguments for the same reason (typically, the item was 'just a statement'). This particular result highlights the important point that the participants' perceptions of the presented arguments would have been interacting with their

conceptualisations of the nature of argument in making judgements as to whether the items were arguments.

In the above-mentioned result, both sets of participants perceived the arguments as just being statements. In the former case, the participants conceptualised arguments in general as just being statements, hence their judgement that the item was an argument. In the latter case, however, the participants thought that arguments are more than just statements, hence their judgement that the items were not arguments.

As documented in the results section, many other reasons were given for the participants' judgement of whether the items were arguments. Sometimes the reasons were not at all clear: in nearly a quarter of the occasions in which the items *were* regarded as arguments, the experimenter was not able to clearly understand or interpret the meaning of the reasons given.

The results overall suggest a relatively poor understanding of the nature of argument, which, realistically, was to be expected, although better levels of understanding could perhaps have been expected of university students.

This carries implications for those who teach critical thinking. The results suggest that students embarking on a first-year level critical thinking course are entering with baseline levels of understanding that are really quite poor, and that thorough instruction on the nature and structure of argument would be time well spent.

With respect to the actual comments made in response to the arguments, there were three distinct major categories: Assessing the Conclusion, Accepting or Rejecting Factual Assumptions, and Free Responses.

The prominence of the category of 'Assessing the Conclusion' came as no great surprise. Conclusions are probably the most noticeable aspect of arguments, and hence draw the most

attention. Indeed, some of the findings reported previously suggest that conclusions may even be regarded *as* the argument for some people (such as when the arguments were perceived as 'just a statement'). Further, conclusions are perhaps the most important aspect of an argument in practical terms, as they are often the foundation for decision-making, planning, and problem solving. Even in the context of formal arguments, early psychological research has shown a focus of attention on the conclusions of syllogisms.

The prevalence of Free Responses was somewhat greater than the experimenter anticipated, but was not totally unexpected. In everyday life, it seems realistic to suppose that one or more aspects of an argument will sometimes trigger the expression of personal views. People are sometimes more interested in expressing their own views than in analysing and evaluating the words of someone else.

For the experimenter, the most surprising and significant result was the relatively large proportion of responses which dealt with factual assumptions. These were not observed at all in Study 1. This was attributed to two main factors. Firstly, the participants in Study 1 had many more arguments to consider, thus restricting depth of consideration. Secondly, the arguments in Study 1 were also not as subtle and 'everyday' as those used in this study, and thus probably had less implicit content.

It is worth noting that in this study, the category of 'Accepting or Rejecting Evaluative Assumptions' was not at all strongly represented. This may be due to the fact that they are often very obvious - sometimes so obvious that they are not noticed because they are taken so much for granted. It may very well be that these assumptions, and factual assumptions, form quite a significant, yet hidden, component of everyday arguments. It was certainly the case in this study that a significant number of assumptions were identified in most of the arguments.

Irrespective of the issue of response prevalence, it was expected that in this study there would be at least some replication of the response categories observed in Study 1. This was

borne out: of the 10 criteria of evaluation found in the previous study, 9 were also found in this study (as expressions of acceptance or non-acceptance of the items) - although some were labelled slightly differently. The only criterion not found in this study was 'Ethics relating to the means used in an argument'.

When this replication is considered, along with the fact that the present study was conducted with strict interpretive checks, it seems that the documented categories of responses to arguments in this study can be regarded as a reasonable portrayal of how people *may* respond when presented with an everyday argument.

Further research is necessary, however, to determine whether any other types of responses may be found with yet other arguments. Many such studies would probably be necessary in order to give this matter adequate consideration.

Nonetheless, the present study, in conjunction with Study 1, may reasonably be claimed to provide a useful indication of the majority of response types that participants may provide in response to everyday arguments.

CHAPTER SEVEN

ARGUMENT PRODUCTION AND ASSUMPTIONS

7.1 Introduction

The previous two studies have examined the nature of responses to everyday argumentation. Although these studies have raised many issues that are worthy of further investigation, it may be said that they have been quite successful in providing useful information on how people see and respond to informal arguments.

At this point, this dissertation will alter its focus from studying the *recipient* of informal arguments to studying the *producer* of informal arguments. Whilst there are many aspects of argument production that could be studied from a psychological perspective, it was decided that assumptions would be particularly worthy of study.

Assumptions may play a greater role in argumentation than is generally thought. In Study 1, one of the categories of responses related to identified evaluative assumptions. In Study 2, the second-most-frequent category of responses to arguments related to identified factual assumptions. Quite apart from this prevalence, the participants identified quite a number of different assumptions *in each argument*, as documented in the results section of that study. Moreover, the experimenter was able to identify yet further assumptions in those arguments - assumptions that none of the participants recognised.

It may even be that if some informal arguments were to be fully explicated (with all their involved assumptions), their originally verbalised content would make up a relatively small proportion of the overall argument.

Irrespective of this issue, these unstated aspects of an argument may be regarded as in greater need of study than the stated aspects, because they are more obscure.

As mentioned in Chapter 2, Ennis (1982) notes that a distinction must be drawn between 'needed' assumptions and 'used' assumptions: 'needed' assumptions are those that "are needed to support the conclusion, to make the argument a good one" (p. 63), while 'used' assumptions are those that are "actually used ... as a basis of argument or action" (p. 63).

Logicians must consider the needed assumptions of an argument when evaluating that argument, but cannot ignore the assumptions that are *used.* It should be noted, though, that logicians become psychologists, in a sense, as soon as they attempt to identify used assumptions.

Psychologists, though, are mainly interested in used assumptions; they are interested in what actually happens psychologically, when assumptions are used in the course of an argument. They are, in general, not so concerned about those assumptions that are needed logically. Such concerns are more appropriate in the realm of logic. For this reason, this dissertation shall focus on *used* assumptions.

One property of used assumptions that informal logicians have recognised is that they may be used consciously or unconsciously. Although reference was made to this in Chapter 2, it was not emphasised.

In Ennis's full definition of a used assumption, he states that such assumptions are "unstated reasons that a person actually use[s] consciously (or subconsciously if you believe in unconscious reasons) as a basis of argument or action" (p. 63).

Gough and Tindale (1985) also refer to the issue of consciousness or unconsciousness of assumptions, although not quite so directly. They refer to assumptions that "an author does not recognise as there or takes to be too obvious or commonplace to mention explicitly" (p. 100).

These references to conscious and unconscious used assumptions seem to be most valid. Quite apart from leaving obvious or commonplace assumptions unstated, it is possible for an arguer to deliberately not state an assumption for fear of drawing attention to a proposition that may be attacked by an audience; to keep such assumptions unstated helps minimise such possibilities.

Another possible scenario for consciously suppressing the statement of a certain assumption may occur when a speaker is aware of his or her speech being publicly recorded. As an example, a speaker may present arguments that contain subtle negative, evaluative assumptions concerning Aborigines, but refrain from openly stating these, for fear of media repercussions.

There is no question that assumptions may also be used unconsciously. Sometimes this is because the assumption is very deeply ingrained into a person's thinking. A doctor, for example, may seek to persuade a very ill patient to take a certain course of drugs, reassuring the person that the drugs are very effective, with minimal side-effects. This doctor may be said to be assuming that the patient wants to overcome the illness, or to become well again. It is unlikely that this doctor would have consciously processed this assumption (unless the patient were very old, unhappy, and did not wish to live any longer). For a younger patient who is happy with life, it would seem extremely unlikely for the doctor to even *consciously* think that the patient wants to become well again - this would be just 'taken for granted'. In other words, it is more likely that, without even thinking about the matter, the doctor would have assumed, unconsciously, that the patient wants to overcome the illness.

Quite apart from this theoretical example, most people have experienced instances in which an erroneous assumption in their argument has been pointed out, much to their surprise (because they were not conscious of using that particular assumption).

In studying assumptions, it seems that unconscious assumptions are most worthy of attention, since they may be argued to be of greater significance than conscious assumptions:

they cannot be scrutinised by an arguer, and hence evaluated and corrected (if applicable) - at least while they are in operation.

This focus brings with it a most vexing question: given that it is possible to use assumptions unconsciously, a paradox arises: the assumption 'exists' in the argument, in the sense that it 'contributes' to the argument in some way, yet it does not seem to 'exist' in the arguer's mind - for it is not consciously held. The question may then be asked: given that these assumptions do 'exist' in some sense, where do they actually reside? How do they operate? What exactly *are* unconscious assumptions, in psychological terms?

7.2 A model of unconscious assumptions

This particular issue has been tackled by a team of psychologists, including the writer of this dissertation. Delin, Chittleborough, and Delin (1994) have developed a model of unconscious assumptions that they argue to be successful in resolving the above-mentioned concerns.

One clarification is necessary at this point. The model proposed by Delin et al. (1994) is not just a model of unconscious assumptions in argumentation. It is also a model of assumptions in other contexts, such as problem solving and everyday actions, as shall be seen. For this reason, they describe their model in language that is not context-specific to argumentation. This, however, does not detract from its ability to be applied to everyday arguments.

Delin et al. begin by examining a number of examples where an assumption has been used, or could have been used, unconsciously. One of these is of a person trying to persuade a friend not to bet on a certain horse, because the horse has a poor record on the track involved, and also because the horse has been assigned to an outside lane (p. 116). As Delin et al. note, it is quite possible for this arguer to be assuming - unconsciously - that his or her friend does not want to lose money.

Another of their examples relates to problem solving: a person is given six matchsticks, and asked to construct a pattern that contains four equilateral triangles. The person struggles with the problem for a while, and then decides there is no solution. This is a relatively well-known 'brain-teaser' that people frequently fail to solve because they assume that the solution must be two-dimensional (p. 116). As soon as solvers are told that the problem can be solved by constructing a three-dimensional structure (like a pyramid), they *then* become conscious of their two-dimensional assumption.

In both of these cases a single unconscious assumption has been involved (or at least mentioned). It must be recognised, however, that a large number of unconscious assumptions may be involved in mental activity. As an example, a person who reads a letter to the editor of a newspaper may write a response that argues towards an opposite opinion. This arguer may assume, unconsciously, that the letter to which he or she is responding was written by a person having the name provided (as opposed to the name being false), and that the letter was intended to be taken literally (as opposed to one written 'tongue-in-cheek'). Additionally, such an arguer could easily unconsciously assume that that the published letter is the same as the letter originally written. There are a number of unconscious assumptions that could be 'nested' within this assumption, for example, the assumption that the newspaper editor has not deleted parts of the letter, that an error has not been made in preparing it for printing (e.g., an accidental addition of a word or punctional symbol that alters the meaning of a statement), that the editor has not wilfully altered the letter, and that the letter was not a complete fabrication of the editor (with an arbitrary name being provided).

There are yet other unconscious assumptions that could operate, for example, a large number of specific assumptions each relating to the intended meaning the author had in using certain words or phrases. The respondent to the letter could also unconsciously assume that the author had certain personality traits or other beliefs on the topic. All of these could be *used* in the course of the person constructing his or her counter-argument. Although it cannot be

disputed that some of these might be used consciously, it remains the case that it is possible that each of them could be unconsciously assumed by an arguer.

Delin et al. argue that in everyday actions, such as boiling an egg for breakfast, a similar case could be made for asserting that a very large number of assumptions could be used unconsciously. The same potential undoubtedly exists in problem solving, too.

Delin et al. then draw attention to the common characterisation of assumptions as being stored propositions: people may be encouraged to 'hold up their assumptions for examination in the light of day', or to 'examine' them, as if they were some kind of entity. As applied to unconscious assumptions, this conception is problematic. As Delin et al. note, there may be a vast (or even infinite) list of assumptions involved in an argument, problem solving effort, or action (p. 117).

In the face of such possibilities, Delin et al. argue that the stored-proposition view of unconscious assumptions seems untenable: it cannot be reasonably proposed that before (or whilst) engaging in an argument (or other mental activity) individuals formulate, as propositions, a very long list of assumptions (if indeed there are such a number involved in any one cognitive task) (p. 117). An individual would presumably be overwhelmed with this cognitive activity, and might not be able to function.

The only solution to this problem, according to Delin et al., is to abandon the stored-proposition view. They argue that "many if not most [unconscious] assumptions appear to correspond more to an absence of some conception than to its presence" (p. 117). Thus, they argue that "the unsuccessful matchstick manipulator does not think, 'The solution has to be two-dimensional', but fails to consider that it might be three-dimensional." (p. 117). Similarly, the person who unconsciously assumed that the betting friend doesn't want to lose money has simply "failed to consider the possibility that winning was unimportant to the friend" (p. 117).

This initial conception is elaborated upon further:

> If we think of an [unconscious] assumption as being, not a positive proposition, but some sort of limitation or circumscription of the thinking process, or the field that the thinking process concerns itself with, many of the problems we have raised are greatly alleviated. In particular, we no longer have a problem with apparently infinite memory and time requirements. More importantly, an assumption, on this model, need not involve the storage of any propositions whatsoever. (Delin et al., 1994, pp. 117-118)

Further,

> to say that a person made such-and-such an assumption [unconsciously] would be to say that their thinking was limited by boundaries of some particular description, but that description itself would not be encoded anywhere in that person's brain [as a proposition]. (p. 118)

Quite apart from explaining how a person can use a large number of unconscious assumptions at once, this model resolves the paradox mentioned before: it explains how an assumption can 'exist' in an argument (or other mental activity), yet not 'exist' in an arguer's mind (in an active way). An unconscious assumptions 'exists' in a person's mind only in the sense that there is a limitation in the person's thinking process (of which he or she is not aware), and this constraint will obviously shape the contents of conscious thinking.

It is important to understand that this characterisation of unconscious assumptions is different from circumstances in which an arguer (or problem solver) has failed to consider certain information. The exact difference between these two situations needs to be explained in some detail.

For the sake of example, a person may argue that milk should be sold in clear glass bottles (for whatever reason - perhaps because bottles can be re-used without recycling, in contrast to cardboard containers). This arguer may have failed to consider the fact (or claim) that the vitamin content of milk is adversely affected by exposure to light. This may be said to represent a shortcoming of the argument. It is not that the arguer has unconsciously assumed that light does not adversely affect the nutrient value of milk; it is simply that the whole issue of light affecting the quality of milk has not been considered at all. There has not been any limitation in the arguer's thinking with respect to the issue of light affecting the nutrient value of milk.

The model of unconscious assumptions as constraints may be applied to the earlier examples. In terms of the horse-betting example, the arguer may be said to be limiting his or her thinking process in such as way that loss of money for the friend is seen as undesirable. Anything contrary to this is not part of the arguer's thinking processes. The arguer is not conscious of constraining him or herself to this universe, but *does* limit his or her thinking in this way. Thus, there is a clear boundary within which the arguer operates, and is limited to - at least while that unconscious assumption is in operation.

The same kind of analysis can be made of the matchsticks problem. Delin et al. give another problem-solving example: the nine-dots problem. In this well-known problem, the solver is presented with an square, symmetrical array of nine dots, as shown in Figure 1.

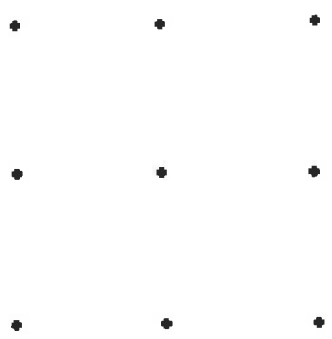


Figure 1. The presented array of dots in the nine-dots problem.

The solver must join all nine dots by four straight lines, without taking the pen off the paper (i.e., the lines must be connected). Solvers typically draw lines which move diagonally across the square, and run along the borders of the square, as exemplified in Figure 2.

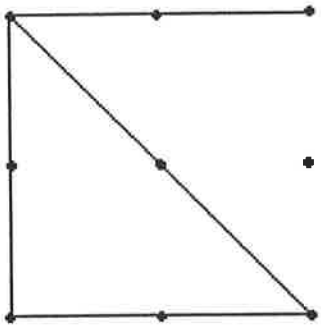


Figure 2. A typical unsuccessful attempt to solve the nine-dots problem.

Many people fail to solve this problem because they assume that the lines must not extend beyond the shape of the square; however, nothing in the wording of the problem suggests this. The solution is shown in Figure 3.

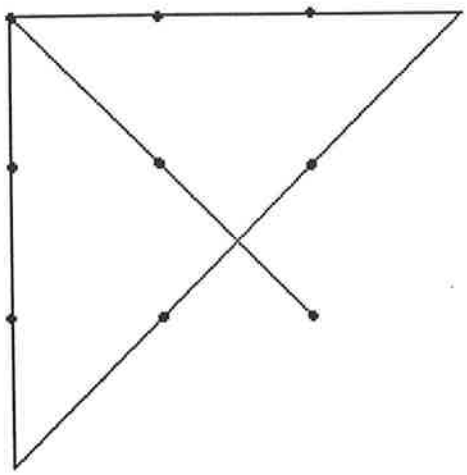


Figure 3. Solution to the nine-dots problem.

When solvers assume - unconsciously - that their lines must not extend beyond the square, this assumption takes the form of an absence of the conception that the lines *may* extend beyond the square. This absence of conception entails a consequent restriction on thinking (of which the solver is unconscious) that prevents solution. Clearly, further examples could be given.

One consequence of this model is that an arguer or problem solver will not be able to identify many (or even all) of his or her unconscious assumptions by 'looking within' - they are not there, as propositions, to be found. Delin et al. note that:

> "the primary, if not the only, technique for finding one's [unconscious] assumptions would be to examine one's thinking to try to observe in what ways it was being limited. Clearly, this process would be difficult to combine with the thinking itself." (p. 118).

Later, they strengthen this claim by asserting that these "boundaries or limits *cannot* [italics added] be directly observed" (p. 119). It would seem to be true both psychologically and logically that it is difficult or even impossible to examine one's thinking for a limitation for which one is not aware. This is not to deny, however, that a person may not experience a sudden and dramatic insight into an assumption he or she is using unconsciously (as in 'Aha!' experiences in problem solving). Such experiences involve some kind of involuntary spontaneous process rather than the kind of effortful processes being referred to here. Delin et al. suggest that it would probably be necessary to stop a thinking task before one could even start to search for these assumptions (p. 118). Obviously, this would be a retrospective search - a search for the unconscious assumptions that *had* been employed in a thinking task, since they cannot be observed while in use, and even then, this might be very difficult.

Having explained and illustrated the model, it is worth emphasising that it seems, on philosophical grounds, to be the only possible model: any model of unconscious assumptions *must* refer to the absence of conscious thought, yet at the same time specify the operation of an assumption. The model proposed here does these things.

Acordingly, it was decided that research work should be conducted with the purpose of seeking verification of what would seem to be a *necessarily* correct model of unconscious assumptions. The outcome of this work is reported in the next two chapters.

CHAPTER EIGHT

STUDY 3

8.1 Introduction

The purpose of this third study was to seek verification of the model of unconscious assumptions proposed by Delin et al. (1994), which was argued to be *necessarily* correct. This study was *not*, however, conducted in the context of argumentation. The reason for this was that it was anticipated to be very difficult to exert the necessary methodological control over what unconscious assumptions an arguer will use in an argument.

Instead, the medium of problem solving was used. The advantage of seeking verification for the model in this context was that greater control could be exerted over the unconscious assumptions a participant is likely to use, by choosing appropriate problems.

Such problems need to have two characteristics. The first of these is that they should be such as to be tackled, typically, on the basis of an assumption that prevents solution (a 'false' assumption). The second of these required characteristics is that the solvers should, typically, be unaware (unconscious) of this assumption. The nine dots problem and the match-sticks problem possess both of these characteristics. Problems of this nature may be referred to as 'assumption-prone problems'.

The medium of problem solving was also a suitable choice from the perspective that Delin et al. do not differentiate between unconscious assumptions in problem solving and unconscious assumptions in argumentation; they are characterised as being the same in psychological terms. Thus, any confirmation of the model in a problem solving context would mean that the model would also be valid in an argumentation context. Academic rigour, however, would demand that the model also be formally verified in argumentation.

In this third study, verification of the model proposed by Delin et al. was sought by presenting participants with 'assumption-prone' problems. It was expected that if the participants were interviewed after attempting the problems, the majority would agree to having operated on the basis of the corresponding 'false' assumption (given the nature of the problems). It was not expected that *all* the participants would agree in *every* instance to having operated on the basis of the false assumption, since complete control could not be exerted over the participants in this regard.

It was hypothesised that when these assumptions *were* employed, and were employed unconsciously, that they would take the nature of an absence of conception of anything outside of the associated constraint upon their thinking. This mental state of affairs may be expressed formally and summarily as a failure to consider the sphere of possibilities entailed by the negation of X ('Not X'), where 'X' is the unconscious assumption. Although this formal characterisation was not used by Delin et al., it was implicit in several of their examples - such as in the Matchstick Triangle problem in which solvers typically assume (unconsciously) that the solution must be two-dimensional. This may be said to come about through failing to consider that the solution might be three-dimensional (p. 117) - that is, failing to consider 'Not X', where X is 'the solution is two-dimensional'. There is an absence of the conception that it is not the case that the solution is two-dimensional. Although this abbreviated, formalised characterisation of unconscious assumptions cannot take the place of the complete account of the model, it does capture the proposed working essence of unconscious assumptions for the purposes of this study.

In this study, two other hypotheses were put forward. These did not relate directly to an attempt to verify the model proposed by Delin et al., but rather, to corollary predictions of the model. As mentioned in Chapter 7, Delin et al. argue that on both psychological and logical grounds, it is difficult (if not impossible) to identify one's own unconscious assumptions whilst they are in operation, since one cannot examine one's thinking for a constraint for which one does not have awareness. In their view, it would be necessary to stop a thinking task before one could even start to search for assumptions that had operated.

Accordingly, a second hypothesis was put forward: if one group of participants are instructed to be 'on guard' against making 'false' assumptions (when attempting to solve 'assumption-prone' problems), then these participants should *not* perform any better at solving the problems than participants who are instructed merely to solve the same problems. Naturally, this hypothesis presumed that in most cases, the participants of both groups would indeed unconsciously operate under the false assumptions associated with each problem. Since the use of these false assumptions prevents solution, this would mean that they would not have any advantage over the second group in terms of problem solving performance.

A third hypothesis was also put forward: that the group asked to watch for making false assumptions would not solve the problems more quickly than the other group. This was predicted for the same reasons as the second hypothesis above.

8.2 Method

8.2.1 Participants

Twenty-eight participants took part in the study; 21 female, and 7 male. Twenty-five of the participants were undergraduate psychology students at the University of Adelaide, primarily first-year students, while the remaining three were postgraduate psychology students. The undergraduates who participated had responded to a written invitation to participate. The other three were verbally invited.

8.2.2 Materials

Each of the participants was given a booklet containing four problems. Each problem was stated on a separate page, with adequate space left for solution attempts. The problems were presented in the following order.

PROBLEM ONE

In a city hospital, 2 girls were born on the same day, of the same year, at nearly the same time, to the same parents, but the girls were not twins. Explain.

This problem was a devised one. It was hoped that participants would falsely and unconsciously assume that there were not any other offspring - making triplets, for example.

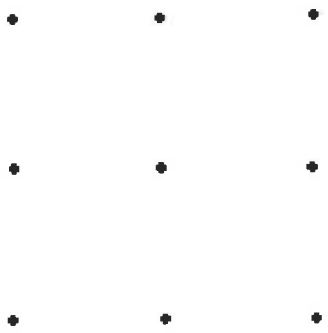
PROBLEM TWO

A London orchestra conductor goes off on a Sunday afternoon, with his ten-year-old son, to rehearse the orchestra for a concert of piano concerti, to be held the following Sunday.
Unfortunately, during the tea-break, the boy falls off the podium into the piano, damaging it severely, and breaking his own arm.
To add to his problems, the conductor leaves his case of valuable batons in the taxi, on the way to the hospital, and loses it.
Subsequently, he places an announcement in the newspaper explaining that, owing to circumstances beyond his control, the concert has had to be cancelled.
Why ?

It was hoped that solvers of this problem would unconsciously and falsely assume that the boy is not the pianist. Although several explanations could be given for cancelling the concert, the best-fitting one relates to the boy being the pianist. This problem was devised as a variant to a more well known problem which plays upon the tendency of people to assume that surgeons are male.

PROBLEM THREE

Draw 4 straight lines without taking your pen off the paper, in such a way as to inter-connect all 9 dots in the figure below.



As discussed previously, solvers of this problem frequently and unconsciously assume that the lines cannot be drawn beyond the square. The participants were given 12 of these arrays of nine dots to attempt to solve this problem.

PROBLEM FOUR

In an unusual event, an eccentric billionaire offered a single prize of one million dollars to the racing car driver whose car came last in the race. Ten contestants entered the race. Instead of the drivers going as slowly as possible, the race ran normally. Why ?

This problem was devised with the hope that participants would unconsciously and falsely assume that the drivers are driving their *own* cars. The solution is that each driver drives another competitor's car. Under such circumstances, each driver will try to get in front of their own car being driven by someone else. This problem was not worded in a misleading way, since it states that the prize goes to the driver *whose car* comes last.

When these problems were presented to several participants in a preliminary trial, it was found that they commonly, if not always, operated under the desired assumption.

8.2.3 Procedure

The participants were randomly assigned to either a control group, or an experimental group. Each took part in the study on an individual basis, in a quiet room. Those who were assigned to the control group had the following neutral introduction printed on the cover page of their booklet:

"*Problem solving is an activity that forms a fairly large proportion of our everyday functioning - people are required to solve problems at home or at work. Problem solving is also a task that many people enjoy as a pastime. Regardless of the setting, the processes involved in problem solving are similar.*"

Those who were assigned to the experimental group had the following instructions printed on the cover page of their booklet:

"*It has been found that people almost always operate from a false assumption when they try to solve these problems, which prevents them from arriving at the solution. When tackling each problem, remember that you are very likely to be operating from such a false assumption*".

Following this, the participants were given identical instructions. They were told to tackle each problem in turn, after first reading the problem carefully. They were then told that they would be given a certain amount of time to solve the problems (but they were not told how long this would be). For the first problem, a time limit of 3 minutes applied, while for the remaining three problems, the limit was 5 minutes. The participants were told that they should indicate immediately to the experimenter when they thought they had arrived at the solution. If the proposed solution was not correct, the participant was asked to continue solving the problem. The time involved in such interruptions was not deducted from the elapsed time, since they were kept short enough to not be a concern, and also because it

would have added unnecessarily to the procedure. If a problem was solved, the time taken was recorded (in seconds).

The complete instructions given to each group were almost equal in length, to avoid any possible effects due to differential amounts of attention.

Prior to each problem, the participants in the control group were told *"You may now commence solving this problem"*, while those in the experimental group were reminded *"Please remember that operating from a false assumption will prevent solution"*.

Once the participants had attempted all of the problems, they were then interviewed. All participants were asked whether they had seen any of the problems before, and if so, whether they knew the solution, or had known the solution but forgotten it.

At this point, a set of questions were asked only of the participants in the experimental group. Firstly, they were asked whether they understood what was meant when they were told that they were likely to be operating from a 'false assumption'. This question was obviously a check on the effectiveness of the manipulation, but also served to check the validity of the experimenter's presumption that the participants had a reasonable concept of assumptions.

Those in the experimental group were also asked whether they had *tried* to find the assumptions that they were operating from while they were attempting to solve the problems (another check). If the participant assented to this, the experimenter asked whether this effort led to success. If so, the participant was asked to state the assumption(s) that were identified and to say whether the identification was accidental (i.e., the identification 'just happened') or whether she or he employed some procedure or technique. If some such procedure was used, details were requested. It was hoped that answers to this question might lead to methods or tools that could be used for identifying unconscious assumptions.

Such tools would be of great value in problem solving, argumentation, or even thinking tasks generally. Such methods, though, could only be carried out after the cessation of the mental task in question, since unconscious assumptions cannot be observed while in use.

All the remaining questions were asked of both groups of participants for each problem in which the solution was *not* reached. The participants were asked whether it would be correct to say that they were operating from the relevant false assumption whilst solving the problem - for example, "Would it be correct to say that you assumed that the car drivers were driving their own cars?". An affirmative response was generally expected in each case. If the participant disagreed, he or she was then asked to characterise what took place (whether it be that they were operating on the basis of another assumption, or that some other event was taking place rather than an assumption).

If the participants agreed that they had operated under the false assumption (which was expected most of the time), they were then told that in actual fact, the *negation* of their assumption was true - but this was expressed more directly, for example, 'In actual fact, the drivers were all driving each other's cars'. If the solution to a problem was still not apparent, it was further explained. In some cases, the participants were told the solution first, and *then* the negated assumption.

The participants were then asked whether it 'just happened' that they tried to solve the problem whilst not envisaging or not considering the negation of the assumption. The actual question was not worded in this way, but was expressed more directly, for example, 'Did it 'just happen' that you tried to solve the problem whilst not considering that you could extend your lines outside the square arrangement?'. This question was intended to directly test the working essence of the proposed model of unconscious assumptions.

If any of the participants *did* solve any of the problems, they were asked the same questions as those who did not solve the problems, except the questions were asked with respect to the period *previous* to reaching the solution.

8.3 Results

8.3.1 Data exclusions

Prior to analysis, the interview results were examined to determine whether any of the participants had foreknowledge of any of the solutions to the problems - thus justifying exclusion from analysis. For the first problem (the Hospital Births problem), no one was excluded from analysis, although one participant claimed to have seen the problem before, but this person did not know the solution prior to tackling it, and had not known it. Indeed, this participant did not solve the problem. None of the participants was excluded in relation to the second problem either (the Orchestra Conductor problem). This was expected, given that the problem was devised.

With respect to the third problem (the Nine Dots problem), only one participant was excluded due to having a prior knowledge of the solution. Another eight participants said that they had known the solution before, but each of these was unable to solve the problem. Examination of their solution attempts showed no difference from those who had never encountered the problem before. None of the participants' data was excluded from the fourth problem (the Car Race problem), since none had seen the problem before, and did not know the solution (as would be expected in this devised problem).

With respect to the experimental group, some data had to be excluded for reasons regarding the instructions. The entire set of data from one participant had to be excluded from analysis because it was found during the interview that he did not understand what was meant in being told that he would be likely to be operating from a false assumption. Another participant also said that he did not understand this - but only with respect to the Orchestra Conductor problem. Since this same participant did not report the same difficulty in any of the other problems, and because there did not seem to be anything special about this problem

(e.g., being spatial, like the Nine Dots problem), it was decided that this participant's report would be ignored, and that his data would be kept in the analysis.

8.3.2 Interview results on the nature of assumptions

The first results that may be reported relate to the first hypothesis. As stated in the procedure, the participants were presented with the 'false' assumption associated with each problem and asked if they had operated under that assumption. If they agreed, they were asked whether it had 'just happened' that they had not considered the negation of that assumption. This question was asked of those who failed to solve the problem as well as those who did, but in the latter case, the question was asked in relation to the period prior to solving the problem. The results are shown in Table 3.

Table 3

Participants Not Considering the Negation of the False Assumption Which They Had Operated Under

Name of Problem	Operated Under False Assumption	Did Not Consider Negation of False Assumption
Hospital Births	27	27
Orchestra Conductor	15	15[a]
Nine Dots	18	18
Car Race	27	27

[a]Although one participant disagreed that she had not considered the negation of the false assumption in this problem, the nature of the problem allows this report to be disregarded: if it was not the case that she had not considered the negation of the assumption (i.e., that she *had* considered that the boy was the piano player) then she would have solved the problem, but she did not. Also, when this same participant was questioned further, she disagreed that she had consciously assumed the false assumption. This datum has thus been stated as 15 rather than 14.

8.3.3 Solution success/failure results

The next analysis sought to determine whether there was any difference between the two groups on the number of problems solved and the number that were *not* solved. Table 4 displays the results obtained in relation to the former.

Table 4

Total Number of Solutions to Each Problem, According to Group

Name of Problem	Group	
	Control (N=14)	Experimental (N=13)
Hospital Births	2	1
Orchestra Conductor	8	7
Nine Dots	5	0[a]
Car Race	1	3

[a]There was one solution of the Nine Dots problem by a participant in the experimental group, but this person admitted to already knowing the solution, hence this datum was excluded from analysis.

As can be seen, there was very little difference between the two groups. Where this small amount of difference occurred, it tended to be in favour of the *control* group, who were *not* given the instructions to be careful against making false assumptions.

With respect to group differences in failure to solve the problems, Table 5 displays the obtained results.

Table 5

Total Number of Failures to Solve Each Problem, According to Group

Name of Problem	Group	
	Control (N=14)	Experimental (N=13)
Hospital Births	12	12
Orchestra Conductor	6	6
Nine Dots	9	12
Car Race	13	10

Table 5 indicates that overall, there was no difference between the groups in propensity to fail at the problems.

When each of the participants were given a score out of four (for the number of problems solved), a Mann-Whitney U-test found no significant difference between the two groups, with $U = 78$, $p > .05$.

One of the important conditions needed for the study to be successful was that the participants in the experimental group did actually try to find assumptions each time they tackled a problem. In the majority of instances, the participants reported that they did comply with this direction (in 42 of the 51 problem solving instances, or 82%). In the remaining instances, these participants reported that they had not tried to find assumptions.

When the Mann-Whitney U-test was repeated in such a way as to only include the instances in which the experimental group did try to find assumptions, the results remained the same: no significant differences were found between the two groups, with $U = 68$, $p > .05$.

8.3.4 Solution time results

The next analysis focused on those occasions when the problems were successfully solved. A comparison was made between the two groups on their solution times, although some restrictions and special conditions were necessary in the analysis.

Due to the fact that there were only a total of three solutions for the first problem (Hospital Births), this problem had to be omitted from analysis. It was also necessary to include in this analysis those instances in which the experimental participants stated that they had not tried to find any false assumptions. This was due to the limited number of solutions observed in the experimental group.

With respect to the composite results for the second, third, and fourth problems (which each had the same time limit), it was found that the mean solution time for the control group was 128 seconds ($SD = 81$), while the mean solution time for the experimental group was 98 seconds ($SD = 75$). A two-tailed t-test revealed that there was no significant difference in solution times between the two groups, with $t(25) = 0.98$, $p > .05$.

8.3.5 Results of efforts to identify assumptions

The remaining results were derived from the interview questions that related to the participants' efforts to find assumptions in their problem solving (experimental group only). If the participants indicated that they had tried to find assumptions during their problem solving, they were asked whether they were successful in this endeavour. It should be emphasised that these interview questions were asked *before* the participants were provided with, and questioned about, the false assumption associated with each problem (although of course some participants had solved the problems). The results are shown in Table 6.

Table 6

Reported Failure or Success of Attempts by Experimental Group to Find Assumptions

	Attempts to Find Assumptions	
Name of Problem	Unsuccessful	Successful
Hospital Births	6	4
Orchestra Conductor	5	6
Nine Dots	4	4
Car Race	5	7

Note. There were a total of nine instances in which participants did not try to find assumptions, and hence do not appear in this table. Three of these instances related to the first problem, two to the second, three to the third, and one to the fourth problem. In one further instance, data was missing. Participants who reported success with respect to any one problem did not identify any more than one assumption.

It is evident from Table 6 that when the experimental group participants looked for assumptions, there was no guarantee that they would meet with success. Only 51% of the attempts (21 of the 41 attempts) were reported to be successful.

These results need to be qualified, though, by an examination of the 'assumptions' that were identified, to determine whether in fact they *were* assumptions. This turned out to be a more difficult task than anticipated, since the participants were not always clear in their expression (in the interview, the experimenter recorded the exact wording used in the statement of identified 'assumptions').

Nevertheless, the experimenter was able to relatively confidently assess 16 of the 21 identified 'assumptions' as actually being assumptions, while 5 were not. Thus, the *real* success rate in identifying assumptions, as opposed to *reported* success, was only 39% (16 of the 41 attempts).

Of these 16 real assumptions, only three clearly corresponded to the false assumption. These were as follows: "That there were only the two girls born", "That they were driving their own cars", and "That lines couldn't be drawn outside the square". The two participants who identified the first two of these assumptions were successful in solving the problem (as would be expected, since recognition of a false assumption in these two problems would lead immediately to solution). The participant who identified the third of the above assumptions was not successful in the solving the corresponding problem (Nine Dots). This was not entirely unexpected, since there are a number of possible configurations that may be attempted with lines outside the square before the solution could be reached.

There were another five genuine assumptions which could have been regarded as constituting the false assumption, but this was not a clear-cut matter. These five assumptions were all found in relation to the Orchestra Conductor problem. None of them specifically referred to the boy not being the pianist, but they did refer to more general assumptions that subsumed this assumption, for example, the false assumption "That it was because of the father that the concert couldn't be performed". Operating under this assumption would also mean operating under the false assumption that the concert wasn't cancelled because of the boy, and operating under this assumption in turn would also mean operating under the false assumption that the concert wasn't cancelled because the boy was the pianist. The point is thus illustrated that it is possible for assumptions to be subsumed by more general assumptions.

(In fact, more than one assumption can be subsumed by a more general assumption. For example, the assumption that the concert wasn't cancelled because of the boy subsumes at least two assumptions: the assumption that the concert wasn't cancelled because the boy was *hurt*, and the assumption that the concert wasn't cancelled because the boy *as a pianist* was hurt).

In each of the above five cases, the participants solved the problem, but this may have come about by a process of reasoning - by considering other possible reasons for cancelling the concert, besides the conductor - such as the son having a greater role than initially thought.

Depending on the how the above five assumptions are regarded, it may be said with certainty that no more than eight of the 16 genuine assumptions corresponded to the false assumption.

While none of the remaining eight assumptions corresponded to the false assumption, they were particularly interesting to the experimenter. With respect to the Nine Dots problem, one participant identified the assumption "That I had to draw a line between 3 of the dots" (an examination of this participant's solution attempts showed that at one point, she began trying to solve the problem by drawing some lines between just two dots). Another participant identified the assumption "That I couldn't fold the paper", and yet another identified the very pertinent assumption "That it was possible to be solved". In relation to the Car Race problem, one participant recognised having used the assumption "That they were driving forwards".

The nature of these assumptions raised an important point: it would be entirely possible for a solver to make several of these assumptions in addition to the false assumption. When this observation is added to the previous point concerning hierarchies of assumptions, it is clear that Delin et al. (1994) were entirely correct in pointing out that a person may make a very large number of unconscious assumptions.

As mentioned previously, 5 of the 21 identified 'assumptions' were not actually real assumptions, as defined by logicians. Of these five 'assumptions', two were actually solutions that had not been considered. Both of these related to the Car Race problem: "They [the participants] didn't know about the prize", and, "Maybe the people racing didn't want the million dollars. They may not have heard about the prize. They might not believe the billionaire - because he was eccentric".

The other three 'assumptions' took a variety of forms: "They were not twins, but it was the same parents, so one of these [statements] is false", "That it is not possible for two parents to have two girls at the same time unless there is some intervention" (Hospital Births problem), and the puzzling 'assumption' of "The son being the conductor, and so on" (Orchestra Conductor problem).

8.3.6 Reported methods of identifying assumptions

When the participants reported having identified an assumption, they were asked whether they found them by employing some procedure or technique, or whether they just happened to find them. Since the participants did not always identify real assumptions, the only results reported here relate to the methods used (if any) in those instances where genuine assumptions were found.

In 6 of the 16 instances in which genuine assumptions were identified, the participants reported that they 'just happened' to find the assumptions, often elaborating by saying that the assumption "... just occurred to me", or "I just found it".

In 3 of the 16 instances, the participants reported a process that amounted to analysing the wording of the problem: "I went through every main key word and saw if I could break it down into different meanings" (Hospital Births problem), "I just kept reading and looking at key words" (Orchestra Conductor problem), and "I eliminated the parts where there could be assumptions. There was nothing ambiguous about the billionaire. There wasn't much to make assumptions about, besides the cars" (Car Race problem). In the latter case, the participant probably meant to say that ambiguous terms were *examined* for an assumed meaning (rather than *eliminated* from consideration, as stated).

In another three instances, the participants reported a process of logical analysis: "It can't be that the girls couldn't be twins if both were born on the same day and weren't twins", "I used a process of reasoning - I went through everything that went wrong and realised it

couldn't be the conductor, so it must have been the son", and, "I asked why aren't they going slow? Perhaps there was a greater reward for going faster".

A variety of processes were described in another three occasions: "I thought he [the conductor] could have continued, but with his son, I realised not", "I couldn't see any way of solving it" (Nine Dots problem), and "I remembered the assumption from another problem" (folding the paper over in the Nine Dots problem). Data was missing in the one remaining instance.

8.4 Discussion

It was hypothesised that in those cases where the participants employed a false assumption, and did so unconsciously, that this assumption would take the form of an *absence of conception* of anything outside of the associated constraint upon their thinking, or in other words, that they failed to consider anything belonging to the sphere of possibilities entailed by the negation of X ('Not X'), where 'X' is the unconscious assumption.

This hypothesis met unqualified support: in *every* instance where a false assumption was employed (either some or all of the time), the participants agreed that it 'just happened' that they had not considered the negation of that assumption. Although this result does not state that the false assumptions were used unconsciously, it may be easily argued that this must have been the case. This argument is as follows.

To use the example of the Car Race problem, all of the participants agreed to having assumed (at least at some stage) that the car drivers were driving their own cars. In each of these instances, the participants agreed that they had not considered the negation of this assumption (i.e., they had constrained their thinking in such a way as to not consider anything besides the drivers driving their own cars). In other words, they agreed that they had *not* considered that the drivers were *not* driving their own cars. This possibility did not enter their minds; they did not consider it. It follows, then, that the participants could not

have consciously assumed that the drivers were driving their own cars. If they did, they must have 'said' to themselves something like "I am going to assume that the drivers were driving their own cars". If they had 'said' this to themselves, they must have considered the possibility that the drivers were *not* driving their own cars - and, as argued above, it is known that this possibility never entered their minds. The participants could not have been conscious of the assumption for which they did not consider the negation (i.e., anything outside of that constraint) because if they were, they would have been aware of that constraint.

To use a different example outside of this study, a detective might say to him or herself "I will assume that there was only one person involved in committing the murder". Clearly, this is a *conscious* assumption. In stating this, the detective must have entertained the notion that there might have been others involved in the murder - or at least been *aware* that there may have been more - but for whatever reason, decided to proceed as if there was only one person. It would not be possible for the detective to agree, on being questioned, that he or she had not considered that there may have been more than one murderer, *and* to have consciously assumed that there was only one.

Similarly, it would not be possible for the participants to agree that they had not considered that the drivers were *not* driving their own cars, *and* to have consciously assumed that the drivers *were* driving their own. It must be the case that if the participants agreed that they had not considered the negation of an assumption (anything outside of the constraint upon their thinking), then they could *not* be conscious of that which they assumed.

It may be said therefore that the model of unconscious assumptions proposed by Delin et al. has been verified: unconscious assumptions do indeed take the form of a constraint or limitation on the thinking process in such a way that there is an absence of conception of a sphere of possibilities.

A second hypothesis was also tested. This proposed that the participants who were instructed to be 'on guard' against making 'false' assumptions (the experimental group) would not perform any better at solving the problems than those who were instructed merely to solve the same problems (the control group). This followed from a corollary of the model: that it is difficult (if not impossible) to identify one's own unconscious assumptions whilst they are in operation, since one cannot examine one's thinking for a constraint for which one does not have awareness. This hypothesis was borne out: no significant difference was found between the two groups in terms of the total number of problems solved by the participants.

The third and final hypothesis that was tested proposed that the experimental group would not solve the problems more quickly than the control group. This was proposed on the same grounds as the second hypothesis. This also was borne out: when the participants were successful in solving the problems, a t-test found no significant difference between the two groups in solution times.

In the study, some of the participants did become aware of the false assumption that they had been using unconsciously. This result does not discredit the model proposed by Delin et al. Their model relates to the nature of unconscious assumptions whilst they are in operation. The model does not suggest that unconscious assumptions are permanently unconscious, or that such assumptions cannot, somehow, come into conscious awareness.

As noted in Chapter 7, many problem solvers have experienced the 'Aha!' phenomenon, in which a 'psychological block' to solving a problem suddenly lifts, making the solution become apparent. Such psychological blocks often correspond to unconscious false assumptions. These spontaneous realisations of unconscious false assumptions are occurrences that may never be properly understood.

Not all 'discoveries' of unconscious false assumptions are spontaneous. The results of this study showed that some came about by various conscious processes, or at least were

triggered by conscious processes (an important qualification). When the participants were successful in identifying assumptions, they were asked whether they used some kind of method or procedure, or whether they 'just happened' to find them.

In 6 of the 16 instances in which genuine assumptions were identified, the participants reported that they 'just happened' to find the assumptions. In the remaining cases, some kind of method was described, although the nature of this was not always clear.

There was, however, one clear method: analysing the wording of the problem. This process may be regarded as a cessation of problem solving: the focus of thinking has temporarily shifted from trying to solve the problem to trying to analyse the wording of the problem (looking for different meanings, ambiguities, and so on). In other words, the process involved a partial withdrawal from actively trying to solve that problem; the participants were 'taking a step back' and looking at the situation. Naturally, they were still trying to the solve the problem as an overall goal, by looking at the wording of the problem, but they were not engaged in a specific focus of trying to reach a solution. This finding was consistent with the view of Delin et al. who suggest that it is probably necessary to stop a thinking task before a search for unconscious assumptions can be made.

8.5 Conclusion

The model of unconscious assumptions proposed by Delin et al. is one that has been argued on philosophical grounds to be the only possible model of unconscious assumptions: such a model must refer to the absence of conscious thought, yet at the same time specify the operation of an assumption, and this model does this. In this study, verification for this model was sought - and obtained.

The results of this study also suggested that it is possible for a person to unconsciously use quite a large number of assumptions - a possibility that presents no difficulties for the model

because it can explain how a potentially infinite number of assumptions may be used unconsciously.

Results were also obtained that were consistent with predictions from the model regarding the difficulty of identifying the unconscious assumptions and the possible ways in which this might occur.

CHAPTER NINE

STUDY 4

9.1 Introduction

The model of unconscious assumptions proposed by Delin, Chittleborough, and Delin (1994) was argued to apply to the context of argumentation as well as problem solving (and in fact, any thinking context).

In Study 3, verification for this model was sought in the context of problem solving. The main reason for this was that problem solving, unlike argumentation, was seen as a medium in which relatively high levels of control could be exerted over the likelihood of certain assumptions being used at an unconscious level. It was also seen as a desirable initial choice of context since argumentation can be very complex.

Since the validity of the model was demonstrated in the medium of problem solving, this fourth study sought to verify it in the context of argumentation. In doing this, it was decided that a suitable approach would be to ask participants to produce arguments on 'real life' everyday topics, and to interview them about their assumptions in a *second* session, following an analysis of their arguments.

It was also decided that useful information could be collected if *other* participants were asked to conduct the above-mentioned analyses. While it was considered possible that intervention by the experimenter might be necessary if these other participants were not successful in identifying assumptions, it seemed worthwhile to attempt this involvement. Further, the results of Studies 1 and 2 suggest that there would be little difficulty in this regard. The nature and number of assumptions identified by these extra participants was also regarded as valuable research data in its own right.

On the basis of this methodological approach, two main hypotheses were put forward. The first of these was that if participants were asked to produce their own arguments on several topics, then other participants who examined those arguments would be able to identify assumptions that the arguers would agree to having used unconsciously.

Relatedly, and more significantly, it was hypothesised that if the arguers agreed to having used a certain assumption without consciousness, they would agree to having had an absence of conception of anything outside of the associated constraint upon their thinking, or in other words, that they failed to consider anything belonging to the sphere of possibilities entailed by the negation of X ('Not X'), where 'X' is the unconscious assumption (as specified by the model).

9.2 Method

9.2.1 Participants

Ten first-year psychology students at the University of Adelaide agreed to take part in the experiment in response to a letter of invitation to participate. Seven of these were female, and three were male. These ten participants were asked to produce several arguments on different topics. Another five participants were also invited to take part in the study. These were asked to act as argument analysts. With only one exception, these argument analysts were graduate or postgraduate students from a range of university departments.

9.2.2 Stage 1 Materials and Procedure

Each of the ten participants assigned to the 'Argument Production' condition took part in the study individually. These participants completed the required tasks in a quiet room, free of distraction.

Each participant was given a booklet which included all the necessary instructions. These instructions were read out by the experimenter. The participants were invited to read along as this happened. The experimenter ensured that these instructions were understood.

On the front cover of this booklet, the participants were told that they would be presented with three topics on which their views were requested. In an attempt to elicit genuine viewpoints, the instructions emphasised that "everyone has a right to hold their views" and that "everyone has their own particular reasons for those views".

On the next three pages of the booklet, the three topics were presented (one topic per page). The topic was stated at the top of the page, with the remaining space left for the participants to write down their response. The participants were invited to spend some time thinking about each issue before responding, if they desired.

The topics were selected with a view to eliciting the most common types of everyday argument. One very common type of informal argument is the argument containing a prescriptive conclusion. As mentioned in Chapter Three, these are conclusions that prescribe or recommend something. Arguments containing these types of conclusion might be termed 'prescriptive arguments'. In order to obtain an argument of this nature from the participants, the first topic was as follows:

"I would like you to consider the issue of illegal graffiti in the city and suburbs, and what you think should be done about the problem. Please write down your view, giving reasons".

Clearly, the participants were free to make any recommendation they thought appropriate. As evident from the instructions, though, the participants were asked to provide reasons for their recommendations, thus ensuring that an argument was produced, and not just a plan of action.

Another common type of everyday argument involves people aligning themselves to one side of an issue, perhaps agreeing or disagreeing with a practice (e.g., euthanasia) or a proposal (e.g., legalisation of marijuana). Accordingly, the participants were then presented with the following:

"I would like you to consider the issue of child care. Specifically, do you think that all students should pay for the funding of the child care centre at Adelaide University through their Union fees? Please write down your view, giving reasons".

It is necessary to explain at this point that all students at the University of Adelaide are required to pay Union fees upon enrolling each year (including, of course, those participating in the experiment). These fees contribute to the operation of various services available to students at the university. They are distinct from, and considerably more affordable than, the fees associated with the Australian Government's Higher Education Contributory Scheme.

The third topic sought to elicit an argument containing a mixture of the properties of the first two argument types. The participants were asked:

"Do you think that a function of the penal system should be to provide a resolution satisfactory to the victims of crime or their relatives? Please write down your view, giving reasons".

This completed the first session of the study. For convenience, these participants were labelled by the experimenter as members of the Argument Production group. These participants were asked not to discuss the study with anyone else. This was particularly important, since interaction was possible (but not likely) between these participants and those who would be analysing their arguments.

9.2.3 Stage 2 Materials and Procedure

After the completion of Stage 1 above, another five participants took part in the study. These were labelled by the experimenter as members of the Assumption Identification group. In essence, these participants were instructed to examine the arguments produced by the first group, and to identify any underlying assumptions.

As with the Argument Production group, the participants in the Assumption Identification group took part individually, and were given a booklet of instructions and tasks. The participants were invited to read along with the experimenter as their instructions were read out.

These participants were told that they would be presented with three arguments on three different topics by one person, then another three arguments on the same topics by one other person. They were not given any information about who produced these arguments.

They were then told that they would be required to read over the arguments and identify any assumptions that they thought might underlie those arguments.

At this point, the notion of an assumption was explained in a relatively simple manner, avoiding unnecessary academic precision which could have caused confusion. The analysts were told that: "An assumption in an argument is something which is *pre-supposed*, or something which is *taken for granted.* Some assumptions are questionable, while others are perfectly reasonable".

An example was then given to further their understanding. They were given the following hypothetical example of an argument, put forward by a teacher to a student's father: "You should encourage your son to play sport because it helps young children to gain confidence in themselves".

The analysts were then told (on the instruction page) that this argument contained a number of assumptions. They were listed as follows: that the father had not already tried to encourage his son to play sport, that playing sport will help this *particular* child's confidence, that the father's son does not already play sport, and that the father wants the best for his son. The likelihood (or improbability) of each of these assumptions was commented on, where this was possible, in order to emphasise the point made earlier that some assumptions are perfectly reasonable, while others may not be.

After these instructions, the participants were encouraged and actively invited to question the experimenter if they needed any further clarification about the nature of 'assumptions'. Following this, the participants were asked to rate the extent to which they thought they understood this concept, using a 7 point scale (ranging from 'Not at all' to 'Completely').

On the following six pages, the six arguments were presented, with the topic stated immediately above the argument. The arguments were typewritten to ensure legibility, and to prevent any possible recognition of hand-writing. The remaining space on each page was allowed for the participants to record the assumptions they had identified.

As indicated previously, each participant in the Assumption Identification condition was given two sets of three arguments (the two sets representing two participants from the Argument Production group). Thus, only five people were required to analyse the arguments produced by the 10 participants in Stage 1.

9.2.4 Stage 3 Materials and Procedure

After the completion of Stages 1 and 2, the Argument Production participants were then contacted and asked to attend their second session of this experiment (as previously agreed). Unfortunately, five of these ten participants did not comply with this request, nor with several successive requests. Since the purpose of this study was to verify the model rather

than test it (given that the model was argued to be the only possible model of unconscious assumptions), the investigation continued with these remaining five participants.

Each of these participants was presented with the booklets they were originally given, so that they could re-read the topics and their associated arguments. With respect to each argument, the participants were asked questions about the assumptions that their assigned analyst had identified. They were not told, though, that another person had viewed or analysed their arguments.

For each of these assumptions, the interview questions followed a certain order. Initially, the participants were asked whether they had 'operated under' the given assumption. This wording was preferred to asking whether they had 'made' each assumption, since this term has slightly negative connotations (sometimes it is an expression of criticism to state that someone has 'made' an assumption). If the participant disagreed that she or he had operated under that assumption, no further questions were asked in relation to it.

If the participant agreed to having operated under that assumption, the experimenter asked the following question: "Did you consciously say or think [the assumption] to yourself at some point in time?". If the participant agreed, no further questions were asked in relation to that assumption. Such assumptions were regarded as conscious assumptions.

If the participant disagreed, the experimenter then asked: "Did it just happen that you proceeded whilst not envisaging or not considering [the negation of that assumption]?". If the participant agreed, this assumption was regarded as an unconscious assumption. Once these questions had been asked for each of the identified assumptions, the session was concluded.

9.3 Results and Discussion

With respect to the Assumption Identification group, the mean level of indicated understanding of the nature of assumptions was 6 (where '7' corresponded to 'Complete understanding'). The values ranged from 5 to 6.5.

Due to attrition in the Argument Production group, not all of the analyses could be used in Stage 3 of the study. In fact, only three of the five argument analysts' work could be used when interviewing the five Argument Production participants. When these three analysts were considered, their mean level of understanding of the nature of assumptions was 6 (as before), with the values still ranging from 5 to 6.5. This was regarded as an acceptable level of understanding, especially considering that assumptions are probably regarded as rather abstract entities by most people.

9.3.1 Analysis of the identified 'assumptions'

Before the central hypotheses of this study could be tested, it was necessary to examine the 'assumptions' identified by the Assumption Identification group, in order to determine whether they really were assumptions. Any identified 'assumptions' that were not real assumptions had to be excluded from hypothesis testing.

A total of 68 'assumptions' were identified by the three analysts (over the five sets of three arguments generated by the Argument Production group). The analysis of these 'assumptions' turned out to be more difficult than anticipated. These difficulties were regarded, in themselves, as a result that was most worthy of mention - in addition to the outcome of this analysis.

9.3.1.1 Identified 'assumptions' that were rejected

Of the 68 'assumptions' identified, a total of 31 (45.6%) were excluded from analysis. Twenty four of the 31 assumptions were excluded because they took the form of explicitly stated propositions, which, by definition, cannot be assumptions. Some examples of these are exemplified below.

With respect to the Child Care topic, one participant began his argument with the following three sentences:

"All students should pay for child care. The children of students are part of the university society as well. Besides, we should all support our fellow students, and if they need child care services to be able to continue studying, then they should be made available."

The argument analyst who examined this argument identified the following 'assumption' (amongst others): "That everyone should support the 'university society'". Although the original arguer did not use these exact words, it was clear that the idea being expressed was more or less explicitly stated in the argument.

Another example was as follows. In relation to the Illegal Graffiti topic, another arguer frequently referred to graffiti as "artistic". After recommending that sites be set up for legal graffiti, she stated:

"Areas set aside would be seen as an opportunity to express the artistic views of graffiti-ists, and would be enjoyed by the community as a specific art-form".

The argument analyst who examined this argument identified the following 'assumption': "That graffiti is art". Again, this was more or less explicitly stated in the argument.

There were many instances in which explicitly stated ideas were identified as 'assumptions'. The experimenter partly attributed this to misunderstandings about the nature of assumptions. In Chapter 2, reference was made to Ennis (1982) who commented that assumptions are sometimes regarded as something of unverified or questionable status, hence people sometimes make comments like "That's only an assumption. You don't know it" (p. 61). Thus, in the 'graffiti is art' example, the experimenter thought that this may have been identified as an 'assumption' because it was regarded as questionable.

One of the difficulties encountered by the experimenter was that some of the identified 'assumptions' initially appeared to be explicitly stated propositions, but on continued consideration, were recognised as subtle examples of genuine assumptions. The following example was a good illustration.

One participant began his Penal System argument with the following two sentences: "Ultimately, I would like to see the victims of crime being able to decide the fate of the criminal. This would lead to a much less corruptible legal system and would in a number of cases solve the over-crowding problem".

The argument analyst who examined this argument identified the following 'assumption': "That the legal system is corruptible". At first sight, the experimenter regarded this as another example of an explicitly stated proposition.

On continued consideration however, it was realised that this example actually *was* an assumption. As mentioned in Chapter Two, one special type of assumption is a presupposition, which may occur in a question or a statement. A presupposition in a statement has been defined as "a proposition that if false, would make the statement neither true nor false" (Ennis, 1982, p. 80). One example given by Ennis is as follows: 'The missile gap will take five years to eliminate'. This statement contains the presupposition that there is a missile gap. If this were not true, then it is neither true nor false that the missile gap will take five years to eliminate.

The same kind of analysis could be made of the above-mentioned example from this study. If it is assumed that the legal system is *not* corruptible, then it *would* be neither true nor false to say that if victims of crime are able to decide the fate of the criminal, that this would lead to a less corruptible legal system. Thus, the identified assumption really was an assumption - a presuppositional assumption. It can be seen, then, how the experimenter had to be very careful in analysing each of the asserted 'assumptions'.

Of the total of 31 'assumptions' that were excluded from analysis, 7 were rejected because the experimenter was not able to class them as 'non-assumptions' with certainty.

In 5 of these 7 instances, the experimenter found it difficult to determine whether the identified 'assumption' was an implied proposition or an actual assumption. In the other two cases, the experimenter found it difficult to determine whether the identified 'assumption' was an indirectly but almost explicitly stated proposition, or whether it really was an assumption. An examination of the former cases (of possible instances of implied propositions) yielded some significant theoretical issues, as discussed below.

To the experimenter, implied propositions differ from assumptions in that they constitute assertions that are hinted at, but do not play an active role in the development of an argument; they are akin to 'offshoots' in an argument. In contrast, assumptions play a role in the construction of an argument (regardless of whether they are consciously or unconsciously involved). This conceptual distinction, however, did not always turn out to be very clear in reality, as illustrated in the following two examples.

With respect to the Illegal Graffiti topic, one arguer had the following comments to offer (among others): "I don't really think that making offenders clean up the graffiti will change their attitudes towards it, make them stop doing it. Tougher penalties are needed for those caught, and should be based on the extent to which the damage is done and whether it is offensive".

The participant who analysed this argument identified the 'assumption' that "Existing penalties are too lenient". At first thought, this was regarded as *implied* by the statement in the argument that "tougher penalties are needed". On continued consideration, however, the experimenter recognised that it could also be said that the proposition "existing penalties are too lenient" is an assumption that the arguer used in order to produce the statement that "tougher penalties are needed for those caught". The answer to this dilemma could not be resolved by the experimenter.

The second example came from a response to the Child Care topic. The argument was not always clear, but is reproduced here in full: "I would tend to view child care facilities as part of the services provided (I'm not sure whether it is) by the [Student] Union, and as such, the fact that not everyone use them [all of the services] is not really important. I bet that many services provided have not been used yet by myself but if we are going to bother having any services [sic] provided by the Union, this is necessarily going to be the case."

"If these services (i.e., child care) had to be paid for fully by the parents of children using them only, then there would have to be some sort of government assistance above what would be given to students without the need to use the facilities, so only if this was the case, i.e., some sort of government funding of them, would I agree with user pays only. Otherwise, I believe it would be discriminatory against students with the need to use day care facilities."

One 'assumption' that was identified in this argument was "That it is unfair to charge people for using the child care facilities, when users of other facilities are not charged".

The experimenter considered it possible that this 'assumption' was actually just a proposition that is *implied* by the first two sentences of the argument.

It was also considered possible that this 'assumption' really was an assumption, but with an interesting twist: it may have been an assumption by virtue of the fact that it was an *unstated conclusion* that followed from the first two sentences - and this unstated conclusion was subsequently used as an *assumption* in the complex structure of this extended argument.

As was noted in Chapter Two, the structure of arguments can be very complex, particularly in extended arguments such as the above. Thomas (1973) mentioned that in some arguments it is possible for a conclusion to be explicitly drawn, which is then used as a premiss in a subsequent argument (p. 35). Johnson and Blair (1980) pointed out that informal arguments may contain conclusions that are not actually stated (p. 18). When these two observations are combined, it is clear that it is possible for an argument to contain an unstated conclusion which is then used, but never explicitly, as an *assumption* underlying another sub-argument within an entire extended argument.

Thus, with the above-mentioned 'assumption' that was identified by the analyst, it was difficult to determine which of these two scenarios was the true one. Although this question could perhaps have been answered by questioning the arguer again, a satisfactory answer would have been dependent on the person being logically sophisticated enough to understand the two possibilities.

This example also raised the interesting issue of how implied propositions can be differentiated from unstated conclusions. Such a matter, quite possibly, could be far more complicated than may be imagined.

9.3.1.2 Identified 'assumptions' that were analysed

Of the 68 identified 'assumptions', a total of 31 (45.6%) were excluded from analysis, as mentioned previously. Accordingly, the total number of assumptions that were *included* in the analysis was 37 (54.4% of the total number 'identified').

Of the assumptions that were included in the analysis, not all were regarded by the experimenter as likely to have been used by the original arguer. The experimenter recognised, though, that the purpose of analysis at this point was to determine whether the identified 'assumptions' really were assumptions - in the sense of being consistent with the *nature* of assumptions. The likelihood of the original arguer using these assumptions was not a relevant issue. An examination of the 37 assumptions occasionally yielded some noteworthy points, as discussed below.

With respect to the Penal System topic, one arguer presented some recommendations for perpetrators of violent crimes, and also for perpetrators of non-violent crimes (such as shoplifting). Throughout these recommendations, no reference was made to gender, but the arguer concluded with the following remark:

"The penal system is there at the moment for the protection of the perpetrator, not the people he has affected".

One of the identified assumptions in this argument was "That the perpetrators of crimes are male". The arguer's use of the word 'he' in the last sentence served as an *indicator* of an assumption being used. Although no other instances of this nature were observed, it raised the possibility of at least some assumptions being identified through a linguistic type of analysis.

An examination of the assumptions included in analysis also showed that the argument analysts occasionally identified *needed* assumptions, which were defined by Ennis (1982) as being assumptions that are "needed to support the conclusion, to make the argument a good one, to make a position rational" (p. 63).

One example came from the analysis of another arguer's point of view on the Penal System topic. This particular arguer expressed a general opposition to the idea of victims of crime determining the fate of an offender. At one point, this arguer stated that:

"I think that the penal system must judge what is best for society as a whole, whether that be removing an offender from society long term, or deciding that some sort of rehabilitation is possible without incarceration".

The analyst assigned to this arguer identified the following assumption: "That the penal system is *able* to make judgements that are best for society".

This was seen by the experimenter as a needed assumption, since the argument seems to *need* the above assumption in order to recommend that the penal system judges what is best for an offender.

The experimenter also noticed that quite a number of the identified assumptions corresponded to what Gough and Tindale (1985) described as those that are "too obvious or commonplace [for an arguer] to mention explicitly" (p. 100).

One particularly good example was found in relation to the Child Care topic. One arguer put forward a complex proposal which included government assistance to students. The participant assigned to analyse this argument identified the following assumption: "That government assistance to students ... would be in a monetary form".

9.3.2 Hypothesis evaluation

After the very laborious process of determining which of the identified 'assumptions' really were assumptions, the experimenter was able to begin evaluation of the central hypothesis of the study. In order for this hypothesis to be supported, it was necessary that there be unanimity in the participants' responses in terms of the nature of their mental events when unconscious assumptions were acknowledged to have been in operation. Even one dissenting report would have discredited the model proposed by Delin et al. (1994).

In 17 of the 37 (45.9%) cases in which genuine assumptions were identified, the original arguers *denied* that they had operated under those particular assumptions.

In the 20 remaining cases in which the arguers *agreed* that they had operated under an identified assumption, there were 13 instances in which the arguers indicated that they had consciously said or thought that assumption to themselves at some stage during the production of their argument.

For the remaining 7 cases, every arguer indicated that they had not consciously said or thought that assumption to themselves. In *every one of these instances*, the arguers indicated that it 'just happened' that they proceeded whilst not envisaging or considering the negation of the corresponding assumption (i.e., that their assumption took the form of a constraint upon their thinking that entailed an absence of conception of anything outside of the boundary that limited their thinking).

Thus, the results showed that *the nature of every one of the unconsciously used assumptions was exactly the same as that proposed by Delin et al. (1994).*

Some examples of these unconsciously used assumptions are given below, to highlight their operation in everyday, real-life argumentation.

With respect to the Illegal Graffiti topic, one arguer presented several recommendations on how to deal with this problem. The following assumption was identified in this argument: "That graffiti is a bad thing". The original arguer indicated that he had not consciously thought or said this to himself. On further questioning, he stated that it had 'just happened' that he had failed to consider the possibility that graffiti is *not* a bad thing (the negation of his unconscious assumption).

It was not at all surprising to the experimenter that this assumption was used unconsciously. Very commonly accepted views are often so taken for granted that they are no longer held

consciously. As unconscious assumptions, they take the form of failing to consider the negation of that which is assumed (i.e., an absence of conception of anything outside of the limit upon thinking).

Another arguer expressed various views on the Child Care topic, mainly stating that low income groups should be able to use the child care service at a subsidised rate, whilst those who can afford the fees should pay them in full. One argument analyst identified the following assumption in this argument: "That those that can afford the service do not already pay in full". When the original arguer was questioned, she agreed that she had operated under this assumption, but not consciously. She agreed that she had simply not considered that those who can afford the services do not already pay the full fee. Since she did not consider this, she assumed (unconsciously) that those who can afford the service only pay at the subsidised rate.

Again, this was seen as a good example of the kind of assumption that people sometimes make in everyday life. It is not altogether uncommon for people to make assumptions about certain matters that turn out to be false on further investigation.

9.4 Conclusion

The model of unconscious assumptions, as proposed by Delin et al. (1994) has now been unreservedly verified in the contexts of both problem solving and argumentation.

Some considerable light has now been shed on psychological perspectives of an important aspect of argument production. This is especially significant when it is considered that a great many unconscious assumptions may be in operation at any one point in time during argumentation, each playing a role in the construction of an argument. Although a great deal more work could be conducted on other psychological perspectives of argument production, such work is beyond the scope of this dissertation.

This dissertation has sought to initiate a some rigorous investigations into the processes of responding to, and producing, everyday arguments - investigations into some basic areas that psychologists have heretofore neglected in relative terms.

It is now timely to review the proceedings of this dissertation, and to consider the conclusions that may be drawn.

CHAPTER TEN

CONCLUSIONS

10.1 Review

At the commencement of this dissertation, it was noted that there are two main branches of logic: formal and informal logic. It was also noted that informal logicians have criticised formal logic on the grounds that the arguments that it studies are not at all common in everyday life. In contrast, they assert, informal logic is soundly focused on 'real-life', everyday arguments. It was regarded as important to determine the truth or falsehood of this claim, as it would suggest an appropriate focus of study (at least from the point of view of preponderance of argument types).

A careful examination was made of the two branches of logic, focusing on the characteristics of the arguments they study. It was concluded that the informal logicians were very much justified in their claims. The types of arguments they study were argued to involve many elements that are not present in formal arguments - elements that are clearly present in day-to-day arguments (as might be encountered, for example, in a conversation, a committee meeting, an advertisement, a promotion for a product, or in a legal case).

Accordingly, it was decided that, from this perspective, informal arguments would be most worthy of study in this psychology dissertation. Given this focus, a recent definition of the nature of informal arguments was presented. This definition was developed principally by the writer of this dissertation, and was argued to represent an improvement over other definitions in the literature in that it more fully captures the elements that are so often involved.

An examination was then made of the psychological literature, with a view to determining the extent to which informal arguments have been studied, along with any main findings. It

was found that a great deal of theory and research has been generated by psychologists with respect to formal arguments. This focused primarily on participants' judgements of formal arguments, and the process by which such arguments are produced.

With respect to informal arguments however, the extent of theoretical or research work was found to be very limited in comparison. Although some research on several different issues was noted, it was concluded that there is a distinct lack of work on how people naturally respond to everyday arguments. As a consequence, it was recognised that a great deal of new ground needed to be broken with respect to psychological research into people's judgements of, and responses to, everyday arguments.

In the absence of any previous methodological models or findings to use for guidance, the writer commenced Study 1. This involved presenting participants with a range of informal arguments that were either fallacious or sound. They were asked to evaluate these arguments, and give reasons. A range of criteria were identified through a pains-taking analysis of the participants' responses.

Following Study 1, a much more extensive study was carried out, which was also methodologically improved (following the experience of conducting Study 1). In this study (Study 2), a comparison was made between participants who had their arguments labelled as arguments, compared to those who did not. The rationale for this comparison was that in everyday life, very few arguments are explicitly labelled or heralded *as* arguments. Study 2 also examined the accuracy of argument perception. This was considered an important issue to examine, since it may explain unusual responses or even errors of evaluation. Another matter investigated in Study 2 related to the participants' concept of what constitutes an argument (and what does *not* constitute an argument).

The major point of interest in Study 2, however, concerned the participants' responses to the arguments. In that study, the participants were not asked to evaluate the arguments. The reason for this was simply that in everyday life, people are often exposed to arguments, but

are not explicitly invited to pass judgement on them. The nature of responses to the arguments under these conditions (and especially when the arguments were not labelled as such) was seen as important in attempting to gain quality information about how people behave in day-to-day circumstances.

The main methodological improvement that was made in Study 2 related to efforts to validate the experimenter's interpretation of the responses. It was recognised in Study 1 that the experimenter's interpretations were subjective, and that biases or expectation effects may have entered into the results. Further, they lacked independent validation. In Study 2, the participants were invited back to a second session in which the experimenter's analyses could be checked.

A very large amount of information was gained from Study 2 regarding the above issues. With respect to the actual responses to the arguments, it was found that nine of the ten categories of responses identified in Study 1 were also found here (as expressions of acceptance or non-acceptance of the arguments). In addition, some other categories of responses were found. In the course of analysis, two different types of assumption were identified (a distinction that had not been made in the literature). When analysing the prevalence of response types, three main categories were found, one of which related to assumptions.

At the conclusion of Study 2, it was decided that a very useful exploration had been made of a number of fundamental aspects of people's perceptions of, and responses to, everyday arguments - with some very extensive results.

Following Study 2, the experimenter began to examine the *production* of informal arguments (just as psychologists have also studied the production of *formal* arguments by participants). In doing so, particular attention was paid to the role of assumptions.

Assumptions were chosen as a focus of attention in this regard for two main reasons. On the basis of the results of Studies 1 and 2, it was argued that if a typical everyday argument was to be fully explicated (that is, with all the involved assumptions formally set forth), then it would be quite possible that these assumptions could make up most of the content of that argument. Assumptions were also seen as an important subject of study in the context of argument production, simply because they are obscure, and in need of greater explication.

It was subsequently noted that a distinction has been made in the informal logic literature between *used* assumptions and *needed* assumptions. The former type correspond to the assumptions that are actually used in the production of an argument. The latter refer only to those assumptions that are needed in order for an argument to be 'logical' or 'sound' - and these may not necessarily be used.

In terms of this dissertation, it was indicated that used assumptions are the type of assumption of relevance, rather than needed assumptions, since they represent a psychological event: to assume something is to engage in a special type of mental event.

After referring to some informal logicians who distinguished between conscious and unconscious assumptions, it was decided that the latter would be most worthy of study. The main reason for this was that conscious assumptions can usually be readily identified by an arguer (and hence are not too difficult to study); however, unconscious assumptions differ in this regard. It was reasoned that if progress is to be made in the fundamentals of understanding psychological aspects of argument production, then difficult and central subjects of study (such as unconscious assumptions) need to be addressed rather than avoided.

After settling on this focus, it was recognised that unconscious assumptions pose an apparent paradox in their operation: such assumptions 'exist' in an argument, in the sense that they are part of an argument, and contribute to it, yet they do not 'exist' in an arguer's

mind (since they are unconscious). The question was then raised: how may such assumptions actually occur, in psychological terms?

A proposed answer to this question was then presented in the form of a model developed by several psychologists (including the writer of this dissertation).

The model proposed that unconscious assumptions do not exist as psychological 'entities' or stored propositions, but exist as 'invisible' constraints upon thinking; they correspond to an absence of conception of anything outside of the associated constraint, or in other words, they involve a failure to consider anything belonging to the sphere of possibilities beyond the boundary that limits the thinking. This model was argued to be the only possible model of unconscious assumptions, since it simultaneously explains how an assumption shapes thinking, yet does so without 'existing' in consciousness. The model was also seen as overcoming the difficulties entailed by a stored proposition model in situations in which a large number of assumptions are used (there is no need to propose that, at some level, a large number of propositions are constructed as part of the thinking process). This model of unconscious assumptions was argued as applying to assumptions in contexts such as problem solving as well as argumentation.

Verification of this model was then sought in Study 3. This study, however, was carried out in the context of problem solving, rather than argumentation. One reason for this was that relatively high levels of control could be exerted over the unconscious assumptions that participants would be likely to make through the careful choice of certain types of problems. The other reason was that the model was expected to apply to all unconscious assumptions, regardless of context, and hence it seemed appropriate to use the more manageable setting of problem-solving as an initial choice.

In Study 3, it was found that in *every* instance in which an unconscious assumption was used (as agreed by the participants), there was an absence of conception (or failure to consider) anything belonging to the sphere of possibilities outside the mental boundary that

defined the participants' assumption. Other results were obtained that were consistent with predictions made by the model concerning the difficulty of thinking about how one's thinking is being limited as the way to identify such assumptions.

Following this result, Study 4 was conducted in order to seek confirmation of the model in the context of argumentation. Although the participants could not be induced to be likely to use certain assumptions, they were asked to present arguments on three different topics with the hope that they would employ at least some unconscious assumptions in these cases. This was found to be the case and, in each instance, the nature of the assumption was exactly the same as that proposed in the model.

10.2 Theses

In this dissertation, some very new, fundamental, and significant contributions have been made to knowledge in an area of endeavour that has been largely ignored. Much insight has been gained into numerous aspects of people's perception of, and responses to, everyday arguments. Many details have been obtained with respect to these issues. A greater understanding has been reached of the nature and operation of unconscious assumptions, along with some related issues. Future researchers in this field may find that their efforts will be assisted by examining the methodologies and results used and obtained here.

It would be a mistake, however, to view the explicit results of this research as the only outcome of this dissertation, notwithstanding their importance and value. There are some further and deeper conclusions that may be drawn.

Throughout this research, it was evident that everyday arguments cannot be considered as merely a collection of words that can be analysed and evaluated. The nature of an everyday argument transcends the actual words that are used in a multiplicity of ways - and in each case, psychological processes or factors play a role. Indeed, the thesis may be put that

everyday arguments may be regarded as being as much psychological entities as they are 'logic' entities. The extent of this thesis may be illustrated in several ways.

As argued in Chapter 3, the *intention* of a person in communicating will decide whether an argument has even been put forward in the first place. If there is an intention to either persuade or to establish something, then an argument may be said to exist. An analysis of the mere words used in a communication will not necessarily indicate whether an argument has been put forward. Although informal logicians have developed a set of indicator words (such as 'because', 'since', and so on), such indicators are recognised as imperfect, since they do not always signal the use of a premiss or conclusion (as noted in Chapter 2). It was also noted in Chapter 2 that informal arguments may not even contain indicator words. Ultimately, the intention or purpose of a person will determine whether an argument has been presented.

Arguments may also be regarded as psychological entities in the sense that an arguer will often have an audience or recipient in mind. To use the terminology suggested by Chittleborough and Newman (1993) in Chapter 3, an arguer may deliberately choose certain 'supportives' or 'persuaders' in order to maximise the impact of an argument. These may be selected according to the arguer's knowledge of the characteristics of the recipients.

This can be seen especially in the context of fallacies identified by informal logicians that are calculated to play upon the emotions of the recipient. Indeed, Chittleborough and Newman (1993) define 'persuaders' as "psychologically manipulative technique[s] used by an arguer with the intention or hope of increasing the chances of the conclusion being accepted by a recipient" (p. 196).

The nature of an everyday argument must also be understood from a psycholinguistic perspective. The meaning of an argument, as it is presented, may vary somewhat from the intended meaning of an arguer. As noted in Chapter 2, people will vary greatly in vocabulary and other aspects of expression in such a way that the words used in an

argument may not correspond exactly to the intended meaning. Once again, the notion of intention is important here - not so much the overall intention of the communication, but the intended meaning of the words used.

Perhaps more than anything else, the difference between needed assumptions and used assumptions highlights the psychological nature of arguments. As mentioned in Chapter 7, needed assumptions refer to those assumptions that are needed in an argument (from a logician's point of view) in order that it be judged to be sound or valid. Such assumptions, however, may not necessarily be *used* by an arguer.

The very nature of used assumptions must ultimately be considered to be psychological. As Ennis (1982) stated, "claims that a used assumption has been identified are empirical mental-event or state claims about the thinking of a person" (p. 67).

The significance of this point is highlighted when unconscious assumptions are considered. Studies 3 and 4 demonstrated how such types of used assumptions involve very subtle psychological processes.

Following from the thesis that everyday arguments may be regarded as being as much psychological entities as they are 'logic' entities, a second thesis may be put forward: that everyday arguments can only be *fully* understood and satisfactorily evaluated when these psychological aspects of argumentation are *thoroughly* identified.

Having said this, it may not always be possible to identify such aspects fully. Clearly, if the producer of an argument cannot be questioned, there may be many uncertainties that cannot be resolved.

Even if the arguer is available for questioning, some potential barriers exist. The first is these is that he or she may lack the necessary ability to introspect in order to provide the requested information. Even if such information could be accessed, it may not be adequately

articulated by the arguer. The experimenter encountered many instances in which participants were unable to clearly describe their thought processes.

The second barrier relates to assumptions - particularly unconscious assumptions. Argument analysts are not infallible, and may not identify all of the assumptions used by an arguer. When such missed assumptions were used in an argument unconsciously, the arguer is quite unlikely, upon request, to be able to identify them in retrospect. This is because many unconscious assumptions are deeply ingrained, or considered so obvious that they are not even consciously entertained (as noted in Chapter 7).

Despite these potential limitations, it must be recognised that the extent to which an argument may be fully represented will depend on the complexity of it. Not all everyday arguments are complex and subtle.

There is one further conclusion that may be drawn from the results of the research reported in this dissertation. This is somewhat related to the first thesis. It may be concluded that the nature of *responses* to everyday argument can *only* be properly understood by examining them in terms of the psychological factors and processes that attend the recipient's exposure to the argument; an examination of them in terms of their logical connection to the argument is destined to generate a false, or at least, limited understanding.

One of these factors relates to the way in which an argument is *perceived.* In Study 2, it was found that the presented arguments were only perceived as *being* arguments 53% of the time. On 35% of the occasions on which an argument was presented, it was not even considered to be an argument. Although these results were qualified by examining the reasons given for these perceptions, the basic point remained; the participants varied in whether they saw the arguments as being arguments or not. Such perceptions will significantly determine how a person will respond.

Another psychological factor explaining participant responses to an argument is the *accuracy* with which the argument is perceived. Results were reported in Study 2 which suggested that some of the participants may have had grossly inaccurate perceptions of what the arguments were actually stating. Although qualifications were offered as to the extent of this problem, it remains the case that inaccuracies in perception will occur, and these in turn will influence the nature of a person's response. As an example, an apparently irrelevant or 'off the track' response to an argument may actually be properly understood as *relevant* or properly targetted when a person's interpretation of the argument is considered.

Relatedly, the personal experiences and disposition of a recipient may explain reactions to certain components of an argument. This was well illustrated by one category of responses in Studies 1 and 2, which was labelled as 'Responding to Implied Propositions'. Here, the participants expressed their acceptance or non-acceptance of what they saw as being implied in an argument. In the experimenter's view, some of the perceptions of the implied propositions seemed accurate, while others seemed more idiosyncratic; reflecting strong personal attitudes and feelings that were easily triggered.

A person's response to an argument must also be considered in terms of the *purpose* or *nature* of that response. In Study 2 it was found that some responses to the arguments represented expressions of acceptance (or non-acceptance) of the arguments being presented. Other responses fell into the category of being 'free responses' (i.e., there was no attempt to refute or endorse what was being said). Researchers must not assume that responses to arguments in natural settings necessarily have a logical connection. It was evident from Study 2 that some people simply chose to respond to the arguments with an expression of personal opinion on the subject - that is - they were perhaps more interested in their own view on the subject than the view being expressed in the argument.

It is clear, then, that there are at least three psychological factors or processes that need to be taken into consideration before properly understanding the nature of a person's response to an argument: whether the argument is actually perceived as an argument, the accuracy of the

perceived content, and the purpose of the person's response to the argument. This has implications for all researchers into people's responses to arguments. Teachers of critical thinking courses will also need to bear some of these considerations in mind when examining their students' analyses and evaluations of any presented arguments.

10.3 Final remarks

There is one final matter that is worth highlighting in this dissertation - above and beyond the research findings and theses. This concerns the value of interdisciplinary research. In this dissertation, attention has been drawn to the relationship and interplay between considerations normally of interest to logicians, and considerations normally of interest to psychologists. Valuable insights have been gained in the process of examining this relationship. It seems very clear that psychology and informal logic have the ability to inform each other, and in fact, it could be said that it is essential that such exchanges and mingling takes place.

Quite apart from this issue, it is hoped that the contributions made by this dissertation will provide a springboard for more work in this area by psychologists. Everyday arguments are sufficiently central, and important, in daily living to not receive more attention in both theory and research.

APPENDICES

List of Appendices

Appendix A

Difficulties with Govier's conceptualisation of 'conductive' arguments

Govier (1980c) gives the following as an example of an argument that cannot be regarded as a deductive or an inductive:

Assisted euthanasia should not be legalised, because (1) the danger of abuse is too great, and (2) medical advances being possible, we never know for certain that a particular patient is incurably ill (p. 3).

Govier argues that the conclusion of this argument cannot have truthhood or likelihood ascribed to it - as she asks: do the premisses "(1) and (2) 'make it probable' that assisted euthanasia should not be legalised?" (p. 3). Clearly, the conclusion cannot be regarded as true or false, because it amounts to a recommendation.

Govier (1987, 1992) suggests that such arguments be termed 'conductive' arguments. This term, however, was borrowed by Govier from Wellman (1971) who stated that a conductive argument:

> derives its conclusion from a variety of premisses each of which has some independent relevance. Typically, although by no means always, several reasons are given in such arguments; and in those cases where a single reason is advanced, there are others which might have been given as well. Since what is characteristic of this sort of reasoning is the leading together of various considerations, it seems appropriate to label it 'conduction' (p. 52).

Appendix A (continued)

Govier (1992) characterises conductive arguments in a similar way to Wellman (1971), stating that in such arguments, the premisses each count separately, and relevantly, in favour of the conclusion, in a converging pattern, but not in such a way as to entail the conclusion (pp. 308-309).

This characterisation, however, seems to miss the point. With the assisted euthanasia argument, Govier highlights the fact that the conclusion cannot be regarded as (or rendered) true or false - and thus cannot be regarded as deductive or inductive). It would seem that the main feature of this argument is the prescriptive nature of the conclusion (i.e., involving a recommendation).

Confusion is apparent on the part of Govier (1992) when a study is made of one of her examples of a conductive argument. The argument, in essence, states that a certain woman is in love with a certain man (conclusion) because the she never takes her eyes off him, pays considerable attention to him, and continually talks about him favourably to others (p. 309).

As Govier has mentioned, conductive arguments do not have their conclusions 'made more likely' by their premisses, so this should be true of the above example. To employ the criteria Govier used previously, the question could be asked: do the premisses 'make it probable' that the woman loves the man? In this case, the question does make sense, and the answer to the question would seem to be affirmative. The premisses do seem to help make it probable that the woman loves the man, or is infatuated with him, or something similar.

It is clear then, that there are some problems in the way in which Govier characterises conductive arguments. Not withstanding these difficulties, Govier is clearly most correct in identifying a type of argument that cannot be regarded as deductive and inductive.

Appendix A (continued)

As indicated in the text of this dissertation, the writer proposes that the term 'prescriptive' argument be used instead of 'conductive', since it is the prescriptive nature of the conclusions that best characterises these kinds of arguments. The conclusions of such arguments may be termed 'prescriptive conclusions'.

Appendix B

Sources of Definitions of Type I Arguments as Considered by Chittleborough and Newman (1993)

Many informal logicians have provided definitions of the term 'argument'. According to Chittleborough and Newman (1993), none of these adequately capture the true variety and complexity of characteristics of informal arguments.

The definitions considered included the following: Angell (1964; p. 5); Annis (1974; p. 1); Barry (1980, p. 5); Baum (1975; p. 4); Beardsley (1950; p. 9); Blumberg (1976; p. 4); Byerly (1973; p. 13); Carney and Scheer (1974; p. 3); Carter (1977; p. 2); Copi (1978; p. 7); Ehninger (1974; pp. 10-11); Engel (1976; p. 6); Fogelin (1978; pp. 34-36); Girle, Halpin, Miller and Williams (1978; p. 31); Johnson and Blair (1977; pp. 3-4); Kahane (1971; p. 1); Manicas and Kruger (1976; p. 42); Michalos (1970; p. 2); Moore and Parker (1986; p. 182); Munson (1976; p. 176); Pospesel (1974; p. 4); Salmon (1973; p. 3); Schipper and Schuh (1959; p. 3); Scriven (1976; p. 55); Simco and James (1976; p. 1); Thomas (1973; p. 1); and Weddle (1978; p. 2).

Appendix C

Arguments used in Study 1

Listed below are the 30 arguments used in Study 1. Twenty four of these were examples of fallacies, and six were sound arguments. A total of seven arguments were excluded from the statistical analysis, as explained in the statistical results section of Chapter 5. All 30 arguments were used in the main analysis of results.

As each argument is stated, its source is indicated, along with an account of the fallacy it represents, where applicable, and whether it was excluded from statistical analysis.

Argument 1

"Whatever is immaterial is unimportant, whatever is spiritual is immaterial, therefore, whatever is spiritual is unimportant".

This was an example given by Ehninger (1974, p. 114) of the Fallacy of Equivocation. The fault revolves around the fact that the meaning of a word changes in the course of an argument. In this argument, the word 'immaterial' changes its sense.

Argument 2

"In future, I will go to the movies or just relax on the night before an exam, because normally I study then, but this time I didn't, and did better than I ever have before".

Appendix C (continued)

Argument 2 was encountered by the writer and was included as an example of the fallacy known in Latin as Post Hoc Ergo Propter Hoc ("After this, therefore because of this"), which is also described by some informal logicians as False Cause (eg., Moore, 1967). As implied by the Latin name for this fallacy, the temporal precedence of one event by another does not necessarily mean the antecedent event caused the subsequent event.

Argument 3

"Couldn't you bring Tim's mark for maths up to a pass ? You've always been a good friend of the family, and you know the financial difficulties we have in supporting him through his studies."

This represented a re-wording of an example given by Moore (1967, p. 315) of the fallacy of Appeal to Pity. There is an (irrelevant) appeal to the teacher's emotions, in order to influence him or her to adjust the mark upwards.

Argument 4 (excluded from statistical analysis)

"If you are sufficiently ingenious in looking for work, or have enough initiative, you can get a job without much trouble. Unemployment in Australia would cease to be a problem if unemployed people showed greater ingenuity and initiative".

This represented a slight re-wording of an example given by Carter (1977, p. 141) of the fallacy of Composition. This fallacy involves arguing that what is true of part of a whole will be true of the entire whole.

Argument 4 was excluded from statistical analysis since remarks made by participants led the experimenter to regard this as not a clear-cut example of this particular fallacy. While it is undoubtedly still fallacious, it was not included.

Argument 5

"I don't fancy the idea of getting married, because my chances of getting divorced, according to the official figures, is somewhere around 38%".

This argument was encountered by the writer and was included as an example of the fallacy of Division. This is the fallacy of arguing that what applies to the whole may be said to be applied to a part of that whole (Engel, 1980, p. 20). Here, the person is arguing that because the population divorce rate figures are 38%, then he or she as a member (or part) of that population has this probability of getting divorced. This is the reverse of the fallacy of Composition.

Argument 6

"The idea of promoting intra-mural sports should be considered because they provide large numbers of students with an inexpensive way to get healthy exercise and have fun".

This was devised by the writer and was intended to be an example of a good argument, or at least, one without any major flaws. It was considered that the very mild nature of the conclusion - that the promotion of intra-mural sports 'should be considered' - would protect this argument from objection. A stronger conclusion (eg., that intra-mural sports *must* be promoted) would leave this argument open to criticism.

Appendix C (continued)

Argument 7

"The existence of God should be accepted, because there is absolutely no proof that God **doesn't** exist".

This represented a re-wording of an example given by Thomas (1973, p. 208) of the fallacy known in Latin as Argumentum Ignorantiam (Argument to Ignorance). This argument is fallacious because failure to have evidence or proof of something does not mean that the opposite statement can necessarily be asserted.

Argument 8

"University professors really have it pretty easy. My parents have a cottage next door to a professor from one of the universities, and he's there from late April right through to September fishing and relaxing".

This represented a re-wording of an example given by Johnson and Blair (1977, p. 19) of the fallacy of Hasty Generalisation. Clearly, the speaker is generalising to all university professors on the basis of one case.

Argument 9

"Students should be allowed to use their texts during exams because lawyers can use their law texts in preparing a case and doctors can use their medical books in making a diagnosis".

Argument 9 was an edited version of that offered by Barry (1980, p. 155) to exemplify the fallacy of Faulty Analogy. The fallacy in this case lies in arguing that the tasks presented to students (exams) are like (or analogous to) the tasks that qualified professionals in law and medicine may be presented with, and because the latter are able to consult texts, so should students. Such an analogy, obviously, is deficient.

Argument 10

"Chris must be an effective teacher. We know that he is well-liked by his students from a student-run evaluation survey".

This was a significant modification of an example given by Byerly (1973, p. 50) of the fallacy of Irrelevant Premiss. Clearly, the effectiveness of the teacher cannot be established on the basis of being well-liked. There is a lack of relevance of the latter to the former.

Argument 11

"You've thrown four 3's on the dice in a row now, so I suggest you leave it at that because your chances of winning again by throwing *another* 3 is considerably less now than before".

This represented a significant re-wording of an example given by Munson (1976, p. 278) of the well-known Gambler's fallacy. The chances of throwing a '3' on any occasion on a die always remains the same: one chance in six.

Argument 12

"My friend who's in hospital, seriously ill, says that he'll recover if he gets a certain serum. I got a letter from him saying he's now recovered, so he must have got the serum".

Appendix C (continued)

Argument 12 represented a re-wording of an example given by Moore (1967, p. 16) of the formal logic fallacy of Affirming the Consequent. This takes the form of arguing 'If p, then q; q; therefore, p'. Here, the affirmed consequent 'q' (the recovery) does not necessarily mean that the serum had been administered ('p'). The person may have recovered spontaneously, or due to some other treatment, for example.

Argument 13

"Women shouldn't be permitted to be politicians because they weren't in the past, and if they were able to contribute in this regard, this would have been recognised".

This represented a re-wording of an example given by Michalos (1970, p. 40) of the fallacy of Appeal to Past Practice. The nature of the fault is self-evident: past practice need not necessarily constitute a good (or acceptable) rule of thumb, criterion, or guideline for current or future practice.

Argument 14

"There is, very rarely, a totally masculine male and a totally feminine female, psychologically speaking, since almost all males and females have elements of femininity and masculinity in them, respectively".

This was devised by the writer and was intended to be an example of a good argument. Once again, the very modest nature of the conclusion protected it from flaw: the conclusion was qualified with 'very rarely' - in contrast to 'never'. The premiss also refers to 'almost all' males and females - in contrast to 'all' males and females.

Appendix C (continued)

Argument 15 (excluded from statistical analysis)

"Teachers shouldn't put *too* much effort into helping the brighter students in class, because the lower and middle ability students need the help more".

This was devised by the writer and was intended to be an example of a good argument. It was excluded from statistical analysis because comments from some of the participants led the experimenter to regard it as open to challenge: one reasonable objection was that all students are entitled to equal attention and assistance from teachers.

Argument 16

"In recent World Cup tennis, the Australians won six matches, and the U.S. one. This is not surprising when you consider that on interview, the Australians said they were keyed up for playing for their country, while the Americans said they were playing mostly for personal success or money".

This represented a re-wording of an example given by Kahane (1973, p. 241) of the fallacy of Hasty Conclusion. Here, attributions for success or failure are made too hastily (without sufficient care) - the conclusion does not necessarily follow.

Argument 17

"Pre-marital sex is wrong, because it inevitably gives one a taste for sexual variety and leads to adultery and broken marriages later on".

Appendix C (continued)

Argument 17 represented a re-wording of an example given by Kahane (1984, p. 101) of the fallacy of Domino Theory. The fault in the argument is that each chain of consequence cannot be asserted to follow necessarily from the previous claim.

Argument 18

"This parliamentary bill should not be accepted, because the man who introduced it is uneducated and also a known communist, and we don't want his sort of ideas around here".

This was devised by the writer, but inspired by the example given by Barker (1965, p. 196) of the fallacy known in Latin as Argumentum ad Hominem (Argument Against the Person). This fallacy involves attempting to dismiss a person's claims or ideas by making an attack on the person. The person's actual assertions are not addressed in these kinds of fallacious attacks.

Argument 19 (excluded from statistical analysis)

"It is probable that life exists, or can exist, in other solar systems, since Fred Hoyle, who was not only a well-known science fiction writer, but, more importantly, an astronomer as well, has stated that the chances of there being life of some form in other planetary systems is actually quite high".

This was devised by an associate of the writer and was intended to be an example of Fallacious Appeal to Authority. This fallacy involves supporting a claim by citing someone who appears to have appropriate authority, but in actual fact does not (Ehninger, 1974).

This was excluded from statistical analysis since remarks made by participants led the experimenter to regard this as not a clear-cut example of this particular fallacy.

Appendix C (continued)

Argument 20

"As headmaster, you should expel the students involved in the disturbance, or the Board is certain to step in and question the way you've handled the situation".

This represented a re-wording of an example given by Munson (1976, p. 271) of the fallacy of Appeal to Force. The headmaster is being given the threat of investigation in order to persuade him or her to take a certain course of action (thus avoiding the threat). Technically speaking, no actual reasons are given for expelling the students - instead means of applying force are used.

Argument 21 (excluded from statistical analysis)

"The jury system is unnecessary in a sense, because questionnaire studies have revealed that in most cases, the judge would have reached the same verdict as the jurors".

This represented a significant re-wording and editing of an example given by Manicas and Kruger (1976, p. 311) of a certain fallacy in such a way that the result was intended to be an example of a good argument.

It was excluded from statistical analysis because comments from some of the participants made it clear that insufficient emphasis was placed on the important qualification of 'in a sense', and what was meant by this.

Argument 22 (excluded from statistical analysis)

"Under any circumstances, censorship is a violation of the rights of a free press, and should not be tolerated".

Argument 22 represented a slight re-wording of an example given by Werkmeister (1957, p. 38) of the fallacy of Accident. The fallacy involves applying generally accepted principles to situations in an indiscriminate fashion - even in exceptional circumstances.

This was excluded from statistical analysis since remarks made by participants led the experimenter to regard this as not a clear-cut example of this particular fallacy.

Argument 23

"Every opinion poll shows that public whipping is the best remedy for those who commit crimes of violence".

This was an example given by Pirie (1985, p. 127) of the fallacy of Appeal to Popular Belief. Clearly, popular belief cannot be taken necessarily to constitute evidence or sufficient reason to accept some claim, as in this case.

Argument 24

"If I eat too much, I'll be ill, but since I haven't eaten too much, I won't be ill".

This represented a slight re-wording of an example given by Pirie (1985, p. 51) of the formal logic fallacy of Denying the Antecedent. This takes the form of arguing 'If p, then q; Not p; therefore, not q'. Here, the denied antecedent 'not p' (not eating too much) does not guarantee that the person will not become ill ('not q'). Clearly, the person could become ill due to other factors, however unlikely, such as food poisoning or an allergic reaction.

Appendix C (continued)

Argument 25 (excluded from statistical analysis)

"We will not grant you a 3% pay rise, since you received a 5% rise less than a year ago, and even then you were well paid by relative standards".

This was devised by the writer and was intended to be an example of a good argument. It was excluded from statistical analysis since numerous participants identified a fault with it: that the reasons given should not be the sole reasons for deciding whether to grant a pay rise.

Argument 26

"The Minister said he was opposed to free tertiary education, as experience shows people do not properly appreciate what they get for nothing".

This was devised by an associate of the writer as an example of the fallacy of Trivial Objections. As implied by the name, this fallacy involves objecting to something on trivial grounds (Pirie, 1985, p. 164).

Here, the objection to having, or continuing, free tertiary education is that people do not properly appreciate what they get for nothing. This may be regarded as a trivial objection.

Argument 27

"We should reduce the amount we spend on foreign aid, because it has to be remembered that about three quarters of all aid goes into the pockets of corrupt politicians and black marketeers".

Argument 27 represented a re-wording of an example given by Johnson and Blair (1977; pp. 135-136) of the fallacy of Questionable Premiss. Here, the questionable premiss is the claim that three-quarters of all foreign aid is pocketed by black-marketeers and corrupt politicians.

Argument 28

"One cannot say hunting is cruel to animals because of the slow death of that fox in our area - a post mortem showed it died of natural causes".

This represented a significant re-wording of an example given by Pirie (1985, p. 146) of the fallacy of Refuting the Example. This fallacy involves attempting to reject an argument's central claim by discrediting a supporting example. As Pirie notes, unless the supporting example is given as *evidence*, such a practice cannot, of itself, enable the rejection of the central claim.

In this example, it seems that the speaker had been previously presented with the view that hunting is cruel to animals. An example had been given of a hunting incident in which a fox was found to have been slowly dying, or to have had died slowly.

In the above example, the speaker has responded by refuting the correctness of the example, stating that the death was due to natural causes. On this basis, the arguer also implicitly rejects the claim that hunting is cruel. While the example may be refuted successfully, this does not constitute reason to dismiss the main claim of hunting being cruel to animals.

Appendix C (continued)

Argument 29 (excluded from statistical analysis)

"Police resources are limited, so they shouldn't use too much of them in mounting crackdowns on trivial things like seat-belt wear - they should concentrate their efforts on serious things like rape, murder and drugs".

This was devised by the writer and was intended to be an example of a good argument. Care was exercised in wording this argument in order to protect it against criticism in two main ways. The argument did not state that 'crackdowns' on seat-belt wear should be *stopped*; it simply stated that with limited police resources, it is unwise to devote too higher a proportion of those resources to such campaigns. The argument also pointed out that the incidence of seat-belt problems is minor in comparison with the other issues mentioned (an Australian context was assumed, in which compulsory seat-belt wear is almost always observed).

Despite these efforts, some participants objected that seat-belt wear is '*not* trivial', referring to the tragedy of those few who do lose their lives due to not wearing a seat-belt. At first, the experimenter dismissed these objections as lacking substance, because of the above-mentioned strengths of the argument.

On further reflection, however, the experimenter decided that the argument could not be strictly regarded as 'sound', since the argument could be interpreted as implying that seat-belt wearing problems are a trivial concern in the sense of 'not important' rather than 'not frequent'. Although the experimenter regarded the argument's context as sufficient to define 'trivial' as 'not a major problem', it was thought that the argument is still nevertheless not explicit enough about the sense in which 'trivial' is intended. Since the experimenter regarded 'sound' arguments as containing no flaws of any type, this example was not included in the statistical analysis.

Appendix C (continued)

Argument 30

"You can't charge us with false advertising. Most of our commercial competitors make similar claims for their product".

This last argument represented a modification of an example given by Barry (1980; p. 61) of the fallacy of Two Wrongs Make a Right. This well-known fallacy involves erroneously pointing to the wrong-doings of others as the justification for one's own wrong-doing.

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