THE EFFECTS OF COPING STRATEGIES UPON THE

EXPRESSION OF FEAR

by

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ABSTRACT

Glogower et al. (1978) have suggested that coping selfstatements (CSS) form the major therapeutic component of cognitive restructuring therapies. However, to date there has been no consensus in the literature about the nature of effective CSS. Indeed, many studies which have examined the effects of cognitive therapies have failed to adequately describe the CSS component of the therapies. The initial focus of this thesis was on two coping strategies which have been described (Meichenbaum, 1971; Evans, 1977). Both strategies encourage fearful subjects to cope with the physiological concomitants of fear on the assumption that fear is mediated by their perceptions of such concomitants. However, the emphasis of these strategies is quite different; Evans' strategy encourages subjects to passively accept the physiological concomitants of fear (PCS) while Meichenbaum's encourages subjects to actively cope with this aspect of fear by self-instructing to relax and keep calm (ACS). It was found that the former strategy (PCS) had a beneficial effect upon fear of spiders but lead to an increase in fear for a group of speech-anxious subjects. The ACS had a significant fear-reducing effect upon speech anxiety. In addition, it was found that fearful public speakers who devised their own strategies experienced a reduction in fear. The possible interpretation of these findings prompted an investigation of the relationship between locus of control orientation and the expression of fear. It was found that externality was positively correlated with fear of many of the items on the FSS III (Wolpe, 1973) including the item 'Speaking in Public'. However, when actually presenting a speech it was found that fearful internals expressed significantly more fear than fearful externals. Interpretations of the finding are discussed along with possible implications for therapy. A practically convenient procedure for investigating speech anxiety is described. An investigation of the recognition of the non-verbal expression of speech anxiety is also reported.

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Julia, Austin and Edna

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CHAPTER 1 - INTRODUCTION

Defining characteristics of phobias

At first sight, and especially following comparison with other symptoms of psychopathology, the general text portrays the phobia as one of the more tangible as well as circumscribed of abnormal behaviours. This view is reinforced by many definitions of phobias which rest at a descriptive level. For example, Beck (1976) has couched his definition of phobias in seemingly straightforward language :

'Fear of a situation/object that, by social consensus and the person's own intellectual appraisal when away from the situation, is disproportionate to the probability and degree of harm inherent in that situation.' (p 159)

However, this phenomenon becomes rapidly more complex when an attempt is made to understand the nature of such fears, and their potential impact upon the lives and the psychological well-being of the people who have them. Again at a descriptive level it is apparent that phobics not only experience excessive fear in certain situations, but for many of them the avoidance which tends to accompany this fear ultimately brings distress and unhappiness. This puzzling 'selfperpetuating and self-defeating' behaviour has been referred to by Mowrer (1950) as the 'neurotic paradox'; paradoxical in the sense that it is contrary to the tenets of most philosophical and psychological theories which emphasize the hedonistic nature of man (Eysenck, 1979).

As Mowrer points out :

'Common sense holds that a normal, sensible man, or even a beast to the limits of his intelligence, will weigh and balance the consequences of his acts; if the net effect is favourable, the action producing it will be perpetuated, and if the net effect is unfavourable, the action producing it will be inhibited,

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abandoned. In neurosis, however, one sees actions which have predominantly unfavourable consequences, yet they persist over a period of months, years, or a lifetime.' Mowrer, 1950, p 486).

The complex nature of fear and its possible impact upon the phobic in terms of self-defeating and persistent behaviour is illustrated in a case study presented by Rachman (1968).

'A medical student complained of an intense fear of authority figures and examination situations. He described his feelings in the presence of authority figures (his teachers, senior colleagues, policemen, etc.) as one of total fear, sometimes bordering on panic. He reported that he was quite unable to cope with these people, and that when it was impossible for him to avoid a direct meeting with them, he felt extremely frightened and trembled openly. In his case, the autonomic reactions were primarily sweating, muscular tension, palpitations and a strong flush. In addition, the muscular tension quite often centred on the muscles of the throat region, and this prevented him from speaking normally in the presence of authority figures. His motor reaction was one of avoidance. Whenever and wher ever possible, he avoided coming into contact with his teachers and senior colleagues. This unadaptive behaviour was interfering with his medical education, apart from the heavy burden which it imposed on him in day-to-day matters.' (p 5).

Two points of interest are clearly illustrated by this case. Firstly, it underscores Mowrer's observation of the self-defeating and disruptive nature of excessive fear. Secondly, it suggests that although the word 'fear' is used without difficulty in everyday language and in definitions (e.g. Beck ibid), the fearful response is a complex one, manifest in a number of physiological, subjective and

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behavioural ways. Both of these points are discussed below; firstly, the complexity of fear and its measurement will be considered.

Rachman's case, like many others in the literature, leaves little room to doubt the notion that fear is a complex phenomenonwhich may be expressed and measured in many different ways. The many operational definitions of these expressions and their measurement can be found elsewhere (e.g. Cimenero, Calhoun and Adams, 1977; Nay, 1977; Sartory and Lader, 1978), and therefore only a brief overview will be given here. As suggested above these expressions may be regarded as responses in one of three response systems: gross motor/behavioural, physiological, verbal/subjective.

Cross Motor/Behavioural Responses:

A variety of operational definitions have been used in the literature for gross motor or behavioural expressions of fear, although most typically they have involved the exposure of subjects to a phobic stimulus. This exposure has either been in a temporal sense (e.g. a subject may be requested to remain in a situation until fear becomes unbearable), or in terms of physical proximity (i.e. bringing the feared object toward the subject or instructing the subject to approach and/or inter-act with the stimulus) (e.g. Lang and Lazovik, 1963; Leitenberg, 1976; Ost, 1978). Other definitions of the behavioural expression of fear have included : the disruption of feeding behaviour (e.g. Mowrer and Viek, 1948); the disruption of speech (e.g. Mahl, 1956); and the bodily movements and facial expression of fearful public speakers (e.g. Lamb, 1978; Paul, 1966).

Verbal Responses:

Hugdahl (1981) has suggested that the verbal-cognitive component of fear has been conceived of in the literature in at least three different ways: i) as a verbal overall rating of subjective feelings, typically using a 'fear-thermometer', but without specification of the

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source of the ratings (e.g. Sartory et. al. 1977; Grey et al, 1979); ii) secondly, as 'worrying and brooding' about the forthcoming fear provoking event. Hugdahl suggests this may include negative thoughts about being unable to cope instrumentally with the situation, and iii) Thirdly, the cognitive-verbal component may mean those changes of mood and feelings of unreality, uncontrollability, guilt, selfblame, etc., when exposed to a phobic stimulus, or when thinking about the stimulus. (Hugdahl, 1981).

A fourth conceptualization which might be added to this list involves those verbal responses expressed during fearful interactions which reflect the perception of autonomic arousal, i.e. "I felt my heart racing."

Physiological responses:

A variety of physiological responses to phobic stimuli may be measured and analysed in a variety of ways although data interpretation in not always easy or conclusive (Rachman, 1978). However, some researchers (e.g. Sartory and Lader, 1978) have suggested that measures of cardiovascular activity may be more reliably measured and readily interpreted.

Cur understanding of the nature of fear therefore is best pursued in terms of the measurement of responses in those response-systems. However, such an understanding is further complicated by the observations that the measures of responses in these systems can co-vary, vary inversely, or vary independently, (e.g. Lacey, 1967; Lang and Lazovik, 1963; Hodgson and Rachman, 1974; Rachman and Hodgson, 1974; Sartory, Rachman and Grey, 1977). In response to such observations, Lang (1968, 1971, 1978) proposed a 'Three-systems Model' of fear. He argued that fear can no longer be viewed as a 'lump', a unitary phenomenon which may be measured in different ways, or encompassed by the indices in one system. Rather fear must be viewed as a set of loosely coupled and partially

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independent components which may be reflected to varying degrees by the responses in the three response systems. This conceptualization has been more recently supported in the writings of Rachman (1976, 1978) and Eysenck (1976). Indeed Rachman and Hodgson (1974) have gone on to generate a number of hypotheses pertaining to the relationship between indices of fear, although little research (see Sartory et. al. 1977; Grey et al, 1979) has been done to date to test these.

It is interesting to note that this conceptualisation of fear contrasts with the attribution theory of emotion proposed by Schachter (1964) and which stresses the interdependence of the indices of emotional expression. In this formulation, physiological arousal, or the perception of arousal, whether illusory or veridical (Valins, 1970) is seen as necessary, although not sufficient for the expression of emotion in other systems. These contrasting conceptualisations have been discussed critically elsewhere (Hugdahl, 1981) and will not be discussed further at this point, although it will become apparent that they have different implications for the theories of aetiology of phobias and approaches to treatment.

In summary then, it is apparent that adequate models of phobias must account for the complexity of the expression of fear, which includes an understanding of the relationship between the responses indexing fear, and the persistence and seemingly self-defeating nature of these responses.

Several other characteristics of phobias must also be considered if a full understanding is to be gained. These include selectivity, age of onset and sex differences.

Selectivity:

Selectivity refers to the observation that the set of potentially phobic stimuli is seemingly non-arbitrary.

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'They comprise a relatively non-arbitrary and limited set of objects: agoraphobia, fear of specific animals, insect phobias, fear of heights, fear of the dark, and so forth. All these are relatively common phobias, and only rarely, if ever, do we have pyjama phobias, grass pho_bias, electric outlet phobias, hammer phobias, even though these things are likely to be associated with trauma in our world'. (Seligman, 1971). Age of Onset:

Marks (1969) has suggested that the onset of phobias is also non-random, each 'syndrome' (e.g. animal phobias, agoraphobia) having a characteristic age of onset.

Sex Differences:

Hersen (1973) has reported that college-age females report more intense fears than males on fear survey schedules. In addition, Geer (1965) has presented data which show that women in American colleges reported significantly higher levels of fear than males for eight of the fifty-one items on a fear survey schedule, while the reverse was true for two of the items. In a more recent study involving students in an English college (Kartsounis, Mervyn-Smith and Pickersgill, 1983) it was found that females reported significantly higher levels of fear than males for sixteen of the eighty-eight items of Wolpe's (1973) Fear Survey Schedule (FSS-111). Whether such fears are qualitatively and/or quantitatively different from those experienced by individuals seeking clinical interventions remains to be seen although the observed sex differences are consistent with the preponderance of women amongst phobic patients (Marks, 1969).

Models of Phobic Behaviour:

Watson and Rayner's Model:

Watson and Rayner's (1920) model of phobic behaviour is incomplete and by now is of purely historical interest. However, their ideas were

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fundamental to future theoretical developments and also generated a good deal of research. Therefore, a discussion of this model will place these future developments within an historical perspective.

Watson and Rayner's contention was that neurotic disorders were essentially conditioned emotional responses, the process of conditioning being entirely Pavlovian in nature. In support of this proposal these researchers reported a case study of an eleven-month old boy in whom they conditioned a fear of rats (Watson & Rayner 1920). The study is by now famous and has been frequently cited and described, however, the description bears repetition.

The conditioning procedure involved Watson striking a steel bar whenever the infant reached out for a rat. The subsequent expression of fear in the infant to the rat, but in the absence of the noise created by the striking of the bar, Watson argued, could be explained in terms of Pavlovian conditioning. He postulated that the once neutral stimulus (rat) following contiguous pairing with the loud noise (unconditioned stimulus) came to elicit the same response (conditioned response) as the noise, but in its absence. Watson and Rayner also reported that following this procedure the boy displayed fear reactions to other furry animals (dogs and rabbits) and to furry objects (e.g. fur coat) and although these stimuli were not used in the original conditioning process, such generalisation is predicted from Favlov's work with dogs (Pavlov, 1927). The process of classical conditioning then, appears highly relevant for the acquisition of irrational fears. To state this simple model in a single sentence :-

'Phobic reactions may develop by means of such conditioning where, as a result of pairing a traumatic event evoking fear with a neutral environmental stimulus, the latter acquires the ability to elicit conditioned fear.' (Meyer and Crisp, 1970)

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However, several points of criticism can be made of both Watson and Rayner's research and theory. Firstly, it is apparent that the case study offers little support for the theoretical model. As Harris (1979) has recently pointed out:

'Critical reading of Watson and Rayner's (1920) report reveals little evidence that Albert developed a rat phobia or even that animals consistently evoked his fear.' (p 154).

Watson and Rayner also report that the response which was conditioned began to extinguish and required additional trials to maintain it. Therefore, the study failed to demonstrate the persistence of phobic behaviour. Indeed, in theoretical terms, there is no reason why Watson and Rayner should have expected a conditioned response to persist, given Pavlov's (1927) description of the phenomenon of extinction based upon his experimental observations.

In short then, the model fails to explain the persistence of phobic behaviour, and the case study offers little evidence that phobic responses can be acquired via Pavlovian conditioning.

The Two-stage Theory of Fear and Avoidance:

An attempt to solve the theoretical problem of the persistence of phobic behaviour was made with the introduction of the Two-Stage theory of fear and avoidance (Mowrer, 1939). This theory was based upon a critical appraisal of the ideas of Freud, James, Watson and Pavlov, and has had a great influence upon theorising on this subject. It held the central notion that anxiety could act as a drive and hence as a motivational state. Mowrer's position is illustrated by the following quotation :

'A so-called 'traumatic' (painful) stimulus (arising either from external injury, of whatever kind, or from severe organic need) impinges upon the organism and produces a more or less violent defense (striving) reaction.

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Furthermore, such a stimulus-response sequence is usually preceded or accompanied by originally 'indifferent' stimuli which, however after one or more temporally contiguous associations with the traumatic stimulus, begin to be perceived as 'danger signals', i.e. acquire the capacity to elicit an 'anxiety' reaction. This latter reaction, which may or may not be grossly observable, has two outstanding characteristics: (i) it creates or, perhaps more accurately, consists of a state of heightened tension (or 'attention') and a more or less specific readiness for (expectation of) the impending traumatic stimulus, and ii) by virtue of the fact that such a state of tension is itself a form of discomfort, it adaptively motivates the organism to escape from the danger situation, thereby lessening the intensity of the tension (anxiety) and also probably decreasing the chances of encountering the traumatic stimulus. In short, anxiety (fear) is the conditioned form of the pain reaction, which has the highly useful function of motivating and reinforcing behaviour that tends to avoid or prevent the recurrence of the pain-producing (unconditioned) stimulus.' (Mowrer, 1939, p 554 - 555).

Acquired fear then, was seen as a motive to avoid, and its presence ensured continued avoidance, the avoidance response being reinforced by the reduction of fear. Although Mowrer's model has undergone various modifications since 1939 (e.g. Miller, 1951; Mowrer, 1960; Eysenck and Rachman, 1965), the essential notion of fear as a motivator has remained.

Evidence to support this theory is discussed below. It has been drawn from five main sources (Eysenck and Rachman, 1965) : research on the induction of fear in animals; the development of anxiety states in combat soldiers; experiments on the induction of fear in a small number of children; clinical observations (e.g. dental phobias) and an experiment on the effects of traumatic stimulation in adults.

Animal Studies:

The literature is replete with reports describing the phenomenon of 'experimental neurosis' in animals (see reviews by Broadhurst, 1960, 1962; Wolpe, 1958.). Some of these studies, such as those conducted by Miller (e.g. Miller, 1948), demonstrate that persistent avoidance of an initially innocuous stimulus (e.g. a tone) can be induced in rats by formerly exposing them to pairings of the neutral stimulus (CS) and an aversive stimulus (UCS) such as an electric shock. This observed avoidance, which is seen as analogous to human phobic avoidance, is interpreted in terms of fear as an acquired drive, specifically, avoidance is thought to index a classically conditioned fear response which reduces in intensity with avoidance, thus reinforcing and maintaining that avoidance. Interestingly, however, direct measurement of the presumed classically conditioned fear response is not usually made in these studies (Evans, 1976), although it is apparent (Evans, 1976) that classically conditioned autonomic nervous system responses are readily produced in animals.

The main thrust of this literature prompted Rachman (1976) to conclude :

'There is little room for doubt about the facility with which fear reactions can be conditioned - at least in animals tested under laboratory conditions.'

Combat Neurosis:

The observations (e.g. Flanagan, 1948; Gillespie, 1945; Grinker and Spiegel, 1945; Lewis and Engle, 1954) that intense fear can result from traumatic stimulation in combat have also been seen as evidence in support of a conditioning model of phobias (Rachman, 1978). One example of these observations, cited by Grinker and Spiegel (1945) suggests that the intense fear reactions they observed in pilots engaged in combat were precipitated by a single catastrophic event, or by repeated experiences of severe, long-lasting, fear-provoking missions. <u>Induction of Fear in Children:</u>

Several researchers (Bregman, 1934; English, 1929; Valentine, 1946) have attempted to replicate the findings of Watson and Rayner, although they have met with mixed success. For example, English reported three instances of attempts to induce fear in a child. The first replicated Watson and Rayner's finding using a black stuffed cat as the conditioned stimulus (CS) and similarly the third was successful when the conditioned stimulus was a shoe. However, in the second of these three cases, English failed to produce a conditioning effect using a wooden duck as the CS, although it was noted that this failure could be attributed to the failure of the unconditioned stimulus (UCS) (striking a large metal bar) to elicit any fear: without an effective UCS conditioning cannot be expected.

In Bregman's study, fifteen children (aged from eight to sixteen months) were used as subjects and exposed to various pairings of two types of UCS; negative (a loud bell) or positive (a rattle) with a variety of conditioned stimuli; wooden shapes and coloured cloths. He reported that the negative UCS was effective in eliciting fear from the children, although the conditioned stimuli were not. Therefore these findings do not support the two-stage model of fear acquisition.

Valentine's (1946) findings offer only mixed support for the model. He succeeded in producing a fear (albeit an unstable one) of a caterpillar in a two-year old child but failed to make her fear a pair of opera glasses.

The Effects of Traumatic Stimulation in Adults:

Some well controlled studies with humans suggest that avoidance conditioning, using 'traumatic' shock as theUCS, is possible (Turner and Solomon, 1962). However, few studies have examined the induction in humans

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of strong autonomic responses characteristic of fear. One study to do so was conducted by Campbell, Sanderson and Laverty (1964).

These researchers recorded heart rate, respiration, muscle tension and electro-dermal activity in a small number of alcoholics while subjecting them to an extremely unpleasant conditioning procedure. The conditioned stimulus consisted of a tone which was paired with the effects of succinylcholine (UCS), a muscle relaxant which left them conscious but suspended respiration for about one hundred seconds. The CS was presented throughout this respiratory paralysis for the experimental group, while two control groups received either the drug or the tone on its own. After one conditioning trial subjects were allowed to recover for five minutes and then asked to describe their experimences. Most drugged subjects believed they were dying.

Subsequently, all subjects were given sixty extinction trials during which the tone was presented alone. Interestingly, these researchers observed increases in these measured responses from the conditioning to the extinction phase for the experimental group and continued responding without decrement during the extinction trials. Indeed, on one of the trials further increases in the magnitude of all responses were observed. In short, these researchers had conditioned physiological responses which were not only resistant to extinction but showed increases in magnitude with repeated exposure to the conditioned stimulus.

Criticism of the Two-Stage Theory:

Despite this apparent wealth of evidence in support of the twostage model of fear acquisition and avoidance, it became apparent that it could not adequately account for the observed characteristics of phobias (Eysenck, 1979). Indeed, it will be noted below that it fails to explain some of the observations discussed above which are presumed to support it. The criticisms of this model will be discussed under the following headings: persistence of phobic behaviour, selectivity, and

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single trial learning.

Persistence of Phobias

The basic premise of the Two-Stage theory is :

- 1) After a conditioned stimulus is paired with an aversive unconditioned stimulus (such as electric shock) the CS alone comes to elicit the conditioned fear response.
- 2) This conditioned fear response motivates avoidance. When this avoidance response is made the CS terminates, fear is reduced, and this reduction serves to reinforce and maintain the avoidance response.

At first sight the animal literature, as suggested above, would seem to provide useful support for this model, the observation of continued avoidance in rats apparently paralleling the persistence of human phobias. For example, Solomon and Wynne (1954) observed :

'In return for a few intense shocks during acquisition of avoidance, dogs give back as many as six hundred and fifty avoidances, without showing any sign of extinction.'

This observation seems to be common in the literature (see Razran 1956 for a review; Seligman and Campbell, 1965). However, several researchers (Kamin, Brimer and Black, 1963; Starr and Mineka, 1977) have suggested that animals proficient at avoidance responding no longer appear very fearful of the CS. Indeed, some researchers have observed that such animals may actually look nonchalant before and after the onset of the CS and 'make avoidance responses with aplomb' (Seligman and Johnston , 1973). The findings of Church and Black (1958) reinforce these observations. They reported that classically conditioned heart rate changes (presumed to be a conditioned fear response) in dogs largely extinguished within ten extinction trials, with substantial extinction occurring after the first shock omission.

These observations appear to raise serious theoretical problems for Mowrer's model, and cast some doubt upon the presumed parallel between avoiding animals in these experimental conditions and fearful avoidance in humans. Firstly, the question arises : "If the fear response has extinguished in these animals then what is motivating avoidance ?" Perhaps one possible explanation is that the conditioned fear response has not extinguished but remains unobserved, although our present state of knowledge is reflected by a statement from Rescorla and Solomon (1967) summarising an extensive review of the literature :

'In summary, we have not yet identified any peripheral CRs which are necessary to mediate avoidance behaviour.'

Their solution to this problem was to suggest that the conditioned fear response exists as a central state, and thus avoidance is mediated by a central nervous system response rather than an autonomic nervous system response. Such a solution also fails however, because it overlooks the most crucial issue. If a conditioned response either peripheral or central were present in these animals then it would violate the Pavlovian law of extinction. What appears to be observed in these studies is consistent with Pavlovian laws, namely the extinction of a conditioned response which occurs with repeated exposure to an unreinforced conditioned stimulus.

In summary then, Mowrer's Two-Stage theory of fear acquisition and avoidance cannot account for the persistence of avoidance in animals as the literature seems to provide no evidence of the persistence of a conditioned fear response which is required to motivate such avoidance. If such a response were observed it would violate Pavlovian laws of extinction. The model also fails to account for the persistence of fearful avoidance in humans for similar reasons; it does not explain the persistence of a fear response (presumed to motivate avoidance) which if classically conditioned should extinguish with repeated exposure to an unreinforced conditioned stimulus.

Selectivity:

Mowrer's theory also fails to account for the observation that

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the range of possible phobic stimuli would appear to be non-arbitrary (Seligman, 1971). Parenthetically, this non-arbitrary nature of phobic stimuli may be reflected in the studies, summerized above, which attempted to induce fears in children, (Bregman, 1934; English, 1929; Valentine, 1946). Implicit in the two-stage theory is the premise of equipotentiality, a premise fairly central in Pavlov's conceptualisation of classical conditioning.

'Any natural phenomenon chosen at will may be converted into a conditioned stimulus, any visual stimulus, and desired sound, any odour and the stimulation of any part of the skin.' (Pavlov, 1927, p 86).

Single Trial Learning:

The Campbell et al (1964) study described above, suggests that conditioning can occur from a single trial, however it appears that single-trial conditioning is very rare in the laboratory (Kamin, 1969; Seligman, 1968). Similarly, single-trial conditioning involving trauma is rare in real life.

'There is usually no history of a clearly traumatic onset of human phobias.' (Marks, 1977)

An exception to this may be the combat fears discussed above. However, most typically, when phobics do report single incidents of onset (Melville, 1977) the experience rarely seems traumatic. Such observations have been regarded as presenting problems for Mowrer's model :

'.... it is by no means clear how events that usually do not appear very traumatic in the life of the patient can lead to such very clear-cut consequences.' (Eysenck, 1979 p 157).

In short, it seems that in the laboratory very intense UCS (i.e. Campbell et al, 1964) are required for single - trial learning, however this does not seem to be true for the genesis of phobias, assuming they are conditioned.

Modifications of Mowrer's Two-Stage Theory:

The inability of the two-stage theory to adequately account for these various observations has prompted several researchers to suggest theoretical modifications. For example, several solutions have been offered, within the framework of the model, to account for the observed persistence of apparently fearless avoidance in animals. They have included : conservation of anxiety (Solomon and Wynne, 1954); automatisation (Kimble and Perlmuter, 1970); and safety-signal reinforcement (Gray, 1971; Nowrer, 1960; Rescorla and Lolordo, 1965). These concepts have been critically discussed elsewhere (Seligman and Johnston , 1973) and need not be discussed further here, for the present discussion is not concerned with the inability of Mowrer's model to explain the behaviour of avoiding rats, but the persistence of fearful avoidance in humans; a point which needs to be stressed as the two lines of enquiry have been confused in the literature (Mineka, 1979).

Preparedness:

The observation that phobic stimuli appear to be non-random (an observation which violates the classical conditioning premise of equipotentiality), prompted Seligman (1970, 1971) to propose the concept of 'preparedness'. This concept suggests that the most frequently experienced phobias are attached to stimuli which once threatened the survival of our ancestors, and which are now acquired via a genetic predisposition. This genetic predisposition he argues, means that fears of 'prepared' stimuli such as snakes and spiders (presumed to be of evolutionary significance to our ancestors) are more readily acquired than fears of 'non-prepared' stimuli (e.g. shoes, cloth). Furthermore, fears of prepared simuli, he suggests, are more resistant to extinction than fears of unprepared stimuli.

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'Phobias are highly prepared to be learned by humans, and, like other highly prepared relationships, they are selective and resistant to extinction, learned even with degraded input and probably non-cognitive.' (Seligman, 1971 p 321).

It is interesting to note that Seligman's views are not entirely new. For example, Valentine (1946) in a discussion of the inconsistencies to be found in the literature on the induction of fears in children, speculated that little Albert's rat fear (Watson and Rayner, 1920) was

'....readily established partly because there was an existing innate tendency, though as yet unawakened, to fear the rat.'

Similarly Eysenck (1979) has suggested that the concept of preparedness explains the findings of Bregman (1934) and English (1929).

Another problem which may be explained by this concept is the choice of conditioned phobic stimuli. When a person experiences a traumatic event, or even a series of subtraumatic events, he may be surrounded by many possible conditioned stimuli; the question arises : "Why does the spider become the phobic stimulus and not the bath plug ?" Seligman's concept suggests that this 'choice' would be determined by innate preparedness. Indeed, he suggests that fears of certain objects or situations seem to be 'so close to the surface' that when they serve as conditioned stimuli they acquire the fear-provoking qualities of the unconditioned stimuli far more readily than other stimuli. Trauma such as that caused by an injection of Scoline (Campbell et al, 1964) is not required for such learning. The concept of preparedness also offers some explanation for the likely temporal imprecision of the CS-UCS pairing in real life. Typically, in the laboratory, CS - UCS intervals are of critical

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importance for conditioning to occur. However, in real life such precision is unlikely. Therefore, Seligman suggests that learning with a prepared CS can occur with severely degraded input, which in typical laboratory circumstances with a non-prepared CS would lead to failure.

In summary, Seligman's preparedness concept offers plausible theoretical solutions for several problems encountered by Mowrer's two-stage theory. Specifically, these problems are : the selectivity of phobic stimuli , the absence of a traumatic UCS, the temporal imprecision of the CS-UCS pairing, and the resistance of the conditioned fear response to extinction.

Seliman's hypotheses have generated a good deal of research, much of it conducted by Ohman and his colleagues. (Huguahl, 1978; Ohman, 1979; Ohman, Erikson, Fredrikson, Hugdahl and Olofs**son**, 1974; Ohman, Brikson and Lofberg, 1975; Ohman, Fredrikson and Hugdahl, 1978a, 1978b; Ohman, Fredrikson, Hugdahl, Rimmo, 1976.) Before discussing the findings of these studies it will prove useful to describe Ohman's usual experimental paradigm as there seems to be some confusion in the literature about it (Eysenck, 1979).

Typically, Ohman's general approach was to present to normal non-phobic college students pairs of visual conditioned stimuli (slides). For each subject one of these CS (this would be counterbalanced) would be paired with an aversive unconditioned stimulus (mild electric shocks or loud noises), and at the same time autonomic activity was monitored (skin conductance and vasomotor responses), (Ohman, 1979). The type of conditioned stimulus varied from study to study. However the general theme is a comparison of the conditionability and resistance to extinction of 'prepared' (e.g. snakes and spiders) and 'unprepared' stimuli (e.g. flowers and mushrooms).

The main finding of these studies is interesting (Ohman, 1979).

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In short, it was found that autonomic responses were readily acquired to both fear-relevant (prepared) and irrelevant (non-prepared) conditioned stimuli when they were paired with the UCS. This finding appears to be inconsistent with Seligman's preparedness concept, although the precision of CS - UCS pairing when the CS is fear-irrelevant may have facilitated the acquisition of responses to these stimuli. However, these studies do show differential rates of extinction to these different conditioned stimuli. Specifically, responses to the fear-relevant stimuli were significantly more resistant to extinction when compared with the responses evoked by the fear-irrelevant stimuli. (Responses to both unreinforced fearrelevant and irrelevant stimuli showed rapid habituation with continued presentation of these stimuli.) In reference to this finding Ohman (1979) has stated :

'In fact, we have repeatedly failed to find any reliable evidence of extinction to phobic stimuli, in spite of relatively long extinction trials. Thus, our data deviates from what would be expected from traditional learning theory and are similar to phobias in this respect.' (p 120)

However, these results are consistent with the notion that some phobic stimuli are prepared, although they tell us little about the nature of that preparedness. It could be argued that they reflect differences in previous learning history, rather than biological predisposition as Seligman suggests. For instance, it is highly likely that these subjects had been exposed to unreinforced stimuli such as flowers and mushrooms on numerous occasions, while exposure to spiders and snakes is less likely, and indeed, fear is more likely to be associated with these latter stimuli in Western societies.

In an attempt to control for subjects' learning histories

Hodes, Ohman and Lang (1977) conducted a study using three classes of stimuli: (i) phylogenetically fear-relevant stimuli (i.e. snakes and spiders); (ii) ontogenetically fear-relevant stimuli (i.e. revolvers and rifles); and (iii) fear-irrelevant stimuli (i.e. household objects). The UCS was a loud complex noise, and the standard experimental paradigm described above was used. The preparedness theory would predict that subjects presented with stimuli in class (i) would show superiority of response acquisition compared to subjects exposed to the other types of stimuli (classes (ii) and (iii)) and also greater resistance to extinction. Consistent with the findings of the studies discussed above, these researchers found that there were significant acquisition effects for the reinforced conditioned stimuli, regardless of the stimulation class. However, the pattern of extinction of these responses was in line with the preparedness theory: those conditioned responses evoked by the phylogenetically fear-relevant stimuli showed greater resistance to extinction compared with the responses evoked by the other two classes of stimuli. Ohman (1979) has suggested that :

'This result ... indicates that there might be some evolutionary specificity to the effects observed with potentially phobic CS.'

Ohman's caution is warranted. It is clear that these researchers selected stimuli (rifles and revolvers) that are dangerous to modern man but were not dangerous to pre-technological man, and stimuli (snakes and spiders) which, we might assume, have evolutionary significance. However, they also differ in other respects which may have influenced the conditioned response. Again it might be argued that the level of pre-exposure to these stimuli varied from class to class. It seems plausible to suggest that the subjects used in the study would have been exposed many more times to rifles

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(via television) and household items, than to spiders and snakes. This point is important given the findings which suggest that nonreinforced pre-exposure to a CS significantly interferes with subsequent conditioning to that stimulus (MacKintosh, 1974). Extinction may also be influenced. Of course, with regard to rifles or revolvers we might reflect that exposure is often reinforced, people are regularly shot on television. However, the rifle or revolver does not do the shooting but the sinister gangster who is operating it. Stumbling upon a rifle in a dark alley may evoke little fear compared to stumbling upon a man with a gun. The argument, essentially, is that guns per se are not dangerous; as inanimate objects they pose no more threat than a broom. This is a second point; Ohman used two classes of inanimate objects and one class of living creatures.

An illuminating experiment within this paradigm might involve the use of snakes and toads as stimuli. Both are living creatures and as types of both are venomous, they are, in evolutionary terms, potentially phobic stimuli. Assuming comparable pre-exposure, the preparedness theory would predict that both stimuli would elicit responses equally resistant to extinction. However, if there is a cultural influence upon conditionability and the persistence of these conditioned responses, we might expect that responses elicited by snakes show greater resistance to extinction, as snakes would appear to be more readily associated with harm and fear.

It would seem that further research is required to determine the defining characteristics of those stimuli which elicit an autonomic response resistant to extinction. At present, the most cautious interpretation of this research is that stimuli which are more likely to be associated with phobias are more likely, in the laboratory, to elicit a conditioned response with greater resistance

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to extinction than responses elicited by other types of stimuli. Such an interpretation is consistent with the notion that humans may be more prepared or predisposed to acquiring fears of certain stimuli through conditioning, although the nature of that preparedness is still unclear.

Two recent papers which have reported observations of phobic patients are also particularly pertinent to the preparedness concept. One of these (Rachman and Seligman, 1976) described treatment programmes with two patients, one with a fear of chocolate, the other with a fear of vegetables and plants. It seems reasonable to assume that these fears are nonprepared or evolutionally neutral and therefore according to the preparedness concept they should be very responsive to treatment or, specifically, minimally resistant to extinction. However, this was not the case. The chocolate phobic failed to respond favourably to 'an intensive course of behavioural treatment that normally achieves a success rate of between 70 and 80%' (p 336), while the second patient made little progress over forty-eight hours of therapy in which systematic desensitisation and modelling, amongst other procedures, were used.

In the second paper De Silva, Rachman and Seligman (1977) reported the findings of a retrospective study of a large number of phobias treated over a five year period. The most important findings were that assumed preparedness was unrelated to the ease of acquisition of the fear and to therapeutic outcome. These researchers concluded that the failure to find a systematic relationship between evolutionary criteria of preparedness and either acquisition or therapeutic outcome poses serious problems for the preparedness concept.

It would seem then, that at present the preparedness concept, although intuitively appealing (Torgersen, 1979), does not reliably define those stimuli which may become phobic stimuli, or those phobias which are readily modifiable. Therefore, it does not help to solve the

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problems of selectivity, persistence or ease of acquisition (i.e. single trial learning), without becoming dangerouslycircular: prepared fears are those which are most resistent to modification. <u>Incubation</u>:

Eysenck, (1968, 1976, 1979) has also turned his attention to the persistence of phobias and the theoretical problem this observation poses for the two-stage theory. He argues for an extension of the theory to include two concepts: Seligman's (1971) preparedness concept and the notion of incubation. He defines incubation as the process by which conditioned fear responses not only fail to extinguish, but increase with repeated exposure to an unreinforced conditioned stimulus. His explanation of this process is discussed below, however, it should be noted firstly, that there is some disagreement in the literature about whether this phenomenon exists at all. For example, McAllister and McAllister (1967) concluded a review of this field by suggesting that:

'Although the incubation of fear hypothesis has been tested in a wide variety of situations, the phenomenon has

yet to be convincingly demonstrated.' (p189) More recently, Bersh (1979) has critically reviewed the few studies upon which Eysenck has based his arguments and found them to be methodologically flawed. His criticisms have also been echoed by other researchers who have offered alternative interpretations of these findings (e.g. Evans, 1976; Kimmel, 1979; Levis, 1979; McAllister and McAllister, 1979; Mineka, 1979). To quote Bersh (1979) :

'In general ... experimental evidence for incubation due to CS is not substantial. At best, incubation must be regarded in the words of Rohrbaugh and Riccio (1970) as an 'exceptional outcome' in the laboratory. The clinic appears to offer more frequent cases of enhancement of 'anxiety/fear', during

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treatments based upon exposure to 'fear-provoking' stimuli, but the circumstances do not readily permit a determination of the precise basis for the effect or a clear identification of the variables which influence its occurrence.'

As Bersh (1979) suggests the clinic may produce evidence of incubation and indeed, Eysenck (1979) has not overlooked this possibility. However, the evidence produced to date is anecdotal and relies upon subjective report of fear for evidence of incubation. Given the observations of low correlations between measures of the various indices of fear (Lang, 1968; Rachman and Hodgson, 1974) caution must be exercised in assuming that subjective reports reflect changes in conditioned physiological responses. Similar caution must also be exercised when interpreting observations of avoidance behaviour (Solomon, Kamin and Wynne, 1953; Solomon and Wynne, 1954; Maatsh, 1959) in terms of the incubation of conditioned fear responses.

However, if it is assumed that the phenomenon of incubation can be shown to be reliably reproducible, then how does Eysenck propose to account for its occurrence ? He suggests (1979) that under certain circumstances the CS not only elicits a conditioned response (CR) which has drive properties, but that this CR produces a nocive response (NR) :

'Traditionally we would denote these NRs as response produced stimuli, in the sense that measurable autonomic responses, such as changes in heart rate.... are experienced by the organism as interoceptive stimuli... It is not the CR itself that acts as reinforcer, but rather the responseproduced stimuli: not the autonomic, hormonal and muscular reactions themselves but rather the experience of fear/anxiety

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based upon them. In sofar as the CR-produced stimuli are identical with the US-produced stimuli, it seems automatic that they will be reinforcing in exactly the same manner, in so far as they are different they will also act as reinforcers to the extent that they are painful and aversive.' (p160).

These NRs, Eysenck argues, come by classical conditioning to evoke more fear, thus producing a positive feedback and enhancement of fear. He suggests the notion 'somewhat resembles Seneca's famous saying about having nothing to fear but fear itself.'

In order to explain the observations of both extinction and incubation of conditioned responses, Lysenck argues that both processes are occurring simultaneously. Usually, he suggests the extinction process is stronger than incubation and thus extinction of the conditioned response eventually occurs with the repeated presentation of an unreinforced C.S. However, under certain circumstances the extinction process may be weaker than the CS-NR process (described above) and observable incubation will result. The two variables which determine this net effect are the intensity of the UCS during conditioning and the duration of each unreinforced presentation of the conditioned stimulus. The former variable determines the strength and the refore the reinforcement potential of the conditioned response; the latter variable determines whether a non-reinforced conditioned stimulus has a net reinforcement or extinction effect. The strength of the CR, he argues, decreases progressively during exposure to an unreinforced conditioned stimulus and if the CR strength is above the critical point at the time of CS-termination, the CS increases CR strength, i.e. incubation occurs. However, if CR strength is

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is below the critical point at the time of CS termination, the CS produces a decrement in CR strength, i.e. extinction occurs. Furthermore, the net strengthening effect of the CS increases with the degree to which CR strength exceeds the critical level at the time of CS termination, while the net weakening effect of the CS increases with the degree to which CR strength falls below the critical level.

In summary, Eysenck's (1979) model of fear acquisition and avoidance represents the most recent attempt to explain human phobias within a traditional learning theory framework. It includes both the concepts of incubation and preparedness, the former of which has been criticised at both a theoretical and empirical level (Bersh, 1979), while the latter at present seems in danger of being circular (Gray, 1979). However, these concepts are likely to generate a good deal more research which hopefully will increase our understanding of phobias. In the mean time, the debate surrounding conditioning models of phobias is likely to continue (Eysenck, 1979, 1980).

Criticisms of Conditioning Models:

There still exist, however, issues which have not been fully discussed above, and which need to be addressed if a conditioning model of phobias in any form is to be tenable. These issues, which are central to a conditioning model, include the elusiveness of the unconditioned stimulus and the nature of the conditioned response. The Elusiveness of the Unconditioned Stimulus:

Eysenck (1979) has suggested that: 'the rhetoric of conditioning paradigms does not always map easily into the realities of the experimental situation' and Marks (1979) has added : '....and maps hardly at all onto the realities of the clinical situation'. For example, in laboratory studies the UCS is easily defined (e.g. electric shock), however, such clearly defined UCS in real life are distinctly rare (Gourney and O'Connor, 1971; Lautsch, 1971). In the majority of cases there is some sort of insidious onset without any single event that could be called 'traumatic' even by lenient standards (Marks, 1969; Melville, 1977; Rachman, 1968). It is possible though, that people with prepared phobias (Seligman, 1970) may never be able to report a traumatic onset to their fears as such trauma never actually occurred. However, Rachman and Seligman (1976) have reported that phobias with non-prepared or contra-prepared fears also fail to report a traumatic onset, a finding inconsistent with the preparedness theory:

'Prepared fears can be conditioned even with degraded input, that is with non-optimal CS-UCS intervals, singletrial conditioning, and relatively weak UCS; with non-prepared fear this is not so.' (Eysenck, 1979).

Interestingly, Rachman and Seligman (1976) also describe the non-prepared fear of one of their cases as growing in intensity over the course of several years. This might have been what Eysenck has described as incubation, and if so some account of traumatic onset might seem more likely as he argues that incubation occurs 'when the UCS is exceptionally strong'.

In short, it appears that for a variety of fears there is little evidence of a conditoning experience. To suggest that this reflects a UCS of a sub-traumatic nature (i.e. degraded input) would appear to make the UCS more elusive and the hypothesis of a UCS-CS pairing at the onset of phobias less accessable to an empirical test. Moreover it must also be noted that to date there would appear to be no evidence of conditioning in humans without an awareness of the UCS-CS contingency (Brewer, 1974; Dawson, et al 1979). Parenthetically, it must be pointed out that phobics' retrospective reports of traumatic onset of their fears do not provide incontrovertible proof that those

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fears were acquired through classical conditioning.

The Nature of the Conditioned Response:

The most fundamental premise of conditioning models of phobias, is that phobic behaviour (i.e. avoidance and subjective report) is mediated by a conditioned fear response. Such a response is generally presumed (Eysenck, 1979) to be physiological in nature and indeed, it is apparent that phobic stimuli can elicit physiological responses from subjects in the laboratory (Ohman, 1979) and phobics in the clinic (see Sartory and Lader, 1978). Importantly, however, the implication of this premise is that fear is a unitary concept necessarily reflected by physiological responses (Hugdahl, 1981). Such an implication is consistent with some models of emotion (e.g. Fehr and Stern, 1970; Schachter, 1964), although it seems at odds with a 'Three-Systems' conceptualisation of fear (Lang, 1971), which suggests that fear is best construed as a set of loosely coupled components, rather than a unitary concept. The observations (Lang 1971) which prompted this conceptualisation would seem to threaten the notion that a conditioned fear response is necessary for persistent subjectively fearful avoidance or that fearful avoidance is a necessary consequence of a conditioned fear response. This is not to say that this conceptualisation renders a conditioning model untenable, although it is necessary for future models to take account of the observed discordance between various indices of fear; a reformulation of both the aetiology and maintenance of phobias within such a framework may be required. It may also be necessary for conditioning theorists to concede that phobias may be acquired and maintained in other ways (Rachman, 1977).

Summary and Conclusions

An adequate theory of phobias must take account of a number

of defining characteristics, these are : i) The complexity of fearful responses (Lang, 1971); ii) The persistence of these responses despite their seeming self-defeating nature (Mowrer, 1939); iii) The random nature of phobic stimuli; iv) The role of age in determining the onset of phobias, and v) The difference between the sexes in reported fearfulness.

To date conditioning models of fear acquisition and avoidance have focussed upon the acquisition of conditioned fear responses (Watson and Rayner, 1920), the acquisition and persistence of conditioned fear (Mowrer, 1939) and more recently, the persistence of conditioned fear and the non-random nature of phobic stimuli (Eysenck, 1979). The most recent of these models (Eysenck, 1979) attempts to rectify some of the theoretical shortcomings of the previous theories while maintaining the central premise that fear can be a classically conditioned response which has drive properties. It does so by drawing upon two concepts : 'Preparedness' (Seligman, 1970) and 'Incubation' (Eysenck, 1979). The former concept proposes that humans are genetically predisposed to acquire fears more readily to certain stimuli (i.e. those of evolutionary significance), and that once acquired these responses are resistant to extinction. The latter concept proposes that under certain circumstances conditioned responses will not only fail to extinguish but increase in magnitude with repeated exposure to an unreinforced conditioned stimulus. However, neither of these concepts has been received uncritically (e.g. Bersh, 1979 on Incubation; Gray, 1979, on Preparedness), while pertinent research has either been inconclusive (Ohman, 1979) or yet to be done (McAllister and McAllister, 1979).

To date the characteristics of age related onset and sex differences have not been seriously considered within a traditional learning theory framework, but perhaps most importantly the complex nature of fear (Lang, 1971) has been overlooked. Given the observations (Lang, 1971) that simple linear relationships between the indices of fear do not exist, it is now generally accepted (Sartory et al. 1977) that fear is best construed as a construct of loosely coupled and partially independent components. However, a conditioning model assumes that fear is a unitary phenomenon (Hugdahl, 1981) reflected necessarily by a simple relationship between physiological responses and avoidance.

This apparent conflict between these conceptualisations of fear is seen as having different implications for conditioning models of phobias. Some researchers (Hugdahl, 1981) have suggested that it renders conditioning models untenable, while others (Rachman, 1977) have more cautiously suggested that the complexity of fear responses in phobias may reflect several modes of acquisition :

'If the analysis of the three components ¹ are applied to the pathways to fear acquisition we can hazard the speculation that in fears acquired by a conditioning process, the components which will be most markedly involved are the psychophysiological and behavioural, with the subjective component playing a minor role. In the case of fears transmitted indirectly (i.e. vicariously or informationally) one might expect the subjective aspect to be predominant and the psychophysiological changes and behavioural effects to be comparatively minor.' (p 385)

Finally, it seems reasonable to conclude, as Rachman suggests, that a conditioning model in some form may be able to account for the actiology and maintenance of some fears but not others. Therefore, it seems reasonable at present to speculate about other possible explanations of phobias. Some of these are considered in the following chapters.

1 Behavioural, Physiological, Subjective.

CHAPTER 2

THE ROLE OF COGNITIONS IN THE AETIOLOGY AND MAINTENANCE OF PHOBIAS

The problems generated by theories developed within a traditional learning theory framework, have prompted several researchers to consider the possible role of cognitive mediation in the acquisition of fear and avoidance in animals. (i.e. Hilgard and Marquis, 1940; Osgood, 1950; Ritchie, 1951; Seligman and Johnston, 1973.)

Ritchie, for example, was quick to recognise that the observed (e.g. Solomon and Wynne, 1954) high resistance of avoidance responses to extinction would present a problem for the S-R reinforcement theories. As an alternative to these theories he sug ested that the extinction data could readily be explained in terms of Tolmanian S-S expectancies. He proposed that an animal in a traditional one-way shuttlebox avoidance situation expects to be shocked in the goal box, and during the extinction an asymptotically avoiding animal will avoid before his expected shock arrives, so this expectancy willnever be disconfirmed.

More recently, Seligman and Johnston (1973) have proposed a cognitive theory of avoidance learning in animals based upon the ideas of Irwin (1971) and like Ritchie, with clear origins in the work of Tolman (1932).

They suggest that avoidance learning can be explained by resort to two concepts : one cognitive, the other emotional. The emotional component, they propose, is based upon a classically conditioned fear response which may be considered to be either peripheral or central in nature. However, unlike the two-stage theory (Mowrer, 1939) this response, or more specifically its reduction, is not required to reinforce and maintain avoidance. Maintenance of avoidance is a function of the cognitive component. This component makes use of pairs of act-outcome expectancies and a corresponding preference between outcomes:

'In our theory, an expectancy is a hypothetical construct:

a state of the organism which represents (stores information about) contingencies between responses and outcomes in a given situation. The general form of this three-term expectancy is S : rEO, which is read: it is expected that in given situation (s) a given response (r) leads to an outcome (o). A preference is also a hypothetical construct: a state of the organism which controls the choice of response on the basis of outcomes expected. The general form of the preference is $0_1 PO_2$ which is read: one outcome (0_1) is preferred to another outcome (0_2).'(Seligman and Johnston, 1973)

With resort to these two clearly defined components, Seligman and Johnston account for avoidance learning in animals in the following way: when a conditioned stimulus is paired with shock, a fear response is classically conditioned; this is the emotional component. With subsequent presentations of the unreinforced CS this response, in accord with Pavlovian laws, will extinguish. However, the animals continued avoidance will be maintained by the expectation that shock follows the CS and a preference for not experiencing shock; this is the cognitive component. As the animal learns to avoid shock, the contingency of CS - no shock (if the shock is omitted) is never sampled and therefore the expectancy generated by the initial CS-UCS pairings is never disconfirmed.

These researchers discuss in some depth the data their theory explains, some it fails to account for, and its implications. However, these arguments are not relevant to this discussion. What is of relevance is the possibility that concepts such as preferences and outcome expectancies might prove useful in explaining the aetiology and maintenance of fearful avoidance in humans.

A Cognitive Model of Phobias:

Seligman and Johnston's theory proposes that the classical

conditioning procedure generates an expectancy. Specifically, the organism expects the UCS to follow the CS if no response is made. They do state, however :

'We are not offering a new analysis of the classical conditioning process. In particular, we are not asserting that it is mediated by expectations of any kind.' (p 96)

In this statement of neutrality these authors leave open for debate two basic possibilities. a) Classical conditioning is an automatic unconscious process, with awareness of the CS-UCS contingency being an epiphenomenon, or b) awareness of the contingency may play a necessary causal role in conditioning.

It is interesting to note that Seligman and Johnston did not turn their attention to these possibilities, for they have certain implications for their theory. Assuming the truth of the first possibility, the implication appears to be that the physiological component of fear (CR) and avoidance are the product of independent mechanisms: the first some automatic reflex, the second an expectancy. The first then, can extinguish in accord with Pavlovian laws while the second can persist. However, if it is assumed that awareness of the CS-WCS contingency is a necessary prerequisite for conditioning to occur, then the implication is that both the physiological and behavioural components of fear are a function of the same hypothetical construct, namely, the expectation that the UCS follows the CS. If this is the case, the question arises : Why does avoidance persist and fear (the physiological component) extinguish ? If the expectancy of shock persists, as Seligman and Johnston suggest it does in avoidance learning, then it follows that both avoidance and physiological responses should persist.

For their explanation of the persistence of fearless avoidance in animals to be tenable, the first of the two possibilities must hold.

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However, the persistence of fearful avoidance in humans (phobias) would be more adequately explained by the second possibility. Specifically, we might speculate that some human phobias have their origins in the experience of CS-QCS pairings which generate the expectancy that UCS will follow CS. Given that the individual has a preference for not experiencing the UCS, this expectancy will mediate between the CS and the fear response. Such fearful avoidance would persist as long as the individual entertains such expectancies and preferences.

Several predictions follow from this 'cognitive conditioning model'. Firstly, the central tenet of this suggestion is that an awareness of the CS-uCS contingency (i.e. an expectation that the UCS will follow the CS), is necessary for establishing and maintaining conditioned fear responses. Given this assumption we would expect that phobics would be able to describe a conditioning experience as the onset of their fears, and also the expectation which maintains their fear response to the phobic stimulus.

With regard to the central assumption stated above, there appears to be some controversy in the literature about the role of awareness of the CS-UCS contingency in acquiring conditioned responses. In 1975 Martin and Levey suggested :

'On the whole, current opinion is that verbalised awareness of stimulus relationships is not necessary for conditioning to occur, even though a strong causal relationship has been established between cognitive variables and the rate of classical conditioning and extinction.' (p 284).

In the same year Brewer (1974) argued that awareness of stimulus contingencies is an important and perhaps essential aspect in establishing human conditioned responses. In his review of the literature he suggested that there was no convincing evidence for conditioning without awareness. This argument has more recently been supported by

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several other researchers. (Grings, 1979; Dawson, Catania, Schell and Grings, 1979; Dawson and Furedy, 1976; Ohman, 1979.) For example, Dawson et al interpreted their recent findings thus :

'The present results, when considered in combination with the previous results, clearly implicate the importance of cognitive factors in the establishment of human autonomic classical conditioning. It appears essential therefore, to better understand the specific sequence of cognitive processes which occur during classical conditioning.'

However, whether or not conditioned responses can be acquired to phobic stimuli without awareness¹ is a question which must still be answered empirically. It would be interesting to examine this question using the experimental paradigm described by Dawson et al, (which was designed to test for a 'pure' non-cognitive level of learning), and potentially phobic CS (i.e. snakes, spiders). The findings of Dawson et al's study and the logic of the cognitive model discussed above, would suggest that responses to the phobic CS would only be acquired if subjects could verbalise an awareness of the CS-WCS contingency.

If, for the moment, it is assumed that awareness of the CS-UCS contingency is necessary for the acquisition of conditioned fear responses, then what of the other predictions detailed above ? Firstly, the prediction that phobics would be able to describe a conditioning experience as the onset of their fear. Marks (1969) has suggested that most phobias are characterised by an insidious onset with no evidence of a UCS. However, both Rimm et al (1977) and Murrey and Foote (1979) have reported that some of the fearful students they questioned ascribed their fears to conditioning experiences. More recently, Ost and Hugdahl (1981) reported that

1 This is one of the predictions of Seligman's (1971) preparedness concept.

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over 50% of their patient sample described conditioning experiences to which they attributed their fears. It must be noted that these observations do not prove that conditioning experiences caused the fears of these subjects, although they are consistent with such an interpretation.

The second prediction, namely that phobics would be able to describe the expectations which maintain their fear, receives some support from Beck (1976). Based mostly upon his clinical observations, he has argued that :

'....when patients... with phobias are questioned carefully, it becomes apparent that they....are afraid not of a particular situation or object in itself, but of the consequences of their being in the situation or in contact with the object. A person with a phobia of heights indicates that he is afraid of falling, a person with a phobia of social situations states that he is afraid he will be humiliated or rejected.' (p 167)

Beck also suggests that in many of these instances, the onset of the patients' fear and expectations, involved some sort of trauma being associated with the phobic stimulus. Such observations are consistent with the notion that fears are maintained by expectations of harm which were possibly generated by a conditioning experience (i.e. phobic stimulus plus trauma). However, an alternative interpretation is possible. Specifically, it could be argued that these patients' 'expectations' are post hoc rationalisations of their fears.

It would seem then, that no convincing evidence exists to suggest that some phobias are a function of expectations of harm which result from a conditioning experience. Therefore at present such a notion must remain a plausible possibility.

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Phobias and the Transmission of Information:

The failure of traditional conditioning models (see Chapter I) to adequately account for all phobias, has also prompted Rachman (1976) to suggest that researchers acknowledge two possible alternative 'pathways' to fear.

Acquisition through instruction:

The first alternative proposes that fears can be transmitted and acquired via information giving and/or instruction. This possibility, Rachman suggests, has been 'strangely overlooked - despite the fact that it is obvious, or perhaps because it is too obvious' (p 193). Information giving he argues, is an inherent part of child-rearing, carried on by parents and peers in an almost unceasing fashion, probably providing the basis for many of the commonly encountered fears of everyday life.

One advantage of such a theory is that it is flexible enough to account for the fact that people display fears of situations and objects which they have never encountered. Furthermore, it enables us to explain some, but by no means all, of the failures to acquire fear in situations where it might, according to conditioning theory, (Eysenck, 1979) have been expected to arise. Not only might individuals learn by information and instruction which stimuli to fear, but also learn to distinguish those stimuli which are not to be feared. Such a process may account for the observation of the non-random nature of phobic stimuli. It also seems reasonable to suggest that such a means of fear acquisition is of particular value for survival. For example, there is little opportunity for learning directly that snakes or venomous toads are dangerous, indeed if we did have to rely upon direct experience it might be our last.

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When considering the evidence to support this theory Rachman (1978a) suggests :

'Persuasive evidence, if persuasion is needed, should not be difficult to collect. In theory it is a simple matter of demonstrating that people who begin with no fear of object X display signs of such a fear shortly after being informed that X is dangerous. The following two examples are chosen from a host of possibilities in the hope that they are both clear and convincing. In the first of our hypothetical experiments, a group of trainee laboratory workers are introduced to specimens, and animals in a pathology laboratory. After confirming the absence of significant fear, half of the trainees are informed (correctly) that direct contact with specific contaminated animals and specimens is dangerous and may cause them to acquire lethal diseases. At least a degree of fear will be transmitted in this way.' (p 194).

Such work would clearly prove illuminating, however, several studies already exist which lend support to the notion that phobias may be acquired through the transmission of information. These studies fall into two categories: those which asked subjects to describe the onset of their fears - retrospective studies - and those which illustrate the physiological effect of instructions which create an expectancy of aversive stimulation - instructed conditioning studies . Retrospective Studies:

In their study, Murray and Foote (1979) analysed the responses of sixty snake phobic (snake avoiders) undergraduates to a twenty-item (7 point scale) questionnaire which consisted of two parts. The first ten questions dealt with the components of fear of snakes, while the second part concerned the origin of this fear. They interpreted their

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data to suggest that direct conditioning did not seem to account for the majority of snake fears. Instead, the results seemed to suggest that different observational or instructional experiences were responsible for the acquisition of their fears.

The second part of this study shed some light upon the nature of these experiences. These researchers administered the same questionnaire to a second sample of one hundred and seventeen undergraduates, thirty-five of whom were classified ¹ as high-fear subjects and eighty-two as low-fear subjects in relation to snakes. In this sample of subjects they found little evidence of personal experience with snakes. Indeed the correlational analysis (r = -.25)suggests that the more experience people have with snakes the less they fear them. However, those subjects who described their experience as frightening tended, not surprisingly perhaps, to be generally more fearful of snakes (r = .33). Of greater interest is the nature of these frightening experiences; most of them were described as startling, while none involved being touched or harmed by a snake. Indeed, only three of the total sample reported having been bitten by a snake and all of them were in the low-fear group. Again Murray and Foote interpreted this data as offering little support for the notion that snake fears were acquired by direct conditioning experiences. Instead the responses of these subjects suggest (consistent with those of the first sample), that fear of snakes may be acquired through a variety of observational and instructional experiences which communicate negative information about snakes. For example, they found positive correlations between a general fear of snakes ² and items on their questionnaire such as :

1 This classification was determined on the basis of their scores on a 'snake fear questionnaire'.

2 Determined by the snake questionnaire.

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'snake stories' (r = .34), and parental warnings about snakes and similar negative information from films, television, books and newspapers (r = .32).

Rimm et al (1977) similarly asked snake phobic students about possible learning experiences. Their results also suggest that snake fears may be acquired through instruction/information, although in contrast to Murray and Foote's finding, the percentage of their sample reporting such an onset as small. Among forty-five subjects interviewed, sixteen attributed their fear to direct experience, thirteen could recall no experience, nine reported no specific experiences, three reported vicarious experiences and four reported verbal instructions. Interestingly then, almost half of the sample (twenty-two) were unable to account for their fears in terms of learning experiences, while twenty-three subjects were able to do so. Among this latter group, conditioning experiences. Unfortunately, these researchers gave no details of these experiences.

More recently, Ost and Hugdahl (1981) asked a sample of phobic patients about the onset of their fears. They too found that a number of this sample, albeit a small minority (10.4%) reported that they acquired their fears through instruction or verbal information.

In conclusion, these findings are consistent with Rachman's (1976) suggestion that some fears may be acquired via information giving and instruction. However, we should be cautious about over-emphasizing the value of such retrospective reports. It is possible that these researchers have been tapping post hoc rationalisations of fearfulness.

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Instructed Conditioning Studies:

The hypothesis (Rachman, 1976) that phobias may be acquired via instructions, also receives some indirect support from research demonstrating the physiological effects of instructions which create an expectation of aversive stimulation.

The experimental paradigm usually employed in these studies, involves attaching recording electrodes and a 'shock' electrode to the subject and telling him that every time the light comes on he will be shocked. Using such an 'informed pairing design', researchers have shown that instruction alone is sufficient in producing a conditioned physiological response to a neutral stimulus (e.g. Deane, 1969; Epstein and Clarke, 1970) and that such responses (GSR) are similar to those acquired by subjects who had actually received electric shock as the UCS (Bridger and Mandel, 1964). Furthermore, these studies (e.g. Epstein and Clarke, 1970) have shown that subjects' conditioned responses are a function of the intensity of the aversive stimulus which they expected to follow the CS.

It seems reasonable to speculate then, that the fearful responses observed in human phobics could have been acquired in a similar way. Specifically, through instruction which creates an expectation that aversive stimulation will follow phobic stimulus.

However, Bridger and Mandel's (1964) findings suggest that this experimental procedure does not provide a useful analogy for the maintenance of phobias. In their study a conditioned GSR was acquired by groups of subjects via instruction or direct conditioning (i.e. CS+ threat of shock versus CS + shock). In the second phase of the study the conditioned stimulus was presented after the shock electrode had been removed. During this extinction phase these researchers observed a gradual extinction of response in those

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subjects who had received shock, whereas subjects under threat of shock showed almost immediate extinction. A second study by Bridger and Mandel (1965) confirmed these findings even when suspicious subjects in the shock group, who thought that they might still receive shocks via the GSR electrodes were removed from the analysis. Several other researchers have reported similar findings (e.g. Chatterjee and Erikson, 1962; Notterman, Schoenfeld and Bersh, 1952; Wilson, 1968). Such findings are at odds with the common clinical observation that phobias are usually insensitive to rational arguments about the reality of exposure to phobic stimuli. Telling phobics that exposure will not lead to harm, i.e. 'informed unpairing', does not lead to the extinction of phobic responses (e.g. Leitenberg, 1976; Marks, 1969). However, a more recent study by Hugdahl (1978) suggests that instructions can create a physiological response resistant to an informed unpairing extinction procedure; the crucial elecent appears to be the nature of the conditioned stimulus. In his study neutral and potentially phobic CS (i.e. spiders and snakes) were presented to subjects and paired with either threat of shock, or a shock UCS. Subsequently, subjects were informed that presentations of the CS would not be followed by shock (i.e. extinction phase). The results show that the instructions had a differential effect upon the extinction of conditioned skin conductance responses. Specifically, responses to the potentially phobic CS showed greater resistance to extinction than those elicited by the neutral CS, regardless of how the response was established.

We might tentatively conclude from Hugdahl's findings, that the transmission of information through instruction which creates an expectation of harm following exposure to a potentially phobic stimulus, may result in phobic behaviour. However, it must be noted that the criticisms levelled at Ohman's studies (see Chapter 1) also apply to

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Hugdahl's work. Specifically, Hugdahl suggests that the observed differential extinction rates, reflect the potentially phobic nature of one class of CS (i.e. snakes and spiders). However, while it is apparent that these stimuli (snakes and spiders versus circles and triangles) do differ in terms of their potential as phobic stimuli, they also differ in other respects. Respects which may have influenced subjects' prior learning histories and which may also account for Hugdahl's findings (Bandura, 1977; Delprato, 1980). For instance, Bandura (1977) points out :

'In every day life, houses and faces are repeatedly correlated with neutral and positive experiences as well as with negative ones, whereas references to snakes are almost uniformly negative.' (p 76).

Similarly, circles and triangles are likely to have been correlated with neutral experiences for Hugdahl's subjects, whereas as Bandura suggests, snakes and probably spiders may have acquired more negative connotations. Such prior experience may have influenced the observed extinction rates in Hugdahl's study. Parenthetically, it must be stressed that the suggestion is not that phobias are culturally or socially determined, rather than biologically prepared, but simply that prior experience of these stimuli may have influenced the observed rates of extinction. A further point is that the degree of prior exposure to these stimuli is likely to have been different for these subjects and again, a possible influential factor in the extinction of conditioned responses. Finally, it is apparent that these stimuli also differed in an obvious, but perhaps important respect: circles and triangles are inanimate shapes; spiders and snakes are living creatures.

The recent findings of McNally (1981) also suggest caution in

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interpreting Hugdahl's results. In his study, McNally presented subjects with two fear-relevant stimuli; a picture of a snake and a picture of a spider. The first phase of the experiment involved pairing one of these stimuli with a shock UCS for each subject. They were told that only one stimulus would be reinforced. Following a series of twelve discrimination learning trials, subjects were informed that the CS-UCS contingency would be reversed: specifically, that shock would no longer follow the previously reinforced stimulus but might follow the previously unreinforced stimulus. Actually no further shocks were delivered. This instructional manipulation produced an immediate reversal of the conditioned electrodermal response curve. In short, subjects began to respond to the stimulus which they expected might be followed by shock, while responses to the previously reinforced stimulus extinguished.

McNally suggests that these findings are inconsistent with those reported by Hugdahl and inconsistent with the hypothesis that responses conditioned to fear-relevant stimuli are insensitive to cognitive manipulations.

The implication of the findings appears to be that physiological responses acquired in laboratory conditions are not similar to those persistent responses which characterise phobias. Under certain circumstances (i.e. the reversal procedure used by McNally) conditioned responses to potentially phobic stimuli do extinguish following cognitive manipulations, while phobic behaviour appears to be insensitive to such simple instructions.

In conclusion, it seems apparent that although a theory of fear acquisition based upon instruction is intuitively appealing, there is no direct evidence to support it. The studies discussed above suggest beyond little doubt that physiological responses can be acquired through instruction. However, the inconsistent findings (i.e. Hugdahl,

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1978; McNally, 1981) related to the rate of extinction of these responses, casts some doubt upon the notion that they are comparable to those experienced by phobics. Continued research . within the instructed conditioning paradigm will prove interesting and hopefully shed some light upon the apparent contradictions between the findings of McNally and Hugdahl. Similarly, research along the lines suggested by Rachman (ibid) would prove illuminating, although for ethical reasons will most probably not be conducted. The Vicarious Transmission of Fear:

The other 'pathway' to fear which Rachman (1978a) suggests researchers should acknowledge, is the vicarious transmission of fear.

'The significant advances made in our understanding of processes of observational learning and modelling made it plain that we acquire much of our behaviour, including emotional responses, by vicarious experiences. It is probable that fears can be acquired either directly or vicariously....' (p 189)

More specifically he proposes that individuals may acquire fears and phobias of once neutral stimuli through the observation of the threatening, painful or fear-provoking effect of these stimuli on others. However, at present, the evidence to support such an intuitively appealing notion is indirect and anecdotal. It comes from retrospective studies, clinical observations, and experiments investigating the phenomenon of vicarious classical conditioning.

Retrospective Studies:

The evidence which suggests that phobias may be acquired through observation is sparse. However, some retrospective studies (Murray and Foote, 1979; Ost and Hugdahl, 1981; Rimm et al. 1977) have been conducted which offer some support for this notion.

In their study, Murray and Foote questioned subjects about

the origins of their fear of snakes. They found that a group of snake phobics reported significantly more observations of another person being frightened or harmed by a snake, than a group of low fear subjects. Furthermore, their analyses show a significant positive correlation (r = .26) between the degree of snake fear reported and the number of such observational experiences. Rimm et al also questioned snake-fearful subjects about the onset of their fears. They found that a small number of their sample (three out of forty-five) attributed their fears to an observation of someone being harmed by a snake. In a more recent study, Ost and Hugdahl (1981) reported that 17%of a sample of one hundred and six phobic patients, recalled vicarious experiences as initiating their fears.

These findings then, are consistent with the notion (Rachman, ibid) that phobias can be acquired vicariously. However, it must be noted that alternative interpretations of these data are possible. For example, it is possible that some phobics, in the absence of a ready explanation, attribute their fears post hoc to particular vicarious experiences.

Clinical Observations:

Some anecdotal evidence reported by clinicians is also consistent with the notion of phobias being acquired vicariously. For example, Wolpe (1981) recently reported:

'People may fear worms, flying insects, doctors or hospitals because they have observed a parent consistently show fear to these things. A family I encountered had three adolescent daughters with widespread fears of insects from watching their mother go into a panic every time she saw one.' (p 37) While such reports are interesting and probably similar to the observations made by many clinicians, the support they offer for a theory of fear acquisition through observation should not be over-emphasized.

Vicarious Classical Conditioning:

In laboratory investigations of vicarious classical conditioning (e.g. Berger, 1962; Bandura and Rosenthal, 1966), a subject typically observes a model undergoing an 'aversive' conditioning procedure. Specifically, the model is presented with a neutral stimulus and shortly afterwards displays pain cues, supposedly in response to unconditioned aversive stimulation, while the subject watches. The main thrust of the research findings is that the conditioned stimulus alone comes to elicit a conditioned physiological response from the observer, even though he has not experienced aversive stimulation directly.

Such findings seem to be consistent with the notion that the physiological concomita_nts of fear may be acquired vicariously. However, further research is needed to determine whether physiological responses acquired in this fashion are resistant to extinction, and therefore, similar to those observed in phobics. Furthermore, research is needed to determine whether subjective and behavioural fear responses can be acquired vicariously and similarly, whether they show resistance to extinction.

Another issue, which need only be mentioned briefly here, concerns the mechanisms by which responses are acquired vicariously. The implication of Rachman's (1978a) suggestion is that the vicarious transmission and acquisition of fear involves the transmission of information about the phobic stimulus. So for example, we might speculate that the observation of seeing someone appear frightened when being bitten by a dog, conveys to the observer the information

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that being bitten by a dog is a frightening experience. If such an expectation is entertained by the observer it may generate fear upon subsequent exposure to dogs. However, it could be argued that the acquisition of conditioned physiological responses through observation can be explained in terms of conditioning independent of cognitive mediation. Indeed, this seems to be the suggestion in Bandura's (1965) discussion of vicarious classical conditioning.

In short, there is a need to determine the degree of similarity between responses acquired vicariously in the laboratory and those observed in phobics. Furthermore, there is a need to explore ¹ the mechanisms by which these responses are acquired.

Attribution of Physiological Arousal and the Aetiology of Phobias

Another suggestion which implicates the role of cognitive mediation in the acquisition of phobias, has been offered by Asso and Beech (1975). They suggest that phobias may be acquired through a process of attribution when the individual is already in an adverse state :

'When individuals experience spontaneous surges of physiological arousal, which are not prompted by environmental events, they may attribute the experienced disturbance to some cue external to themselves.'

Unfortunately, the study reported by these researchers does not test the hypothesis that phobias may be acquired in such a way, although the notion, which has clear origins in the work of Schachter and his colleagues (e.g. Schachter and Singer, 1962; Schachter, 1966) deserves some attention.

1 Bandura's (1977) model of observational learning may provide a useful conceptual framework for such research.

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Summary and Conclusions:

The apparent failure (Rachman, 1976) of theories developed within a traditional learning theory framework (see Chapter 1), to adequately account for the acquisition and maintenance of all fears, has prompted several researchers to offer alternative explanations (e.g. Rachman, 1978a). Those described in the present chapter share a common theme; specifically, they implicate the role of cognitions in both the aetiology and maintenance of fears, although they offer different explanations for how these cognitions are generated.

The proposal which evolved from Seligman and Johnston's (1973) ideas was that some phobias may be maintained by an expectation that harm will accrue from exposure to the phobic stimulus. It was argued that this fear-generating expectation may result from a direct conditioning experience, i.e. phobic stimulus plus trauma. In contrast, Rachman (1978) has suggested that fears may be transmitted and acquired indirectly through instruction and observation, although similarly these proposals implicate the role of expectations in maintaining fears acquired in this fashion. Lastly, the suggestion (Asso and Beech, 1975) that phobias may be acquired through a process of attributing physiological arousal to phobic stimuli, also necessarily implies the involvement of cognitive processes.

A discussion of relevant research findings and clinical observations, suggests that there is no convincing evidence to support these proposals, although the evidence to date is consistent with these ideas. Therefore, it must be concluded that at the present time, these proposals must remain plausible possibilities.

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CHAPTER 3

COGNITIONS AND THE MAINTENANCE OF PHOBIC BEHAVICUR:

The conditioning models of fear acquisition and maintenance discussed in the first chapter, may be seen to reflect a long philosophical tradition which has discounted the possible role of cognitions in emotional behaviour (Averill, 1974).

Averill (1974) suggests that this influential philosophy has its origins in the ideas of the Greek philosopher Anaxagoras. In his discussions of the concepts of mind and body, Anaxagoras conceived of the mind largely as an agent of rationality ¹ and described it as without passion. Emotional reactions on the other hand, were seen as unpremeditated, intuitive and impulsive. They were then, regarded as antithetical to rational behaviour and therefore pertaining to the physical (body) aspect of the human organism and consequently non-cognitive.

This particular theme is seen to 'trail through the centuries' (Brett, 1962) incorporated in the philosophies of Plato, Aristotle and Descartes. (See Averill, 1974, for a discussion of these philosophies.)

More recently, this conceptualisation of emotions has been apparent in the writings of Fehr and Stern (1970), James (1890), Lange (1885), and Wenger (1950). They have also argued that

1 'Rationality being the weighing of evidence by appeals to general principles and according to standards of inference: standards which may be explicit, e.g. rules of logic, or which may be largely implicit and unformulated but nonetheless recognisable.' (Averill, 1974) emotional reactions are primarily physical (in terms of ANS activity), with the subjective experience of these reactions being purely tangential. Similarly, the most prominent theories of phobias (Eysenck, 1979) stress the central role of ANS activity in mediating phobic responses and place no reliance upon cognitions.

However, several writers have suggested that phobias are cognitively mediated (e.g. Beck, 1976; Ellis, 1977; Meichenbaum, 1977; Rachman, 1978). Those proposals which implicate the role of cognitions in both the acquisition and maintenance of phobias were discussed in the previous chapter (i.e. Rachman, 1978; Seligman and Johnston, 1973). In this chapter the views of Ellis, Beck and Meichenbaum will be considered. These writers have emphasized the role of cognitions in maintaining phobias and have offered suggestions about the nature of these mediating cognitions.

Interestingly, the theories proposed by these writers rest upon a premise which can also be traced back to an early philosopher:

'Men are disturbed not by things, but by the views

they take of them.' (Epictetus, quoted by Meichenbaum,

1977, p 183)

Such a conceptualisation is also reflected albeit in a more sophisticated way, in more recent discussions of the psychology of emotions (e.g. Arnold, 1960; Lazarus, 1968).

Ellis' Rational Emotive Therapy:

Ellis (1977) has recently enumerated seventeen imprecisely stated hypotheses generated by his rational emotive therapy. However, the major premise of this theory of emotional disturbance, which has been central to Ellis's ideas for over twenty years (Ellis, 1958; 1962), is that thinking mediates emotional states :

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'In terms of the RET of emotion and personality, A (an activating event or activating experience) does not exclusively cause C (an emotional consequence) in the gut. B (people's beliefs about A) more importantly and more directly contribute to (or 'cause') C'. (Ellis, 1977, p 3).

More specifically, illis (1977) asserts that irrational or malalaptive beliefs or thoughts, produce the negative affect charapteristic of neuroses such as phobias. Conversely, rational thoughts are seen to result in positive emotional states. By irrational beliefs, illis (1977) means those thoughts which are either empirically false, or of such a nature that they cannot be empirically verified. Parenthetically, it is interesting to note that illis (1977) believes that humans have a biological predisposition toward irrationality. He also suggests that individuals, given this predisposition, may acquire patterns of irrational self-verbalisations and beliefs, by imitating the overt verbal behaviours of significant others. Such an idea is not too dissimilar from Rachman's (1978) notion that fears can be acquired through instruction.

In terms of phobic behaviour, Ellis (1962) stresses the critical mediational role of catastrophizing: simply stated, one says to oneself that something terrible is going to happen and then experiences fear and avoidance. The following example more clearly illustrates Ellis' position. Consider the dog phobic who sees a dog in the street. This is a simple observation of an environmental stimulus which may be accompanied by the self-verbalisation: 'There is a dog in my path.' The second self-verbalisation may be an inferential statement with regard to this observation: 'That dog is likely to bite me.' The third thought would be an evaluative conclusion: 'That would be horrible.'

In Ellis's scheme of things irrational thinking (where thinking is equated with self-verbalisations), is seen in the inference (dogs

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do not usually bite people) and in the conclusion (being bitten by a dog, while somewhat painful, is not horrible). He also assumes that fear originates not with the observation, but with the inference and the catastrophic evaluative conclusion.

Empirical Support for Ellis' RET of phobias:

Ellis' ideas have received a good deal of attention from a number of researchers (Ellis, 1977). Some of this research has focused upon the basic assumption that emotions are mediated by self-verbalisations, while other researchers have examined the relationship between specific cognitions and particular affective states. The research relevant to a cognitive mediational model of phobias is discussed below. Consistent with these lines of enquiry, it is presented under the following headings: correlational studies; studies examining the physiological correlates of selfverbalisations; and studies examining the effects of self-verbalisations on mood.

Correlational Studies:

A sories of studies conducted by David Rimm and his colleagues (Rimm, 1973; Rimm, Saunders and Westel, 1975) appear to offer some support for the notion that phobias are cognitively mediated. They found that when it was suggested to subjects that they are engaging in fear-provoking thoughts in the phobic situation, most, with some prompting, were able to provide reports of self-verbalisations having a content which would be expected to evoke fear. However, such evidence by no means constitutes incontrovertible proof that self-verbalisations mediate phobic behaviour. Indeed, the fact that subjects reported self-verbalisations may reflect nothing more than the obvious demand characteristics of these studies.

In a more recent study Rimm, Janda, Lancaster, Nahl and Dittmar (1977) attempted to minimise such effects. They asked subjects to imagine themselves approaching and confronting the phobic situation. While subjects were engaged in this activity they were simply asked whether they were experiencing any thoughts or images and if so, to relate the content. Their analysis of these data revealed that significantly more subjects reported self-verbalisations than did not. These self-verbalisations were categorised as follows : 'objective description', 'catastrophizing', 'thoughts of avoidance', 'labelling of emotion', and 'not classified'. Subsequent analyses revealed that the content of those self-verbalisations reported while 'imagining approach' did not distinguish between subjects. However, those reported while subjects were imagining being in the phobic situation did. Specifically, all but three of the reports fell into three of the categories : 'catastrophizing' (19); 'thoughts of avoidance' (25); and 'labelling of emotion' (14). A definitive interpretations of these data are difficult, although Rimm et al suggest :

'The most obvious conclusion is that phobic subjects imagining themselves in phobic situations typically do not engage in self-verbalisations which are of a veridical or objective nature.'

In terms of Ellis' Rational Emotive Theory, it is interesting to note that while 'catastrophizing' (e.g. 'I am going to fall') was not infrequent, such thoughts clearly did not predominate. A comparable number of subjects reported self-verbalisations which do not readily fit into Ellis' simple mediational model. Parenthetically, it is interesting that Rimm et al. do not regard emotional-labelling self-verbalisations (e.g. 'I am afraid') as being of a veridical nature.

One final point of interest to emerge from Rimm et al's study concerns the nature of the relationship between self-verbalisations and fear. These researchers asked their subjects whether, in real

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life, the thought or fear came first when they were exposed to the phobic stimulus. Twenty-three of the subjects reported worrying first, eighteen reported feeling fear first and four reported that affect and cognitions occurred concurrently. Evidence then that cognitions invariably, or even usually, precede negative affect in fearful subjects was not found.

A more recent study by Lohr and Rea (1981) also failed to find any clear-cut relationship between fear of speaking in public and irrational beliefs. They did find a statistically significant correlation (r = .23) between 'demand for approval' and fear of public speaking, although as they point out the percentage of the variance accounted for is minimal. It must also be noted that this 'belief' failed to distinguish between high and low fear public speakers.

In conclusion, it is apparent that these research findings do not consistently support the contention that particular selfverbalisations are related to phobias. Furthermore, when catastrophizing self-verbalizations have been related to fear, the nature of that relationship has not been clear (Rimm et al. ibid) There is certainly no convincing evidence for Ellis' (1962) suggestion that such thoughts cause fear.

Studies Examining the Physiological Correlates of Self-Verbalisations:

Ellis' basic assumption that self-verbalisations can elicit emotional responses has been more directly examined in several studies (Craighead, Kimball and Rehak, 1979; Rimm and Litvak, 1969; Rogers and Craighead, 1977; Russell and Brandsma, 1974). The general strategy typically involves asking subjects (usually from non-clinical populations) to engage in negative or irrational self-verbalisations. At the same time physiological responses to these self-verbalisations are monitored and recorded. Subsequently, these responses are compared

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to those elicited by neutral self-verbalisations, positive self-verbalisations or both.

Of these studies, two offer some support for the notion that negative self-verbalisations elicit a greater emotional response than neutral self-verbalisations (i.e. Rimm and Litvak, 1969; Russell and Brandsma, 1974).

In their study, Rimm and Litvak presented experimental group subjects with negative sentence triads of the form: observation (e.g. 'My grades may not be good enough this semester'), Inference ('I might fail out of school') and Conclusion ('That would be awful'). A control group similarly received sentence triads but of a neutral nature, e.g. 'Inventors are imaginative.... Edison was an inventor..... therefore he was imaginative.' a comparison of subjects' physiological responses to these sentence triads, revealed a significantly greater respiration rate and depth for the experimental group, although GSR failed to distinguish between the groups. Of more interest however, is the failure to find differential responses to the sentence type for experimental group subjects. This finding is contrary to Ellis' prediction that emotional arousal is a function of inferential and conclusive self-verbalisations.

More recently, the findings of Craighead, Kimball and Rehak (1978) failed to support the pivotal assumption of RET, namely, that negative self-verbalisations elicit emotional arousal. In the first of three experiments these researchers instructed two groups of subjects to visualise scenes of social rejection. One of these groups contained students who had scored extremely high on the social approval scale of the irrational beliefs test (Jones, 1968), while the other group consisted of low scorers. While imagining their scenes the highirrational subjects emitted significantly more negative self-referent statements than their low-irrational counterparts. However, contrary

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to predictions from the RET model, no differences were obtained in terms of positive self-statements, self-report of emotional arousal, or physiclogical arousal.

The findings reported by Rogers and Craighead also challenge the notion that a simple causal relationship exists between negative self-verbalisations and emotional reactions. In this study, subjects cognitively rehearsed self-referent statements while physiological responses were monitored. The self-statements had been chosen to reflect identified problems and were either positively or negatively valenced. In addition, the self-statements varied in the extent of their discrepancy from the subjects' personal beliefs about themselves. The important finding from this investigation was that there were no differences between either positively or negatively valenced self-statements and neutral self-statements on any physiological response (heart rate, finger pulse volume, skin conductance). The only significant finding was an interaction between valence and discrepancy of self-statements, which was reflected in the measure of skin conductance. Specifically, negative self-statements of moderate discrepancy generated greater arousal than moderately discrepant but positive self-statements. Rogers and Craighead concluded that the relationship between cognitions and emotional arousal is more complex than that proposed by Ellis. They also extended this conclusion to their critical review of the literature.

'.... due to the inconsistent and unreplicated findings among these studies, the simple generalisation that experimentally induced self-verbalisations have definite emotion-arousing effects has not been empirically demonstrated.'

In terms of phobias then, it would seem that there is no direct or indirect evidence to support the notion that the supposed selfstatements entertained by phobics (Ellis, 1977) elicit physiological responses indicative of fear.

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Studies Examining the Effects of Self-Verbalisations on Mood:

A number of studies have also used the basic experimental design described above, to evaluate the effect of self-verbalisations on mood state (e.g. Craighead, Kimball and Rehak, 1979; Velton, 1968). For example, Velton, who originally developed this experimental procedure (Velton, 1968) had subjects read self-referent statements that varied in content, reflecting either elation, depression or neutrality. He found that such a procedure had a significant effect upon measures of reaction time and writing speed which, he presumed, reflected mood state. Indeed, a post-experimental questionnaire supported such an interpretation, suggesting that the depression and elation treatments had respectively induced depression and elation. More recent findings (see Rimm and Master, 1979, for a review) also seem to be consistent with the notion that self-verbalisations can produce a depressed mood. However, Craighead et al were unable to show differences in reported moods between high- and low-irrational subjects following visualisation of social rejection scenes, although the former group emitted significantly more negative self-referent statements.

The reason for such apparent inconsistencies in the literature is not altogether clear, although the bulk of the evidence does suggest that negative self-verbalisations may induce a depressed mood. However, to date there is no evidence to suggest that selfverbalisations produce subjective anxiety or fear.

In conclusion, Ellis' (1962) notion that phobic behaviour is mediated by catastrophizing self-verbalisations has not been supported by research findings. It is apparent (Rimm et al. ibid) that such self-verbalisations are not invariably or even usually entertained by phobics and when they are there is no evidence to suggest that they may cause subjective or physiological responses indicative of fear.

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Beck's Theory of phobias:

Beck (1976) has suggested that a good deal of theorising about phobias has been misguided by a common assumption which is illustrated in a statement by Friedman (1959) :

'A phobia is a fear which becomes attached to objects or situations which objectively are not a source of danger, or, more precisely are known by the individual not to be a source of danger.' (p 293).

Beck (1976) does agree that when the phobic is away from the phobic stimulus he believes it to be relatively harmless (see chapter 1, page 1). However, he argues that as the phobic approaches the phobic stimulus, the idea of its dangerousness becomes progressively greater until it completely dominates his appraisal of that stimulus:

'His belief switches from the concept 'it is harmless' to the concept, 'it is dangerous' '(Beck, 1976, p 164.)

To support this suggestion that phobics have a 'dual belief system', Beck draws upon his own clinical observations :

'I have tested this observation many times by asking phobic patients to estimate the probabilities of harm. At a distance from the phobic situation, for example, a patient may state that the possibility of harm is almost zero. As he approaches the situation, the odds change. He goes to 10 per cent, to 50 per cent, and finally in the situation, he may believe 100 per cent that harm will occur.' (p 164).

Those observations are interesting and add to our knowledge of phobias. They are also consistent with Beck's contention, which like Ellis, states that phobics are not afraid of a particular object per se, but the consequences of being

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exposed to that situation or object. The consequence being, Beck suggests, physical or psychological harm. So for example, a person with a fear of heights is afraid of falling, while an individual with a fear of social situations is afraid of humiliation, or rejection.

Beck also suggests that many of his patients' expectations of harm can be explained in terms of a traumatic experience involving the phobic stimulus :

'The traumatic phobias illuminate the conceptual processes involved in the formation of fears. As a result of the traumatic experience, the person radically revises his estimate of the dangerous potential of the situation or object. He now conceives as harmful a situation previously regarded as relatively innocuous.' (p 184).

The similarity between Beck's ideas and the model of phobic behaviour which developed from Seligman and Johnston's (1973) cognitive theory of avoidance behaviour, is readily apparent (see Chapter 2).

However, it must be stressed that Beck's anecdotal evidence should not be overemphasized. Indeed, his observations do not necessarily imply the simple causal relationship between fear and expectations of harm (i.e. expectations of harm - fear) which he suggests. For instance, it is possible that an increase in the experience of fear (expressed physiologically and subjectively) influences expectations of harm.

Imagery and Phobic behaviour:

A further aspect of Beck's theorizing which deserves some attention, is his suggestion (Beck, 1976) that imagery may play a role in the maintenance of phobias. He argues that the phobic,
instead of self-verbalising his expectation of harm, may experience it in imagery form. So for example, a person with a fear of heights may imagine falling when close to a cliff's edge, and then experience fear.

Interestingly, there is some evidence (May and Johnson, 1973) which suggests that self-generated images of words of an affective nature, produce physiological changes and subjective reports of emotional experience. However, to date there is no empirical evidence to suggest that phobics generate fear-provoking images of impending harm when exposed to the phobic stimulus. <u>Meichenbaum's Speculations upon the Role of Cognitions in the</u> <u>Maintenance of Phobias</u>:

Self-verbalisations (or 'internal dialogue') are also central to Meichenbaum's (1977) ideas about the maintenance and modification of maladaptive behaviours such as phobias. However, his suggestions about the nature of these mediating cognitions are somewhat different to those of Beck and Ellis. He has similarly argued that appraisals of external stimuli may have physiological effects, however, he suggests that it may be the subsequent appraisal of these internal events (i.e. physiological responses) which determines behaviour :

'The present theory postulates that it is not the physiological arousal per se that is debilitating but rather what the client says to himself about that arousal that determines his eventual reactions.' (Meichenbaum, 1977, p 208).

Simply stated, the suggestion appears to be that some phobics are afraid of being afraid. However, to date there is little more than casual observations (Meichenbaum, 1972; Wine, 1970, 1971) to support Meichenbaum's contention. One typical example, cited by Meichenbaum, involved the self-verbalisations of a test-anxious subject: ' "I'm really nervous; I'm sweating; others will see it; I can't handle this." ' (Meichenbaum, 1977, p 208).

In conclusion, Meichenbaum's suggestion must remain an intuitively appealing possibility until more convincing research is carried out.

Summary and Conclusions:

The arguments of Ellis, Beck and Meichenbaum have been precented which suggest that phobic behaviour is mediated by cognitions which have been variously labelled : irrational beliefs; self-verbalisations; imagery; internal dialogue. While their arguments do not exhaust all those presented in favour of this notion (e.g. Bandura, 1977) they do represent the mainstream of thought. Their ideas also form the basis for much of the clinical work with phobics which is referred to as cognitive behaviour therapy.

The research which their ideas have generated has been discussed in relation to phobias. It fails to provide convincing support for the notion that appraisals of internal or external stimuli (in the form of self-v.rbalisations or imagery) precede or cause the physiological, behavioural or subjective correlates of fear.

CHAPTER 4

THE MODIFICATION OF FEARFUL BEHAVIOUR THROUGH COGNITIVE INTERVENTIONS:

Several writers, most notably Beck (1976), Ellis (1977) and Meichenbaum (1977) have argued that phobias are mediated by selfverbalisations of one sort or another. However, the conclusion reached in the previous chapter was that there is no convincing evidence to support this notion. To date, the empirical evidence suggests that cognitions do not invariably, or even usually, precede fearful behaviour (e.g. Rimm et al. ibid). Furthermore, when cognitions can be seen to precede fearful behaviour (e.g. Beck, 1976) their role in producing this behaviour is not altogether clear.

Despite this gap in our knowledge, the idea that cognitions mediate both adaptive and maladaptive behaviours (e.g. phobias) has assumed a central role in the development of a number of varied clinical interventions (e.g. Beck, 1976; Ellis, 1977; Goldfried, 1977; Meichenbaum, 1977). These interventions have been fully described by their originators and by other writers (Rachman and Wilson, 1981; Rimm and Masters, 1979), who have also discussed the various conceptual and procedural differences between them.

A detailed discussion of this literature is not warranted here. Relevant issues will be considered only where they have a direct bearing upon the main focus of this chapter, namely the controlled outcome research ¹ which has evaluated the efficacy of various interventions upon particular behaviours, i.e. rat, snake, spider and public speaking fears. Furthermore, much of this outcome research does not readily fall into these therapeutic categories (e.g. Ellis' rational emotive therapy or Meichenbaum's self-

1 A more extensive review of the outcome literature has been provided by Barrios and Shigetomi,(1980);Rachman and Wilson (1981); and Rimm and Masters (1979). instructional training), described in the general texts and therefore requires specific description.

In this review, several major questions are considered : firstly - "Do cognitive interventions significantly influence these targeted behaviours ? Specifically, do they reduce snake, rat, spider and public speaking fears ?" Secondly, "What is the nature and composition of effective interventions ?" Thirdly, "Do these effective interventions shed any light upon the mechanisms of their effect ?"

The Effects of Cognitive Interventions upon Snake, Rat and Insect Fears:

The first half of this chapter will deal with those studies which have examined the effects of various cognitive interventions upon snake, rate and spider fears. These studies are not readily classified in terms of the interventions investigated, therefore, for ease they will be discussed under the following headings :

Studies presenting cognitive interventions via instruction, and Studies presenting cognitive manipulations via models. Studies Presenting Cognitive Interventions via Instruction:

Several studies have examined the efficacy of cognitive interventions which have been presented to fearful subjects via instruction. (D'Zurilla, Wilson and Nelson, 1973; Evans, 1977; Meichenbaum and Cameron, 1973; Odom, Nelson and Wein, 1978; Tori and Ward, 1973; Wein, Nelson and Odom, 1975).

In their studies, Tori and Worell (1973) assigned snake-phobic college students to one of five groups : 'specific cognitive'; 'general cognitive'; 'high expectancy'; 'counter conditioning'; and a no-treatment control group. On post-test and follow-up assessments of approach behaviour and subjective reports of fear, these researchers found the two cognitive and 'high-expectancy' groups to be significantly superior to the other two groups, but not

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different from each other. They concluded that subjects' reductions in fear and avoidance behaviour were a function of being exposed to 'a set of sensible and structured scientific procedures which convinced them that they would be able to approach the feared object with greater equanimity.' They suggested that such procedures created an expectancy of therapeutic effect and a demand to show increased approach behaviour on a snake EAT and also to report less subjective fear.

However, while such non-specific variables may have influenced the behaviour of subjects in all of the treatment groups, because they were not procedurally isolated the magnitude of their effect cannot be determined. For instance, the behavioural change of the 'high-expectancy' subjects may be just as readily attributable to a number of other procedures which comprised this condition, i.e. instructions and practice in relaxation and imagery of pleasant scenes. Similarly, subjects in the 'cognitive' conditions were exposed to a number of procedures which may have been responsible for the observed reduction in their fearfulness. These treatments included: cognitive relaxation instructions and the rehearsal of these instructions; muscle relaxation and practice at relaxation after performing a W.A.I.S. task and while imagining successful interaction with a snake. In summary, little can be concluded from these findings about the relative effects of a number of procedures and presumed non-specific variables.

Meichenbaum and Cameron (1973) also examined the effects of multi-component interventions upon the rat and snake fears of a sample of college students. This involved assigning these subjects to one of five treatment groups: stress inoculation; self-instructional training; systematic desensitisation; anxiety relief; and a notreatment control.

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The stress inoculation procedure involved : (1) a discussion of stress reactions (with an emphasis on the labelling and attribution of physiological responses, and arousal-inducing self-statements); (2) relaxation training (presented as an active coping skill); (3) instructed practice in the emission of coping self-statements, and (4) supervised practice in utilising the above coping skills in an actual stress situation (e.g. an unpredic_table shock situation). Subjects in the selfinstructional group received identical training, except for the supervised practice in a stress situation.

The data analyses of approach scores and subjective reports of fear for both post-treatment and follow-up assessments, revealed the stress inoculation condition to be significantly superior to all other conditions in reducing both rat and snake fears.

A series of studies conducted by Nelson and her colleagues (D'Zurilla, Wilson and Nelson, 1973; Odom, Nelson and Wein, 1978; Wein, Nelson and Odom, 1975) evaluated the effects of a treatment procedure they labelled 'cognitive restructuring'. This procedure involved a 'perceptual relearning' and 're-labelling' of fear and fear responses. Specifically, subjects were given four theoretical explanations for their fear ¹ (i.e.'perceptual relearning'), and encouraged to perceive and modify the irrational bases of their own fears, (i.e. 're-labelling').

1 Watson and Raynor's (1920) conditioning theory, acquisition through modelling and imitation - Bandura and Walters (1963), cognitive labelling - Schachter and Singer (1962) and perceptual learning - Hebb (1946).

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In the first of their studies, D'Zurilla, Wilson and Nelson (1973) employed this procedure to control for nonspecific factors in two experimental conditions (i.e. systematic desensitisation and graduated prolonged exposure), which were being examined for their effects upon fear of rats in college students. The results revealed that only graduated prolonged exposure resulted in significant reductions in avoidance behaviour compared with a no-treatment control, although no significant differences existed between the treatment groups. However, on a self-report measure of anxiety, only the cognitive procedure resulted in significant improvements compared with controls. Again no differences emerged between this and the other treatment conditions on this measure.

In a subsequent study, Wein, Nelson and Cdom (1975) compared the effects on snake phobic behaviour of cognitive restructuring (CR), verbal extinction (VE), systematic desensitisation (SD) an attentionplacebo control (AP) and a no-treatment control (NC). Their data analyses revealed that cognitive restructuring was as effective as systematic desensitisation in reducing avoidance behaviour and, as in their previous study, it was found to be superior to no treatment in reducing self-reported fear. Systematic desensitisation did not differ from attention-placebo or no treatment controls on this measure. It is also interesting to note that there was no differential improvement among the five conditions on the measure of heart rate.

These researchers also took a measure of subjects' expectations of improvements at various points during treatment. Their analysis revealed no significant differences between the groups for pretreatment ratings and ratings taken after the first session. However, analysis of ratings taken after the sixth and last treatment session produced a significant main effect. Post-hoc

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ccmparisons of treatment means (no-treatment subjects were excluded) indicated that subjects in the cognitive restructuring condition rated themselves more likely to improve than subjects in the verbal extinction and attention-placebo conditions. Similarly systematic desensitisation subjects expected to benefit more than verbal extinction and attention-placebo subjects.

Interpreting these results, Wein et al. suggest :-

'The fact that the particular treatments to which the subjects were exposed influenced their expectations of benefit after the last session, but not on the other two occasions, indicates that the subjects became increasingly cognizant of changes (or absence of changes) that were occurring as treatment progressed. Since there was no difference among the conditions on predictions of i. provement following the explanations of the various treatment procedures and rationales, all of the groups can be viewed as equivalent in their effects upon the non-specific therapy factors of expectancy and demand.'

The third study in this series (Odom, Nelson and Wein, 1978), compared cognitive restructuring (CR) with guided participation (GP), systematic desensitisation (SD), verbal extinction (VE), an attention placebo (AP) and a no-treatment control (NC). Once again the subjects were snake-fearful college students.

Their analyses revealed that guided participation produced significantly more approach behaviour than the five other groups, while systematic desensitisation and cognitive restructuring were significantly more effective on this measure than verbal extinction, attention placebo and no-treatment. Verbal extinction produced significantly greater approach behaviour than attention placebo and no-treatment. Analysis of subjective reports of fear revealed that guided participation was significantly superior to all groups, while cognitive restructuring and verbal extinction were more effective in reducing subjective fear than systematic desensitisation, attention placebo and no-treatment.

Interestingly, and in contrast to the findings of their previous study, these researchers found that heart rate scores at post-test were differentially effected by the six treatments. Specifically, post-hoc comparisons of means indicated that heartrate scores were significantly lower for the cognitive restructuring condition than all other conditions. Scores for the systematic desensitisation group were lower than those for subjects in the attention placebo and no-treatment conditions, while verbal extinction produced lower heart rates than guided participation at ention placebo and no-treatment.

Unfortunately their previous study lacked sufficient detail regarding the heart rate measure to allow meaningful comparisons with these subsequent findings.

In contrast to these studies which have investigated the effects of multi-component cognitive interventions, a recent study by Evans (1977) examined the effect of one particular component of Meichenbaum's self-instructional training programme. Specifically, Evans tested the hypothesis that the rehearsal of positive coping self-statements is sufficient to reduce spider-avoidance. This hypothesis evolved from ^{fu}eichenbaum's (1977) emphasis upon the therapeutic role of coping self-statements. An emphasis which is illustrated by the following quotation :

'Although I agree with Thorngate's (1976) analysis that we do not always have to think before we act, I believe that if we are going to change a behaviour we must think before we act. Such thinking (i.e. the production of inner-speech) deautomatizes the maladaptive behavioural act and provides the basis for providing the new adaptive behaviour.' (p 210)

Interestingly, dvans found that those subjects who had prepared themselves for feeling afraid by rehearsing positive coping self-statements, evidenced significantly less fear on a behavioural avoidance test than controls.

Summary and Conclusions (Also see Table 1)

The results of these studies consistently suggest that cognitive interventions are significantly superior to no-treatment controls in reducing subjective fear. Similarly, the bulk of the evidence suggests that these interventions are more effective than no-treatment in reducing avoidance behaviour. Only one study (D'Zurilla, Wilson and Nelson, 1973) failed to find such an effect.

Physiological measures were used in only two of the studies reviewed and have provided inconsistent results which are difficult to interpret.

It seems reasonable to conclude then, that cognitive interventions can significantly reduce the subjective and behavioural concomitants of fear in insect, rat and snake fearful college students.

In addition, the comparisons made by Nelson and her colleagues between cognitive restructuring and other interventions, revealed that this procedure was superior to systematic desensitisation and graduated prolonged exposure in reducing subjective reports of fear, but inferior to guided participation. In terms of avoidance,

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	Outcome	1 = 2 = 3 > 4, 5 1 = 2 = 3 > 4, 5	1>2, 3, 4, 5 1>2, 3, 4, 5	3>4; 1 = 2 = 3 1>4; 1 = 2 = 3	1 = 2, 4 = 5 1>5, 2 = 4 = 5 1 = 2 = 3 = 4 = 5
	Measures of fear	Behavioural (BAT) ¹ Subjective report	Behavioural (BAT) Subjective report	Behavioural (BAT) Subjective report	Behavioural (BAT) Subjective report Physiological (HR) 2
	Description of conditions	 Specific cognitive General cognitive High expectancy Counterconditioning No-treatment control 	 Stress inoculation Self-instructional training Systematic desensitisation Anxiety Relief No-treatment control 	 Cognitive restructuring Systematic desensitisation Graduated prolonged exposure No-treatment control 	 Cognitive restructuring Systematic desensitisation Verbal extinction Attention placebo No-treatment control
sect lears.	Population	Snake-fearful college students	Rat and snake fearful college students	College Students afraid of dead rats	Smake-fearful college students
rat and in	Authors	Tori and Worell (1973)	Meichenbaum and Cameron (1973)	D'Zurilla, Wilson and Nelson (1973)	Wein, Nelson and Odom (1975)

/Continued over..

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Table 1 continued

L. Co S. Sy L. Ve J. Ve	Snake-fearful 1. Co college students 2. Gu 3. Sy 4. Ve 5. At 6. No
	Snake-fearful college students

2 HR : Heart rate 1 BAT : Behavioural Avoidance Test

In these tables the major comparisons are presented in summary form. The direction and significance of the comparison is indicated by symbols showing that one intervention for a given measure was more effective (>) or less effective (<), or not significantly different from (=) the other interventions (s)

cognitive restructuring was found to be comparable with systematic desensitisation but inferior to graduated prolonged exposure and guided participation.

However, what is particularly interesting about these findings is that the effective multi-component interventions are procedurally quite different and also appear to differ in emphasis. For instance, Meichenbaum's stress inoculation procedure emphasizes the role of positive coping self-statements in reducing fear, while D'Zurilla's cognitive restructuring intervention is similar to Ellis' rational emotive therapy, with its emphasis upon challenging the irrational beliefs presumed to mediate phobias. Interestingly, however, those interventions do share a common element which may be critical for change. Wein et al (ibid) make this point in a discussion of their findings :

'A parsimonious explanation for the effects of cognitive therapies in modifying both verbal and motor behaviour, as occurred with the cognitive restructuring treatment in the present study, is that internally generated self-statements serve to cue appropriate motor behaviour.'

This suggestion appears to echo Meichenbaum's argument which was quoted above :

'... Thinking deautomatizes the maladaptive behavioural act and provides the basis for providing the new adaptive behaviour.' (p 210)

In short, these researchers are suggesting that self-statements are a critical component in their therapeutic interventions: guiding new adaptive behaviours in place of maladaptive behaviours such as phobias. This emphasis upon the therapeutic role of self-statements is further underscored by the findings from Evans' (1977) study.

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The Effects of Modelled Self-instructions:

Meichenbaum (1971) has reported a study which examined the effects of various model characteristics upon the fearfulness of snake phobic observers. He argued that one of the factors which influences fearful observers' imitation of a model, and hence the reduction in their fearfulness, is the degree of perceived similarity between model and observer. Specifically, the hypothesis is that the greater the perceived similarity, the greater the imitation. ¹

In order to test this hypothesis the subjects in this study observed either a 'coping' or a 'mastery' model. The coping model he suggested, is similar to the fearful observer in that he or she initially demonstrates anxious hesitant behaviour and then subsequently overcomes anxiety to interact with the snake. Therefore, the prediction was that this model would facilitate greater imitation and hence greater reductions in fear, than a mastery model who, unlike the fearful observer is able to demonstrate fearless interaction with a snake.

He also suggested that learning coping behaviours through observation would be further facilitated if the coping model were to explicitly model coping self-statements. In order to test this hypothesis two groups of subjects observed silent models (either coping or mastery), while another two groups observed a coping or a mastery model verbalize self-statements appropriate to their behaviour. Specifically, the coping model emitted statements self-instructing to cope with the physiological concomitants of fear and remain calm and relaxed by taking deep breaths, while in contrast the mastery model produced statements which reflected their overt behaviour, e.g. "I'll put my hand in the cage and stroke it (i.e. the snake) first."

1 This argument is consistent with the suggestions of several researchers, e.g. Bandura, Ross and Ross, 1963; Flanders, 1968.

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Meichenbaum's analyses revealed that subjects who had been exposed to coping models, whether the models verbalised or not, displayed significantly more approach behaviour on an avoidance test than subjects who had observed mastery models. Furthermore, analysis of experimenter's ratings of subjects' fear and hesitancy on the initial approach responses of the BAT, also suggest that the coping model groups were significantly less afraid than 'mastery model' subjects. However, similar ratings suggest that only those subjects in the coping plus self-verbalisation condition experienced significant reductions in fear during final approach responses.

Similarly, subjective measures of fear experienced during the BAT suggest that while mean scores for all groups showed a decrease from pre- to post-treatment assessment,only subjects who were in the coping plus verbalisation condition experienced significant reductions in fear.

In a more recent series of studies Kazdin (1973, 1974a, 1974b), also examined the effects of various model characteristics upon the behaviour of fearful observers. However, unlike Meichenbaum (1971), Kazdin used covert as opposed to overt models. Specifically, he asked subjects to imagine various types of models. Farenthetically, Kazdin (1974a) has argued that observational learning is primarily concerned with the process by which response elements are symbolically coded, rather than the form by which response information is presented. Thus, the presentation of live or filmed models is unnecessary for modelling effects as long as the covert processes which guide behaviour can be altered. Indeed, to date there is some evidence (Cautela, Flannery and Hanley, 1974) to suggest that overt and covert modelling procedures are equally effective in reducing the fearfulness of observers.

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Similar to Meichenbaum (1971) however, one of the characteristics varied by Kazdin in each of these studies was fear-relevant model similarity. Specifically, he compared coping and mastery models, although interestingly, his coping model conditions were more similar to Meichenbaum's coping plus self-verbalisations model, in that they included statements aimed at coping with fear. He included the following instructions in his coping model conditions:

'Imagine that the person (model) puts on the gloves and tries to pick up the snake out of the cage. As the person is doing this he sort of hesitates and avoids grasping the snake at first. He stops and relaxes himself, feels calm, and picks up the snake.'

In Kazdin's (1973) first study, sixty-four snake-fearful college students were matched on pre-treatment snake avoidance and randomly assigned to one of four experimental conditions: (1) covert coping model; (2) covert mastery model; (3) scene control, and (4) delayed treatment control. The scene control group visualised scenes of snake approach without any model interaction, while delayed treatment control subjects simply received pre- and postassessments.

Post-treatment data analyses revealed that the two covert modelling groups achieved significant improvements in snake approach performances and subjective indices of fear. Furthermore, both modelling groups were superior to the scene control and delayed treatment control conditions. Moreover, the coping model condition was significantly more effective than the mastery model in improving approach behaviour. These improvements were maintained at a threeweek follow-up assessment, while scene control subjects showed no change.

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In the second of these studies Kazdin used a similar assessment format and a 2 x 2 factorial design in which fearirrelevant model similarities (age and sex) were crossed with fear-relevant similarity (coping versus mastery). An exposureonly control group (i.e. scene control) was again utilised.

Kazdin's findings suggest that the efficacy of the covert model depended upon fear-irrelevant similarities. Subjects who imagined a model similar in age and same sexed, performed significantly better than subjects who imagined a model who was older and opposite sexed. This main effect of irrelevant model similarity was consistently demonstrated across measures of approach behaviour, and subjective reports of fear. However, of the two groups which imagined a model similar in age and same sexed, those who also imagined a model similar in the fear-relevant dimension, i.e. a coping model, tended to show greater change. Specifically, at post-treatment these subjects showed significantly more approach behaviour and less anxiety (Anxiety Checklist: Zukerman, 1960) than subjects who had imagined a similar mastery model. However, at follow-up the former subjects were significantly different from the latter on the approach test only. As with the previous study the exposure only control group failed to evidence any improvement.

The same experimental design was used by Kazdin in the third study to examine the effect of model identity, i.e. imagining oneself versus another person, upon fearful behaviour. His results suggest that the efficacy of covert modelling was not reliably effected by the identity of the model. However, as with the previous studies, the findings underscored the superiority of the imagined coping model over the masterymodel in reducing fearful behaviour.

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<u>Summary</u>¹ and Conclusions:

The results of these studies suggest that both live and covert models are effective in reducing the fearful behaviour of observers. In addition, they suggest that certain model characteristics influence the subsequent behaviour of the observer. The most important of these appears to be the similarity between model and observer in terms of age and sex. Specifically, subjects who imagined (Kazdin, 1974a) a model similar in these respects showed the greatest reductions in fearfulness, while models who were dissimilar in age and sex were no more effective than controls. Interestingly, however, Kazdin's findings suggest that imagining oneself as the model is no more effective than imagining a similar other. Parenthetically, both models and observers in Meichenbaum's (1971) study were female.

The second influential characteristic examined in these studies was the fearfulness of the model. The results suggest with some consistency that a coping model is superior to a mastery model; given that the models are similar in age and same-sexed.

Both Kazdin (1974a) and Meichenbaum (1971) have suggested that one of the factors responsible for the efficacy of the same age/sex coping model in reducing fear, is the perceived similarity between the observer and the model. The main thrust of their argument is that this perceived similarity may facilitate the imitation of those modelled strategies which help observers to cope with their fearfulness and behaviour adaptively, i.e. interact with the phobic stimulus. Furthermore, Meichenbaum suggested that when these strategies are made explicit by models' self-verbalisations, this learning process is further enhanced.

1 Also see Table 2,

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Table 2. Summary	table of studies examining	the effects of various model charact	eristics upon snuke fears.	
Authors	Population	Description of conditions	heasures of fear	Outcome
Meichenbaum (1971)	Snake-fearful college students	 Coping model Coping model and self- verbalisations Mastery model Mastery model and self- verbalisations 	Behavioural (BAT) Experimenters ratings Subjective measures	<pre>1 = 2>3 = 4 1 = 2>3 = 4 (initial approach) 2>1 = 3 = 4 (final approach) 2>1 = 3 = 4</pre>
Kazdin (1973)	Snake-fearful college students	 Covert coping model ' Covert mastery model No-model scene control Delayed treatment control 	Behavioural (BAT) Subjective report	1>2>3 = 4 1 = 2>3 = 4
Kazdin (1974a)	Snake-fearful college students	 Covert coping model similar in age and sex Covert coping model dis- similar in age and sex Covert Mastery model similar in age and sex Covert master model dis- similar in age and sex No-model scene control 	Behavioural (BaT) Uubjective report Anxiety checklist	1>3>2 = 4 = 5 1 = 3>2 = 4 = 5 (initial tasks of BAT) 1 = 3 = 4 = 5, 1>2 1>2 = 3 = 4 = 5

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$inviourul (BAT) \qquad 1 = 2, 2>4>3 = 5$	jective report $1 = 2 > 5$ (initial tasks of BAT)	<pre>iety checklist</pre>	
 Covert coping model -uneself Bel Covert coning model - other 	3. Covert mastery model onself Sub 4. Covert mastery model - other	5. No-model scene control Any	
Snake-fearful college students	0		
Kazdin (1974b)			

In these tables the major comparisons are presented in summary form. The direction and significance of the comparison is indicated by symbols showing that one intervention for a given measure was more effective (>) or less effective (\leq). From significantly different from (=) the other interventions (s)

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However, while these suggestions have some intuitive appeal, two points must be noted. Firstly, the degree of perceived similarity between models and observers in these studies can only be inferred, as these researchers did not directly measure this variable. Secondly, the suggestion that observers learned adaptive coping strategies, or self-statements from coping models, can again only be inferred. No systematic attempt was made by these researchers to determine whether subjects were actually using modelled selfstatements to guide their performances. However, Meichenbaum did note that some observers spontaneously imitated coping tactics during post-testing, in his study.

These points are important (and underscore the need for more research), as Bruch (1976) has recently suffersted that the efficacy of the coping model is explicable in terms of information about response consequences, rather than the provision of coping statements :

'Possibly, a coping model's gradually more daring approach behaviour, increases the salience of response consequences to observers more than the benign performance of a mastery model. The inherent 'contrast effect' of a coping model's performance may increase attending to the absence of negative consequences thus augmenting positive expectations for performing.'

In short, the suggestion is that the observer learns more readily from a coping model that aversive consequences will not accrue from interaction with the phobic stimulus. Parenthetically, this argument assumes that phobic behaviour is mediated by such expectations.

It could be argued that this explanation accounts for the efficacy of Meichenbaum's coping model, although it fails to account for the superiority of the coping plus self-verbalisations model in his study. Similarly, it is difficult to see how Bruch's suggestion may account

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for Kazdin's findings. The subjects in his studies were simply asked to image the coping model picking up a snake and not explicitly instructed to image the absence of negative consequences. It cannot be assumed that such imaging disconfirmed any expectations about handling snakes.

Kazdin's (1974b) findings also raise another interesting point regarding the mechanisms by which covert models are effective. He noted an intriguing lack of correlation between imagery vividness and the reduction in observer's fearfulness. Whether this noncorrespondence reflects the absence of a relationship between these variables, or the crudeness of imagery assessment methods remains to be seen. However, if it is veridical, we are faced with a complex question regarding the manner in which covert models produce therapeutic change. Indeed, the obvious implication would be that imagery of covert models is not necessary for change. We might speculate then, that the use of coping self-statements, like those included in Kazdin's coping model conditions, can effectively reduce fearfulness.

In conclusion, the results of the studies reviewed in this and the previous section suggest that a variety of interventions can effectively reduce fearful behaviour in college students. Furthermore, these studies implicate the role of self-statements in actively producing behaviour change. However, only one of these studies (Evans, 1977) has directly tested the hypothesis that the rehearsal of coping self-statements is an active fear-reducing component of these interventions.

Evans, like Meichenbaum (1977) argued that it is not physiological arousal per se which mediates fearful behaviour, but what subjects say

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to themselves about that arousal. ¹ For example, Meichenbaum (1977) has suffected that subjective fear and avoidance is mediated by maladaptive self-statements similar to those he observed in one of his subjects : "I'm really nervous; I'm sweating; others will see it; I can't handle this." Furthermore, he stressed the adaptive nature of reappriasing that arousal:

^bIn our own research, the clients, following cognitive behaviour modification treatment, come to label their physiological arousal as facilitative rather than debilitative. (Meichenbaum, 1972; Wine, 1970).

The physiological arousal that the client had previously labelled as totally debilitating anxiety and fear, the harbinger of further behaviour deterioration leading to feelings of helplessness, was now relabelled as eagerness to demonstrate competence, as a desire to get on with a task and as a sign to cope.'

The self-statements used by Evans in his study, are consistent with this notion that fearful subjects are afraid of experiencing the physiological concomitants of fear. Specifically, he asked a group of spider-fearful subjects to rehearse statements instructing themselves to expect, and accept the physiological concomitants of fear and to appraise them as harmless. He found that these subjects experienced significant reductions in fearfulness compared with controls.

1 It should be noted that while these researchers emphasize the role of physiological arousal in generating the cognitions which mediate avoidance, they are not explicit about the possible origins of that arousal.

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Interestingly, however, while these self-statements appear to be adaptive, they are in sharp contrast to those employed in the interventions examined by Meichenbaum (1971) and Kazdin (1973, 1974a, 1974b). These researchers provided subjects with selfstatements designed to actively cope with the physiological concomitants of fear (i.e. 'Relax, keep calm, take slow deep breaths') rather than passively accept them.

This apparent inconsistency would suggest that the question: "What is the nature of positive or adaptive coping self-statements ?" must in future be answered empirically rather than intuitively.

The first study presented below is a partial replication of Evans' experiment and was designed to test the hypothesis that his 'passive' coping strategy leads to a reduction in fear of spiders. The subsequent study examined the relative effects of this strategy and the 'active' self-statements used in Meichenbaum (ibid) and Kazdin's (ibid) studies.

The Effects of Cognitive Interventions upon Fear of Public Speaking:

Several studies have examined the effects upon speech-anxiety of a variety of interventions aimed at altering subjects' cognitions. These studies are discussed under the following headings :

> Studies evaluating the efficacy of Rational Emotive Therapy, Studies evaluating the efficacy of some variant of .

Cognitive Restructuring.

Studies Evaluating the efficacy of Rational Emotive Therapy:

To date three studies (Casas, 1975; Karst and Trexler, 1970; Trexler and Karst, 1972) have examined the effects of rational emotive therapy upon speech-anxiety.

In their study Karst and Trexler (1970) compared the effects of Rational Emotive Therapy, Kelly's (1955) 'Fixed Role Therapy' and a no-treatment control condition upon public speaking anxiety. The dependent variables were five self-report measures of anxiety and two behavioural measures. Unfortunately, adequate interobserver reliabilities were obtained with only one of the behavioural measures and post-trea ment data analyses indicated no differences between the groups on this measure. Three of the five self-report measures showed both therapies to be superior to the no-treatment control. At a six-month follow-up, 80% of the contacted treatment subjects reported their speech anxiety to be 'much' or 'somewhat' less than it had been prior to intervention. However, the lack of adequate controls in this study does not allow us to preclude the possibility that the observed changes were a function of exposure to a therapy and therapist.

A subsequent study by Trexler and Karst (1972) was a partial replication of this study. In addition to a rational emotive therapy and no-treament condition, the design included an 'attention-placebo' condition in order to control for non-specific effects of exposure to a therapy and therapist. Their three behavioural measures of speech anxiety revealed no inter-group differences, while two selfreport measures favoured Rational Emotive Therapy over the other groups. However, a third rating of subjective anxiety suggested that the attention-placebo ¹ group subjects had experienced significantly greater reductions in anxiety compared to those who had received rational emotive therapy.

More recently, Casas (1975) examined the relative efficacy of rational emotive therapy and self-control desensitisation in reducing public speaking anxiety. His data analyses suggest that

1 Subjects in this condition actually received relaxation training.

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behavioural, subjective and physiological measures of fear failed to distinguish between these groups and indeed, showed them to be no more effective than a waiting-list control.

We might tentatively conclude ¹ from these three studies, that when rational emotive therapy is effective in reducing public speaking anxiety, the effect is limited to subjective reports of anxiety.

Studies Evaluating the Efficacy of some Variant of Cognitive Restructuring

Several researchers (Fremouw and Zitter, 1978; Jaremko, 1980; Leichenbaum, Gilmore and Federaricius, 1971; Weissberg, 1977; Weissberg and Lamb, 1977), have examined the effects of a number of varied cognitive interventions upon speech-anxiety.

In a very thorough and well-controlled study, Meichenbaum et al (1971), examined the relative efficacy of insight plus rehearsal; desensitisation and combined desensitisation plus insight. Their design also included attention-placebo, waiting-list and low fear control groups.

The insight procedure involved an emphasis upon the argument that 'speech anxiety is the result of self-verbalisations and internalised sentences which are emitted while thinking about the speech situation.' In addition, the goals of therapy were for each subject to become aware of these self-statements and then to produce incompatible and adaptive self-instructions to guide adaptive behaviour. Unfortunately, no details were given regarding the nature of either the self-defeating or adaptive self-verbalisations.

The measures of speech anxiety included Paul's (1966) Behavioural Checklist (BCL), three measures of speech disruption (i.e. word count, duration of silence and the number of 'ah' statements.) and two measures of subjective anxiety.

Authors	Population	Description of conditions	Indices of Speech Anxiety	Outcome
Casas (1975)	College students	 Rational restructuring Self-control desensitisation Waiting-list control 	Behavioural observations Physiological measures Self-report Questionnaire measures of anxiety	1 = 2 = 3
Karst and Trexler (1970)	college students	 Rational emotive therapy Fixed role therapy No-treatment control 	Behavioural observation Self report measures of anxiety	1 = 2 = 3 1 = 2 > 3
Trexler and Karst (1972)	College students	 Rational emotive therapy Attention-placebo (relaxation training) No-treatment 	Behavioural observation Self-report measures Subjective anxiety rating	1 = 2 = 3 1 > 2 = 3 2 > 1

Table 3. Summary table of studies examining the effects of Rational Emotive Therapy upon speech anxiety.

In these tables the major comparisons are presented in summary form. The direction and significance of the comparison is indicated by symbols showing that one intervention for a given measure was more effective (>) or less effective (<), or not significantly different from (=) the other interventions (s)

Their data analyses revealed similar patterns of change reflected in BCL and anxiety checklist scores. Specifically, comparisons between the conditions revealed that i) waitinglist control subjects showed significantly less improvement than all other groups; (ii) the attention-placebo and combined desensitisation plus insight groups did not show differential improvements; (iii) both of these groups showed significantly less improvement than subjects in the desensitisation and insight conditions; these latter two conditions producing similar and significant improvements.

The second measure of anxiety (anxiety differential) did not distinguish between the treatment conditions but reflected a significant reduction in anxiety for these groups compared to controls.

These researchers also reported significant improvements for the three treatment groups on the measures of speech disruption. However, pre-treatment comparisons between low and high fear groups casts some doubt upon the validity of two of these measures as indices of speech anxiety. Specifically, they found that the number of 'ah' statements did not distinguish between these groups, while interestingly, the low fear subjects, contrary to predictions, produced longer durations of silence.

In conclusion, the general pattern of results seems to suggest that desensitisation and insight plus rehearsal are equally superior to both a combination of these procedures and controls in reducing some aspects of speech anxiety (i.e. behavioural manifestations measured by the BCL).

In the first of two recent studies also involving speech anxious subjects, Weissberg (1977) compared the relative efficacy

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of a cognitive modification procedure (after Meichenbaum, 1972), desensitisation and desensitisation with coping imagery. Subjects received one of these treatments either directly or vicariously by watching a fellow subject being treated on video.

The cognitive modification programme comprised several elements : i) A discussion emphasizing the rationale that speech anxiety is caused by illogical, self-defeating and exaggerated thoughts and self statements; ii) challenging the truth and logic of these statements and substituting anxiety-inhibiting self statements intheir place, and iii) standard desensitisation using task relevant self statements to cope with any anxiety experienced during scene visualisation.

Treatment effectiveness was measured using: i) Paul's (1966) Personal Report of Confidence as a Speaker (PRCS); ii) A Behaviour Checklist (BCL) (Paul, 1966), and iii) an Adjective Checklist. All measures were taken before treatment, the week after treatment was completed and at a follow-up eleven weeks after.

The data analyses revealed that both cognitive modification and desensitisation with coping imagery, were significantly more effective than desensitisation in reducing the behavioural manifestations of anxiety (BCL). However, this difference was not maintained at follow-up. On the self-report measures of speech anxiety (PRCS and ACL) no significant differences were found between the treatment conditions.

Weissberg drew the following conclusion from his findings :

'There is no direct and consistent evidence to indicate that either treatments ... or conditions (direct or vicarious), significantly differed in their effectiveness in reducing speech anxiety. Relative to a control group, however, the treatment programmes as a whole resulted in significant reductions in speech anxiety.'

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However, it should be noted that the comparisons of the treatment conditions with waiting-list controls were made using a total of 84 analyses of covariance. Therefore, his results and his conclusion should be considered with caution.

In a subsequent study Weissberg and Lamb (1977) used the same measures of speech anxiety to examine the relative efficacy of cognitive modification, desensitisation, and speech preparation plus practice. A waiting list control group was again utilised.

Their analysis of Behaviour Checklist scores revealed that none of the treatments showed significant reductions at post-test. However, at follow-up (eleven weeks) both cognitive modification and speech preparation plus practice groups were significantly less anxious than controls, although they did not differ significantly from each other. In terms of the self-report measures of anxiety (PRCS and ACL) the three treatment groups did not differ from each other but reported significantly less anxiety than controls.

Unfortunately, these researchers did not incorporate an attention-placebo condition in their design and therefore we cannot preclude the possibility that the observed changes in subjective anxiety were a function of non-specific variables associated with exposure to a therapy or therapist.

In a more well controlled study, Fremouw and Zitter (1978) assigned speech anxious subjects to one of four conditions : cognitive restructuring (after Meichenbaum et al 1971) plus relaxation training as a coping skill; behavioural skills training for public speakers; discussion-placebo, or a waiting list control.

Their measures of speech anxiety were: i) Behaviour Checklist (BCL - after Mulac and Sherman, 1974); ii) An overall rating of anxiety made by observers, iii) The Anxiety Differential (Husek

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and Alexander, 1963); iv) Paul's (1966) Personal report of Confidence as a Speaker (PRCS) and v) the duration of silence during speeches.

In terms of the behavioural ratings (BCL and overall rating), the data analyses suggest that both treatment groups experienced significant reductions in anxiety relative to waiting list controls. However, the overall ratings also suggest that only cognitive restructuring was superior to the discussion placebo control. The third behavioural measure, namely duration of silence, failed to distinguish between any of the groups.

In terms of self-rated confidence (PRCS) the skills training procedure was superior to cognitive restructuring, although both were superior to discussion-placebo. The other subjective measure of anxiety (ACL) however, did not distinguish between the groups.

In conclusion, Fremouw and Zitter's results suggest that their cognitive intervention was significantly effective in reducing both behavioural and subjective manifestations of speech-anxiety.

More recently, Jaremko (1980) used 62 speech anxious college students to compare the effects of Meichenbaum's (1977) stress inoculation training with no treatment.

His measures of speech anxiety included : i) the Behavioural Assessment of Speech Anxiety (BASA) - Mulac and Sherman (1974); ii) the Multiple Affect Adjective Checklist (MAACL) - Zuckerman and Lubin, (1965), and iii) a speech self-efficacy measure ¹ which measures subjects' confidence in their ability to perform successfully. 1 This measure was based on the one developed by Bandura (1977) His findings suggest that both groups experienced significant and comparable reductions in behavioural anxiety (BASA) from pre- to post-assessment; reductions which were maintained at follow-up. However, the two self-report measures suggest that treatment subjects were significantly less anxious than controls at post-test and follow-up.

In conclusion, Jaremko's results seem to suggest that stress inoculation training is significantly more effective than no-treatment in reducing the subjective expression of anxiety. However, it must be noted that this poorly controlled experiment leaves us to assume the validity of these measures as indices of speech anxiety.

Summary and Conclusions: (Also see Table 4)

The results of the above studies suggest that a variety of cognitive interventions significantly reduced both the behavioural and subjective expressions of speech anxiety relative to waitinglist controls. However, the failure to utilize adequate controls in three of these studies (i.e. Jaremko, 1980; Weissberg, 1977; Weissberg and Lamb, 1977) means that we cannot readily dismiss the possibility that the observed effects were a function of non-specific variables inherent in the interventions.

The other two studies (i.e. Fremouw and Zitter, 1978; Meichenbaum et al, 1971) were more well controlled. They included attention-placebo conditions in their designs to control for the possible effects of exposure to a therapy and therapist. In addition, Meichenbaum et al, in a most thorough study, utilized a low fear control group in order to assess the validity of their measures. Pable 4. Summary table of outcome studies examining the effects of some variant of cognitive restructuring upon speech anxiety.

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Author	Population	Description of conditions	Indices of speech anxiety	Outcome
Fremouw and Zitter (1978)	College students	 Cognitive restructuring plus relaxation Behavioural skills training Discussion-placebo control Maiting list control 	Behaviour checklist Duration of silence Overall anxiety rating Anxiety differential Personal report of confidence as a public speaker	<pre>l=2>4, 1 =2=3 l=2=3=4 l=2>4, 1 3, l=2=3=4 l=2, 3=4 l=2, 3=4 l=2, 3=4 l=2, 3=4 l=2, 3=4 l=2, 3=4 l=2, 1 3, l=2=3=4 l=2, 1 4, 1 4, 1 4, l=2=3=4 l=2, 1 4, l=2, l=2=4 l=2, l=2, l=2=4 l=2, l=2, l=2, l=2=4 l=2, l=2, l=2, l=2, l=2=4 l=2, l=2, l=2, l=2, l=2, l=2, l=2, l=2,</pre>
Jaremko (1980)	College students	 Stress inoculation training No-treatment control 	Behaviour checklist Affect Adjective checklist Perceived self-efficacy	1=2 1>2 1>2
Meichenbaum, 2ilmore and Fedorovicius (1971)	College students	 Insight and rehearsal Desensitisation Combined desensitisation and insight Attention-placebo Waiting-list control Low fear control 	Behaviour checklist Speech disruptions: Word count duration of silence No. of 'ah' statements Adjective for anxiety checklist Anxiety differential	<pre>l=2>3=4>5 l=2>3=4>5 b>(1+2+3+4+5) at pre-treatment 6= (1+2+3+4+5) l=2>3=4>5 l=2=3=4>5</pre>

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Author Population Weissberg and Lamb College students (1977) Weissberg (1977) College students			
Weissberg and Lamb College students (1977) Weissberg (1977) College students	Lescription of conditions	Indices of speech anxiety	Outcome
Weissberg (1977) College students	 Cognitive modification (after 1 Meichenbuam, 1972) Desensitisation Speech Preparation and practice Waiting-list control 	Behaviour checklist Personal report of confidence as a speak e r Affect Adjective checklist	<pre>l=2=3=4 l>4, 3>4 (at follow-up) l>4, 3>4, (at follow-up) l>4, 3>4, (at follow-up) l=2=3>4 (at post test l=2=3>4 and follow-up)</pre>
	 Cognitive modification and self l control desensitisation 'after Meichenbaum, 1972) Desensitisation with coping imagery Desensitisation (Each group was divided in half subjects receiving direct or vicarious treatment, i.e. watching a video of a subject being treated). Waiting-list control 	Behaviour checklist	1=2>3=4 1=2=3 (at follow-up) 1=2=3>4 1=2=3>4

In these tables the major comparisons are presented in summary form. The direction and significance of the comparison is indicated by symbols showing that one intervention for a given measure was more effective (>) or less effective (<) or not significantly different from (=) the other intervention(s).

The results of these studies suggest that both cognitive restructuring plus relaxation (Fremouw and Zitter, 1978) are significantly more effective than attention-placebo conditions in reducing subjective and behavioural expressions of speech anxiety.

To date only two studies (Glogower, Fremouw and McCraskey, 1978; Thorpe, Amatu, Blakey and Burns, 1976) have attempted to determine which elements of these multi-component interventions are responsible for the observed effects upon speech anxiety. These are discussed below.

Component Analysis Studies:

In the first of these studies, Thorpe and his co-workers (1976) examined the relative effects of the components of Meichenbaum et al.'s (1971) insight plus rehearsal intervention. The subjects, who were secondary school pupils, were either given insight into the negative self-statements which are presumed to maintain speech anxiety, or asked to rehearse adaptive coping self-statements.

These researchers interpreted their results as suggesting that 'insight' is a more important component of the intervention than 'rehearsal'. However, their ambiguously presented results do not seem to warrant this conclusion. The significant results which were found suggest that rehearsal similarly affected the subjective measures of anxiety.

In a more recent study, Glogower, Fremouw and McCraskey (1978) assigned 'communication-anxious' college students to one of five conditions: insight into negative self statements; knowledge and rehearsal of coping statements; a combination of these procedures; a discussion placebo or a waiting-list control group. A low 'communication-anxious' group was also utilised to validate the measures of anxiety used.

The effects of these various procedures were determined by observations of a number of behavioural manifestations of anxiety, while subjects took part in a group discussion, and by two self-report measures.

Their findings suggest that both the 'combination' and 'coping statements' conditions were significantly superior to the waiting-list control, although these groups did not differ significantly from each other. In contrast, the insight and discussion-placebo conditions produced some improvement, although this was usually non-significant. These researchers concluded :

'The results suggest that while discussionplacebo and identification of negative self-statements produce some improvement, the coping statement component is the primary factor in the cognitive restructuring procedure.'

One of the questions which arises from this conclusion concerns the nature of coping self-statements. Glogower et al. comment on their findings :

'The fact that some subjects in the discussion placebo and insight groups used general coping statements but did not improve as much as the coping statements or combined procedure subjects who learned more specific task-related statements, suggests that the type of coping statements employed may be important.'

In their study, these researchers encouraged subjects in the 'coping statements' and 'combined procedure' conditions to use task-relevant statements, such as: "Speak slowly, I can handle this" and "What is it I want to say ? It's only a short
sentence."

In contrast, Thorpe et al. (ibid) had subjects in their 'rehearsal' condition rehearse 'productive' ideas (e.g. "It's nice if people approve of me, but I can survive without their approve if need be,") which were seen as the 'desirable' counterparts of four irrational ideas (i.e. necessity for approval; projectionism; necessity to worry; life's unfairness), which may elicit and maintain speech anxiety. However, recent research casts some doubt upon the relevance of such adaptive self-statements. Specifically Lorh and Rea (1981) found that speech anxiety is not characterised by these particular irrational beliefs.

In the outcome studies discussed above, the nature of the coping self-statements used was not always reported (e.g. Meichenbaum et al. 1971; Jaremko, 1980; Weissberg, 1977). Where they have been, they have taken the form: "I can only improve," (Fremouw and Zitter, 1978) which is a task-relevant coping statement, or comprised of both task-relevant and anxietyrelated statements (Weissberg and Lamb,1977). For example Weissberg and Lamb had subjects practice such statements as : "I practiced as much as I need to, so just relax and concentrate on the speech"; "Even if I never make a good speech, there are still a lot of other things I do well." Subjects in this study were also encouraged to rehearse coping-statements which reflected and challenged a presumed irrational need for approval: "It would be nice if everyone approved of my speech, but I can live without that."

In conclusion, it would appear from these research findings (as with those concerned with the 'animal literature' in the earlier sections above), that coping self-statements (CSS) are an active fear-reducing component of cognitive interventions. However, it is also apparent that these statements, where reported, have varied from study to study, with the rationale for their use usually being unclear. It would seem that some researchers have used their intuition to determine what constitutes adaptive CSS. Therefore, future research might empirically determine the nature of adaptive CSS, the mechanisms by which they produce change and their possible task, situation or subject specificity.

The fourthin the series of experiments presented below employed speech-anxious subjects in order to examine the effects upon fear of two coping strategies, devised by Evans (1977) and Meichenbaum (1971), which were theoretically based (Wine, 1970; Meichenbaum, 1977).

EXPERIMENT 1

AN EXAMINATION OF THE EFFECTS OF A COPING STRATEGY UPON FEAR OF SPIDERS

Glogower and his colleagues (1978) concluded from their well controlled study that the rehearsal of task-oriented coping statements are more effective in reducing speech anxiety than insight into the maladaptive self-statements which are presumed to maintain that anxiety. Similarly, Wine (1970) has suggested that the rehearsal of adaptive coping statements is the most important component of self instructional training (Meichenbaum et al. 1971) in reducing test anxiety. Recently, Evans (1977) has also found that the rehearsal of coping statements significantly reduced spider avoidance in fearful college students.

Consistent with the arguments of Wine (1970) and Meichenbaum (1977), Evans proposed that fear is not mediated by physiological arousal per se, but by the maladaptive self-statements which that arousal generates. Such self-statements he argued ¹ reflected a 'cognitive fear' of the physiological concomitants of fear, or in short a 'fear of fear'. Thus they may take the form "I feel afraid.... I cannot cope with it." Therefore in his study Evans encouraged subjects to rehearse and use (on a subsequent spider avoidance test) self statements which involved a reappraisal of the physiological concomitants of fear, i.e. to expect to experience them but to accept them as harmless.

The present study provided a further test of the hypothesis that the rehearsal of such self-statements, phrased in subjects' own 1 Evans (1977) and in personal communication.

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words,¹ leads to a reduction in spider fearful behaviour. Three measures of fear were taken to test this hypothesis : approach towards the feared stimulus (in the form of a behavioural avoidance test or B.A.T.) subjective ratings of fear (after Walk, 1956) and heart rate. Heart rate was chosen as a physiological measure of fearfulness on the basis of research findings which suggest that fear associated with phobic stimuli such as spiders, is characterised by significant increases in heart rate (e.g. Hare and Blevings, 1975. Also Sartory and Lader, 1977, for a review of this literature).

METHOD

Subjects:

Twenty-six subjects took part in the study, all of whom were college students and 18 of whom were females. They had been selected from a total of sample of 135 on the basis of their response to the item 'spiders' on the Wolpe's (1973) Fear Survey Schedule (FSSIII). On the five-point scale 16 of the subjects had scored 4 ('Much' fear of spiders) and 10 had scored 5 ('Very Much' fear of spiders).

Equipment and Materials:

A George Washington Polygraph recorder was used to measure heart rate (bpm). Heart beats were recorded via three silver plate electrodes placed on the right leg and left forearm with an earth on the left leg. A manual event recorder was also attached to the polygraph.

A 10¹/₂ inch tall plexiglass container was used to house a
2 inch long Tegenarians spider. The container had solved on one
of its plexiglass faces ten horizontal lines at 1 inch intervals.
1 It was assumed (Evans, 1977) that such coping statements
rephrased in subjects' own words, but maintaining the basic strategy,
would be more meaningful for subjects and more effective in reducing fear.

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Experimental Design:

All subjects were matched in pairs on the basis of their sex and a pre-treatment assessment of their fearfulness in approaching a spider. Subsequently they were assigned to either an experimental or control condition before completing the posttreatment assessment. Treatment effects were determined by behavioural (i.e. a behavioural avoidance test), subjective (i.e. a ten point fear thermometer) and physiological (i.e. heart rate) measures.

Procedure:

All subjects volunteered to take part in an experiment which would take two hours of their time, and which was divided into two, hourly sessions one week apart. They were not told about the nature of the experiment until they arrived at the test room for the pre-treatment assessment.

Pre-treatment Assessment:

Upon arrival at the test room subjects were reminded of their response to the item 'spiders' on the FSS III (Wolpe, 1973) and asked if it was still an accurate evaluation of their fearfulness. No discrepancies emerged between subjects' initial and subsequent ratings.

Subjects were then read the following instructions: "I am going to present a live spider. It is a harmless, non-poisonous, British spider. It will be in a container from which it cannot escape. When I have presented it I want you to try and touch it. Do you wish to proceed ?" None of the subjects refused to take part.

All subjects were then given a brief explanation of the function of the polygraph in order to allay any unnecessary anxiety. Subsequently, the heart rate recording electrodes were attached with an assurance that no sensations would be felt from them. Subjects were not told that heart rate was being recorded.

Following this, the contained spider was placed upon a small table in front of the seated subject. The table and container were positioned so as to make it easy for the subject to approach and touch the spider with their electrode-free hand. (This procedure was employed in order to minimize the effect of subjects' body movement upon heart rate and therefore increase the sensitivity of this measure as an index of fear).

Subjects were then instructed to try and touch the spider. When they had stopped approaching but had not touched the spider the polygraph print-out was event-marked. They were then asked : "Can you go any further ?"¹ If subjects moved any closer the polygraph print-out was again event-marked at the point of their maximum approach response.

Approach responses on the B.A.T. were recorded in terms of the number of horizontal lines (scribed on the container) that the subjects' forefinger had crossed before he withdrew his hand. Upon completion of the B.A.T. subjects were asked to rate the fear they had experienced at the point of maximum approach; i.e. when they were closest to the spider. These ratings were made on a 10-point 1 This 'High demand for approach' (Wein et al. 1975) on both pre and post-treatment B.A.T.S. was employed on the assumption that it would reduce the possibility that a significant difference between the control and experimental conditions reflected the influence of demand characteristics inherent in the latter condition. (See Bernstein and Paul, 1971, for a discussion on this point).

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Fear Thermometer (F.T.) (After Walk, 1956). It was anchored in the following way: subjects were told to equate 1 with 'calm relaxation', 5 with 'moderate fear' and 10 with 'extreme fear'.

At the end of this pre-treatment session, arrangements were made to see subjects for the following session. They were also asked not to divulge the nature of the experiment to anyone. <u>Treatments and Post-Treatment Assessment</u>:

On the basis of their pre-treatment B.A.T. scores and their sex, subjects were matched in pairs and assigned to either the control or experimental condition.

On their return to the test room for the second session, subjects were told the nature of the task (which was exactly the same as the pre-treatment assessment) and asked if they wished to proceed; none refused.

The procedures for the two groups were then as follows : <u>Control condition</u>:

Prior to the presentation of the second B.A.T. control group subjects received the following instructions on a sheet of A4 :

'Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below please write down your ideas about facing up to your fear of spiders. Try to make it convincing to yourself perhaps by imagining that you are giving instructions to help someone else.'

This procedure was designed to control for the possible nonspecific effects of the experimental condition such as writing down and rehearsing self-statements.

Experimental condition:

:

Experimental group subjects were given the same instructions as control group subjects plus the following paragraph printed on a

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sheet of A4.

'A couple of sentences are given to start you off: Of course I cannot help being afraid in this situation. I shall be afraid but at least I should realise that there is no point in getting frightened of the fear. The feelings of fear cannot kill me so I shall try and stand back and examine my fear: pounding heart, sweating palms...'

Subjects were told to read the instructions carefully and take as long as they wanted over rephrasing the coping self statements in their own words (Experimental group) or devising their strategies (control group). They were then told to read through and mentally rehearse the self-statements three times and use them during the subsequent behavioural avoidance test.

The procedure employed for this B.A.T. along with the measurement of subjective and physiological indices of fear, was the same as that described for the pre-treatment assessment. In addition, however, a one-minute baseline recording of subjects' heart rates was taken fifteen minutes after the completion of this post-treatment assessment. During this time subjects were instructed to relax.

These baseline heart rates were recorded after the completion of both assessments in order to avoid the possibility of a pretreatment measure being influenced by anticipatory arousal. However, it must be noted that post-assessment recording may have been influenced by the treatments administered although it was assumed that subjects would be more able to relax knowing that they had completed the tasks.

At the end of the second session subjects who wished to, were given a chance to ask questions.

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RESULTS

Behavioural Avoidance Test Scores:

B.A.T. scores were subjected to an ANOVA for a two factor experimental design with repeated measures on one factor: Group (2) x Fre and Post treatment assessments (F ratios are presented in Table 5 and ANOVA summary tables in Appendix 1).

The analyses revealed a statistically non-significant main effect of Group (F = 0.09, df 1, 25, p > .1). However a significant main effect of Assessment did emerge from the analysis (F = 8.6, df 1, 24, p < .01). This main effect is most readily interpretable in terms of a significant Group x Assessment interaction (F = 7.1, df 1, 24, p < .05). The means (see Table 6) reflecting this interaction show, as expected, an increase in approach behaviour for the experimental group from pre- to post-treatment assessments, while the performance of the control group subjects remained almost constant across assessments.

An analysis was also made of the numbers of subjects from each of the conditions who touched or failed to touch the spider on the post-treatment assessment. This analysis revealed a statistically significant chi squared ($\chi^2(1) = 4.06$, p $\lt.05$). The numbers reflecting this statistic are presented in Diagram ¹. Consistent with expectations they show that more of the experimental group subjects (8 out of 13) completed the post-treatment B.A.T. (i.e. touched the spider), than control group subjects (2 out of 13). Subjective Fear Ratings:

Subjective fear ratings were subjected to an ANOVA for a two factor experimental design with repeated measures on one factor: (Group (2) x Pre- and Post-treatment Assessments). (F ratios are presented in Table 5 and ANOVA summary tables in Appendix 1. Means are presented in Table 6).



Group (n = 13)

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Experimental

Control

Table 5

F ratios emerging from the analyses (ANOVAs) 1 of all

measures

Measure	Source of variation	F ratio(degrees of freedom)
Approach scores	Group Assessment Group x Assessment	0.09 (1.25) 8.59** (1.24) 7.10* (1.24)
Subjective fear ratings	Group Assessment Group x Assessment	2.34 (1.25) 0.73 (1.24) 0.37 (1.24)
Heart rate scores	Group Assessment Group x Assessment	0.10 (1.25) 0.78 (1.24) 1.99 (1.24)

* p**<.**05

** p**<.**01

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(1 Complete ANOVA summary tables are presented in Appendix 1)

Table 6

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Table of Means (M) and Standard deviations (SD) for all dependent measures and baseline heart rates

Group	Experimental		Control	
Assessment	Pre-treat ment	Post-treat ment	Pre-treat ment	Post-treat ment
B.A.T. scores. M Range O - 10 SD inches.	6.69 2.95	8.31 2.78	7.15 2.41	7•23 2•24
Subjective M fear ratings.SD (Range 0 - 10)	6.31 1.93 .	6.77 1.36	5.69 1.11	5.77 1.74
Heart rate. M (BPM) SD	82.10 15.53	83.51 16.17	84.32 17.16	78.0 9.10
Baseline heart M rates (BPM) SD		58.23 10.26		60.84 9.42

Analyses revealed statistically non-significant main effect of Group (F = 2.34, df l, 24, p >.1) and Assessment (F = 0.73, df l, 24, p >.01), and a non-significant Group x Assessment interaction (F = 0.37, df l, 24, p >.1).

Heart Rate Scores:

Pearson correlation coefficients were computed for baseline HRs and HRs recorded during the five second period prior to subjects' maximum approach responses on both B.A.T.s. These correlation coefficients were small and statistically nonsignificant (for the pre-treatment B.A.T. r = .32, n = 26, p > .05; for the post-treatment B.A.T. r = .27, n = 26, p > .05). Therefore variations in baseline HRs were not statistically controlled for when analysing HRs recorded during the Behavioural Avoidance Tests.

Heart rate scores were subjected to an ANOVA for a two factor experimental design with repeated measures on one factor: Group (2) x Pre and Post-treatment Assessments . (F ratios are presented in Table 5 and ANOVA summary tables in Appendix 1. Means are presented in Table 6).

The analyses revealed statistically non-significant main effects of Group (F = 0.1, df 1, 25, p >.1) and Assessment (F = 0.78, df 1, 24, p >.1), and a non-significant Group x Assessment interaction (F = 1.99, df 1, 24, p >.1).

DISCUSSION

The findings of this study offer some support for the hypothesis that the rehearsal of coping self-statements results in a reduction of fear in spider-fearful college students. Specifically, the above results show that approach behaviour increased significantly for the experimental group subjects, who had devised and rehearsed selfstatements which focussed upon the expectation and acceptance of the physiological concomitants of fear. In contrast, the control group subjects, who had devised and rehearsed their own self statements, showed little change in approach behaviour.

However, the subjective and physiological measures failed to support the above hypothesis: contrary to expectations these indices suggest that the experimental group subjects did not experience significant reductions in fear.

The most straightforward interpretation of this desynchronous change in these indices of fear is that it reflects the method of measurement employed. Both the subjective ratings and heart rates were taken as an index of fear at the point of maximum approach on both the pre- and post-treatment B.A.T.s. However, it is possible that this point of maximum approach was determined by subjects' tolerance threshold for subjective and/or physiological fear. Therefore, these measures could also be seen as an index of this threshold which, for both the control and experimental groups, did not change significantly across B.A.T.s; although for the latter group approach behaviour changed significantly before the threshold was reached.

Given this interpretation (which assumes a causal relationship between these indices of fear) a more adequate test of the hypothesis that the rehearsal of coping self-statements results in a reduction in subjective and physiological fear, could be achieved by controlling for pre- and post-treatment differences in approach behaviour. Using the present experimental design this would involve scoring the subjective and physiological measures at the point of maximum approach on the pre-treatment B.A.T. and then comparing these scores with scores taken at the same point of approach on the post-treatment B.A.T. Thus, when subjects reached their pre-treatment maximum during the post-treatment B.A.T., they would be stopped and asked to rate their subjective fear and HR would also be recorded.

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Subsequently they would be asked to proceed with the B.A.T. in order to determine their maximum post-treatment approach score. If subjects' approach behaviour increased on the post-treatment B.A.T. (as it did for the experimental group in this study) then the threshold hypothesis would predict that these subjects would experience lower levels of subjective and physiological fear at that point during the post-treatment B.A.T. equivalent to their maximum pre-treatment approach score. This would be because at this point they would not have reached their maximum post treatment approach score and therefore, their associated subjective and/or physiological threshold.

The possibility was considered of evaluating the effect of the treatments upon the subjective and physiological indices, while statistically controlling for the differences in approach scores between the groups. However, Spearman correlation coefficients (post hoc analyses: see Appendix 2) do not suggest that a linear relationship exists between these variables: such a relationship being the basis of statistical control.

In summary, these results suggest that the rehearsal of coping self-statements significantly increased the approach behaviour of fearful subjects towards the feared stimulus. In contrast, these self-statements appeared to have little effect upon the subjective and physiological indices of fear. However, it was proposed that the methodology adopted in the present study did not provide an adequate test of the prediction that these measures would index significant reductions in fear for the experimental group.

Several additional points regarding methodology also need to be noted. Firstly, exact matching of subjects on all pre-treatment measures, while ideally desirable was practically impossible. Indeed,

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perfect matching on the one measure selected, i.e. B.A.T. scores, was not achieved. The effects of such imperfect matching are not clear, although the possible influence upon the reported findings cannot be disregarded. Secondly, baseline heart rate means were noticeably low: subsequent studies in this series report that baseline heart rate means for groups of college students are usually within the 70 - 80 bpm range. In this study, the mean for the total sample was 59.5 bpm. This may have been a function of the 15 minute relaxation period. However, it is also possible that it reflects measurement error and therefore the observations of heart rate must be regarded as suspect.

Experiment 2

AN INVESTIGATION OF THE EFFECTS OF DIFFERENT COPING STRATEGIES UPON FEAR OF COCKROACHES:

In Chapter 4 of this thesis a number of studies which examined the efficacy of a variety of cognitive therapies were reviewed. Briefly, the conclusions to be drawn from this review are as follows : firstly, it is evident that both speech anxiety and fears of animals and insects in college students have been reduced by cognitive behaviour therapies. Secondly, there is some evidence (i.e. Wine, 1970; Glogower, 1978) to suggest that while all of the components of cognitive restructuring therapies produce some reduction in fear, the major therapeutic component is the use of coping self-statements (CSS). Thirdly, it is also apparent that the nature of adaptive coping self-statements has yet to be clearly defined (indeed, in many studies researchers have tended to omit a full description of the statements used by their subjects).

Relevant to this third point, Meichenbaum (1977) has suggested ¹ that the cognitions which are presumed to mediate fearful behaviour are a function of the perception of the physiological concomitants of fear and, therefore, effective self-statements should focus upon adaptively coping with subjects' perceptions of being aroused in fear-evoking situations.

Consistent with this suggestion, Evans (1977) argued that adaptive self-statements include those which encourage fearful subjects to revise their perceptions by learning to expect and passively accept the physiological concomitants of fear and thus

1 This suggestion is discussed more fully in Chapter 3.

not be afraid of being (physiologically) afraid. The findings of the previous study offer some support for this suggestion by showing that the rehearsal of such statements significantly reduced avoidance behaviour in spider-fearful students. Interestingly, several other studies (e.g. Meichenbaum, 1971; Kazdin, 1973; also see Chapter 4 above) have also reported the efficacy of interventions which involved presenting subjects with self-statements designed to cope with physiological arousal. However, in these instances the coping self-statements were conceptually quite different from those used in Evans' study: they encouraged subjects to actively cope with the physiological concomitants of fear by self-instructing to "relax and keep calm" while they approached a phobic stimulus.

The interesting theoretical implications of these two coping strategies concerns their effect upon the physiological concomitants of fear. The coping self-statements used in the studies of Meichenbaum (1971) and Kazdin (1973) imply that a reduction in physiological arousal is a pre-requisite for approach behaviour (i.e. subjects must be calm and relaxed) and therefore, that such statements are adaptive only if they reduce that arousal. (Unfortunately, these studies did not include a measure of physiological arousal with which to test this hypothesis). In contrast, the coping self-statements examined in the previous study imply that a reappraisal but not a reduction of physiological arousal is necessary for approach behaviour; although such a reappraisal may result in a reduction of arousal.

These implications are interesting. They would seem to suggest that these coping self-statements produce reductions in fear (if indeed this is what they do) via different mechanisms.

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Although this need not necessarily be so. For example, it is conceivable that both strategies result in a perceived reduction in physiological arousal, rather than a reduction in arousal per se and that this perception results in reductions in subjectively and behaviourally expressed fear. Alternatively, it is possible that the rehearsal of the coping self-statements serve to distract subjects from those self-statements which usually mediate fear, thus resulting in a reduction of fear.

The investigation of these possibilities in future research might shed some light upon the nature of fear and the mechanisms by which self-statements modify fear. However, the purpose of the study reported below was to provide a further examination of the effects of the coping self statements devised by Evans (1977), and in addition to test the basic ¹ hypothesis that the coping self statements devised by Meichenbaum (1971) produce significant reductions in fear. The relative efficacy of these coping selfstatements was also of interest.

The effects of these strategies were examined by measuring the fearfulness of cockroach-fearful college students as they underwent a behavioural avoidance test (B.A.T.). Specifically it was predicted that subjects who rehearsed either of the coping strategies would express significantly less fear than control group subjects.

The measures of fear included a measure of approach behaviour (i.e. physical distance from a phobic stimulus), a subjective rating of fear (using a 10-point Fear Thermometer) and a physiological measure (i.e. heart rate). In order to validate

In the studies reviewed in Chapter 4 (i.e. Meichenbaum 1971; Kazdin, 1973, 1974a,b) these coping self-statements formed a part of treatments comprising several components and their efficacy has not been directly examined.

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the use of these measures as indices of fear, a low fear control group was incorporated in the experimental design: it was predicted that these measures would distinguish between the high and low fear subjects.

In addition, this low fear control group allowed for a comparison of the heart rate responses of high and low Fear subjects to a signal preceding the presentation of a phobic stimulus. On the basis of recent research findings (Hare and Blevings, 1975) it was expected that the heart rates of the fearful subjects would be characterised by acceleration in response to the signal, while the heart rate response of the low Fear group would be a deceleratory one. Moreover, observations made by Hare (1973) suggest that a similar pattern of heart rate response (i.e. acceleration for fearful subjects and deceleration for fearless subjects) would be expected following the presentation of a phobic stimulus.

METHOD

Subjects:

Forty-eight subjects took part in the study. They were selected from a total sample of 260 students who had completed Wolpe's (1973) Fear Survey Schedule (FSSIII). This selection was based upon their responses to the item 'crawling insects': 36 of them (high fear subjects) had indicated their fear to be 'much' (n = 21) or 'very much' (n = 15) while 12 (low fear subjects) reported that they were 'not at all' afraid. Equipment and materials:

A Grass Model 7D Polygraph recorder and D.C. driver amplifier were used to measure heart rate (bpm). Heart beats were recorded via 3 silver-plate electrodes placed on the right leg, left forearm and left leg (the earth). A manual event-recorder was also attached to the polygraph.

Subjects avoidance behaviour was measured by recording the distance (in centimetres) their hands moved towards the phobic stimulus, i.e. a cockroach. The precise distance was determined by using a length of cotton on a reel. The cotton was attached to the subjects' forefinger with an elastic band and as he moved towards the cockroach, from a fixed starting point, so the cotton unwound from the reel. The distance the cotton travelled from starting point to maximum approach response was recorded.

The cockroach was contained in an open-topped jar 3 inches deep and 5 inches in diameter. This container was coated with a clear non-stick substance (manufactured by I.C.I.) which ensured that the cockroach could not escape.

Procedure:

All selected subjects volunteered to take part in an experiment the nature of which was kept from them until they arrived at the test room.

Upon arrival at the test-room subjects were asked to confirm their FSSIII rating of their fearfulness of 'crawling insects' and then asked if their rating would be the same if the item read 'touching a cockroach'. Three subjects had reported a fear of crawling insects but were unafraid of cokroaches, therefore they were thanked for their help but dismissed at this stage. This procedure occurred before subjects were assigned to conditions and meant that a total of 51 subjects were screened in this manner before the total of 48 participants was reached.

These subjects were then read the following instructions :

"I am going to present to you a live, harmless cockroach. It will be in a container from which it cannot escape. I am going to ask you to try and touch it. Is that clear ? Do you wish to proceed ?"

None of the subjects refused to proceed.

All subjects were then given a brief explanation of the function of the polygraph in order to allay any unnecessary anxiety. Subsequently, they were seated in a room adjacent to the equipment room and the recording electrodes were attached with an assurance that no sensations would be felt from them. The subjects were not told that heart rate was being recorded.

Subjects were then given 8 minutes in which to 'acclimatise' to the electrodes and the test situation. In this time the High Fear subjects were assigned to one of the three conditions. This was done in the following way: the first scheduled subject from a particular FSS level (i.e. 4('much') or 5 ('very much') was assigned to the first of the 3 conditions; the second subject from that FSS level to the second condition and so on. This assignment procedure was repeated with each block of three subjects from each of the FSS levels, thereby guaranteeing an equal number of subjects from each FSS level (i.e. 7 from level 4 and 5 from level 5) in each of the three conditions.

Subsequently subjects received written instructions in accordance with their allocation. These were as follows : Passive Strategy condition:

For ease of distinction this condition is labelled the 'Passive Strategy Condition'. Subjects in this group received the following coping self statements (after Evans, 1977), printed on a sheet of A4 paper. They read as follows :

"Most people find that they can prepare themselves for

a difficult task by thinking about it. In the space below write down your ideas about facing up to your fear of cockroaches. Try to make it convincing, perhaps by imagining that you are giving instructions to help someone else."

A couple of sentences are given to start you off. "Of course I cannot help being afraid in this situation. I shall be afraid, but at least I should realise that there is no point in getting frightened of the fear. The feelings of fear cannot kill me, so I shall try and stand back and examine my fear; pounding heart, sweating palms"

Active Strategy Condition:

Subjects in this condition received the following coping self-statements (after Meichenbaum, 1971) printed on a sheet of A4 paper:

"Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below write down your ideas about facing up to your fear of cockroaches. Try to make it convincing, perhaps by imagining that you are giving instructions to help someone else."

"A couple of sentences are given to start you off.. 'Relax, keep calm, take this one step at a time. If other people can do it so can I. Take it slowly, breathe deeply, that's it. I am relaxed, calm. I can cope with this."

High Fear Control Condition:

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Subjects in this condition received the following instructions printed on a sheet of $\blacktriangle 4$ paper :

"Most people find that they can prepare themselves for a

difficult task by thinking about it. In the space below write down your ideas about facing up to your fear of cokroaches. Try to make it convincing, perhaps by imagining that you are giving instructions to help someone else."

The condition was incorporated into the experimental design in order to control for the possible non-specific effects of the other conditions, such as writing down and rehearsing self-statements.

Low Fear Control conditions:

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Low Fear control group subjects received the following instructions printed on a sheet of A4 paper :

"Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below please write down your ideas about facing up to your fears. Try to make it convincing, perhaps by imagining that you are giving instructions to help someone else."

Subjects were told to read the instructions carefully and take as long as they wanted over rephrasing the coping strategies in their own words (Passive and Active Strategy conditions) or devising their own strategies (High and Low Fear control conditions).

They were then told to read through and mentally rehearse the self-statements three times and use them during the subsequent behavioural avoidance test.

The cotton which was used to measure approach behaviour was then attached to the subjects' index finger. Subsequently the contained cockroach was placed behind a screen (and therefore out of sight) on a table in front of the seated subject.

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The table and container were positioned so as to make it easy for the subject to approach and touch the cockroach with their electrode-free hand. (This procedure was employed in order to minimise the effect of subjects' body movement upon heart rate and therefore increase the sensitivity of this measure as an index of fear). Subjects were then read the following instructions:

"I am going to present to you a live, harmless cockroach in a container from which it cannot escape. When I tell you to do so, I want you to try and touch it. Is that clear ? During this task I also want you to use the strategy that you have rehearsed." Subjects were then instructed : "Please focus upon the screen. It will be removed in ten seconds from now."

Heart rate was being recorded at this time and the tensecond period was event marked on the polygraph print-out. When the screen was removed ten seconds was allowed to elapse before the subject was told to try and touch the cockroach. When subjects stopped approaching but had not touched the cockroach (this point was also event-marked on the polygraph print-out), they were asked : "Can you go any further ?" ¹ If subjects moved any closer the polygraph print-out was again event-marked at the instant of their maximum approach response.

1 This high demand for approach (Wein et al. 1975) on the

B.A.T. was employed on the assumption that it would reduce the possibility that a significant difference between the High fear control and the Passive and Active strategy conditions reflected the influence of demand characteristics inherent in the latter two conditions. (See Bernstein and Paul (1971) for a discussion of this point.)

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Upon completion of this behavioural avoidance test (B.A.T.) subjects were asked to rate the fear they had experienced during the test by using a 10-point Fear Thermometer (F.T.) after Walk, 1956). This Fear Thermometer was anchored in the following way: subjects were told to equate 1 with calm relaxation, 5 with moderate fear and 10 with extreme fear.

Subsequently they were told to relax for 10 minutes after which time a baseline heart rate was recorded.

Finally, any questions subjects had about the experiment were answered and they were asked not to divulge the nature of the study to anyone.

RESULTS:

Behavioural Avoidance Test scores:

B.A.T. scores were not normally distributed: 18 of the 36 high fear subjects completed the B.A.T. (i.e. touched the cockroach - a score of 75). Therefore the hypothesis that the conditions resulted in differential approach behaviour was tested by subjecting B.A.T. scores to a Kruskall- Wallis one way analysis of variance. This analysis revealed that no statistically significant differences existed between the high fear groups (H = 2.88, df 2, p > .05). (Means are presented in Table 7). (An analysis summary table is presented in Table 9).

The Kruskall- Wallis H statistic (Steel, 1959) was used to compare the B.A.T. scores of each of the high fear groups with the Low Fear Control group. The analyses revealed a significant difference between the Low Fear and High Fear control group (T min = 102, df 3, p \leq .01) suggesting that B.A.T. scores were an index of fear. However, no significant differences were found between the Low Fear and Passive Strategy groups (T min = 126, df 3, 12, p >.05) or between the Low Fear and Active Strategy groups (T min = 114, df 3, 12, p > .05). Analysis of B.A.T. scores in terms of the number of subjects completing the final response (i.e. touching the cockroach) revealed a statistically non-significant distribution across the High Fear conditions $(\chi^2 (2) = 2.68, p > .05)$ for each condition these numbers were: Passive Strategy - 8; Active Strategy - 6; High Fear controls - 4).

Subjective ratings of fear:

Subjective ratings of fear for the high fear conditions were subjected to a Kruskall-Wallis one way analysis of variance. This analysis revealed no significant differences between the groups (H<1). (Means are presented in Table 7).

Using Steel's (1959) procedure for comparing all treatments with a control, scores for the high fear groups were compared with those of the Low Fear Control Group. These comparisons revealed that subjective ratings of fear were significantly lower for the Low Fear Group compared with each of the high fear groups: Low Fear (LF)group vs High Fear Control group (T min = 85, df 3, 12, p \leq .01): Low Fear vs Passive Strategy group (T min = 81, df 3, 12, p \leq .01); Low Fear vs Active Strategy group (T min = 84, df 3, 12, p \leq .01). (An analysis summary table is presented in Table 9). <u>Heart Rate</u>:

Baseline heart rates for all groups were subjected to a one-way analysis of variance (ANOVA). This analysis revealed a statistically significant difference between the groups (F = 3.14, df 3, 44, p $\leq .05$). The group means (which are presented in Table 8) show that the average heart rate for the Low Fear group was approximately 12 bpm faster than the average for the High Fear control group and between 7 and 9 bpm faster than the average for the Passive and Active strategy groups respectively. The reason

Table 7

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Table of Means (M) and Standard Deviations (SD) for the behavioural and subjective measures of fear

Measure		Active Strategy condition	Passive Strategy condition	High Fear control	Low Fear control
B.A.T. score (Range: 0 - 75 cms)	M SD	65.52 13.12	73.17 3.64	68.98 7.81	75.00 0.00
Subjective fear ratings (range 0 - 10)	M SD	5.17 2.12	5.17 1.51	4.67 1.86	1.50 0.80

for these differences is not clear although they may have been a function of the treatments administered. Therefore they cannot be assumed to reflect actual baseline variations. For this reason the analyses of heart rates recorded during the B.A.T. did not statistically control for these differences in 'baseline' scores.

The purpose of the subsequent analysis was to test the hypothesis that heart rate distinguishes between high and low fear subjects during approach towards a phobic stimulus. In addition, this analysis tested the prediction that subjects in the strategy conditions would experience lower levels of fear (indexed by slower heart rates) than the High Fear controls.

This analysis was a one-way analysis of variance (ANOVA) of heart rates for all groups recorded during the five second period prior to the instant of maximum approach on the B.A.T. It revealed, contrary to expectations, that no statistically significant differences existed between the groups (F = .48, df 3, 44, p > .05). Group means are presented in Table 8 and and plotted in Figure 1.

Figure 1 also illustrates the group heart rate means for three periods prior to the presentation (p) of the cockroach (i.e. p - 10 seconds; p - 5 seconds; p - 2 seconds) and for three periods after presentation (i.e. p + 2 seconds; p + 5 seconds; p + 10 seconds).

This figure shows that both the Low and High Fear control groups experienced an overall deceleration in heart rate in the minute prior to presentation and that all groups experienced a deceleration during the 1° second period prior to presentation. After the presentation the two control groups and the Active Strategy group experienced an initial acceleration in heart rate from p + 2 to p + 5 seconds and then a deceleration from p + 5 to p + 10 seconds. In contrast, for the Passive Strategy group the pattern of heart rate change during these periods was the reverse: initial deceleration and then acceleration.

A post hoc, two way analysis of variance for a repeated measures design: Group (4) \mathbf{x} Period (2), was computed in order to determine whether these heart rates differed significantly with respect to group or period. Heart rates for the ten second periods before and after presentation were used in the computation.

The analysis revealed statistically non-significant main effects of Group (F = 2.70, df 3, 44, p > .05) and Period (F = 0.30, df 3, 44, p > .05) and a non-significant Group x Period interaction (F = 2.33, df 3, 44 p > .05). (Group means are presented in Table 8). (See Appendix 3 for an ANOVA summary table).

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Table 8

Table of Means (M) and Standard Deviations (SD) for heart rates

Grou (n= <u>Measure</u> : Heart rate (b	p: 8)	Active Strategy condition	Passive Strategy condition	High Fear control	Low Fear control
	۲ <u>سر</u>				
Time (secs)					
P - 60 -	M	90.50	97.67	88.83	90.50
P - 10	M M	97.50	103.00	88.00	96.00
P - 5	M	97. . 00	100.00	86.00	95.00
P - 2	SD M	13.00 95.00	100.00	16.84 85.00	90.00
P + 2	SD M	17.32 100.00	17.32 102.50	17.32 85.00	18.11 92.50
P + 5	sd M	14.77 102.00	23.79 100.50	17.32 89 [.] 00	15.42 95.00
P + 10	SD M	12.00 100.83	18.29 101.00	13.00 87.00	13.97 93.50
н	SD	10.18	19.12	12.40	12.65
P = point of	f pres	entation of	cockroach		·
M - 5	M	101.00	102.00	95.00	98.00 16.83
M - 2	M	105.00	97.50	95.00	102.50
	SD	15.72	18.60	11.71	20.11
M + 2	M.	97.50	102.50	92.50 20.14	97.50 18.63
M + 5	SD M	98.00	104.00	95.00	102.00
	SD	8.61	17.97	15.74	18.86
M = point of maximum approach on the B.A.T.					
M + 10	M	100.00	103.00	95.00	102.50
	SD	9.34	16.50	13.50	16.74
M + 20	M SD	97.00 9.93	101.31 14.42	93.30 12.00	15.50
Baseline	M SD	81.00 8.96	83.12 11.29	77.31 8.99	90.10 11.67

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Table 9

Results Summary Table

Measure	Analysis	Outcome of Analysis	
B.A.T. scores	Kruskall-Wallis one way analysis of approach scores for the high fear conditions	H = 2.88, df 2, p > .05	
	The Kruskall-Wallis H statistic was used to compare the B.A.T. scores of each of the high fear groups with those of the Low Fear control group (LF)	LF vs High Fear controls p∠.01 LF vs Passive strategy condition p>.05 LF vs Active strategy condition p>.05	
	Chi square: a comparison of the number of high fear subjects in each group who touched thecockroach with the number who did not	X ² = 2.68x df 2, p>.05)	
Subjecti ve fear ratings	Kruskall-Wallis one way analysis of fear ratings for the high fear conditions	H=.8 df 2, p > .05	
	The Kruskall-Wallis H statistic was used to compare the fear ratings of each of the high fear groups with those of the Low Fear control group (LF)	LF vs High fear controls p < .01 LF vs Passive strategy condition p∠.01 LF vs Active strategy conditon p∠.01	
Heart ¹ rate	One way analysis of variance of baseline heart rates for all groups	F = 3.14, df 3, 44, p < .05	
	One way analysis of variance of heart rates recorded during the five second period prior to the instant of the maximum approach on the B.A.T.	F = .48, df 3, 44, p > .05	

1. A complete ANOVA summary table is presented in Appendix 3.

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DISCUSSION

Contrary to the findings of the previous study, the results of this study do not suggest that the rehearsal of the 'Passive Coping Strategy' (after Evans, 1977) is significantly more effective in reducing fear in cockroachfearful subjects than the rehearsal of personally devised strategies, i.e. those strategies rehearsed by the High Fear Control group. In addition, the present experiment failed to illustrate the expected fear-reducing properties of the 'Active Coping Strategy' (after Meichenbaum, 1971).

The reason why these expected differences did not emerge is not clear, although the observations which were made in this study do raise doubts about the adequacy of the experimental methodology, as a test of the hypothesised effects of the strategies. Specifically, these observations suggest that the subjects in all of the high fear groups were, on average, only moderately fearful during the B.A.T.: they reported only moderate amounts of subjective fear and approach scores show a marked ceiling effect, with 50% of subjects touching the cockroach. Moreover, heart rates recorded during the B.A.T. failed to distinguish between the high fear and low fear groups. It is conceivable that such levels of fearfulness, with little scope for further reductions, served to reduce the possibility of significant differences between the strategies emerging. Therefore, a more adequate investigation of the differential efficacy of the strategies would attempt to maximise the fearevoking potential of the behaviour avoidance test. This would have the effect of increasing the potential magnitude of fear reduction and, therefore, increase the probability of any real differences emerging.

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Maximising the fear-evoking potential of the B.A.T. could be achieved by selecting a sample of more highly fearful subjects (e.g. only those who reported 'very much' fear on the FSSIII), and by making the B.A.T. itself more demanding. For example, subjects could be asked to handle the feared stimulus rather than just touch it.

A future experiment might also include a second high fear control group who simply undergo a B.A.T. without the prior rehearsal of a strategy. The inclusion of such a group would allow for a test of the possibility (not considered in this or the previous study), that the rehearsal of any strategy is effective in reducing fearfulness.

A final point of interest about the observations made in this study concerns the pattern of heart rate responses to the signal ¹ preceeding the presentation of the cockroach. It is interesting to note that in the ten second period following the signal, but prior to presentation, the high fear groups showed an overall deceleration in heart rate ². This pattern of deceleration is inconsistent with research findings (Hare and Blevings, 1975) which suggest that the heart rates of fearful subjects awaiting a slide presentation of a phobic stimulus are characterised by acceleration.

- 1 This was the signal "Now" which was given to the subject by the experimenter and preceded. the presentation of the cockroach by ten seconds.
- 2 Also see Figure 1.

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One possible interpretation of these discrepant findings is that the heart rate responses of the high fear subjects in this study, including these of the High Fear control group, were influenced by the treatments which were administered prior to the signal. However, given that there is no evidence to suggest that the treatments had a significant effect upon any of the measures, a more plausible interpretation of this finding, and one which is consistent with the other observations discussed above, is that the observed pattern of heart rates were those of moderately fearful subjects, while those recorded by Hare and Blevings were those of highly fearful subjects. Indeed the pattern of heart rates for the high fear subjects in this study more readily resembles the deceleration noted by Hare and Blevings (ibid) for low fear subjects anticipating a slide presentation. We might speculate then, that anticipatory heart rates for highly fearful subjects are characterised by acceleration, while heart rate deceleration is characteristic of moderate or low levels of fear.

Alternatively, it is possible that these inconsistent findings reflect the different stimulus presentations (i.e. slide vs live stimulus), or that in this study heart rate acceleration for both high and low fear subjects reflected their readiness to perform a task (i.e. approaching the stimulus). Interestingly, Hare and Blevings, (ibid) have suggested that the anticipatory accelerative response they observed prior to pictorial stimuli, may represent a way of 'coping with an unpleasant situation, viz. tuning out, rejection, or alternation of disturbing stimuli, with the result that the impact of the CS (tone) - UCS (slide) complex

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is reduced somewhat.' However, they go on to suggest that such attenuation of potentially disturbing stimuli is only adaptive when the individual cannot 'use these stimuli to facilitate avoidance or escape behaviour.' It is possible that when subjects expect to see a live stimulus which they have been asked to approach, such attenuation is not as adaptive as an increased alertness and peripheral scanning for stimuli relevant to the situation and particularly to approach and avoidance: such increased alertness and peripheral scanning being characterised by heart rate deceleration (Hastings and Obrist, 1967).

Hopefully, future research will determine the nature of the relationship between the degree of fearfulness of subjects and their anticipatory heart rate responses to phobic stimuli presented in different ways.

In the 1⁰ second period following the presentation of the cockroach, the pattern ¹ of heart rates for the Active strategy and High Fear Control groups was one of initial acceleration (in the first 5 seconds) followed by deceleration between 5 and 10 seconds; the overall trend being acceleration. This pattern is consistent with the observations made by Hare (1973) and Hare and Blevings, (1975) of heart rate responses of fearful subjects to slides of spiders which were presented with and without signals. Interestingly, however, the third high fear group in the present study i.e. the Passive Strategy condition, exhibited the reverse pattern: deceleration followed by acceleration, but with an overall trend of deceleration. In addition, while Hare (1973) found that low fear subjects responded to slides of spiders with heart rate deceleration, the Low Fear group in this study responded with a pattern of heart rate change similar 1 Also see Figure 1.
to that of the High Fear control group, i.e. overall acceleration in the 10 second period following presentation.

The reason for these seemingly inconsistent observations is not clear although they must raise some doubts about whether high and low fear subjects can be considered to be reliably characterised by different patterns of heart rate change during stimulus presentations.

Finally, a discussion of some of the practical and methodological difficulties which arose in this and the previous study is warranted. It was because of these difficulties that subsequent experiments pursued the investigation of the efficacy of coping strategies using subjects with a fear of speaking in public rather than a fear of insects.

The first practical difficulty concerned the recruitment of large numbers of fearful subjects to take part in both pilot studies and experiments: this and the previous study greatly depleted the pool of insect and spider fearful subjects available. In addition, the results of the present study suggest that a more stringent criterion would need to be employed in future experiments if a sample of highly, rather than moderately, fearful subjects were required. Thus the number of potential subjects would be further reduced.

The second practical problem involved the acquisition of the phobic stimuli. Both spiders and cockroaches are surprisingly difficult to find at certain times of the year.

Of the methodological difficulties which arose the most interesting concerned the containment of the stimuli. In both studies care was taken to control for the movement of the stimuli andtherefore subjects were presented with a contained,

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motionless spider or cockroach. However, this procedure provoked some interesting comments from the subjects who took part in this study. A number of them asked after the B.A.T. if the cockroach was dead, while several commented upon the absence of movement and the roach's containment. When these subjects were questioned it became apparent that their perceptions had made thecockroach less frightening than they had expected it to be.

It seems then, that for some subjects at least, a contained. motionless cockroach is a different stimulus to a moving uncontained one: the latter possibly evoking significantly higher levels of fear than the former. If this is the case then presenting subjects with an uncontained roach would not only be expected to evoke higher levels of fear but also provide a more meaningful methodology for the assessment of treatment effects: in real life insects are usually uncontained. However, such a procedure is unlikely to be employed experimentally as it would create practical and ethical problems. Practically it would be difficult to accurately measure approach behaviour with both the subject and the stimulus moving, especially when the movement of the stimulus is unpredictable and variable. Moreover, a moving subject would reduce the sensitivity of heart rate as an index of fear because such movement would also affect this variable. In addition, physiological recording would be ethically difficult to justify if it involved restricting the subjects' movements (i.e. by being wired to a polygraph) and therefore their ability to avoid the moving stimulus.

Experiment 3:

AN EXAMINATION OF THE POSSIBLE USE OF VIDEO-RECORDING AS AN ALTERNATIVE TO A LIVE AUDIENCE IN INVESTIGATIONS OF PUBLIC SPEAKING ANXIETY

Due to the practical and methodological difficulties encountered in the previous studies a different 'target behaviour' was chosen for subsequent investitations, namely fear of speaking in public. This particular fear was chosen for a number of reasons. Firstly, within the college population which was screened $\frac{1}{2}$ for types and intensity of fears there was a large number of subjects who reported extreme fear of public speaking: 18% of females and 15% of males indicated their fear to be 'very much' on the FSS III (Kartsounis, Mervyn-Smith and Pickersgill, 1983) While indexing a large pool of potential subjects these figures also illustrate the widespread nature of a problem possibly debilitating for many people during college life. Secondly, several studies have demonstrated the amenability of public speaking to a variety of behavioural, subjective and physiological measures (e.g. Blom and Craighead, 1974; Paul, 1966). Thirdly, Borkovec et al. (1974) have argued that indices of public speaking anxiety are resistant to the influence of simple demand or suggestion effects.

Nevertheless, practical problems do exist for researchers investigating speech anxiety, the most notable of which is assembling a live audience. It was considered that one possible solution to this problem would be to use a video-camera instead of an audience: if such a stimulus elicits high levels of fear from

1 Using Wolpe's (1973) Fear Survey Schedule (FSS III)

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speech-anxious subjects then it would have clear practical advantages over the use of a live audience. In addition, a video-recording would provide the researcher with a permanent record of the data source which could be analysed and re-analysed whenever required. Furthermore, video-recording could provide the basis for a standard procedure for investigating speech anxiety which would allow for the direct comparison of research findings. That such a standard procedure is needed is evident from a review of the literature which revealed a good deal of variation in the experimental methodology of those studies investigating speech anxiety, especially with respect to the audience. For example, the size of an audience has varied from one person in some studies (Borkovec et al. 1974) to ten in others (Fremouw and Zitter, 1978) while the composition has varied from a group of clinical psychologists and students (Meichenbaum et al. 1971) to fellow subjects (Fremouw and Zitter, 1978).

Observations made in a pilot study did indeed show that subjects who reported high levels of 'speech-anxiety ¹ expressed high levels of fear ² during the presentation of an impromptu speech to a video-camera. The procedure also involved instructing these subjects that the film of their performance may be shown to a live audience at a later date.

Therefore, the purpose of the present study was to provide a controlled test of the hypothesis that this stimulus complex (i.e. video-camera plus instructions) would elicit significantly more fear from high ¹ fear public speakers than subjects low ¹ in speech anxiety.

1 This was determined by their response to the item 'speaking in public on Wolpe's (1973) Fear Survey Schedule (FSS III).

2 Indexed by subjective, behavioural and physiological measures.

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This hypothesis was tested using behavioural and subjective measures. The behavioural measures included word count (i.e. number of words spoken) and the aggregate duration of silence during the speech. Several researchers (e.g. Geer, 1965; Meichenbaum et al 1971), have shown that these measures distinguish between high and low speech anxious subjects and suggested therefore, that they index speech anxiety. More specifically, Geer (1965) found that high fear speakers produced longer silences than low fear speakers during an impromptu speech, while Meichenbaum et al (1971) found that high fear subjects spoke significantly fewer words than a low fear group during a four-minute speech presented to a live audience.

In accordance with these findings it was predicted that the high fear subjects in this study would produce significantly fewer words and significantly more silence than low fear subjects.

Speech disruptions ¹ were also scored. Mahl (1956) has reported that speech disruptions index anxiety in psychiatric patients during interview, although Fremouw and Harmatz (1975) and Meichenbaum et al (1971) found that this measure failed to distinguish between high and low speech-anxious college students presenting prepared speeches. Therefore, in this study this measure was included in order to test the possibility that speech disruptions index anxiety in fearful subjects presenting impromptu speeches. Specifically, it was predicted that low fear subjects would emit significantly fewer disruptions than the high fear speakers.

During the pilot study it was also noted that in terms of 1 'Ums', 'ahs', stutters, repetitions.

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these behavioural measures the high fear subjects tended to show a deterioration in performance during their speech. Specifically, as time went on they spoke fewer words, silence increased and so did disruptions. Therefore, in order to examine the possibility that high and low fear speakers exhibit significantly different intraspeech trends in performance, the behavioural measures were scored and analysed in terms of three forty-second periods for the two minute speeches.

Subjects were also asked to rate the degree of fear they experienced at three points of their speech presentations. Prior to their speech they were asked for a rating and following it they were asked to rate the degree of fear they had experienced at the beginning and towards the end of their speech. It was predicted that ratings for each point would index significantly higher levels of fearfulness for the high fear speakers.

The effect upon heart rate of presenting an impromptu speech to a camera was also examined in this study. Borkovec and Rachman (1979) have noted in their literature review that speech anxiety is 'characterised by substantial anticipatory heart rate activity'. However, of the few studies (e.g. Blom and Craighead, 1974; Faul, 1966) which have examined such 'anticipatory heart rate activity' none have used groups of low fear subjects with which to validate the use of this measure as an index of fear. Therefore, in the present study heart rates were recorded during a ten-second period prior to speech presentations in order to test the hypothesis that this measure distinguishes between high and low fear speakers. Specifically, it was predicted that heart rates for the high fear subjects would be significantly higher than those of the low fear group during this period. Heart rates were also recorded during speech presentations in order to test the hypothesis that this

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measure indexes fear while speakers are giving an impromptu speech. Again it was predicted that the heart rates for the high fear speakers would be significantly higher than those for the low fear subjects.

In the same way as with the behavioural measures, heart rates recorded during speech presentations were also analysed in terms of three forty-second periods of the speech in order to determine possible differential trends for the high and low fear groups.

METHOD

Subjects:

Twenty subjects took part in the study, all of whom were college students. These subjects were selected from 260 students who had completed Wolpe's (1964) Fear Survey Schedule (FSS III). They were selected on the basis of their response to the item 'speaking in public': 10 had indicated their fear to be 'much' (n = 4) or 'very much' (n = 6) (High Fear Group), and 10 had indicated their fear to be 'not at all' (Low Fear Group). Equipment/Materials:

A Phillips camera and Sony video-recording equipment were used to record subject's speech presentations.

Before, during and after their speeches, subject's heart rates were monitored and recorded via a finger-plethysmograph linked to a pulse meter and counter. A San El pulse meter was used to pick up the signal from the light-sensitive-cell plethysmograph and the monitor light on the meter was used to generate a digital display on a counter. This display consisted of a number of flashes emitted by the monitor light in consecutive 5-second periods, or essentially the number of heart beats per 5-seconds. The digital display was recorded by the experimenter. (See Appendix 4 for a wiring

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diagram of this apparatus and an example of the experimenter's recording sheet.

Measures:

i) Behavioural:

Three measures of speech performance were scored:

- (a) The number of words spoken word count (wc),
- (b) The sum of each period of silence longer than 1second silence (s), and
- (c) The number of disruptions (d), i.e. 'um', 'ah', stutters and repetitions.

These measures were scored for each of the 3 forty-second periods of each 2-minute speech.

ii) Subjective ratings of fear:

Subjects used a 10 point Fear Thermometer (FT) (after Walk, 1956) to rate thedegree of fear they experienced at three points of their speech presentations: prior to their speech they were asked for a rating and following it they were asked to rate the degree of fear they experienced at the beginning and end of the speech. They were told to equate 1 with calm relaxation, 5 with moderate fear and 10 with extreme fear.

iii) Physiological measure:

Heart rates(bpm) were recorded for a ten second period prior to speech presentations and for the duration of the two minute speech. It was scored for each of the three forty-second periods of each speech.

A baseline heart rate was also recorded for a 30 second period 10 minutes afterthe completion of the speech.

Procedure:

The procedure was exactly the same for subjects in both the High Fear (HF) and Low Fear (LF) groups.

Subjects arrived at the test-room not knowing the nature of the study; they had simply volunteered to take part in an experiment. Upon arrival they were reminded of their response to the item 'speaking in public' on the FSSIII and asked to re-appraise it. If their response remained the same (which

it did for all subjects) they were given the following instructions :

"I would like you to speak into the camera you see in front of you (it was placed fifteen feet away from the desk at which they were sitting) on a given topic for two minutes. You will have no time to prepare your speech. The recording of your presentation will be shown at a later date to an audience of people from outside the college. These people willhave no knowledge of the topic I will ask you to talk about, so direct your speech to

One High Fear subject from the original sample of ten refused to take part and therefore another speech anxious student was asked to take part.

them. Is that clear ? Do you wish to proceed ?"

The subjects who agreed to proceed sat at a desk in front of the camera and their left fore-finger was placed in a finger plethysmograph which was fixed to the desk top. In order to allay any unnecessary anxiety they were told that the plethysmograph measured 'blood flow' and that they would not feel any sensations from it. A brief description of how the plethysmograph worked was given. No mention was made of heart rate recording. A microphone was then clipped to a suitable item of the subjects' clothing and at the same time they were given an explanation of its purpose.

Subjects were then asked to use the Fear Thermometer to rate the fear they were experiencing in anticipation of presenting a

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speech. Subsequently, they were given the following instructions:

"Printed on the card on the desk is the topic on which I want you to speak (i.e. 'What I expect to get from college life'), please read it." When subjects had read the card the instructions continued: " I will give you three signals; I will say 'Ready' and then ten seconds later I will say 'Now'. You will start your presentation then and stop when I say 'Stop'. Is that clear ?"

In the 10 second period prior to the speech presentation and throughout the two minute speech, heart rate was being monitored and recorded by the Experimenter, who remained in the test-room sitting in a corner behind the subject. A technician, who remained out of sight in an adjacent equipment room, operated the filming equipment and synchronised (using the signals given to the subject) a digital timer which was superimposed onto the film.

Following their speech presentations subjects were asked to use the Fear Thermometer to rate the fear they experienced at the beginning and towards the end of their speeches. They were then told that the final part of the experiment involved taking a baseline recording of their heart rate. They were asked to relax and ten minutes after the completion of their speech a baseline recording was taken for a 30 second period. Subsequently subjects were given a chance to see the film of their speech presentation and asked for their permission to show the recording to a live audience. Finally, subjects were asked not to divalge the nature of the experiment to anyone.

RESULTS

i) Behavioural Measures:

Silence (s), word count (wc), and disruptions (d), were scored for the three,40 second periods of each speech. Each of these measures was scored by the Experimenter ¹. Silence was scored with the aid of the digital timer superimposed upon the video tape and word count and disruptions were scored with the aid of a hand-counter. Each recording was scored twice for each measure and where discrepancies existed between the scores, the recording was scored a third time.

Scores for each of these variables were subjected to an ANOVA for a two factor experimental design: Group (High Fear vs Low Fear) x Period (3) (F ratios are presented in Table 14 and ANOVA summary tables are presented in Appendix 5).

1 As a check on the accuracy of the Experimenter's (E) scoring a colleague blind to the hypotheses tested, scored ten of the recordings: five selected randomly from each of the groups. Seven of a total of 30 of this colleague's scores were discrepant with those of the examiner: 2 were disruption scores, 3 were silence scores and 2 were word count scores. Re-scoring (both by the examiner and the colleague) of the recordings confirmed four of the examiner's original scores and three of the colleague's. Of the errors made by the examiner, 2 were disruption scores and one was a word count score. The margin of error was one and 2 disruptions not scored on two recordings of High Fear subjects. It was felt that these were acceptable degrees of error and that further checking was not required.

a) <u>Silence</u>:

Analyses of silence scores revealed a statistically significant main effect of Group (F = 11.84, df 1, 18, p<.01). As expected the High Fear subjects were silent for significantly longer than Low Fear subjects. (Means are presented in Table 10). The effect of Period did not reach statistical significance (F = 2.74, df 2, 36, p > .1) although the Group x Period interaction did (F = 6.16, df 2, 36, p < .01).

The means reflecting this interaction (which are presented in Table 1C and plotted in Figure 2), illustrate the consistent intraspeech performance of the Low Fear group in terms of silence and the marked increase in silence for the High Fear group during Period 3. A planned test for a linear trend in the silence means for the High Fear group (from Period 1 to 3) revealed that this increase was statistically significant (F = 11.59, df 1, 36, $p \le 01$). b) Word Count:

The expected main effect of Group did not emerge from the analysis of word count scores ($\mathbf{F} = 3.9$, df 1, 18, p > .1), although a statistically significant main effect of Period did ($\mathbf{F} = 4.41$, df 2, 36, p < .05). This main effect is most readily interpretable in terms of a significant Group x Period interaction ($\mathbf{F} = 20.5$, df 2, 36, p < .01). The means reflecting this interaction(which are presented in Table 10 and graphically illustrated in Figure 3) show the consistent intra-speech performance of the Low Fear subjects and the marked reduction in words spoken by the High Fear Group during Period 3. A planned test for a linear trend in word count means for the High Fear group (from Period 1 to 3) revealed that this reduction was statistically significant ($\mathbf{F} = 242$, df 1, 36, p < .01).





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c) <u>Disruptions</u>:

The analysis of disruption scores revealed a statistically non-significant main effect of Group (F<1), although a significant main effect of Period (F = 3.64, df 2, 36, p <.05) did emerge. This main effect of Period is most readily interpretable in terms of a significant Group x Period interaction (F = 5.2, df 2, 36, p <.05). The means reflecting this interaction are presented in Table 10 and graphically illustrated in Figure 4 . The graph shows the intraspeech consistency of the Low Fear group in terms of speech disruptions and a marked reduction for the High Fear group after the first speech period. A planned test for a linear trend in the Disruption means (from Period 1 to 3) for the High Fear group revealed that this intraspeech reduction was statistically significant (F = 12.18, df 1, 36, p <.01).

In summary, only the analysis of silence scores revealed the expected main effect of Group (i.e. significantly more silence for the High Fear group) although the effect of this factor upon word count scores approached statistical significance ¹. However, when intraspeech trends were considered both of these measures distinguished between the groups, with the High Fear group showing a significant intraspeech deterioration in performance. ²

The intraspeech trend in disruptions for the High Fear group was also statistically significant although this trend was in the direction opposite to that expected, i.e. an intraspeech reduction in disruptions.

1 The.05 rejection region was adopted in all statistical evaluations.

2 i.e. fewer words spoken and more silence









Table 10:

Table of Means (M) and standard deviations (SD) for the behavioural measures:

		Group $(n = 10)$			
		High Fear		Low Fear	
Measure	Speech P _{eriod}	M	SD	М	SD
Word count (No.)	1 2 3	78.60 84.30 57.80	22.16 22.18 31.79	92.70 88.60 99.00	24.07 23.07 17.10
Silence (secs)	1 2 3	8.70 8.20 16.70	5.42 6.73 10.47	2.45 4.40 1.80	4.17 8.95 1.99
Disruptions (No.)	1 2 3	3.90 2.00 2.10	3.51 2.36 2.13	2.10 2.40 2.10	1.85 2.01 1.91

ii) Subjective Fear Ratings:

a) Anticipatory Fear ratings:

Subjective ratings of fear recorded prior to speech presentation were subjected to a t-test for independent groups.

The analysis revealed as expected, that high fear subjects reported significantly higher ratings (i.e. more fear) than low fear subjects in anticipation of speaking (t = 6.03, df 18, p < 01). The group means are presented in Table 11 and plotted, as Rating 1 in Figure 5, above.

b) Subjective ratings of fear experienced during speech presentations:

Subjective ratings reflecting fear experienced during speech presentations were subjected to a two-way ANOVA for a repeated measures experimental design: Group (2) x Rating (2). (F ratios emerging from these analyses are presented in Table 14 and ANOVA summary tables are presented in Appendix 5.)

The analyses revealed a statistically significant main effect of Group (F = 22.6, df 1, 18 p4 01). This main effect is illustrated by Figure 5, which shows group means plotted as a function of rating (rating 2 reflects fear experienced at the beginning of the speech; rating 3 reflects fear experienced towards the end of the speech). This figure shows that high fear subjects were more fearful than low fear subjects during their speeches. It also illustrates the statistically significant main effect of rating (F = 5.1, df 1, 18, p < .05) with both groups experiencing a reduction in subjective fear by the end of their speeches.

The Group x Rating interaction was statistically non-significant (F<1).

In summary, these results suggest, as expected, that the High Fear group were significantly more fearful than the low fear subjects both before and during their speeches. In addition, the analysis of ratings reflecting fear experienced while speaking suggests that both groups experienced significant intraspeech reductions in fear.

Table 11:

Table of means (m) and standard deviations (sd) for the subjective fear ratings:

		Group $(n = 10)$			
		High Fear Low Fear		Fear	
Measure	Rating	M	SD	M	SD
Subjective fear	1 2 3	7.05 7.20 6.00	1.83 2.31 2.87	3.70 3.30 2.50	0.95 1.25 0.97

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iii) <u>Heart rate Measures</u>:

Pearson correlation coefficients were computed for baseline heart rates ¹ and heart rates recorded during speech presentations for both groups. These coefficients (see Table 12) do not suggest with any consistency that a positive linear relationship exists between these measures. Therefore, the following analyses of heart rates were made without statistically adjusting for baseline differences between the groups.

Table 12

Coefficients of correlation between baseline heart rates and heart rates recorded before and during each of the three speech periods

	Group			
Phase of speech	High Fear (n = 10)	Low Fear $(n = 10)$		
10 second period prior to speech presentation	14	•54		
Speech Period 1 2 3	43 .18 .21	•77 * •20 •79 *		

* p <.01 (one-tailed tests)

1 For all analyses heart rates were scored in terms of beats per minute.

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a) Anticipatory Heart Rates:

Anticipatory heart rates (i.e. those heart rates recorded in the 10 second period prior to speech presentations) were subjected to a t-test for independent groups. This test revealed a statistically significant difference between the groups (t = 2.21, df 18, p < .025). This difference is graphically illustrated by Figure 6 (group means are also presented in Table 13) which shows that heart rates for the High Fear group were, as expected, higher than those for the Lor Fear subjects.

b) Heart rates recorded during speech presentations:

Heart rates recorded during the speeches were subjected to an ANCVA for a two-factor experimental design: Group (2) \mathbf{x} Period (3), with repeated measures on one factor i.e. Period.

This analysis revealed statistically non-significant main effects of Group (F = 1.3, df 1, 18, p > .05) and Period (F = 1.4, df 2, 36, p > .05). Similarly the Group x Period interaction was not significant (F<1). (Group means are presented in Table 13 and plotted in Figure 6. F ratios are presented in Table 14 and ANOVA summary tables are presented in Appendix 5).

In summary, these results show that heart rate distinguished between High and Low Fear public speakers who were anticipating presenting an impromptu speech to a video camera. Consistent with expectations heart rates for the High Fear subjects were significantly higher than those of the Low Fear group. However, contrary to expectations heart rates recorded while subjects were speaking failed to distinguish between the group**S**. In addition, while both groups experienced intra-speech reductions in heart rate (see Figure 6) these trends were not statistically significant.

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Table 13

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Table of Means (M) and standard deviations (SD) for the heart rate measures:

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		Group $(n = 10)$			
		High Fear Low Fear		w Fear	
Measure	Speech Period	M	SD	М	SD
Heart rate (BPM)	Antici- patory 1 2 3 Base Line	100.20 104.39 105.90 100.80 75.21	13.57 22.32 24.72 23.02 6.48	87.00 98.20 92.90 92.60 76.44	11.75 12.23 14.70 15.49 4.31

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Table 14

Summary tableof Analyses of Variance (ANOVAs) for all measures.

		Measures					
		Silence	Word Count	Disruptions	Heart rate	Subjective fear rating	
Source of variat- ion	DF	F ratio	F. ratio	F ratio	F ratio	F ratio	
Group Residual	1 18	11.84***	3.89*	0.23	1.28	22.63***	
Period	2	2•74*	4.41**	3.64**	1.44		
Group x Period	2	6.16***	20.45***	5.18**	0.83		
Residual	36						
Rating	1					5.10**	
Group x Rating	1					0.20	
Residual	18						

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* p <.1

** p <.05

***p <.01

¹Complete ANOVA summary Tables are presented in Appendix 5.

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DISCUSSION

The above results offer some support for the hypothesis that individuals who report ¹ 'much' or 'very much' fear of speaking in public (i.e. high fear speakers) experience and express significantly more fear than those who have no fear of public speaking (i.e. low fear speakers), when presenting an impromptu speech to a video-camera with the knowledge that the recording of their performance will be viewed by an audience at a later date.

Specifically, it was found, consistent with expectations and previous findings (Geer, 1965), that silence distinguished between the groups of high and low fear speakers, with the former group producing significantly longer durations of silence than the latter. Given that this measure indexes speech anxiety this finding suggests that the high fear speakers were significantly more fearful than the low fear subjects during their speeches, and consistent with this interpretation, it was also found that the High Fear group experienced significantly higher levels of subjective fear while speaking, than the Low Fear group. Furthermore, the analysis of subjective fear ratings also shows that the High Fear group reported being significantly more fearful than the Low Fear group in anticipation of speaking.

Interestingly, word count per se did not distinguish between the groups although the intra-speech trends in word count were significantly different. Consistent with expectations, and the suggestion that the High Fear group were significantly more fearful than the Low Fear group, the former group produced a significant intra-speech reduction in words spoken, while word production for the latter group remained fairly constant. 1 Using Wolpe's (1973) FSSIII.

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Speech disruptions also distinguished between the High and Low Fear groups when intraspeech trends were considered, although contrary to expectations the High Fear subjects showed a significant intra-speech reduction, rather than increase, in disruptions. However, in retrospect, it seems more plausible to expect that disruptions would decrease over the course of a speech especially if there is an intraspeech increase in silence and decrease in words spoken: disruptions are less likely if a subject is not speaking. If speech disruptions do reflect anxiety but are also dependent upon whether the subject is speaking, then a more sensitive index of anxiety, when the speech is impromptu, might be the ratio of disruptions to words spoken. This possibility could be examined in future studies.

In summary then, the behavioural measures of word count and silence and the subjective ratings of fear, suggest that the High F ear group were significantly more fearful than the Low Fear subjects during their speeches. In addition, subjective ratings suggest that the high fear speakers were significantly more fearful in anticipation of speaking. Contrary to expectations, disruptions did not index higher levels of anxiety for the High Fear group.

The prediction that anticipatory heart rates would distinguish between the groups was also upheld. As expected heart rates for the high fear subjects were significantly higher than those for the Low Fear group. Given that the High Fear group were subjectively more fearful than the Low Fear group in anticipation of speaking, it seems plausible to suggest that this difference in heart rates also reflects a significant difference between the groups in fearfulness. Thus, this finding supports the hypothesis that anticipatory heart rate is an index of fear.

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In contrast, the hypothesis that heart rate is an index of fear while subjects are speaking is not supported. Contrary to expectations heart rates recorded during the speeches failed to distinguish between the groups. It is interesting to note however, that both groups did experience substantial increases in heart rate above baseline during their speeches (see Figure 6) We might speculate that these increases not only reflect the anxiety generated by the task but also the mental and physical effort required to produce an impromptu speech. If this is the case then it is possible that the expected difference in heart rates between the groups, due to differences in fearfulness, was obscured by the effect upon this variable of the mental and physical effort common to both groups. We might speculate further that heart rate would be a more sensitive index of speech anxiety when the mental and physical effort required to deliver a speech is minimized; for example when subjects are reading a rehearsed speech. This possibility might be examined in future studies.

Finally, it is interesting to note that the analyses revealed significantly different intraspeech trends for the groups with respect to both word count and silence. The means show (see Table 10) that word production and silence for the Low Fear group was fairly constant across speeches. However, the performance of the High Fear group deteriorated significantly during their speeches. They spoke fewer words while silences became increasingly longer. If, as assumed, these measures index fear, then we might speculate that the intraspeech trend for the High Fear group reflects a significant intraspeech increase in fearfulness. However, the analysis of subjective fear ratings suggests that both the High and Low Fear groups experienced a significant intraspeech reduction in fear. How can these apparently contradictory findings be interpreted ?

Perhaps the most straightforward interpretation is that the observed desynchrony between these measures reflects the partial independence of these systems (i.e. behavioural and subjective) of fearful expression. Such an interpretation is consistent with a "Three-Systems-Model' of fear (Lang et al, 1972, Rachman, 1978) which proposes that fear is best construed as a set of loosely coupled, partially independent components.

Alternatively, it is possible that these desynchronous trends do not reflect differences in the systems of expression but the way in which these expressions of fear were measured. In the study subjects were asked to rate the degree of subjective fear they felt at the beginning and 'towards the end' of their speech. As these ratings were retrospective it is possible that the ratings for 'towards the end' of the speeches were influenced not only by the fear subjects experienced towards the end of their speech but also the 'fear relief' they may have felt when they were told to stop speaking. Thus it may be misleading to compare these ratings with the behavioural measures which indexed the trend in fear from the first to the last forty-second period of the speeches.

Whatever the explanation, it is hoped that future research might shed some light upon this puzzling observation.

To conclude, the results of this study suggest that the stimulus complex of video-camera plus instructions, elicited significantly more fear from the High Fear speakers, both before and during the presentation of an impromptu speech. Therefore, this stimulus complex can be used as an effective substitute for a live audience in future investigations of speech anxiety.

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Experiment 4

AN INVESTIGATION OF THE EFFECTS OF DIFFERENT COPING STRATEGIES UPON SPEECH ANXIETY

In Chapter 4 of this thesis a number of studies which examined the efficacy of a variety of cognitive therapies were reviewed. Briefly, the conclusions to be drawn from this review are as follows : firstly, it is evident that speech anxiety and fears of animals and insects in college students have been reduced by cognitive behaviour therapies. Secondly, there is some evidence (i.e. Wine, 1970; Glogower et al. 1978) to suggest that while all of the components of cognitive restructuring therapies produce some reduction in fearfulness, the major therapeutic component is the use of coping self-statements (CSS). Thirdly, it is also apparent that the nature of adaptive/effective coping self-statements has yet to be clearly defined. Indeed in most studies researchers have tended to omit a full description of the self-statements used by their subjects.

Two of the coping strategies which have been described (Meichenbaum, 1971; Evans, 1977) evolved from Meichenbaum's (1977) suggestion ¹ that the cognitions which are presumed to mediate fearful behaviour are a function of the perception of the physiological concomitants of fear. Interestingly, however, the CSS devised by these researchers are quite different. ² Evans' CSS encouraged subjects to passively expect and accept the physiological concomitants of fear, while Meichenbaum's encouraged subjects to actively cope with these concomitants by self-instructing to 'relax and keep calm'.

The purpose of the second experiment in this series was to provide a test of the hypothesis that the rehearsal of these coping 1 This suggestion is discussed more fully in Chapter 4. 2 The possible theoretical implication of these coping self-statements are discussed in Experiment 2.

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strategies results in a significant reduction in fear (i.e. fear of cockroaches), although it failed to do so satisfactorily. Therefore, the present study was carried out in order to provide a further test of this hypothesis. However, this study differed from the former study in several important respects Firstly, the results of the previous study (i.e. experiment 3) suggest that speech anxiety is indexed by behavioural, subjective and physiological measures when speakers are presenting an impromptu speech to a video-camera with the knowledge that the recording of their performance will be viewed by a live audience at a later date. Therefore it was decided to use this experimental method in the present study in order to examine the effects of the coping strategies upon speech anxiety. Secondly, experiment 2 included a condition designed to control for the effects upon fear of writing down and rehearsing a coping strategy; this group devised and rehearsed their own coping self-statements before undergoing the behavioural avoidance test (BAT). However, the study did not include a control group which simply underwent the B.A.T. Thus, the possibility that subjects' personally devised coping strategies were effective in reducing fearfulness could not examined. This omission was remedied in this study. be Specifically, the experimental design included four conditions in which subjects either rehearsed coping self-statements based ¹ upon those devised by Meichenbaum or Evans (experimental conditions) or rehearsed their own personally devised coping strategies, or simply underwent exposure to the fear-evoking task without prior

1 As in experiments 1 and 2 subjects were asked to rephrase the coping self-statements in their own words but maintain the meaning.

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preparation (control conditions). Thirdly, in the present study subjects were exposed to the phobic stimulus on two occasions, i.e. they gave two speeches. It was considered that the differential fear-reducing effects of the experimental and control conditions might become more readily apparent during a second speech, after subjects had rehearsed and experienced using the coping strategies during the first speech. More specifically it was expected that the experimental groups would experience significantly greater inter-speech (i.e. from speech 1 to 2) reductions in fear.

The specific predictions made with regard to each of the measures of fear used were as follows. Firstly, the findings of the previous study (i.e. Experiment 3) show that the impromptu speeches of high fear speakers are characterised by a significant intra-speech deterioration in terms of behavioural measures, i.e. a reduction in words spoken and an increase in silence. Therefore, in the present study it was expected that the fear-reducing properties of the coping strategies used by the experimental groups would be demonstrated by significantly different intra-speech trends in these indices for the four groups. More specifically, it was predicted that the intra-speech deterioration in performance would be significantly greater for the control groups during both speeches. In addition, it was considered that all groups would experience an inter-speech (i.e. from Speech 1 to 2) reduction in fear as a function of their repeated exposure to the phobic stimulus and that that reduction would be indexed by an improvement in performance, i.e. more words spoken and less silence during the second speech. However, it was also predicted that the experimental groups would demonstrate a significantly greater inter-speech improvement in performance compared to the control groups.

Secondly, the results of the previous study also show that

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speakers' fear both before and during the presentation of a speech is indexed by subjective ratings on a 10 point Fear Thermometer (after Walk, 1956). Therefore, in the present study it was predicted that this measure would reflect the expected difference between the experimental and control groups. More specifically, it was predicted that the former groups would report significantly lower levels of fear both before and during their speeches. In addition, it was expected that all groups would experience intra¹ and inter-speech reductions in subjective fear but that these reductions would be significantly greater for the experimental groups. Thirdly, the findings of the previous study also show that anticipatory heart rates (i.e. those recorded in a ten second period prior to speaking, also index speech anxiety. Therefore in this study it was predicted that the expected lower levels of fear for the experimental groups would be indexed by significantly lower anticipatory heart rates for these groups compared to the control groups.

The results of experiment 3 also show that the heart rates of high and low fear speakers recorded while they were speaking were markedly elevated above baseline, although this measure failed to distinguish between these groups. In addition, the observations made in this study show that both of these groups experienced an intra-speech deceleration in heart rate; albeit a statistically non-significant one. However, it might be expected

1 Intra-speech changes in subjective fear were measured by asking subjects to rate the fear they experienced at the beginning and end of each of their speeches.

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on the basis of this trend that high fear speakers would show a continued deceleration in heart rate with repeated exposure, be, during a second speech. Therefore in the present study, heart rates were recorded during the subjects' speeches in order to determine whether high fear speakers experience significant interspeech reductions in heart rate and furthermore whether the groups experience different inter-speech trends in heart rate consistent with the trends expected for the behavioural and subjective measures.

METHOD

Subjects:

Thirty-two subjects¹ took part in the study. They were selected from approximately 320 students on the basis of their response to the item 'Speaking in Public' on Wolpe's (1973) Fear Survey Schedule (FSS III). Twenty-four of the subjects had indicted their fear of speaking in public to be 'very much' and eight had indicated their fear to be 'much'.

Equipment/Materials:

A Phillips camera and Sony video recording equipment was used to record subjects' speech presentations.

Before, during and after their speeches, subjects' heart rates were monitored and recorded via a finger plethysmograph linked to a pulse meter and counter. A San El pulse meter was used to pick up the signal from the light-sensitive-cell-plethysmograph and the monitor light on the meter was used to generate a digital display on a counter. This display consisted of the number of flashes emitted by the monitor light in consecutive 5 second periods, or essentially the number of heart beats per 5 seconds. The digital display was recorded by the experimenter (See Appendix 4 ¹ None of these subjects had taken part in the previous study. for a wiring diagram of this apparatus and an example of the experimenter's recording sheet).

Experimental Design:

Thirty-two subjects were assigned to one of four conditions labelled: Active Strategy, Passive Strategy, Control Strategy and Control condition. They were assigned to these conditions in the following way: the first scheduled subject from a particular FSS level (i.e. 4 - 'much' or 5 - 'very much') was assigned to the first of the four conditions; the second subject from that FSS level to the second condition and so on. This assignment procedure was repeated with each block of four subjects from each of the FSS levels, thereby guaranteeing an equal number of subjects from each level in each of the four conditions, i.e. 6 from level 5 and 2 from level 4.

Each subject gave two speeches, separated by a week, on two different topics. For clarity these will be denoted Topics A and B. In order to control for the possible effects of speech topic upon the measures of speech anxiety used, four of the subjects in each condition were asked to speak on Topic A first and Topic B second, while the other four presented speeches in the reverse order, i.e. Topic B and Topic A. The order in which a subject presented speeches on these topics was determined by the same procedure used for allocating the subjects to conditions. Specifically, the first scheduled subject within each condition from a particular FSS level presented speeches in the order AB while the second subject from that level presented the speeches in the order BA and so on. This procedure resulted in one subject in each condition from FSS level 4 and three from FSS level 5 presenting speeches in the AB order and similarly one subject from FSS level 4 and three from FSS level 5 presenting speeches in the BA order.

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Measures of Speech Anxiety:

i) Behavioural Indices

Two behavioural measures of speech anxiety were scored : (a) the number of words spoken - word count (WC); (b) the sum of each period of silence longer than one second in duration silence (S). These measures were scored for each of the three forty-second periods of each speech in order to determine intraspeech trends.

ii) Subjective report:

For both of their speeches subjects used a 10 point Fear Thermometer (FT) (After Walk, 1956) to rate the fear they experienced at three points of the presentation. They were asked to rate their fear immediately prior to speaking and following their speech they were asked for a rating of the fear they experienced at the beginning and end of the speech. They were told to equate 1 with calm relaxation, 5 with moderate fear and 10 with extreme fear.

iii) Physiological Index:

Heart rate was recorded for a ten second period prior to the presentation of each speech and for the duration of each of the two minute speeches. A baseline heart rate was also recorded for 30 seconds ten minutes after the completion of the second speech.

Procedure:

Session 1

Subjects arrived at the test-room for the first of the two sessions unaware of the nature of the study; they had simply volunteered to take part in an experiment. Upon arrival subjects were reminded of their response to the item 'Speaking in Public' on the FSS III and asked to appraise it. If their responses remained the same ¹ they were given the following instructions:

"I would like you to speak into the camera you see in front of you (it was placed 15 feet away from the desk at which they were sitting) on a given topic for two minutes. You will have no time to prepare your speech. The film of your presentation will be shown at a later date to an audience of people from outside the college. These people will have no knowledge of the topic I will ask you to talk about, so direct your speech to them. Is that clear ? Do you wish to proceed ?"

Three subjects refused to take part; two of them had been assigned to the two experimental groups and one to the High Fear control group. These subjects were replaced by additional subjects who had expressed the same degree of fear of public speaking on the FSS III.

Those subjects who agreed to proceed sat at a desk in front of the camera and those who had been assigned to the Active Strategy, Passive Strategy or Control Strategy received, in accordance with their allocation, the following instructions printed on a sheet of A4 paper :

Active Strategy Condition:

Subjects in this group received the coping strategy devised by Meichenbaum et al (1971) and denoted for the purposes of this study the Active Strategy. It was proceeded by an introductory paragraph and read as follows :

Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below please write down your ideas about facing up to your fear of public speaking. Try to make it convincing to yourself

1 For all subjects these responses were the same as their initial responses on the FSS III.

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perhaps by imagining that you are giving instructions to help someone else.

A couple of sentences are given to start you off: "Relax, keep calm, take this steadily. If other people can do it, so can I. Take it slowly, breathe deeply, that's it. I am relaxed, calm. I can cope with the situation...."

Passive Strategy Condition:

The subjects in this group received the following coping self-statements devised by Evans, (1977). Similarly they were proceeded by an introductory paragraph:

Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below, please write down your ideas about facing up to your fear of public speaking. Try to make it convincing to yourself, perhaps by imagining that you are giving instructions to help someone else.

A couple of sentences to start you off : "Of course, I can't help being afraid in the situation. I shall be afraid, but at least I should realise that there is no point in getting frightened of the fear. The feelings of fear cannot kill me, so I shall try and stand back and examine my fear: pounding heart, sweaty palms, etc...." <u>Control Strategy Condition:</u>

Subjects in this group simply received the introductory paragraph received by those subjects in the two experimental groups:

Most people find that they can prepare themselves for a difficult task by thinking about it. In the space below please write down your ideas about facing up to your fear of public speaking. Try to make it convincing to yourself.

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perhaps by imagining that you are giving instructions to help someone else.

This condition was incorporated into the design in order to control for the possible non-specific effects of the experimental conditions, such as writing down and rehearsing self-statements. Control Condition:

Subjects in this group were simply asked to present two speeches.

Subjects in the Active and Passive strategy groups were then told to carefully read through their instructions and take their time over rephrasing the strategy in their own words but without changing the meaning. The subjects in the Control Strategy group were instructed to take their time over devising their own strategies. Subsequently the subjects in these three groups were told to read through and mentally rehearse their strategies three times and use them in preparation for their speeches.

The procedure for subjects in all groups was then as follows : The subjects' left fore-finger was placed in a finger-plethysmograph which was fixed to the desk top at which they were sitting. In order to allay any unnecessary anxiety they were told that the plethysmograph measured 'blood flow'. A brief description of how this was achieved was given. No mention was made of heart rate recording. A microphone was then clipped to a suitable item of the subjects' clothing and at the same time they were given an explanation of its purpose.

Subjects were then asked to use the Fear Thermometer (FT) to rate the fear they were experiencing in anticipation of presenting a speech and then were given the following instructions:

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'On the card on the desk is printed the topic ¹ on which I want you to speak, please read it.' When the subjects had read the card, the instructions continued: 'I will give you three signals: I will say 'Ready' and then ten seconds later I will say 'Now'. You will start your speech then and stop when I say 'Stop'. Please remember to use the strategies you have been rehearsing.'

In the ten second period prior to the speech presentation and throughout the two minute speech, heart rate was monitored and recorded by the Experimenter who remained in the test room sitting in a corner behind the subject. A technician who remained out of sight in an adjacent equipment room, operated the recording equipment and synchronised (using the signals given to the subject) a digital timer which was superimposed on the film.

Following their speech presentations subjects were asked to use the FT to rate the fear they experienced at the beginning and end of the speech.

Appointments were then made at the end of this first session to see subjects in a week's time in order to complete the second half of the study. Arrangements were made to meet them in another part of the college in order to allay any suspicions about the nature of the second session. They were also asked not to talk to anyone about the study.

Session 2:

The second session proceeded as follows : subjects were met at the pre-arranged place and taken to the test-room.

1 The speech topics were : 'What I expect to get from college life... in both social and academic terms' and 'Describe what Bedford College has to offer in terms of social and academic facilities.' There, they were told that the second half of the study, as in the first, involved presenting an impromptu two minute speech which would be recorded andshown to a live audience at a later date. When asked, all subjects agreed to proceed.

Subjects in the strategy groups (i.e. Passive, Active and Control Strategy groups) were then given the strategies they had written and rehearsed in the first session and told to use them in preparation for their second speech. Again they were told to carefully read through the statements and mentally rehearse them three times. The procedure for all subjects was then exactly the same as for the first session apart from the change in speech topic for each subject.

Following their second speech subjects were told that the final part of the experiment involved taking a baseline recording via the plethysmograph, of their 'blood flow'. They were told to relax, and then ten minutes after the completion of their speech a baseline recording of their heart rate was taken for a 30-second period.

Subsequently subjects were asked for their permission to show the recording to a live audience. Their questions about the experiment were answered and finally they were asked not to discuss the study with anyone.

Due to a recurrent equipment fault (i.e. the digital display counter) heart measures for twelve of the subjects presenting their second speeches were lost. However, these subjects agreed to return to the test room so that their baseline heart rates could be re-recorded.

RESULTS

Behavioral Measures:

Word count (WC) and duration of silence (S) were scored for the three 40 second periods of each two minute speech. Both of these measures were scored by the Experimenter. Silence was scored with the aid of the digital timer superimposed on the video-tape and word count with the aid of a hand counter. Each recording was scored twice for each measure and where discrepancies existed between the scores the recording was scored a third time.

The scores for each of these variables were subjected to an ANOVA for a four factor experimental design: Group (4) xSpeech (2) x Topic Order (2) x Period (3), with repeated measures on two of the factors, i.e. Speech and Period. (F ratios are presented in Table 17 and complete ANOVA summary tables in Appendices 6 and 7).

(a) <u>Word Count</u>:

Analysis of word count scores revealed statistically nonsignificant main effects of Group (F = 0.79, df 3, 24, p > .05), Speech (F = 0.91, df 1, 24, p > .05) and Topic Order (F = 0.36, df 1, 24, p > .05).

However a significant main effect of Period ($\mathbf{F} = 11.22$, df 2, 48, p <.01) did emerge from the analysis. This effect is most easily interpreted in terms an expected Group x Period interaction ($\mathbf{F} = 4.91$, df 6, 48, p <.01). The means reflecting this interaction which are presented in Table 15 and plotted in Figure 7, were subjected to planned tests for linear trends (Winer, 1971; p 177). Consistent with expectations these tests revealed a significant intra-speech reduction in word production for the control group ($\mathbf{F} = 4.64$, df 1, 48, p <.05), while the word count for the Active Strategy group was fairly consistent during their speeches ($\mathbf{F} < 1$, df 1, 48, p >.05). However, contrary to expectations the intra

Table 15

Table of Means (M) and Standard Deviations (SD) for Word Count Scores

	Group		Active St	trategy	Passive	Strategy	Control	Strategy	Contr	:0l
Measure	Speech	Period	М	SD	М	SD	м	SD	М	SD
Word count (No.)	1 1 2 1		74.70 81.60	23.37 17.33	71.83 63.68	29.23 31.25	81.63 72.54	21.26 24.54	66.83 61.21	28.66 35.50
	1 and 2	9 2 2 2 2 2	80.19 76.31 78.00	21.54 20.11 21.45	76.31 78.48 48.38	30.93 23.59 27.37	76.63 78.31 76.31	17.66 26.69 25.62	72.19 63.50 56.38	31.56 30.74 33.80
	Ч	4 M M	73.00 74.25 76.88	25 •53 24 •22 23 • 39	79.88 86.50 49.13	31.78 17.07 28.92	79.75 87.00 78.13	15.19 20.40 28.06	76.25 71.50 52.75	26.04 24.34 32.79
	N	UN H	87.38 78.38 79.13	14.97 16.44 20.88	72.75 70.38 47.63	31.77 31.51 27.70	73.50 69.63 74.50	20.38 30.61 24.74	68.13 55.50 60.00	37.65 35.86 36.64

1 These Means are collapsed over Periods

N

These Means are collapsed over speeches.

Figure 7

Word count means as a function of Group and Period



speech trend for the Passive Strategy group was statistically significant (F = 14.5, df 1, 48, p <.001), with the means showing a marked reduction in word production across their speeches. In contrast the Control Strategy group produced consistent intra-speech performances(F < 1, df 1, 48, p >.05).

The expected interaction between Group and Speech was statistically non-significant ($\mathbf{F} = 0.78$, df 3, 24, $\mathbf{p} > .05$), although the Active Strategy group did produce an inter-speech increase in word production while the other three groups produced fewer words during the second speech. (See Table 15).

Similarly, the other first order interactions were also statistically non-significant: Group x Topic Order (F = 0.29, df 3, 24, p > .05), Speech and Topic Order (F = 0.07, df 1, 24, p >.05); Speech x Period (F = 3.02, df 2, 48, p > .05) and Topic Order and Speech (F = 0.13, df 2, 48, p > .05).

All the second and third order interactions failed to reach statistical significance. (All F ratios were < 1.0. They are given in Table 17 and ANOVA summary tables are presented in Appendix 6).

(b) <u>Silence</u>:

The analysis of silence scores revealed statistically nonsignificant main effects of Group (F = 1.83, df 3, 24, p > .05), Speech (F = 0.02, df 1, 24, p > .05) and Topic Order (F = 0.58, df 1, 24, p > .05).

However, as with word count scores a significant main effect of Period (F = 16.28, df 2, 48, p \angle .001) did emerge from the analysis. Again this effect is most easily interpreted in terms of an expected Group x Period interaction (F = 2.73, df 6, 48, p <.05). The means reflecting this interaction, which are presented in Table 16 and plotted in Figure 8, were subjected to planned tests

<u>Table 16</u>

Table of Means (M) and Standard Deviations (SD) for Silence Scores:

	Group		Active	Strategy	Passive	Strategy	Control	Strategy	Contr	01
Measure	Speech		W	SD	M	Ő	W	SD	W	SD
Silence (seconds)	2		11.54 4.40	8.02 4.13	11.60 15.04	10.95 31.16	8.88 9.00	6.15 8.90	13.77 16.54	10.50 11.07
		Period								
	1 & 2 ²	ЧИM	6.56 8.63 8.72	7.93 7.34 6.76	10.09 9.75 20.13	11.85 9.15 12.67	6.16 9.81 10.84	4.58 9.58 7.31	12.25 14.59 18.63	9.60 11.43 12.11
	ŗ	н (11.06	9.17	9.H	11.97	5•25 5.25	2.38	11.13 61.11	6.28
	4	7 5	12.01 11.31	0.00 7.14	17.56	12.74	96.7U	0.20	19.63	12.96
	N	301	2.06 5.00 6.13	2.11 3.16 5.62	10.75 11.69 22.69	12.52 12.04 12.9	7.00 10.13 9.88	6.14 12.47 7.72	13.38 18.63 17.63	12.45 12.09 11.99

•

1 These Means are collapsed over periods

•:.•

2 These Means are collapsed over speeches

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Silence means as a function of Group and Period



for linear trends. Consistent with expectations these comparisons revealed significant intra-speech increases in silence for the control group ($\mathbf{F} = 4.72$, df 1, 48, p < .05), while silence for the Active Strategy group remained fairly constant during their speeches, the slight intra-speech increase being statistically non-significant ($\mathbf{F} = 1$, df 1, 48, p > .05). However, contrary to expectations the intra-speech trend for the Passive Strategy group was statistically significant ($\mathbf{F} = 11.70$, df 1, 48, p < .01), with the means showing a marked increase in silence during the speeches of these subjects. In contrast, silence for the Control Strategy group was fairly constant during the speeches ($\mathbf{F} < 1$, df 1, 48, p > .05).

The expected interaction between Group and Speech failed to reach statistical significance (F = 2.10, df 3, 24, < .05), however the planned comparison ¹ of the Group x Speech means was carried out. (These means are presented in Table 16).

As expected these comparisons revealed a significant interspeech reduction in silence for the Active Strategy Group ($\mathbf{F} = 5.99$, df 1, 56, p < .05). Furthermore, during the second speech the average duration of silence for this group was significantly less than that for the control group ($\mathbf{F} = 8.67$, df 1, 56, p < .01); this latter group interestingly, producing an inter-speech increase in silence. Contrary to expectations the Passive Strategy group produced an inter-speech increase in silence although it was not statistically significant ($\mathbf{F} = 1.39$, df 1, 56, p > .05). However,

1 The procedure used for making these planned comparisons is described by Winer (1971, p 384 - 386).

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during the second speech this group was silent for significantly longer than the Active Strategy group ($\mathbf{F} = 6.66$, df 1, 56, $\mathbf{p} < .05$). The Active Strategy and Control Strategy groups did not differ significantly from each other during the second speech, (F = 1.24, df 1, 56, p > .05).

The other first order interactions failed to reach statistical significance: Group x Topic order (F = 0.01, df 1, 24, p <.05); Speech x Period (F = 0.86, df 2, 48, p < .05); Period x Topic Order (F = 0.34, df 2, 48, p < .05). Similarly, all second and third order interactions were statistically non-significant. (F ratios are presented in Table 17. Complete ANOVA summary tables are presented in Appendix 7). Table 17: Table of F ratios emerging from the analyses (ANOVAs) of Word Count and Silence scores:

Source of		Measure	
Variation	DF	Word count F ratio	Silence F ratio
Group Topic order Group×Topic order Residual	3 1 3 24	0.79 0.36 0.29	1.83 0.58 0.25
Speech Speech×Group Speech×Topic Order Speech×Group×Topic order Residual	1 3 1 3 24	0.91 0.78 0.07 1.00	0.02 2.07 0.01 1.01
Period Period×Group Period×Topic Order Period×Group×Topic order Residual	2 6 2 6 48	11.22** 4.91** 0.13 0.72	16.28** 2.73* 0.34 0.81
Speech×Period Speech×Period×Group Speech×Period×Topic order Speech×Period×Group ×Topic Order Residual	2 6 2 6 48	3.02 0.72 0.23 0.41	0.86 1.19 0.29 0.55

and the second second

•* p < .05 ** p < .01

(c) <u>Subjective Fear Ratings</u>:

i) Anticipatory Fear Ratings:

Ratings of fear experienced prior to presenting each speech were subjected to an ANOVA for a three factor experimental design: Group (4) x Topic Order (2) x Speech (2), with repeated measures on one factor, i.e. speech.

This analysis revealed statistically non-significant main effects of Group (F = 0.51, df 3, 24, p >.05) and Topic Order (F = 0.24, df 1, 24, p >.05). A main effect of Speech (F = 16.69 df 1, 24, p <.01) did emerge from the analyses. The means: Speech 1, x = 6.88, SD = 1.17; Speech 2, x = 5.83, SD = 1.66, show that anticipatory fear had decreased prior to the presentation of the second speech.

All interactions failed to reach statistical significance (F ratios are given in Table 19. Complete ANOVA Summary tables are presented in Appendix 8).

ii) Subjective ratings of fear experienced during speech

presentations:

Subjective ratings reflecting fear experienced at the beginning and end of each speech were subjected to an ANOVA for a four factor experimental design: Group (4) x Topic Order (2) x Speech (2) x Rating (2: beginning and end of each speech) with repeated measures on two factors, i.e. Speech and Rating. This analysis revealed statistically non-significant main effects of Group (F = 0.56, df 3, 24, p > .05), Topic Order (F = 0.01, df 1, 24, p > .05), Speech (F =3.38, df 1, 24, p > .05) and Rating (F = 1.89, df 1, 24, p > .05).

The Group x Rating interaction also failed to reach statistical significance (F = 1.69, df 3, 24, p > .05) and therefore failed to support the prediction of differential intra-

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speech trends in subjective fear. However, the Group x Speech interaction was statistically significant (F = 9.12, df 3, 24, p< .01), suggesting, as expected, different interspeech trends in fear for the groups. However, contrary to expectations the means (which are presented in Table 18 and plotted in Figure 9) show that the Passive Strategy group experienced an increase in subjective fear from Speech 1 to 2. Planned comparisons of these means revealed that this inter-speech increase for the Passive Strategy group was statistically significant (F = 25.18, df 1, 56, p <.01). In contrast, the other three groups reported significant inter-speech reductions in fear: Active Strategy group (F = 9.05, df 1, 56, p <.01); Control Strategy group (F = 7.34, df 1, 56, p <.01); Control group (F = 20.38, df 1, 56, p <.01). Further comparisons also revealed that the Passive Strategy group reported experiencing significantly more fear during the second speech than the Active Strategy group (F = 11.92, df 1, 56, p < .01), the Control Strategy group (F = 6.77, df 1, 56, p < .05) and the Control group (F = 10.58, df 1, 56, p < .01) while the difference between these latter three groups were statistically non-significant (F s <1). All other first and second order interactions failed to reach statistical significance (F ratios are given in Table 19 and ANOVA summary tables are presented in Appendix 9).

1 The procedure used for making these comparisons is described by Winer (1971, p 384 - 386.)

	Group		Active	Strategy	Passive	Strategy	Control	Strategy	Cont	rol
Measure	Speech		М	SD	М	SD	М	SD	М	SD
Anticipatory Fear Ratings	ч		6.63	0.74	7.13	0.83	6.88	1.21	6.88	1.79
	N		5.50	0.93	6.56	1.59	5.63	1.94	5.63	2.07
Subjective ratings of fear	L		6.00	1.57	5.63	2.02	6.44	2.21	6.59	1.76
experienced during speech presentations	2	, ,	5.06	1.48	7.22	1.47	5.59	1.43	5•19	2.39
		Rating								
	Ч	ц	6.38	1.66	5.36	1.05	6.94	2.08	7.06	2.0
		2	5.63	1.48	6.00	2.71	5.94	2.37	6.13	1.4
	N	Ч	5.38	1.06	6.88	1.36	5.81	1.19	5.50	2.3
		2	4.75	1.83	7.56	1.59	5.38	1.69	4.88	2.4
						-				

Table of Means (M) and Standard Deviations (SD) for Subjective Ratings of fear

Table 18

Figure 9

Means of Subjective Ratings of fear experienced during the speeches, as a function of Group and Speech



<u>Groups</u> (n = 8): Passive Strategy Active Strategy Control Strategy Controls

Table 19

Table of F ratios emerging from the analysis (ANOVA) of Subjective Fear Ratings

		MEASURE	
		Subjective fear ratings	Anticipatory fear ratings
Source of variation	DF	F ratio	F ratio
Group Topic×order Group×Topic order Residual	3 1 3 24	0.56 0.01 1.60	0.51 0.24 0.58
Rating RatingXGroup RatingXTopic order RatingXGroupXTopic order Residual	1 3 1 3 24	1.89 1.69 0.03 1.25	
RatingXspeech RatingXspeechXgroup RatingXspeechXTopic order Residual	1 3 1 27	0.40 0.09 0.76	
Speech Speech×Group Speech×Topic Order Speech×Group Topic×Order	1 3 1 3	3.38 9.12** 0.84 2.31	16.69** 0.41 0.18 0.52

* p <.05 ** p ∠.01

Heart Rate Measures:

Owing to an equipment fault heart rate scores for 12 of the subjects were lost during the presentation of their second speech. Therefore, only those scores recorded during the first speech were analysed.

Pearson correlation coefficients were computed for baseline heart rates and heart rates recorded before and during the first

1

speech. These coefficients (which are presented in Table 20) do not suggest with any consistency, that a linear relationship exists between these measures. Therefore baseline differences between the groups were not statistically controlled for.

Table 20 shows that the coefficients for the Control Strategy and Control groups were, for the most part, large and statistically significant, suggesting a positive linear relationship between the heart rate measures. However, the coefficients for the Passive Strategy and Active Strategy groups were of moderate magnitude and statistically nonsignificant.

Table 20

Group (n = 8)		Active Strategy	Passive Strategy	Control Strategy	Control
Anticipatory heart rate		.61	•38	•79**	•69*
Heart rate	Period				
the first	1	.06	•25	. 84**	•45
speech	2	•44	.31	•83* *	•75*
	3	.51	.02	•77*	•84**

Table of Pearson correlation coefficients for baseline heart rates and heart rates recorded before and during speeches

p < .05 (one-tailed tests) p < .01

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Anticipatory Heart Rates:

Heart rates recorded in the 10 second period prior to the first speech were subjected to a two-way ANOVA: Group (4) xTopic Order (2). (F ratios are presented in Table 22 and ANOVA summary tables in Appendix 8).

This analysis revealed a statistically non-significant main effect of Group ($\mathbf{F} = 1.83$, df 3, 24, p > .05), although the means, which are presented in Table 21, show that the observed differences were in the predicted direction. The main effect of Topic Order also failed to reach statistical significance ($\mathbf{F} = 2.55$, df 1, 24, p > .05) as did the Group x Topic Order interaction ($\mathbf{F} = 1.50$, df 3, 24, p > .05).

Heart rates recorded during speech presentations:

Heart rates recorded during the first speech were subjected to an ANOVA for a three-factor experimental design: Group (4) x Topic Order (2) x Period (3), with repeated measures on one factor, i.e. Period.

This analysis revealed statistically non-significant main effects of Group ($\mathbf{F} = 1.49$, df 3, 24, $\mathbf{p} > .05$), Topic Order ($\mathbf{F} = 1.47$, df 1, 24, $\mathbf{p} > .05$) and Period ($\mathbf{F} = 0.79$, df 2, 48, $\mathbf{p} > .05$). The first order interaction between Group and Period also failed to reach statistical significance ($\mathbf{F} = 0.92$, df 6, 48, $\mathbf{p} > .05$). (Means are presented in Table 21). All other first and second order interactions were also statistically non-significant. (\mathbf{F} ratios are presented in Table 22)

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Table 21

Table of Means (M) and Standard Deviations (SD) for Heart rates recorded before and during the first speech

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Measure	Gr	đnc	Acti Stra	ve tegy	Passi Strat	Lve Gegy	Contro] Strateg	SV -	. Cont	rol
	Speech		м	SD	М	đS	M	SD	м	SD
Anticipatory heart rate (BPM)	1		94.50	13.12	89.25	10.85	100.25	24.41	108.00	19.24
Heart Rate (BPM)	ц	Period 1 2 3	93.88 93.88 95.19	19.13 21.15 22.78	91.06 95.75 86.19	17.03 15.98 7.84	97.50 100.50 99.00	20.25 19.60 21.30	110.50 106.25 105.25	20.30 11.59 13.65
Baseline heart rate (BPM)			75.50	8.05	75.75	6.18	78.00	7.48	80.25	8,38

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Table 22

F ratios emerging from the analysis (ANOVAs) of Heart Rates recorded before and during the first speech

		Measure)
Source of variation		Heart rate (recorded during the speech)	Anticipatory heart rate
	DF	F ratio ¹	F ratio ¹
Group Topic×order Group×Topic order Residual	3 1 3 24	1.49 1.47 1.03	1.83 2.55 1.50
Period PeriodXGroup PeriodXTopic order PeriodXGroupXTopic order Residual	2 6 2 6 48	0.79 0.92 1.61 1.10	

1 For all F ratios, p > .05

DISCUSSION

The results of this study provide some support for the hypothesis that self-statements which encourage subjects to actively cope with fear by self-instructing to 'keep calm and relax' when exposed to a phobic stimulus, result in significant reductions in fear. Specifically, the Active Strategy group who rehearsed these self-statements, produced significantly superior intra-speech performances (indexed by both word count and silence) than controls and, in addition, their performances improved significantly (indexed by silence) from Speech 1 to 2,

while those of the control group did not. Given that these behavioural measures index speech anxiety, these results suggest that the Active Strategy group experienced significantly less fear than controls during both speeches and also experienced a significantly greater inter-speech reduction in fear. However, contrary to expectations the Active Strategy group did not differ from controls in terms of intra- and inter-speech changes in subjective fear: both groups experienced intra-speech reductions in fear, although these were not significant, and significant inter-speech reductions in fear. Lastly, the difference between these groups in terms of anticipatory heart rate (recorded prior to the first speech) was also non-significant, although it was quite marked and in the expected direction. It is unfortunate that the heart recordings for the second speech were lost, therefore making it impossible to determine whether this difference became larger and statistically significant.

Contrary to expectations, the findings of this study also suggest that self-statements which encourage subjects to expect and accept the physiological concomitants of fear when exposed to a phobic stimulus, do not lead to a reduction in fear. Specifically, the results suggest that the Passive Strategy group, who rehearsed such statements, did not differ from controls in terms of intra- and inter-speech levels of fear indexed by the behavioural measures. Indeed, the subjective ratings of fear suggest that this group experienced a significant interspeech increase in fear and during the second speech experienced significantly more fear than both the other strategy groups and

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the control group.

Interestingly, the behaviour of the Control Strategy group was also contrary to expectations. Specifically, the results show that this group and the control group differed significantly in terms of behavioural measures. The control group's speeches were characterised by significant intra-speech deteriorations in performance measured by both word count and silence, while the Control Strategy group's speeches were characterised by intra-speech consistency. Again, given that these measures index speech anxiety, these results suggest that the control strategy group devised and rehearsed strategies which resulted in significantly lower levels of fear while speaking, relative to the control group. However, unlike the Active Strategy group, this group did not produce significant inter-speech improvements in performance.

In summary, the behavioural indices suggest that both the Active and Control Strategy groups experienced significant reductions in anxiety. For the former group this was both an intra and inter-speech reduction, while for the latter group it was only an intra-speech reduction. Both groups experienced significant inter-speech reductions in subjective fear both before and during their speeches, however, they were not significantly different from those experienced by the control group. In contrast, the behavioural indices suggest that the Passive Strategy group were as fearful as controls during their speeches while subjective ratings suggest that they experienced a significant inter-speech increase in fear. Differences between the groups in terms of anticipatory heart rates were not significant.

These findings raise several interesting and related

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questions. Those pertinent to the Strategy groups are (i) "What are the mechanisms by which the Active and Control Strategies produced their fear-reducing effects ?" (ii) "What was the mechanism by which the Passive Strategy produced an increase in subjective fear ? These questions will be considered in relation to Meichenbaum's (1977) cognitive model of fear and fear reduction as it was from this model that the strategies of initial interest (i.e. the Passive and Active Strategies) emerged. However, before addressing these questions, another point of interest emerges from the above observations which arrants discussion, as it has a bearing upon cognitive conceptualisations of fear.

Specifically, the above results show that for all the groups, to varying degrees, the various indices of fear changed in a desynchronous way from Speech 1 to 2. This is not a particularly remarkable observation. Indeed, similar observations have been reported in this thesis (i.e. in Experiment 3) and elsewhere (see Rachman, 1978) and can be accommodated within a 'Three-Systems-Model' of fear (Rachman, 1978) which conceptualises fear as a construct of loosely coupled components which may change independently of each other and in a desynchronous way. However, cognitive mediational models of fear (see Chapter 3 above) cannot easily account for such observations. To illustrate this point the behaviour of the control group in this study will be referred to. To reiterate this group produced significant intra-speech deteriorations in performance (indexed by word count and silence) during both speeches with no significant change in performance from Speech 1 to 2. This finding suggests that these subjects experienced comparable levels of fear during both of their speeches. In

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contrast however, subjective ratings suggest that they experienced a significant reduction in subjective fear from Speech 1 to 2. Given that the basic premise of cognitive models of fear is that fear is mediated by thoughts or selfstatements, then it follows that this group's fear during their first speech was mediated by thoughts or self-statements. However, it is consistent with this premise to suggest that their decrease in subjective fear from Speech 1 to 2 reflects the modification (presumably with exposure) of their fearevoking thoughts. However, if their cognitions became less potent in terms of generating fear then it is necessary to explain why this was not reflected in terms of inter-speech reductions in behaviourally expressed fear. It is apparent that cognitive models of fear which assume a one-to-one relationship between cognitions and fear, conceptualised as a unitary phenomenon, cannot do so. Specifically, such models imply that if an individual entertains fear-evoking cognitions then he will become afraid in a unitary sense. Therefore, they do not account for the observations of desynchronous change between expressions of fear in different systems or the observations (Rachman, 1976) of fear expressed in one system (e.g. behavioural) but not another (e.g. subjective).

However, solutions to this theoretical problem, which are consistent with a 'Three-Systems-Model' of fear, are possible. For instance, it is conceivable that when individuals are afraid they are generating different cognitions which have an effect upon particular response systems. So for example, the approach behaviour of a snake-fearful college students taking part in an experiment may be mediated by thoughts such as : "If other people can handle snakes, then so can I". However, his subjective report of fear may be mediated by the thought: "I feel afraid". Thus he would be behaviourally unafraid but subjectively fearful.

Alternatively, it is possible that fear-evoking thoughts have differential effects upon responses in more than one system. For example, it is conceivable that the inter-speech reduction in subjective fear for the control group reflects thoughts such as 'I am becoming less frightened". However, it is also possible that such thoughts reflect the perception, veridical or otherwise, of changes in physiological arousal. If this is the case then we might speculate that when subjects are monitoring and processing 'internal information, 'i.e. physiological responses, there is a resultant reduction in attention to, or even interference with a task such as presenting an impromptu speech which requires them to attend to what they are saying and think about what they will say next. Hence, the poor performances of the control group during both speeches. However, it must be noted that this proposition does not really explain why subjects attention to the physiological concomitants of fear manifests itself in terms of intra-speech deteriorations in performance, unless perhaps their attention shifted from the task to their physiological arousal during their speeches.

Without labouring this discussion it is apparent from these speculations that a cognitive mediational model of fear which conceptualises fear as a unitary phenomena is not tenable. A more complex model is required to account for the presumed relationship between cognitions and the observations of fear as a construct of partially independent components.

Let us now consider the other questions to emerge from the observations made in this study, namely: "What are the mechanisms

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by which the Active and Control Strategy Groups produced their fear-reducing effects ?" and "What is the mechanism by which the Passive Strategy produced an increase in fear ?"

To reiterate the Active Strategy group was asked to rehearse ¹ self-statements which encouraged them to actively cope with the physiological concomitants of fear by self- instructing to relax and keep calm. In accordance with these selfstatements this group became subjectively more calm and relaxed from speech 1 to 2 and, in addition, experienced a significant inter-speech reduction in behaviourally expressed fear. However, these statements did not significantly influence subjects heart rates either before or during their first speech. Similarly, the Passive Strategy group who also rehearsed self-statements aimed at coping with the physiological concomitants of fear, did not differ significantly from controls in terms of heart rate or indeed, in terms of behaviourally expressed fear, although unlike all other groups they experienced a significant inter-speech increase in subjective fear.

In short, while the Active and Passive Strategies had a significant effect upon the behavioural and subjective indices of fear they failed to significantly influence heart rates recorded before and during the first speech. Thus, it would appear that the effects of these strategies upon behavioural and subjective fear were not determined by their effect upon their focus, namely the physiological concomitants of fear. However, it must be noted that heart rates recorded while subjects are speaking is an insensitive index of fear. The results of experiment 3 show that anticipatory heart rates distinguished between high and low fear speakers but that heart 1 It must be noted that subjects' compliance with these instructions can only be assumed as no direct check was made.

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rates recorded during their speeches did not. Thus, the only sound basis for suggesting that these strategies did not influence the physiological concomitants of fear, is the observation that the strategy groups did not differ from each other or controls in terms of anticipatory heart rates recorded before the first speech. Therefore it would be unwise to dismiss the possibility that the effects of the strategies were mediated by their unobserved effect upon physiological arousal.

If, for the moment, it is assumed that these strategies did not significantly influence subjects' physiological arousal, then an alternative interpretation of these findings can be postulated.

Specifically, Meichenbaum (1977) has suggested that the maladaptive self-statements which mediate fear are based upon subjects' perceptions of the physiological concomitants of fear. Thus, we might speculate that the effects of the Passive and Active Strategies were determined by their effect upon subjects' perceptions of their physiological arousal rather than upon physiological arousal per se. The question then arises: "What effect did these strategies have upon subjects' perceptions ?" A possible and parsimonious hypothesis is that they influenced subjects' perceptions of control over the physiological concomitants of fear. Consider the following suggestion made recently by Rachman, (1978 p 261.):

"The utility of the concept (of controllability) can be increased by incorporating a three-systems approach, and by extending the concept to include not only the capacity to reduce the possibility of an aversive outcome, but also the ability to reduce the effects of an aversive event. It seems plausible that fear will be reduced or even avoided if the person perceives that he can control the effects of a potential aversive event."

If we consider that for fearful subjects an effect of speaking in public is physiological arousal then it is possible to extend Rachman's argument and suggest that fear (i.e. the behavioural and subjective expressions) will be reduced or even avoided if the person perceives that he can control that arousal. There is some empirical evidence to support this suggestion. Specifically, Gatchel et al (1979) reported that subjects who received false heart rate feedback leading them to believe that they were successfully slowing their heart rates subsequently experienced significant reductions in speech anxiety although no actual changes in heart rate occurred.

It is possible then, that by instructing themselves to relax and keep calm, etc., the Active Strategy Group perceived that they had control over the physiological concomitants of their fear and therefore were less subjectively and behaviourally afraid. In contrast, the Passive Strategy group, who were encouraged to expect and accept the physiological concomitants of fear, may have perceived a lack of control over their arousal and therefore experienced and reported significant increases in subjective fear and exhibited an inter-speech deterioration in performance, albeit a non-significant one. Future research might examine this possibility by measuring subjects' perceptions of control over physiological arousal after they have used these strategies in fear-evoking situations. However, the following experiments were concerned with a preliminary investigation of the concept of control in relation to the

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expression of fear. Specifically, studies were made of the relationship between the expression of speech anxiety, perceptions of control over the physiological concomitants of fear and subject's locus of control orientation.

Finally, some speculations about the Control Strategy condition. To reiterate, the subjects in this condition were asked to devise and rehearse strategies which they thought would help them cope with their speech anxiety. Indeed, relative to the control group these subjects were significantly less fearful (indexed by the behavioural measures), during their speeches. One possible reason for this effect is suggested by the strategies this group devised. Specifically, five of the eight subjects in this group included in their strategies positive task-oriented statements such as: 'speak clearly', concentrate on what you are saying'. In terms of a cognitive model of fear (i.e. Meichenbaum, 1977) it is possible that such statements were adaptive, in the sense that they reduced fear, because they replaced or distracted subjects from those maladaptive self-statements which are presumed to mediate fear. Hopefully, future research will pursue this enquiry by providing a direct test of the hypothesis that the rehearsal of task oriented self-statements leads to a reduction in speech anxiety.

Summary and Conclusions:

Glogower et al (1978) have suggested that coping selfstatements are an active fear-reducing component of cognitive therapies. The behaviour of the Active Strategy group in this study tends to support this suggestion. Moreover, the reduction in fear experienced by this group is consistent with the notion, implied in the work of several researchers (e.g. Meichenbaum

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et al. 1971; Kazdin, 1973), that adaptive strategies include those which focus upon coping with the physiological concomitants of fear by self-instructing to 'keep calm and relax....' However, the behaviour of the Passive Strategy group also suggests that some self-statements can have a detrimental effect, inasmuch as they result in an increase in subjective fear.

Interestingly, both of these strategies focussed upon the physiological concomitants of fear, although there is no evidence to suggest that they significantly influenced subjects' arousal. However this remains a possibility.

It is also proposed that the effects of these strategies may have been mediated by subjects' perceptions of control over the physiological concomitants of fear. Specifically, it is suggested that the reduction in fear experienced by the Active Strategy group was a function of perceived control while the increase in fear reported by the Passive Strategy group reflected a perceived lack of control over physiological arousal.

The following studies pursued an investigation of the notion of control in relation to fear by examining the relationship between the expression of speech anxiety, subjects' perceptions of control over the physiological concomitants of fear and their locus of control orientation.

The results of this study also suggest that speech-anxious subjects are capable of devising their own coping self-statements (i.e. the Control Strategy group) which have a significant fear-reducing effect. Although these strategies were not as effective as those used by the Active Strategy group. It was noted that most of the subjects in the Control Strategy group devised positive task-oriented statements and it was suggested that such statements have a fear-reducing effect because they may replace or distract subjects from those maladaptive selfstatements presumed (Meichenbaum, 1977) to mediate fear.

Finally, it is proposed that cognitive mediational models of fear need to be revised if they are to account for the observations of discordance and desynchrony between expressions of fear. Possible revisions were discussed in brief.

Experiment 5

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN LOCUS OF CONTROL ORIENTATION AND THE EXPRESSION OF SPEECH ANXIETY

In the above discussion it was noted that Rachman (1978) has recently suggested that

'.... fear will be reduced or even avoided if the person perceives that he can control the effects of a potential aversive event.' (p 261)

Rachman was not explicit about the nature of these 'effects' although the implication of his argument appears to be that he is reforring to the physiological concomitants of fear. He argues 'Consider the psychological consequences that would flow from the discovery of a reliable, fast-acting tablet capable of reducing fear - a fear-reducing equivalent of an aspirin. The mere knowledge of being able to cope with the effects of fear would confer a degree of immunity to fear on the fortunate possessors of this remarkable but regrettably non-existent drug. It would provide an antidote to the fear of fear. There is little doubt that many phobic people, especially those incapacitated by agoraphobic problems, would in addition experience a substantial decline in anticipatory fear if they knew they had the power to cope with unwanted effects should they arise.' (p 262)

If these 'effects' are defined as the physiological concomitants of fear then Rachman's hypothesis can be more precisely stated. Specifically it can be proposed that the behavioural and subjective expressions of fear will be reduced or avoided if the individual perceives that he can control the physiological concomitants of fear evoked by a particular stimulus.

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Some empirical support for this hypothesis comes from two recent studies conducted by Gatchel and his colleagues, who examined the effects of biofeedback training upon speech anxiety. (Gatchel, Hatch, Watson, Smith and Caas, 1977; Gatchel, Hatch, Maynard, Turns and Taunton-Blackwood, 1979). As a control, these researchers included in their experimental designs a condition in which subjects received false heart rate feedback suggesting that they were successfully slowing down their heart rates. Their findings suggest that these subjects experienced significant reductions in behavioural and subjective fear, a finding they interpreted as follows :

'The perception by individuals in this group (false-feedback) that they could exert active control over an anxiety competing response (heart rate) appears to have significantly influenced their self-reports and behavioural anxiety.' (Gatchel et al. 1979).

Their interpretation then, suggests that behavioural and subjective expressions of fear are reduced if an individual perceives that he has control over the physiological concomitants of fear. Moreover, this interpretation suggests a certain relationship between the expression of fear and the concept of control. Specifically, while Gatchel et al examined the role of perceived control in the reduction of fear, the implication of their findings is that generally the expression of fear is negatively related to the degree to which the physiological concomitants of fear are perceived as controllable.

However, if for the moment the reality of a relationship between the expression of fear and the perception of control over physiological responses is accepted, then the findings of several recent studies (Archer, 1979; Houston, 1972; Watson and Baumal,

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1967) suggest that such a relationship may be complicated by the personality variable described as locus of control orientation (Phares, 1976).

Briefly, the locus of control construct viewed as a personality trait, describes individual differences in relatively enduring predispositions to perceive outcomes across a variety of situations as being under personal control, or determined by chance, fate, or powerful others. Those individuals who tend to perceive outcomes as under personal control are described as internals, while those who view outcomes as being determined by chance, fate or powerful others are described as externals.

On the basis of their observations, Watson and Baumal proposed that individuals experience less anxiety in those situations where there is congruence between their beliefs about locus of control of reinforcement in general (i.e. locus of control orientation), and their beliefs about the locus of control of reinforcement of that particular situation. Thus, they predicted that internals will express less anxiety than externals in threatening situations where personal control over threat can be exercised, and conversely that externals will express less anxiety than internals in threatening situations where personal control cannot be exercised.

To date support for Watson and Baumal's congruency hypothesis has come from studies by Archer (1979) and Houston (1972). Houston (1972) found that when subjects were threatened with anxietyinducing electric shock during the performance of a task ¹(which was seen as an index of anxiety) their performance on that task

1 The Digits Backward Sub-test of the Wechsler Adult Intelligence Scale, Wechsler (1955) p 41.

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was related, in the predicted way, to subjects' locus of control orientation. Specifically, he found that when shock was unavoidable, i.e. beyond personal control, externally-oriented subjects performed significantly better than internally-oriented subjects. However, when shock was controllable, i.e. contingent upon subjects' performance, the pattern was the reverse: internals performed better than externals. Consistent with Houston's findings, Archer found that the subjective anxiety of subjects threatened with either controllable or uncontrollable shock was similarly related to their locus of control orientation.

To return to the earlier argument, if, as suggested the expression of fear is related to the perceived degree of control over the physiological effects of being exposed to a phobic stimulus, then two predictions follow from Watson and Baumal's congruency hypothesis.

Firstly, the perception that the physiological concomitants of fear are uncontrollable is a perception which, by definition, is incongruent with the locus of control orientation of internals but congruent with that of externals. Therefore, we can expect that when fearful subjects cannot exercise personal control over these physiological concomitants, internals will express higher levels of fear than externals.

In simpler terms, the suggestion is that fear involves a loss of inner control, in terms of physiological arousal, and that internals are more disturbed by such a loss than externals because it is incongruent with their tendency to perceive that they have personal control over events. Moreover, being more disturbed will be manifest by internals in terms of higher levels of subjectively and behaviourally expressed fear.

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Secondly, however, we can predict, on the basis of the congruency hypothesis, that manipulations¹ or treatments which increase subjects' expectations of personal control over physiological concomitants of fear, will result in greater reductions of fear for internals, as such control is congruent with their locus of control orientation but incongruent with that of externals.

The purpose of the present study was to provide a preliminary investigation of the first of these predictions. This was done by measuring the behavioural and subjective expressions of fear of a group of high and low fear public speakers both before and during the presentation of a speech. In addition, a measure was taken prior to the speeches of subjects' expectations of control over the physiological concomitants of fear that they may experience while speaking.

The specific predictions were as follows :

Firstly, it was predicted that the high fear subjects would expect to experience the physiological concomitants of fear during their presentations as uncontrollable and significantly more so than the low fear subjects.

Secondly, it was predicted that both the behavioural, i.e. number of speech disruptions² (after Mahl, 1956), and subjective

- 1 Such as Gatchel et al.'s (ibid) biofeedback procedure, or the Active Coping Strategy examined in the last experiment.
- 2 It was found in experiment 3 that speech disruptions did not distinguish between high and low speech-anxious subjects as they presented an impromptu speech. However, it is possible that under such circumstances disruptions reflect, to a large degree, processes other than anxiety, such as 'filled pauses' for thought. In the present study the speeches were prepared and therefore it was expected that such pauses would be fewer in proportion to those reflecting anxiety and as a consequence that speech disruptions would be a more sensitive index of anxiety.

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measure, i.e. the State Anxiety scale of the S.T.A.I. (Spielberger et al. 1970) would index significantly higher levels of anxiety for the high fear speakers both before and during their speeches. More specifically, it was expected that the high fear speakers would report higher levels of state anxiety before speaking and emit more disruptions while speaking.

Thirdly, it was predicted that high fear internals would express significantly higher levels of subjective and behavioural fear than high fear externals.

Finally, predictions were made about the behaviour of the low fear internals and externals. One of the predictions noted above was that the low fear speakers would perceive the physiological effects of exposure to their speaking task as significantly more controllable than the high fear subjects. According to Watson and Baumal's congruency hypothesis internals experience less anxiety than externals in those situations where personal control over events can be exercised. Therefore, it was predicted that the low fear internals would express significantly less subjective and behavioural fear than the low fear externals.

METHOD

Subjects:

Twenty-six subjects took part in the study, all of whom were third year psychology undergraduates. As part of their course requirement these subjects had been asked to present the findings of their final year research projects to the psychology department; an audience comprised of lecturers, postgraduates and fellow undergraduates. None of them had taken part in the previous studies.

Two weeks prior to their presentations these subjects were sent the following battery of questionnaires : Levenson's (1974) Locus of Control Questionnaire; the S.T.A.I. (Spielberger, Gorsuch and
Lushene, 1970) and a 7-point rating scale designed to assess their degree of fear of speaking in public. (See Appendix 10a). In addition, subjects received a letter asking for their co-operation and instructing them to complete and return the questionnaires at least one week before their presentations.

The returned questionnaires were not scored until after the subjects' presentations in order to ensure that the scorers (one of whom was the author), of their speech disruptions were blind to both their degree of fearfulness and locus of control orientation.

When the questionnaires had been scored, a median score of 17 on the Internal ¹ dimension of Levenson's Locus of Control scale was used to define 'internals' (<17) and 'externals' (>17). In addition, a score of two or three on the 7 point fear scale was used to define the low fear speakers while scores of 5, 6 and 7 defined the high fear speakers. (One subject who scored 1 on this scale, andwhose native language was not English, was discarded from the analysis. Interestingly, none of the subjects used the mid-point (4) of the scale.)

The defining characteristics of the groups then were as follows :

<u>High Fear Internals</u>: Locus of control mean 1 = 14.63 (S.D. = 1.51); Subjects scoring 7 on the fear scale: n = 4; scoring 6; n = 3, scoring 5: n = 1; Total n = 8. Mean fear score=6.38,(S.D. = 0.74) <u>High Fear Externals</u>: Locus of control mean = 23.0 ; (S.D. = 3.78) Subjects scoring 7 on the fear scale: n = 5; scoring 6: n = 2; scoring 5; n = 1; Total n = 8. Mean fear score = 6.5, (S.D. = 0.76.) 1 This dimension measures the degree to which an individual perceives

events as being contingent upon his own behaviour.

2 The mean Internal scale score for all the subjects (n = 86) who completed Levenson's Locus of Control questionnaire in this and subsequent studies was 19.06, S.D. = 5.25. Low Fear Internals: Locus of control mean = 13.50; (S.D. 2.65). Subjects scoring 2 on the fear scale: n = 3; scoring 3: n = 1; Total n = 4. Mean fear score : 2.25 (SD = 0.50). Low Fear Externals: Locus of control mean = 22.00: (S.D. 4.18). Subjects scoring 2 on the fear scale: n = 3; scoring 3; n = 2; Total n = 5. Mean fear score = 2.40 (S.D. = 0.55). Questionnaires:

Levenson's (1973) Locus of Control questionnaire consists of three scales which can be scored independently of each other. These scales are labelled Internal, Chance and Powerful Others. The Internal scale measures the degree to which individuals perceive that they determine or control events in their lives, while the other two scales measure the degree to which individuals perceive that events are determined by external forces such as chance, fate or powerful other people. In the present study the Internal scale was used to define internals and externals because a tendency to perceive that events are not personally determined necessarily implies an external locus of control. In contrast a tendency to perceive that events are not determined by either chance or powerful others does not necessarily imply an internal locus of control. It is possible to believe that events are not determined by chance but nonetheless believe that they are determined by other external forces and as powerful others and vice versa.

Research (Levenson, 1973) has indicated that these scales have good reliability and validity.

Each of the scales is comprised of 8 questions although they are presented to subjects as a single questionnaire of 24 items. The questions are answered on a 7-point Likert-type scale ranging from 'Strongly Agree' to 'Strongly Disagree'. Spielberger et al.'s (1970) State-Trait Anxiety Inventory (S.T.A.I.) consists of two scales, each of 20 items. The State scale is designed to measure state anxiety intensity at specific points in time, while the Trait scale is designed to measure a more enduring level of anxiousness less influenced by external events. Subjects respond to each of these items by rating themselves on a four-point scale. The S.T.A.I. test manual (Spielberger, et al. 1970) gives extensive reliability and validity data for both the State and Trait scales. These questionnaires appear in Appendices 19 & 20. Procedure:

All third year psychology undergraduates were asked, as a part of their course requirement, to present the findings of their final year research projects to the department. The presentations were made during the course of five, weekly, afternoon sessions, with five to six presentations made in each session. On each occasion the audience comprised of academic staff, postgraduates and fellow undergraduates, with the total number of people ranging from between twenty-five and thirty.

Consistent with this real-life setting, the measures of speech anxiety were chosen in order to minimise the obtrus_iveness of the experimenters. The State Anxiety Scale of the S.T.A.I. (Spielberger, et al., 1970) was used to measure subjective anticipatory anxiety. It was given to each presenter prior to each session with the instruction that it should be completed immediately before their presentations.

Just prior to each session the presenting subjects were also asked to use a 7-point scale (see Appendix 10), ranging from Completely (1) to Not at all (7) to rate their expectations of control of the physiological effects of fear that they may experience while speaking.

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Speech disruptions ¹ (Mahl, 1956) were recorded as a measure of behavioural anxiety and scored for the first two minutes ² of each presentation by two scorers. ³

The subjects were only informed after the presentation that they had been observed in this way.

RESULTS:

Ratings of expected control over the physiological concomitants of fear:

Ratings of subjects expectations of control over the physiological concomitants of fear were subjected to a two-way ANOVA ⁴ : Group (High Fear vs. Low Fear) x Locus of control (Internal vs. External). (See Table 23, for F ratios and Appendix 11 for complete ANOVA summary tables).

This analysis revealed a significant main effect of Group (F = 14.75, df 1, 21, p < .01). Consistent with predictions the High Fear subjects expected to have significantly less control over the physiological concomitants of fear than Low Fear subjects. (Means and standard deviations are presented in Table 23). This

- 1 These disruptions included 'ums', 'ahs', stutters and repetitions.
- 2 This was timed from the first word uttered.
- 3 The scorers were the Experimenter and a colleague who had scored some of the recordings analysed in experiment 3. Thus, she had some experience of scoring speech disruptions and shared the same criteria of disruptions as the Experimenter. A hand-counter was used by these scorers.
- 4 Using the Least-Squares Solution of unequal cell sizes (Winer, 1971, p 499).

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GROUP		HIGH FEAR	~			LOW FEAR		
Locus of control	Internal	·		External	Intern	81	Exte	rnal
	Mean	SD	Mean	SD	Mean	SD	Mean	ŒS
Measure:								
Expectation of physiological control (Range 1 - 7)	4.38	1.99	4.63	1.99	2.25	0.95	1.40	0.55
State Anxiety (STAI)	67.13	7.28	57.00	7.76	46.25	6•39	53.50	10.59
Trait Anxiety (STAI)	33.25	5.97	41.38	10.67	29.75	2,58	37.00	13.00
Speech Disruptions (No.)	12.63	3.34	9.75	3 .85	2.75	1.50	8.00	6.22

Table 23 Table of Means and Standard deviations (SD) for all measures:

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analysis also revealed a statistically non-significant main effect of Locus of control ($\mathbf{F} = 0.1$, df 1, 21, p > .05) and Group x Locus of control interaction ($\mathbf{F} = 0.6$, df 1, 21, p > .05). Thus expectations of control were not related to locus of control orientation.

State Anxiety Scores:

Spearman coefficients of correlation between subjects' state anxiety and trait ¹ anxiety scores were computed. These coefficients were large, probably reflecting subject numbers, but not statistically significant and in one case not positive: for the High Fear Internals r = .35 (n = 8); High Fear Externals r = .60 (n = 8); Low Fear Internals r = .76 (n = 4); Low Fear Externals r = .80 (n = 5). Therefore state anxiety scores were analysed without controlling for variations in trait anxiety levels. They were subjected to a two-way ANCVA ²: Group (2) x Locus of Control (2). (F ratios are presented in Table 24 and complete ANOVA summary tables in Appendix 11).

This analysis revealed a significant 3 main effect of Group (F = 14.2, df 1, 21, p < .01) and a significant Group x Locus of control interaction (F = 6.45, df 1, 21, p < .05), while the main effect of Locus of control failed to reach statistical significance (F = 2.1, df 1, 21, p < .05).

The Group by Locus of Control means are presented in Table 23 and Diagram 2. They show, as expected, that the High Fear group reported higher levels of anticipatory anxiety than Low Fear subjects. In addition, Diagram 2 illustrates the predicted difference between 1 Measured using the Trait Anxiety Scale of the S.T.A.I. 2 Using the Least Squares Solution for unequal cell sizes (Winer, ibid). 3 The 0.05 rejection region was used in all statistical evaluations.

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Diagram 2

State Anxiety means as a function of Group and Locus of control prientation



internals and externals in both the Low and High

fear groups. Specifically, it shows that internals reported more anxiety than externals in the High fear group, while externals reported more anxiety than internals in the Low fear group. However, comparisons ¹ of these means revealed that only the difference between High fear internals and externals was statistically significant, (p $\leq .05$).

Speech Disruptions:

Before analysing the speech disruption scores, the degree of inter-rater reliability was determined using Spearman's correlation computation. The coefficient of correlation between the two sets of ratings was large and statistically significant ($\mathbf{r} = .89$, $\mathbf{n} = 25$, $\overset{*}{\mathbf{r}}$ p < .01) and suggests a high degree of reliability. Furthermore, the mean scores for the two raters were similar and did not differ significantly (\mathbf{R}_1 : Mean = 9.51, SD = 5.36; \mathbf{R}_2 : Mean = 8.99, SD = 4.82; t = .79, df 25, p > .05).

The raters' mean scores for each subject were then subjected to a two-way $ANOVA^2$: Group (2) x Locus of Control (2). (F ratios are presented in Table 24, and complete ANOVA summary tables in Appendix 11).

A significant main effect of Group (F = 11.9, df 1, 21, p < .01) emerged from this analysis. As expected, the Group means (see Table 23) show that the High fear subjects emitted more disruptions than the Low fear speakers. The main effect of Locus of control was

- 1 Comparisons of these means were made using the Newman-Keuls procedure for unequal cell sizes. (Winer, 1971; p 216).
- 2 Using the Least Squares Solution for unequal cell sizes (Winer, ibid).
- * (one-tailed test)

Disruption means as a function of Group and Locus of control

orientation



Measure	Source of variation	DF	F	Ą	Comparison of Means
Expectation of physiclogical control	Group Locus of control Group x Locus of control residual	22222	14.75 0.05 0.60	>.05 5.05	High fear Group > Low fear group
State Anxiety (S.T.A.I.)	Group Locus of control Group x Locus of control . Residual	21111	14.20 2.10 6.45	<.05 •05 •01	High fear Group ≻ Low fear group High fear internals ≻ High fear externals Low fear externals ≯ Low fear internals
Speech disruptions	Group Locus of control Group x Locus of control Residual	21	11.90 0.05 5.80	× ~ ~ • 05 5	High fear group ≻ Low fear group High fear internals ≯ High fear externals Low fear externals ≻ Low fear internals

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Table 24 F Ratios for all AFOVAS for all measures.

not statistically significant (F <1, df 1, 21, p > .05), although the expected Group x Locus of control interaction was (F = 5.8, df 1, 21, p < .05).

The means reflecting this significant interaction are presented in Table 23, and represented in Diagram 3. Consistent with expectations this diagram illustrates that the High fear internals produced more disruptions that the High fear externals, while Low fear externals produced more disruptions than Low fear internals. However, comparisons ¹ of these means revealed that only the difference between the Low fear speakers was statistically significant (p < .05).

DISCUSSION

Consistent with expectations the results of this study suggest that the High Fear group were significantly more fearful than the Low Fear group both before (as indexed by State Anxiety scores) and during (as indexed by Speech disruptions) their speeches.

The observation that speech disruptions distinguished between High and Low Fear speakers is interesting because it is contrary to the finding in Experiment 3. A possible explanation for this inconsistency may be found in the fact that in the present study subjects presented prepared speeches, while in the previous study the speech was impromptu. Two points may be relevant here. Firstly, we might expect that when speeches are prepared, fearful speakers spend less time being silent and more time producing words, thus increasing the probability of disruptions. Secondly, it is possible that disruptions more probably reflect anxiety when the speech is prepared. We might expect that when speeches are impromptu the speakers' 'ums' and 'ahs' reflect a 'filled pause' in which they

1 Comparisons were made using the Newman-Keuls procedure for unequal cell sizes (Winer, 1971, p 216).

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think of what to say next, rather than anxiety. However, when the speech is prepared the speakers may need fewer such pauses for thought.

The findings of this study also suggest that these expressions of speech anxiety were related to the speakers' locus of control orientation, although the pattern of results is complex.

It was predicted that high fear internals would express higher levels of subjective and behavioural anxiety than high fear externals and conversely, that how fear internals would express lower levels of subjective and behavioural anxiety than Low fear externals. However, although the results for both measures were in the predicted direction, only state anxiety scores reflected a significant difference between the High fear groups, while only speech disruptions distinguished between the Low fear subjects.

Several interpretations of this pattern of results are possible. Essentially, they reflect two basic possibilities: namely that real differences between high fear internals and externals and low fear internals and externals only exist in terms of specific systems of expression (i.e. either behavioural or subjective), or alternatively that real differences exist between these groups in both of these response systems but that there was a failure to consistently measure it.

The most straightforward interpretation reflects the first possibility. Specifically, we might speculate that the difference between high fear internals and externals only exists in terms of subjective anticipatory anxiety and similarly, that the only real difference between low fear internals and externals is in terms of behavioural anxiety. While this interpretation is the most straightforward it necessarily implies that the relationship between subjects' Locus of

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control orientation and the expression of speech anxiety is more complex than originally thought.

A more parsimonious interpretation of these data is in terms of measurement error. For example, we might speculate that this pattern of results reflects the different ranges of sensitivity of the measures used. Specifically, it is possible that the S.T.A.I. is a more sensitive index of speech anxiety when subjects are experiencing high, rather than low levels of anxiety and therefore distinguished between the High fear groups but failed to differentiate the Low fear groups. Similarly, it is possible that speech disruptions are a more sensitive index when subjects are experiencing low or moderate amounts of speech anxiety and, as a consequence, this measure failed to reflect real differences in anxiety between the High fear subjects. It is apparent, however, that only further research will allow us to decide between these possible interpretations.

Given that the data suggest that some sort of relationship exists between the behavioural and subjective expressions of speech anxiety and speakers' locus of control orientation, the question arises as to the mechanisms of this relationship.

It was proposed in the introduction (on the basis of Rachman's (1978) arguments and Gatchel et al.'s (1979) research) that the magnitude of the expression of subjective and behavioural fear is determined by the degree to which the physiological concomitants of fear are perceived as uncontrollable. Furthermore, it was argued that the expression of fear would be influenced in a predictable way by subjects' locus of control orientation. Specifically, it was proposed, consistent with Watson and Baumal's (ibid) congruency hypothesis, that if high fear subjects perceived the physiological concomitants of fear as uncontrollable, then those internally-oriented subjects would express higher levels of anxiety than the

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externally-oriented subjects. Similarly, it was predicted that if low fear subjects perceived the physiclogical concomitants of fear as controllable, then internally oriented subjects would express significantly less anxiety than externals.

The significant differences in the expressions of fear observed in this study are consistent with this hypothesis. In addition, High fear subjects tended to expect to experience the physiological concomitants of fear as uncontrollable and significantly more so than the Low fear subjects who tended to expect to be able to control the physiological effects of fear. However, it must be noted that these data do not provide a direct test of the pivotal assumption of this hypothesis, namely that the behavioural and subjective expressions of speech anxiety are causally related to the degree to which the physiological concomitants of fear are perceived as uncontrollable. Therefore, the observed effects cannot be confidently evaluated in terms of the above hypothesis.

In addition, while these effects mquire explanation, it seems prudent to suspend speculation until they have been reproduced under more rigorously controlled conditions. In the present study a number of possible influential variables were not controlled. Specifically, it was not possible to control the size of the audience across sessions or its composition. Indeed, the subjects themselves made up part of the audience and this may have resulted in modelling effects. Furthermore, the topic of each presentation was probably quite varied. Although it is difficult to see how the observed effects may have been determined by these variables, their possible influence cannot be confidently dismissed. Therefore, the following experiment was designed primarily to observe these effects under more well controlled conditions and thus provide a sounder basis for future research.

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Experiment 6

A FURTHER INVESTIGATION OF THE RELATIONSHIP BETWEEN THE EXPRESSION OF SPEECH ANXIETY AND THE SPEAKERS' LOCUS OF CONTROL ORIENTATION

The results of the previous study suggest that the expression of speech anxiety is related to both a speaker's degree of self-reported fear of public speaking (i.e. high or low fear) and his locus of control orientation (i.e. internal or external), although this relationship was more complex than expected.

Specifically, it was predicted that high fear internals would express higher levels of subjective and behavioural anxiety than high fear externals, while low fear internals would express lower levels of subjective and behavioural anxiety than low fear externals. However, although the results for both indices of fear were in the predicted direction, only the subjective measure reflected significant ifferences between the high fear subjects and only the behavioural measure distinguished between the low fear groups.

Possible interpretations of this pattern of results were discussed, although it was stressed that such speculation may be premature given the methodological weaknesses inherent in the study. Due to these weaknesses it is apparent that the factors of fear level and locus of control orientation need to be examined under more rigorously controlled conditions before we can be at all confident about the reality of their relationship with speech anxiety. This examination was the primary objective of the present study, although the effect of a third factor of interest, namely repeated exposure to the phobic situation (i.e. presenting a second speech), was also examined.

The predictions relating to these factors were tested using the experimental paradigm described in an earlier study (i.e. experiment 3). They were as follows : consistent with the findings of experiment

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3 it was predicted that subjects who reported ¹ high levels of public speaking anxiety would express significantly higher levels of anxiety than low fear speakers both before ^{2, 3}, and during ^{4, 5}, the presentation of two impromptu speeches and that this expression would be indexed by subjective ^{2, 4}, behavioural ⁵ and physiological measures ³.

The experimental procedures also included measuring heart rate (bpm) during the presentation of speeches: the results of experiment 3 show that this measure failed to distinguish between high and low fear speakers and therefore, its use in the present study provides a further test of the hypothesis that heart rate recorded while presenting an impromptu speech, is an index of speech anxiety.

In addition, and in accordance with the hypothesis presented in the previous study, it was expected that high fear internals would express significantly higher levels of anxiety than high fear externals, while among the low fear subjects internals would express significantly lower levels of anxiety than externals. Consistent with the parsimony of this hypothesis, rather than the complex pattern

- 1 Levels of public speaking anxiety were determined by subjects responses to the item 'Speaking in Public' on the Fear Survey Schedule III (Wolpe, 1973).
- 2 Subjective anticipatory anxiety was measured using the A-State scale of the S.T.A.I. (Spielberger et. al., 1970).
- Heart rate (bpm) was taken as a measure of anticipatory anxiety.
- 4. A ten-point fear thermometer (Walk, 1956) was used to measure subjective anxiety experienced during speech presentations.
- 5. Word count and duration of silence were used to measure behavioural anxiety expressed during speech presentations.

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of results observed in the last study, it was predicted that these differences would be indexed by subjective, behavioural ¹ and physiological measures of speech anxiety.

Lastly, predictions were made about the effect upon speech anxiety of repeated exposure to the phobic stimulus (i.e. presenting a second speech). The results of experiment 4 in this series show that the control group subjects in that study experienced significant interspeech reductions in subjective fear although the behavioural measures failed to index significant change. Therefore, in the present study a similar desynchronous pattern of inter-speech change was expected for both high and low fear subjects. It was also predicted, based upon the findings of Eorkovec et al. (1974) that both high and low fear subjects would experience significant inter-speech reductions in heart rate measured both before and during speech presentations. In addition asking subjects to present two speeches also made it possible to further our knowledge of the relationship between a speaker's locus of control orientation and the expression of speech anxiety. Specifically, an additional exploratory question addressed in this study was : "Do high fear internals and externals and low fear internals and externals experience similar inter-speech changes in speech anxiety ?"

METHOD

Subjects:

Twenty subjects volunteered to take part in the study. All of them were college students. These subjects were selected on the basis

1 In the previous study speech disruptions were used as a measure of speech anxiety, however, the findings of experiment 3 show that when thespeech is impromptu, word count and duration of silence rather than disruptions distinguish between high and low fear speakers. Therefore these measures were used in the present study.

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of their responses to the item 'Speaking in Public' on Wolpe's (1973) Fear Survey Schedule (FSS III) and their scores on Levenson's (1974) Locus of Control Scale.

The first phase of this procedure involved selecting those subjects who had indicated their fear of public speaking to be 'very much' (High Fear subjects) or 'a little' (Low Fear subjects) from a group of approximately 500 students who had completed the FSSIII. Levenson's Locus of control scale was then sent to the first 35 suitable subjects: twenty high fear speakers and fifteen low fear speakers. As part of a procedure adopted to ensure that the experimenter remained blind to the subjects' locus of control orientation throughout the experiment, this questionnaire was circulated with written instructions to the subjects to write their names on an adjoining top-sheet only. When the questionnaire with its adjoining top-sheet was returned, it was passed to a colleague who assigned the same number to both the questionnaire and the sheet.

This colleague also marked this questionnaire in accord with the subjects' fear status, i.e. they were simply marked with an H (high fear speaker) or an L (low fear speaker). The questionnaire and the top-sheet were then separated: the former was filed and the latter was sent to the experimenter for scoring. On the basis of the scores of these returned questionnaires (following reminders seventeen of the high fear speakers and fourteen of the low fear speakers returned the questionnaire), a median score of 18 on the Internal dimension ¹ of the Locus of Control scale was used to define subjects as either internals (< 18) or externals (> 18). Ten of the

1 The Internal dimension of Levenson's Locus of control scale measures the degree to which subjects' perceive events as being contingent upon their own behaviour.

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high fear speakers and ten of the low fear speakers were then roughly matched on the basis of their locus of control scores, ensuring that five in each group were internals and five externals. A list of the numbers of these subjects was then passed to a colleague who matched them with the file of numbers and names. The experimenter was given the names of these subjects and they were then contacted by letter and asked to take part in an experiment. Two of these subjects failed to reply and were replaced by subjects with the same fear status and similar locus of control scale score. Care was taken once again to ensure that the experimenter was unable to match the names of subjects with their locus of control orientation.

After the experiment the subjects' names were used to trace their numbered questionnaire and hence their locus of control score. The mean scale scores and standard deviations for each of the four categories was as follows : Low speech-anxious internals: Mean 14.60, SD = 2.88 Low speech-anxious externals: Mean 21.80, SD = 3.11 High speech-anxious internals: Mean 13.40, SD = 2.88 High speech-anxious externals: Mean 13.40, SD = 2.88 Equipment/Materials:

A Phillips camera and Sony video-recording equipment was used to record subjects' speech presentations.

Before, during, and after their presentations, subjects' heart rates were recorded via a finger-plethysmograph linked to a pulse-meter and counter. A San EI pulse-meter was used to pick up the signal from the light-sensitive-cell-plethysmograph and the monitor light on the meter was used to generate a digital display on a counter. This display consisted of the number of flashes

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emitted by the monitor light in consecutive five-second periods, or essentially, the number of heart beats per five seconds. This digital display was recorded by the experimenter. (See Appendix 4 for a wiring diagram).

Questionnaires:

Levenson's (1973) Locus of Control questionnaire consists of three scales which can be scored independently of each other. These scales are labelled Internal, Chance and Powerful Others. The Internal scale measures the degree to which individuals perceive that they determine or control events in their lives, while the other two scales measure the degree to which individuals perceive that events are determined by external forces such as chance, fate or powerful other people. In the present study the Internal scale was used to define internals and externals because a tendency to perceive that events are not personally determined necessarily implies an external locus of control. In contrast a tendency to perceive that events are not determined by either chance or powerful others does not necessarily imply an internal locus of control. It is possible to believe that events are not determined by chance but nonetheless believe that they are determined by other external forces and as powerful others and vice versa.

Research (Levenson, 1973) has indicated that these scales have good reliability and validity.

Each of the scales is comprised of 8 questions although they are presented to subjects as a single questionnaire of 24 items. The questions are answered on a 7-point Likert-type scale ranging from 'Strongly Agree' to 'Strongly Disagree'.

Spielberger et al.'s (1970) State-Trait Anxiety Inventory (S.T.A.I.) consists of two scales each of 20 items. The State scale

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is designed to measure state anxiety intensity at specific points in time, while the Trait scale is designed to measure a more enduring level of anxiousness less influenced by external events. Subjects respond to each of these items by rating themselves on a four-point scale. The S.T.A.I. test manual (Spielberger, et al. 1970) gives extensive reliability and validity data for both the State and Trait scales. These questionnaires appear in Appendices 19 & 20. <u>Measures of Speech Anxiety</u>:

(i) Behavioural Indices:

Two behavioural indices of speech anxiety were scored : (a) word count, and (b) the sum of each period of silence longer than one second in duration - silence (s).

These measures were scored for each of the three forty-second periods of each speech. This procedure, which was used in previous studies (i.e. experiments 3, 4), was used to increase the sensitivity of the indices to differences in speech anxiety by taking account of intra-speech trends.

(ii) Subjective Report:

Two instruments were used to measure subjective fear: the S.T.A.I. State Anxiety scale (Spielberger, Gorsuch, and Lushene, 1970) and a ten point Fear Thermometer (FT) (after Walk, 1956). The S.T.A.I. State Anxiety scale was used to measure anticipatory anxiety and was administered prior to the presentation of both speeches. The Trait scale of the questionnaire was administered following the presentation of the second speech. After each speech subjects used the FT to rate the degree of fear they experienced at the beginning and end of the speech. They were told to equate 1 with calm relaxation, 5 with moderate fear and 10 with extreme fear.

(iii) Physiological Measure:

Heart rate (bpm) was recorded for the ten-second period prior to the presentation of each speech and for the duration of each

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of the two minute speeches. A baseline heart rate was also recorded for thirty seconds, ten minutes after the completion of the second speech.

Procedure:

Subjects arrived at the test-room for the first of the two sessions unaware of the nature of the study; they had simply volunteered to take part in an experiment. Upon arrival subjects were reminded of their response to the 'Speaking in Public' item on the FSSIII and asked to appraise it: responses for all subjects were the same as their initial FSSIII responses. They were then given the following instructions :

"I would like you to speak into the camera you see in front of you (it was placed fifteen feet away from the desk at which they were sitting) on a given topic for two minutes; you will have no time to prepare your speech. The film of your presentation will be shown at a later date to an audience of people from outside the college. These people will have no knowledge of the topic I will ask you to talk about, so direct your speech to them. Is that clear ? Do you wish to proceed ?"

None of the subjects refused to take part. The procedure for the first speech presentation was then as follows : subjects were first of all given an explanation of the purpose of the finger plethysmograph which was attached to the desk top at which they were sitting. In order to allay any unnecessary anxiety they were told that it measured 'blood flow' and were given a brief description of how this was achieved. No mention was made of heartrate recording. A microphone was then clipped to a suitable item of the subjects' clothing and at the same time they were given an explanation of its purpose. Subjects were then asked to complete the S.T.A.I. State scale. Having done so they were asked

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to place their left forefinger in the finger-plethysmograph and then given the following instructions:

"On the card on the desk is printed the topic' on which I want you to speak, please read it." When the subjects had read the card, the instructions continued: "I will give you three signals. I will say 'Ready' and then ten seconds later I will say 'Now'. You will start then and stop when I say 'Stop'.

In the ten second period prior to each speech presentation and throughout the two minute speech, heart rate was monitored and recorded by the experimenter who remained in the test-room sitting in a corner behind the subject. A technician, who remained out of sight in an adjacent equipment room, operated the recording equipment and synchronized (using the signals given to the subject) a digital timer which was superimposed on the film.

Following their speech presentations subjects were asked to use the fear thermometer to rate the fear they experienced at the beginning and end of the speech.

After the first presentation, appointment times were confirmed for the second session, which was the following day. Arrangements were made to meet the subjects in another part of the college in order to allay any suspicions about the nature of the second session. They were also asked not to talk to anyone about the study.

The second session proceeded as follows : Subjects were met at the pre-arranged place and then taken to the test-room. There they were told that the second half of the study, as in the first, involved presenting an impromptu two minute speech which would be 1 For the first speech the topic was: 'What I expect to get out of college life... in both social and academic terms.' For the second speech the topic was: 'Describe what Bedford College has to offer in terms of social and academic facilities.'

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recorded and shown to a live audience at a later date. When asked, all subjects agreed to proceed. Subjects then sat at the desk in front of the video camera and completed the S.T.A.I. State scale. The procedure was then exactly the same as for the first session apart from the following additions: after their speeches subjects were asked to complete the S.T.A.I. Trait scale. They were then told that the final part of the experiment involved taking a baseline recording of their 'blood flow' via the plethysmograph. They were told to relax and then ten minutes after the completion of the S.T.A.I. a baseline recording of their heart rate was taken for a thirty second period.

Subsequently subjects were asked for their permission to show the recording to a live audience; their questions about the experiment were answered and finally they were asked not to discuss the study with anyone.

RESULTS

Behavioural Measures:

Word Count (WC) and duration of silence (S) were scored for the three forty-second periods of each two minute speech. Both of these measures were scored by the experimenter. Silence was scored with the aid of the digital timer superimposed upon the video-tape and word count with the aid of a hand counter. Each recording was scored twice for each measure and where discrepancies existed between these scores the recording was scored a third time. The scores for each of these variables were subjected to an ANOVA¹ for a four factor experimental design: Group (2 : High Fear vs Low Fear) x Locus of Control orientation (Internal vs External) x Speech (2) x Period (3), with repeated measures on the last two factors. (F ratios are presented in Table 25 and complete ANOVA summary tables in Appendices 12 and 13). 1 For all measures the ANOVAs were for a split-plot experimental design with repeated measures on one or more factors.

(a) Word Count:

Analyses of word count scores revealed a statistically significant main effect of Group ($\mathbf{F} = 16.22$, df 1, 16, p \angle .01). The group means show that the Low fear group spoke significantly more words per speech period than High fear subjects; they were for the Low and High fear groups respectively: Mean = 94.18, SD = 17.01; Mean = 64.52, SD = 32.83. This finding is consistent with the results of Experiment 3 in this series and provides further support for the notion that the number of words spoken when a speech is impromptu is an index of speech anxiety.

All other main effects failed to reach statistical significance: ¹ Locus of control (F = 1.26, df 1, 16, p > .05); Period (F = 2.99, df 2, 32, p > .05).

Of the first order interactions the expected Group x Locus of control interaction reached statistical significance (F = 4.54, df 1, 16, p \angle .05), while the others failed to do so: Group x Speech (F = 0.64, dfl, 16, p >.05); Group x Period (F = 2.55, df 2, 32, p >.05); Speech x Locus of control (F = 0.45, df 1, 16, p >.05); Speech x Period (F = 0.66, df 2, 34, p >.05); Locus of control x Period (F = 0.17, df 2, 32, p >.05).

The means reflecting the Group x Locus of control interaction are presented in Table 25 and represented in Diagram 4. This diagram illustrates, as expected, a superior performance by internals in the Low fear group and in contrast a superior performance by externals in the High fear group. However, planned comparisons of these means (see Winer, 1971; p 385) revealed that only the difference between High fear internals and externals was statistically significant (t.975 = 2.12, d f 16, SED² = 10.42).

The 0.05 rejection region was used in all statistical evaluations.
SED = Standard Error of Differences of means.

	Group		Lov	v Fear				High Fea r		
	Locus of	control	Intern	41 1	Exte	ernal	Inte	rnal	Ext	ernal
Measure:	Speech	Period	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Word Count (No) (Collapsed over speech and period)			97.90	16.43	90.47	17.04	52.53	32.22	76.50	29•29
Word Count (No) (Collapsed over	Ч		100.26	13.68	91.63	18.28	52.80	29.55	68.53	31.74
period)	N		95.53	18.98	89.26	16.24	52.27	35.74	84.46	25.15
Word Count (No)		Ч	100.80	11.58	91.60	22.07	66.40	18.24	80.40	30.53.
(Means as a function of group, locus of control, speech and	Ч	04 N	96.20 103.80	· 5.54 21.30	89.00 94.40	16.97 19.41	50.40	27.92 39.35	74.20 51.00	31.24
(perrod		Ч	95.00	15.18	93.60	20.16	62.00	40.30	83.60	26.73
	N	N	96.20	26.42	89.00	9.97	49.60	42.06	82.00	29.88
		3	95.40	18.20	85.20	19.32	45.20	29.81	87.80	24.20

Table 25 Table of Means and Standard Deviations (SD) for Word Count Scores:

DIAGRAM 4

Word count means as a function of Group and Locus of control orientation



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The analyses also revealed that all second order interactions were statistically non-significant: Group x Locus of control x Speech (F = 0.25, df 1, 16, p > .05); Group x Locus of control x Period (F = 3.21, df 2, 32, p > .05); Locus of control x Speech x Period (F = 0.51, df 2, 34, p > .05).

(b) <u>Silence</u>:

Analyses of silence scores revealed statistically significant main effects of Group ($\mathbf{F} = 51.40$, df 1, 16, $\mathbf{p} < 01$) and Period ($\mathbf{F} = 8.1$, df 2, 32, $\mathbf{p} < 01$). The means reflecting the main effect of Group illustrate the superior performance of the Low fear group; they are for the Low and High fear groups respectively: Mean = 1.60 (secs), SD = 2.91; Mean = 14.95 (secs), SD = 11.30. This finding is consistent with the results of Experiment 3 and reinforces the notion of silence as an index of fearfulness when the speech is impromptu.

The Period means illustrate a general intra-speech trend of increasing periods of silence, for periods 1 to 3 respectively: Mean = 6.26 (secs), SD = 8.19; Mean = 8.25 (secs), SD = 10.90; Mean = 11.31 (secs), SD = 11.89. However, this main effect of Period is more readily interpretable in terms of a significant Group x Period interaction discussed below. The other main effects failed to reach statistical significance: Locus of control (F = 4.09, df 1, 16, p > 05); Speech (F = 0.09, df 1, 16, p > 05).

Of the first order interactions the following were statistically significant: Group x Locus of control (F = 5.93, df 1, 16, p < .05); Group x Period (F = 4.32, df 2, 32, p < .05). The means reflecting the expected Group x Locus of Control interaction are presented in Table 26 and represented in Diagram 5. This diagram illustrates the expected differences between the groups, i.e. the superiority of Low

Table 26 Table of Me	eans and	Standard Jev	iations (S	.D.) for S	ilence sco	res				
	Group		F	ow Fear				High Fear		
	Locus o	f control	Interna		E.	xternal	Inte	rnal	Bxte	rnal
Measure:	Speech	Period	Mean	SD	Mean	SD	Mean	SD	Mean	US
Silence (seconds) (Collapsed over speech and period)			1.22	2.73	1.98	3.08	19.10	12.31	10.80	8.53
(rollanged over	μ		1.10	1.69	2.03	2.17	17.93	12.17	13.50	10.00
(corransed over period)	N		1.33	3.53	1.93	3.86	20.27	12.76	8.10	5.90
Silence (Means as	_	2	1.70	2.73	1.50	1.41	13.20	3•56	06.6	7.60
locus of control		3 г	0.60	0.89	2.40	2.61	23.80	15.25	19.20	11.08
speech and period)	N	21	0.00	0.00	0.80 1.40	0.84 1.95	15.60 21.70	14.12 14.01	7 .4 0 9 . 30	6.73 8.39
	Group		Low Fear		High Fe	ar				
Measure		eriod	Mean	SD	Mean	SD				
Silence (seconds) (Means as a function) of Group and Period)		Ч с Ю	1.00 1.71 2.10	1.61 2.81 3.89	11.52 14.81 18.53	8.75 12.06 12.20				

Diagran 5

Silence Means as a function of Group and Locus of control orientation.



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fear internals compared to Low fear externals and the superiority of High fear externals compared to High fear internals. However, similar to the analysis of the word count data, planned comparisons of these means revealed that only the difference between Eigh fear externals and internals was statistically significant (t .99 = 2.58, df 16, SED = 2.63). The Group x Period interaction means are presented in Table 26 and illustrate intraspeech increases in silence for both groups although this trend is greater for the Eigh fear group.

All other first order interactions failed to reach statistical significance: Group x Speech (F = 0.10, df 1, 16, p > .05); Locus of control x Speech (F = 0.69, df 1, 16, p > .05); Locus of control x Period (F = 0.40, df 2, 32, p > .05); Speech x Period (F = 1.05, df 2, 34, p > .05).

Similarly, all second other interactions were statistically non-significant: Group x Locus of control x Speech (F = 0.58, df 1, 16, p > .05); Group x Locus of control x Period (F = 1.11, df 2, 32, p > .05); Locus of control x Speech x Period (F = 0.37, df 2, 34, p > .05).

Summary:

In summary it is possible to make the following points on the basis of these analyses: firstly, the significant main effects of Group show that both word count and silence distinguished between High and Low fear speakers therefore suggesting that these measures index speech anxiety when the speech is impromptu.

Given that these measures do index speech anxiety, the second point to note is that both of the Group x Locus of Control interactions show, as expected, that High fear externals were significantly less anxious (i.e. they spoke more words and produced less silence) than High fear internals. In contrast, the expected differences between Low fear internals and externals were small and statistically non-significant. Thirdly, it is interesting to note that these behavioural indices were not significantly influenced by repeated exposure to the phobic stimulus, i.e. presenting a second speech.

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Table 27. F ratios emerging from the analyses (ANOVAs) of Word count and Silence scores

		Measu	re
Source of variation	DF	Word Count F ratio	Silence F ratio
Group Locus of control Group x Locus of contr Residual	1 1 01 1 16	16.22** 1.26 4.54*	51.39** 4.09 5.93*
Speech Group x Speech Locus of control x Speech Group x Locus of control x Speech Residual	1 1 1 1 16	0.09 0.64 0.45 0.25	0.09 0.11 0.69 0.58
Period Group x Period Locus of control x Period Group x Locus of Control x Period Residual	2 2 2 2 32	2.99 2.55 0.17 0.50	8.09** 4.32* 0.40 1.11
Speech x Period Group x Speech x Period Locus of control x Speech x Period Residual	2 2 2 34	0.66 3.21 0.51	1.05 2.39 0.37

** p <.01

* p < .05

Subjective Reports of Fear:

(a) <u>S.T.A.I. State anxiety scale scores</u>:

Spearman correlation coefficients (see Table 28) suggest a positive linear relationship between Trait anxiety and Locus of control orientation, (i.e. externals tended to report higher levels of general anxiety), and between Trait anxiety and State anxiety. However, the majority of the coefficients are of only moderate magnitude and statistically non-significant. Therefore, State anxiety scores were analysed without statistically controlling for variations in Trait anxiety. They were subjected to an ANOVA for a three-factor experimental design with repeated measures on one factor: Group (2) x Locus of control (2) x Speech (2). (F ratios are presented in Table 30 and complete ANOVA summary tables in Appendix14).

This analysis revealed a statistically significant main effect of Group (F = 9.86, df 1, 16, p < .01). The Group means, (which are for the Low fear and High fear groups respectively; Mean = 37.45, SD = 8.04; Mean 51.01, S.D. = 12.15) show that the High fear group reported significantly more anxiety in anticipation of presenting their speeches than Low fear subjects. The other main effects failed to reach statistical significance: Locus of control (F = 0.71, df 1, 16, p >.05); Speech (F = 4.20, df 1, 16, p >.05).

Similarly, all first order interactions were statistically non significant: Group x Locus of control (F = 0.06, df 1, 16, p >.05); Group x Speech (F = 0.70, df 1, 16, p > .05); Locus of control x Speech (F = 1.69, df 1, 16, p > .05). However, analysis of these scores did reveal a statistically significant second order interaction: Group x Locus of control x Speech (F = 6.31, df 1, 16, p \leq .05).

	(n = 5)	Trait scores with State scores	Trait scores with Locus of control scale scores (n = 10)	Scores correlated
	Locus of contro orientation	Speech		Group
•04	l Int- ernal	Ч		
•83*	Ext- ernal		• 28	Low F
•47	Int- ernal			ear
.04	Ext- ernal	N		
.78	Int- ernal			
-37	∃xt- ernal	Γ-	•<	High
•44	Int- ernal		1 5	Fear
•13	Ext- ernal	2		

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Table 28 Coefficients of correlation between Locus of Control, State and Trait anxiety scores

* p <.C5 (one-tailed test)

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The means reflecting this interaction are presented in Table 29 and plotted in Figure 10. This Figure illustrates the fairly constant levels of anticipatory anxiety from Speech 1 to 2 for Low fear externals and High fear internals, and an inter-speech reduction in anxiety for Low fear internals and High fear externals. However, comparisons ¹ of means revealed that only the inter-speech reduction in scores for the High fear externals was statistically significant, (p <.01).

(b) Fear Thermometer (FT) Ratings of Subjective Fear:

Fear thermometer ratings of fear were subjected to a 4-way ANOVA with repeated measures: Group (2) x Locus of control (2) x Speech (2) x Rating (2).² (F ratios are presented in Table 30 and complete ANOVA summary tables in Appendix 15).

The analyses of these ratings revealed significant main effects of Group (F = 11.15, df 1, 16, p < .01), Speech (F = 10.37, df 1, 16, p < .01) and Rating (F = 5.48, df 1, 16, p < .05). The means reflecting the effect of Group (High Fear group: Mean = 5.38; S.D. 2.57; Low fear group: Mean = 3.07, S.D. = 1.12), show that High fear subjects reported significantly more fear than Low fear subjects, while the Rating and Speech means suggest an overall intra- and inter-speech reduction in subjective fear. (Means and S.D.s for Rating 1 and 2 respectively are 4.65(2.29); 3.80 (2.22). Means and SDs for Speech 1 and 2 respectively are : 4.68 (2.40); 3.78 (2.09).).

The main effect of Locus of control failed to reach statistical significance (F = 0.19, df 1, 16, p > .05).

- 1 Comparisons were made using the Newman-Keuls procedure (described by Winer, op cit.).
- 2 Ratings 1 and 2 refer respectively to the subjective fear experienced at the beginning and end of each speech.

2										
	Group			н	ow fear			High	1 fear	
Measure	Locus of c	ontrol	Interr	าลไ	Exte	rnal	Inte	rnal	Exter	nal
	Speech		Mean	SD	Mean	SD	Mean	SD	Mean	SD
S.T.A.I. State	T		37.20	8 . 53	39.80	8.29	49.00	16.17	58,20	7.56
Anxiety scale	2		33.00	7.07	39.80	8.79	50.06	14.99	46.60	7.99
S.T.A.I. Trait			40.60	14.59	37.00	6.20	41.60	7.47	47.00	6.36
Anxiety scale										
		Rating								
	L	1	3.60	1.34	3.40	0.89	7.20	1.92	7.00	1.58
Fear Thermometer		N	2.40	0.89	2.80	1.48	4.60	3.05	6.40	1.52
(Means as a function of group.	N	L	2.80	0.84	3.00	1.00	5.20	2.86	5.00	2.45
locus of control, speech and rating		N	3.00	1.00	3.60	1.52	3.80	3.70	3.80	1.64.

Table 29 Table of Means and Standard Deviations (S.D.)for S.T.A.I. and F.T. scores.


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Of the first order interactions only the Group x Speech interaction was statistically significant (F = 11.55, df 1, 16, p < .01.) The High fear group means and SDs for speech 1 and 2 respectively are: 6.30 (2.20); 4.45, (2.63). The Low fear group means and SDs for speech 1 and 2 respectively are : 3.05, (1.19); 3.10, (1.07). These means suggest that High fear subjects experienced significant inter-speech reductions in subjective fear, while the subjective reports of fear for the Low fear groups were almost constant across speeches. The expected first order interaction between Group and Locus of control was statistically non-significant (F = 0.01, df 1, 16, p > .05), as were the other first order interactions: Locus of control x Speech (F = 0.29, df 1, 16, p > .05); Group x Rating (F = 2.73, df 1, 16, p > .05), Speech and Rating (F = 3.06, df 1, 16, p > .05).

All second order interactions also failed to reach statistical significance: Group x Locus of control x Speech (F = 1.15, df 1, 16, p > .05); Group x Locus of control x Rating (F = 0.17, df 1, 16, p > .05); Group x Speech x Rating (F = 1.19, df 1, 16, p > .05); Locus of control x Speech x Rating (F = 1.19, df 1, 17, p > .05). <u>SUMMARY</u>:

In summary the results of the analyses of the subjective measures of fear suggest that High fear subjects were significantly more fearful than Low fear subjects both before (indexed by State Anxiety Scale scores) and during (indexed by F.T. ratings) their speeches. The analyses of the F.T. ratings also suggest that the High fear subjects experienced significant intra- and inter-speech reductions in subjective fear.

The expected interaction between fear level (i.e. High vs Low) and Locus of control orientation failed to emerge: there were no statistically significant differences in reported fear between High fear internals and externals and Low fear internals and externals. Interestingly however, High fear externals did respond to repeated exposure with significant reductions in anticipatory anxiety, while anxiety levels for High fear internals were roughly constant from Speech 1 to 2.

<u>Table 30</u> F ratios emerging from the analyses (ANOVAs) of Fear Thermometer ratings and State Anxiety scores

Measure		Fear Thermometer Ratings	State Anxiety
Source of Variation	DF	F ratio	F ratio
Group Locus of control Group x locus of control Residual	1 1 1 16	11.15** 0.19 0.01	9.86** 0.71 0.06
Speech Group x Speech Locus of control x speech Group x Locus of control x speech Residual	1 1 1 1 16	10.37** 11.55** 0.29 1.15	4.20 0.70 1.69 6.31*
Rating Group x Rating Locus of control x Rating Group x Locus of control x Rating Residual	1 1 1 1 16	5.48* 2.73 1.21 0.17	
Speech x Rating Group x Speech x Rating Locus of control x Rating Residual	1 1 1 17	3.06 1.19 1.19	·

** p < .01

* p <.05

Heart Rate Measures:

Pearson correlation coefficients were computed for baseline heart rates and heart rates recorded in the 10 second period prior to each speech ('Anticipatory Heart Rate'), and baseline heart rates and heart rates recorded during speech presentations. The coefficients, which are presented in Table 31, suggest a positive linear relationship between these two sets of scores. However, the majority of the coefficients are of only moderate magnitude and statistically non-significant. For this reason heart rate scores were analysed without statistically controlling differences in baseline heart rates.

<u>Table 31</u> Pearson correlation coefficients for baseline heart rates correlated with heart rates recorded before ('Anticipatory heart rate') and during speech presentations.

Group	Low F	ear	High	Fear
Speech	1	2	1	2
Measures correlated: Baseline with				
(n = 10)	•23	•26	•37	.60 *
Baseline with HR recorded during Speeches (n = 10)	•32	• 26	• 09	•60 *

* p <.05 (1-tail)

(a) Anticipatory Heart Rates:

Heart rates recorded in the 10 second period prior to the presentation of each speech were subjected to an ANOVA for a 3 factor experimental design with repeated measure: Group (2) x Locus of control (2) x Speech (2). (F ratios are presented in Table 34 and Appendix 16).

The analyses revealed a statistically significant main effect of Group (F = 6.25, df 1, 16, p < .05). The Group means show that Anticipatory heart rates for the High fear group were significantly higher than those for the Low fear group. (Means and standard deviations for the High and Low fear groups respectively: 104.85 bpm (18.24); 81.15 bpm (10.72),). The main effects of Locus of control (F = 0.09, df 1, 16, p > .05) and Speech (F = 1.93, df 1, 16, p > .05) failed to reach statistical significance.

Of the first order interactions only the Group x Speech interaction (F = 11.82, df 1, 16, p < .01) was statistically significant. The means, which are presented in Table 32, were compared using the Newman-Keuls procedure (described in Winer, op. cit.). These comparisons revealed that prior to Speech 1 heart rates for the High fear subjects were significantly higher (p < .01) than those of the Low fear group. However, heart rates for the former group evidenced a significant (p < .01) inter-speech reduction and prior to the second seepch were not significantly different (p > .05) from the Low fear group.

The expected Group x Locus of control interaction was not statistically significant ($\mathbf{F} = 0.09$, df 1, 16, p > .05) and similarly the Locus of control and Speech interaction ($\mathbf{F} = 2.27$, df 1, 16, p > .05) failed to reach statistical significance.

The second order interaction was also statistically non-significant: Group x Locus of control x Speech (F = 0.07, df l, l6, p > .05).

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Anticipatory heart Speed rate (BPM) Means as 1 a function of group, Locus of control, 2		Locus of	Group	Anticipatory 1 Heart rate (BPM) 2 (Means as a function of group and speech)	Measure	Group
'n		control				
87 . 60 96.00	Mean	Inter		86. 91.	Ме	
10.03 9.49	SD	na l	Low Fea	8 50	an	Low Fea:
85•56 87•60	Mean	Exte	Ч	9.08 12.02	ß	ъ –
9.17 13.81	SD	rnal				
108.00 100.20	Mean	Inte		111 98	Ме	
18 .4 9 7.82	SD	rnal	High F	• 00 • 7	an	High Fe
114.00 97.20	Mean	Exteri	9a r	21.55 12.3	SD	9ar
26.15 16.65	ß	ual		÷		

Table 32. Table of Means and Standard Deviations (SD) for Anticipatory Heart Rates

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(b) <u>Heart rates recorded during speech presentations</u>:

Heart rate scores recorded during speech presentations were subjected to an ANOVA for a 4 factor experimental design with repeated measures: Group (2) x Locus of control (2) x Speech (2) x Period (3). The analyses revealed statistically non-significant main effects of Group ($\mathbf{F} = 2.66$, df 1, 16, p > .05), Locus of control ($\mathbf{F} = 0.12$, df 1, 16, p > .05) and Speech ($\mathbf{F} = 3.89$, df 1, 16, p > .05). However, a significant main effect of Period ($\mathbf{F} = 12.29$, df 2, 32, p < .01) did emerge from the analysis; the means illustrating an overall intra-speech reduction in heart rate: means and standard deviations for Periods 1, 2 and 3 respectively -103.93 bpm (14.75); 99.176 bpm (15.03); 96.27 bpm (14.84).

All first order interactions failed to reach statistical significance Group x Locus of control (F.= 0.01, df 1, 16, p > .05); Group x Speech (F = 3.08, df 1, 16, p > .05); Group x Period (F = 0.13, df 2, 32, p > .05); Locus of control x Speech (F = 0.07, df 1, 16, p>.05); Locus of control x Period (F = 1.43, df 2, 32, p > .05); Speech and Period (F = 0.22, df 2, 32, p > .05).

Of the second order interactions only the Group x Locus of control x Period interaction (F = 3.77, df 2, 32, p < .05) was statistically significant. The means reflecting this interaction are presented in Table 33 and graphically represented in Figure 11. Comparisons ¹ of these means revealed, consistent with expectations, significant intra-speech reductions in heart rate for both High fear externals and Low fear internals (t .99 = 2.46, df 32, SED = 3.12). For the Low fear externals heart rate also showed a reduction, although this decrease was statistically non-significant (p > .05). Similarly, the observed reduction for High fear internals was statistically non-significant (p > .05), being on average little more than one beat per minute. All other second order interactions were statistically non-significant: Group x Locus of control x Speech (F = 0.24, df 1, 16, p > .05); Group x Speech x Period (F = 0.25, df 2, p)34, p >.05); Locus of control x Speech x Period (F = 0.28, df 2, 34, p >.05). 1 Comparisons were made between heart rate means for Periods 1 and 3 for each group.

	Table
	33
Heart	Table
rates	•f Me
٠	ans a
	n a St
	;andard
	Devi
	ations
	(SD)
	for
	Heart
	rate
	scores
	recorded
	during
	Speech
	presentation and
	i fer
	Baselin

	Greup			Г	ow Fear			High]	lear	
	Locus of	control	Inte	rnal	Ext	cernal	Inte	ernal	Ext	;ernal
Measure	Speech	Period	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Heart rate		ч	102.45	8.57	97.75	11.95	105.44	17.62	110.09	18.06
(BPM)		N	94.35	12.53	95.19	10.77	104.25	19.11	102.90	15.92
(Means cellapsed over		Ŵ	93.15	12.68	92.15	6.92	104.10	18.40	95.70	17.65
		1	104.90	7.94	95.80	12.39	106.48	24.15	119.38	20.11.
	Ч	N	94.80	11.04	96.78	11.94	110.10	19.89	110.70	15.67
Heart rate		3	92.40	10.75	92.50	7.80	112.50	17.29	101.70	22.03
(BPM)		1	.06°66	9.34	99.70	12.59	104.40	10.63	100.80	10.68
(Means as a function	2	2	93.90	15.21	93.60	10.59	98.40	18.45	95.10	13.15
or group, locus or control speech and period)		Ś	95.70	15.64	91.80	6.82	95.70	16.92	89.70	11.19
Baseline Heart Rate (BPM)			72.72	6.28	78.90	4.34	81.96	13.18	75.86	6.07



		Measur	e
Source of Variation	DF	Heart rate F ratio	Anticipatory Heart rate F ratio
Group Locus of control Group x Locus of control Residual	1 1 1 16	2.66 0.12 0.CO	6.25* 0.09 0.29
Speech Group x Speech Locus of control x speech Group x locus of control x speech Residual	1 1 1. 1. 16	3.89 1.08 0.07 0.24	1.93 11.82** 2.27 0.07
Period Group x Period Locus of control x Period Group x Locus of control x Period Residual	2 2 2 2 32	12.29** 0.13 1.43 3.77*	
Speech x Period Group x Speech x Peri Locus of control x Speech x Period Residual	2 od 2 2 34	0.22 0.25 0.28	

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Table 34 F ratios emerging from the analysis (ANOVAs) of heart rates

** p <.01 * p <.05

DISCUSSION

Consistent with the findings of Experiment 3 in this series, the results of this study show that anticipatory heart rates, word count, silence and fear thermometer ratings distinguished between High and Low fear speakers, and therefore, provide further support for the notion that these measures index speech anxiety when the speech is impromptu. The above results also suggest, consistent with the findings of the previous study, that State Anxiety (S.T.A.I.) scores were sensitive to significantly different levels of subjective anxiety experienced by these groups prior to speaking.

In addition, and again in accord with previous findings (i.e. those of experiment 3) the heart rate data suggest that heart rate does not distinguish between high and low fear speakers when they are presenting an impromptu speech. Therefore, the observed increases in heart rate above baseline for both groups cannot be assumed to simply reflect anxiety.

Given that these various behavioural (i.e. word count and silence), physiological (anticipatory heart rate), and subjective measures (i.e. F.T. ratings and S.T.A.I. scores) do index speech anxiety, it is interesting to note that they provide an inconsistent picture of the comparative levels of anxiety experienced by internals and externals; especially within the High fear group. The pattern of results for Low fear internals and externals is less complex and therefore will be considered first.

Contrary to expectations all of the indices of anxiety suggest that internals and externals within the Low fear group experienced comparable levels of anxiety both before and during their speech presentations. In short, the results fail to support the hypothesis that internals express lower levels of anxiety than externals in

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response to stimuli which are perceived ¹ as being only minimally frightening.

Given that a real difference in anxiety levels does exist between low fear internals and externals and this was the suggestion of the results of the previous study, perhaps the simplest interpretation of this failure to illustrate it is that the various indices were not sensitive to differences between subjects who were experiencing general ly low levels of anxiety. In short this failure may reflect a 'floor' effect.

Intriguingly, the only significant difference between Low fear internals and externals was in terms of heart rate recorded during speeches. Consistent with the expectations that internals would express less anxiety than externals, the results show that the former group experienced significant intra-speech reductions in heart rate, while intra-speech trends for externals were not statistically significant. However, given that this measure does not appear to simply index anxiety, this finding is difficult to interpret.

The pattern of responses for the High fear subjects, as suggested above, was more complex. The analyses failed tosupport the prediction that internals would experience greater levels of anticipatory anxiety than externals, or more subjective anxiety while speaking. However, the behavioural data may be interpreted to suggest, consistent with predictions, that internals experienced more anxiety while speaking than externals: as expected externals produced significantly more words and less silence in their speeches than internals. The heart rate data recorded during speech presentations are also consistent with expectations: externals experienced significant intra-speech reductions in heart rate, 1 Based upon their responses to the item 'speaking in public' on the FSS III (Wolpe, 1973).

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while for internals intra-speech changes were not statistically significant. Again however, because heart rate did not distinguish between High and Low fear speakers an interpretation of this data in terms of differences in anxiety levels is not justified.

When inter-speech trends in anxiety for the High fear groups are considered the various indices similarly present an inconsistent picture. Subjective reports (S.T.A.I. scores) suggest that externals experienced significant inter-speech reductions in anticipatory anxiety, while levels of anticipatory anxiety for internals remained almost constant from speech 1 to 2. However, anticipatory heart rates may be interpreted to suggest a significant inter-speech reduction in anxiety for both groups, although it should be noted that the greater reduction was experienced by externals: externals experienced an inter-speech reduction of 16.8 bpm compared to a reduction of 7.86 bpm for internals.

Analyses of the behavioural data suggest that levels of anxiety experienced by internals and externals while speaking did not differ significantly from speech 1 to 2. Although consistent with the above findings the latter group showed the greatest improvement in performance, i.e. more words and less silence in their second speech. In contrast, subjective reports of fear experienced while speaking, suggest that both internals and externals experienced comparable and statistically significant intra- and inter-speech reductions in anxiety.

In conclusion, the results indicate that only the behavioural measures support the hypothesis that high fear internals express more anxiety than high fear externals when presenting an impromptu speech. However, although the data from the other measures failed to do so, they are not inconsistent with this hypothesis.

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In addition, there is some evidence (S.T.A.I. scores) to suggest that externals and internals experienced significantly different inter-speech reductions in anxiety. Specifically, externals experienced a reduction in anticipatory anxiety from Speech 1 to 2, while internals failed to do so. Again, although the other measures failed to illustrate this difference, the data are not inconsistent with this interpretation.

The most immediate questions to arise from these observations are as follows : Firstly: "If a real difference in anxiety levels does exist between high fear internals and externals, then why did some of the indices fail to illustrate it ?" Secondly: "Why was this difference apparent in the behavioural response system, rather than in terms of subjective anxiety as in the previous study ?" Thirdly, "Why do differences between high fear internals and externals exist ?"

In response to the first question it is possible that the observed discordance between the various indices of anxiety simply reflects the nature of speech anxiety as a 'Three-Systems' construct (Lang, 1967)¹ of loosely coupled and partially independent responses, which may also change in a desynchronous fashion with repeated exposure. Indeed, the observed desynchrony between measures for the high fear group was expected. Given such a model of speech anxiety, we can then speculate that some of the measures failed to distinguish between high fear internals and externals because in particular response systems differences do not actually exist. So for example, it is possible that these groups differ in terms of the expression of behavioural anxiety but not in terms

1 This conceptualisation of fear has been discussed at some length in Chapter 1 of this thesis and in the literature (e.g. Hughdahl, 1980).

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of subjective anxiety experienced while speaking. Furthermore, it is possible within such a model to expect not only different rates of change of anxiety between groups (i.e. High fear internals vs High fear externals) but also different rates of change for different expressions of anxiety within groups.

However, the results of this and the previous study suggest that this pattern of discordance is not a consistent one. In the previous study subjective anxiety distinguished between high fear internals and externals while in the present study it was the behavioural measures. It would seem possible then, that real differences between these groups may be reflected in different response systems, depending upon the nature of the phobic stimulus (i.e. a live audience vs a video camera) and its anxiety-provoking potential.

It is alternatively possible that some of these indices were insensitive to real differences in anxiety levels between these groups. Such insensitivity may be a function of the nature of the measure; subjects use of the measure (i.e. when responses such as subjective reports are under voluntary control); the nature of the experimental paradigm, or indeed an interaction between these three variables. So for example, the fear thermometer may be a crude and insensitive index of anxiety especially under conditions which may evoke only moderate amounts of subjective fear, thereby reducing the range of scores. In addition, it is possible that such an instrument is susceptible to the response biases of different subject groups. For instance, some researchers (e.g. Houston, 1972; Fhares, 1976 pp 130 - 132) have suggested that internals may be reluctant to report anxiety and may even deny feeling anxious. Indeed, for these subjects it seems plausible to suggest that one possible way in

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which they may cope with the presumed incongruence ¹ between their general expectations of control and the experience of the uncontrollable effects of fear, is to deny that fear. Such a tendency may be reflected in the failure to find differences between internals and externals in this study in terms of subjective anxiety experienced while speaking.

It is also possible that the S.T.A.I. is a more sensitive index of speech anxiety when subjects are experiencing high, rather than moderate levels of fear and therefore distinguished between High fear internals and externals in the last study, but failed to differentiate these groups in the present study. Similarly, the reverse may be true for the behavioural measures; they may be a more sensitive index of speech anxiety when the speakers are experiencing moderate rather than high levels of anxiety.

Clearly these speculations need to be pursued empirically. At present the most cautious conclusion that can be drawn from this study is that high fear internals and externals differ significantly in terms of behaviourally expressed anxiety when the speech is impromptu and experience significantly different reductions in subjective anticipatory anxiety with repeated exposure to the speaking task.

Given such a conclusion the next question to be considered is "Why do these subjects differ in their expressions of anxiety ?" At a descriptive level these findings are consistent with the congruency hypothesis which was discussed in the introduction to the previous study. Specifically, this hypothesis stated that the expression of anxiety is a function of the degree of congruency between general (i.e. Locus of control orientation) and situational 1 The argument is presented in the introduction to the previous

study.

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expectations of control: the greater the incongruency, the greater the anxiety.

On the basis of this hypothesis it was argued that high fear internals would experience more anxiety than high fear externals when exposed to a phobic stimulus because an internal locus of control is incongruent with the experience of fear which, in terms of physiological arousal, implies a loss of control. Indeed, the results of the previous study do suggest that high fear subjects perceive the physiological concomitants of fear to be beyond personal control. However, it cannot be concluded from this finding that a causal relationship exists between such perceptions and the expression of fear. Further research is needed to examine this possibility.

In addition, to examine the relationship between the expression of fear and the perception of physiological arousal, future research might also focus upon actual differences between internals and externals in terms of physiological responding. It is possible that such differences mediate the observed differences in the subjective and behavioural expressions of fear. Indeed, in the present study differences in heart rate were observed between internals and externals while they were speaking, although these differences are difficult to interpret given that this measure did not index speech anxiety. However, it is conceivable that with a different experimental procedure ¹ heart rate would more clearly index speech anxiety and therefore this procedure could be used to examine differences between

1 Such a procedure might involve minimising the effort required to produce a speech (i.e. when it is rehearsed) and maximising the anxiety inducing the potential of the speaking task (i.e. presenting a speech to a large live audience).

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internals and externals.

A further point for future research concerns the differences between high fear internals and externals in terms of their responses to repeated exposure. The general trend for the High fear externals from Speech 1 to 2 was one of fear reduction, while for internals the behavioural and subjective (anticipatory) expression of anxiety remained roughly constant. A clearer picture of the possible differences between these subjects might emerge if they were asked to present three or four speeches.

A final area of enquiry that might also be fruitfully explored concerns fearful subjects' self-statements. For example, fearful subjects might be asked to report their self-statements prior to speaking and their attributions of causality for their success or failure to perform a speaking task. Within a cognitive model (i.e. Meichenbaum, 1977) of fear we might expect that the differences between internals and externals would be reflected by different mediating cognitions. So for example, we might speculate that internals may entertain cognitions or produce self-statements which suggest that they are focusing upon the effects of the fearful stimulus and not the speaking task, hence their poorer performances. Following the presentation of speeches high fear internals and externals may differ in their perceptions of success or failure and the causal attributions of that success or failure. Such perceptions may predict levels of anxiety on subsequent tasks. So for instance, consistent with his expectations an externally-oriented subject may attribute his failure on a speaking task thus "I could not help being afraid when the task was so difficulty." Such an externally oriented attribution (see Metalsky and Abramson, 1981 for a full discussion of 'Attributional styles') may be less inhibiting to the reduction

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of anxiety with repeated exposure than an internally-oriented attribution such as "I am useless at public speaking, I just can't stop myself panicking."

Summary and Conclusions:

The results of this study suggest that in terms of behaviourally expressed anxiety, high fear internals (defined by self report) are more fearful while presenting an impromptu speech than high fear externals. In addition, the latter group experienced a significant inter-speech reduction in anticipatory anxiety, while the former group reported similar levels of anxiety prior to both speeches. Differences in anxiety between low fear internals and externals did not emerge.

It is proposed that the reasons for the observed differences are open to speculation and further research. Speculatively, it is considered that they may be related to the degree of congruency between subjects' locus of control orientation and their perceived control over the physiological concomitants of fear. In addition, it is considered that these differences may be mediated by actual differences in physiological arousal and/or different fear-evoking cognitions.

Possible implications of these findings for theories of fear and therapeutic interventions are considered in the concluding chapter.

CHAPTER 5

INTRODUCTION TO EXPERIMENTS 7 and 8

In carrying out the preceding experiments a good deal of data werecollected which was not directly relevant to the hypothesis tested and, therefore, was not reported. However, the data has a bearing upon the findings reported above and, in addition, adds to our knowledge of speech anxiety and fears generally. Therefore, they are presented in the following studies. Experiment 7 investigated the relationship between locus of control orientation, trait anxiety and self-reported fears of FSS-III items. Experiment 8 examined observers' perceptions of the non-verbal cues of fearful and non-fearful public speakers.

Experiment 7

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN LOCUS OF CONTROL ORIENTATION, TRAIT ANXIETY AND SELF-REPORTED FEARS:

A considerable amount of evidence has been accumulated which demonstrates that externality, as measured by Rotter's (1966) Internal-External Locus of Control scale (I - E) is strongly associated with various types of maladjustment. For instance, it has been found that externals tend to report higher levels of anxiety and depression than internals and also manifest a higher incidence of schizophrenia. (See Phares, 1976 for a discussion of this evidence). Recently, Wright and Pihl (1981) have also found that externals tend to think more irrationally.

Following Rotter, Levenson (1973) constructed three new scales - Chance, Fowerful others and Internal - in order to measure locus of control orientation. Internality, the degree to which individuals perceive that they control events in their lives, is measured by the Internal scale while the concept of externality is sub-divided and measured by the Chance and Powerful others scales. The Chance scale measures the degree to which individuals perceive that events are determined by chance or fate, while the powerful others scale measures the degree to which individuals perceive that events are determined by Powerful other people. Levenson's rationale for sub-dividing externality into these two components was simply that people who believe that events are determined in an ordered way by powerful others, should logically be expected to behave differently from those people who believe that unpredictable external forces, such as chance or fate, determine events.

The purpose of the study reported below was to examine the relationships between Locus of control orientation, measured by

Levenson's scales, trait anxiety, measured by Spielberger et al's (1970) S.T.A.I. and self-reported fearfulness of the items on Wolpe's (1973) Fear Survey Schedule (FSS III). On the basis of previous findings (see Phares, 1976, p 121) it was predicted that externality, measured by both the Chance and Powerful Others scales would correlate positively with Trait anxiety, while internality, measured by the Internal scale, would correlate negatively with this variable. Consistent with these predictions it was also expected that externality would correlate positively with, and internality negatively with Total Fear Scores (TFS) on the FSS III (i.e. the sum of scores for each item on the schedule) and scores for each of the 88 items. However, given that there is some evidence (see Phares, 1976, p 32 - 34) to suggest that an unpredictable aversive stimulus can be more anxiety-evoking than a predictable one, it was also expected that a tendency to believe that events are both beyond personal control and unpredictable, as indexed particularly by the Chance scale, would correlate most strongly with fearfulness of the potentially aversive items on the FSS III. Finally it was predicted that TFSs would correlate positively with Trait anxiety.

METHOD

Subjects:

A total of 85 university students (70 females and 15 males), completed Wolpe's (1973) Fear Survey Schedule (FSS-III) and Levenson's (1973) Locus of Control questionnaire. 45 of these students (31 females and 14 males), also completed both of these questionnaires and Spielberger et al's (1970) State-Trait Inventory (S.T.A.I.).

Questionnaires:

An 88-item version of the FSS III (Wolpe, 1973) was administered, either individually or in class, with assurances of confidentiality. The written instructions which accompanied the schedule explained that the items were commonly associated with fear or other unpleasant feelings and that subjects should rate them according to their current reactions to the objects or situations denoted by the items. Responses were made using a 5 pointLikert type scale ranging from 'Not at all' (1) to 'Very much' (5).

Levenson's (1973) Locus of Control questionnaire was posted or circulated to individual subjects; again with assurances of confidentiality. (Sixty of the 85 subjects who completed it subsequently took part in one or other of the studies reported above).

The questionnaire consists of three scales which can be scored independently of each other. These scales are labelled: Internal, Chance and Powerful Others. The Internal scale measures the degree to which individuals perceive that they determine or control events in their lives while the other two scales measure the degree to which individuals perceive events as being determined by external forces such as chance, fate or powerful other people. Each of the scales is comprised of eight questions although they are presented to subjects as a single questionnaire of 24 items. The questions are answered on a 7 point Likert-type scale ranging from 'Strongly agree' to 'Strongly disagree'.

High scores on the Chance and Powerful Others scales reflect greater externality while high scores on the Internal scale reflect greater internality. Research (Levenson, 1973) has indicated that these scales have good reliability and validity.

Spielberger et al.'s (1970) State-Trait Anxiety Inventory (S.T.A.I.) was also posted or circulated to individual subjects, or completed by subjects during their participation in one or other of the studies reported above. The Trait-scale of the S.T.A.I. consists of 20 items designed to measure a more enduring level of anxiousness that is less influenced by external events than State anxiety. Subjects respond to each of these items by rating themselves on a four-point scale ranging from 'Almost Never' to 'Almost Always'.

The S.T.A.I. test manual (Spielberger et al, 1970) gives extensive reliability and validity data for both the State and Trait scales.

RESULTS

A Total Fear Score (TFS) for each subject was determined by summing their scores for each of the 88 items on the FSS III. Spearman rank correlation coefficients were then computed for the inter-correlations between TFSs, Trait anxiety scores and scores on the Internal, Chance and Powerful Others scales. These coefficients, which are presented in Table 35 are all statistically significant, indicating linear relationships between all of these variables.

More specifically, these correlations indicate that those subjects who reported higher levels of Trait anxiety tended to report higher levels of fearfulness, indexed by TFSs (r = .69, n = .41, p < .001), and also tended to be more externally-oriented, as indicated by the positive correlations between Trait anxiety and Chance scores (r = .61, n = .45, p < .001); Trait Anxiety and

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Powerful others scores (r = .69, n = 45, p < .001) and by the negative correlation between Trait anxiety and Internal scores (r = -.42, n = 45, p < .01). Similarly, subjects who reported higher levels of fearfulness, indexed by TFSs, also tended to be more externally-oriented as indicated by the positive correlations between TFSs and Chance scores (r = .65, n = 78, p < .001); TFSs and Powerful others scores (r = .57, n = 78, p < .001) and by the negative correlation between TFSs and Internal scores (r = -.42, n = 45, p < .01).

Table 35:

<u>Coefficients of correlation between Total Fear scores, Trait</u> Anxiety, Chance, Powerful Others, and Internal scores

		Trait anxiety	Total fear scores
Locus of { control { scales {	Trait anxiety Chance Powerful others Internal	.61***(n = 45) .69***(n = 45) 42** (n = 45)	$.69^{***} (n = 41)^{1}$ $.65^{***} (n = 78)^{1}$ $.57^{***} (n = 78)^{1}$ $ 34^{***} (n = 78)^{1}$

* p < .05; ** p < .01, *** p < .001 (one-tailed tests)

1 Total fear scores could not be calculated for seven of the subjects because they failed to check one or more of the items on the FSS III. Hence the reduced Ns.

Coefficients of correlation between subjects' scores for each of the items on the FSS III and their scores on the three Locus of Control scales were also computed. These Spearman rank correlation coefficients, which are presented in Table 36, indicate significant positive correlations between chance scores and scores for 62 of the items (31 ps < .001; 21 ps < .01; 10 ps < .05), and between Powerful Others scores and scores for 46 of the items (14 ps < .001; 14 ps < .01; 18 ps < .05). In addition these coefficients indicate significant negative correlations between Internal scores and scores for 40 of the items (5 ps < .001: 16 ps < .01; 19 ps < .05). Thus in terms of the number of significant correlations, fearfulness was most strongly associated with a tendency to perceive that events are determined by chance. However, in order to determine whether the relationships between fearfulness and the locus of control scales were significantly different, sign tests were used to compare the Chance by item coefficients with the Powerful others by item coefficients and also these latter coefficients with the Internal by item coefficients. Coefficients were only compared in these analyses when one of the pair was statistically significant.

These tests revealed a statistically significant tendency for the Chance by item coefficients to be larger than the Powerful others by item coefficients (z = 4.26, p < .001), and a significant tendency for these latter coefficients to be larger than these for internal and item scores (z = 2.01, p < .05). Thus for these items which correlated significantly with any of the three scales, fearfulness was most strongly associated with Chance scale scores.

Turning to the small and statistically non-significant correlation coefficients, it must be considered possible that some of them partly reflect the degree of dispersion of item scores. Table 36 shows that the standard deviations of scores for some items were relatively quite small (e.g. Journeys by Train, Weapons), therefore indicating relatively less dispersion. It is possible that with a greater dispersion of scores the hypothesised relationship between fear of these items and locus of control would become evident. However, it is also apparent from Table 36 that not all of the non-significant coefficients are associated with small standard deviations for item scores. (For examples consider the following items ¹: Worms, bats, snakes, crawling insects, mice, spiders). Therefore, it seems reasonable to conclude that fear of such items is unrelated to locus of control orientation.

Table 36

Listed below are the coefficients of correlation between subjects' (n = 85) scores on each of Levenson's (1973) Locus of Control scales and their scores for each of the items of the FSS III. Standard deviations (SD) for items scores are also listed

	Locus of Control Scale						
Item	Chance	Powerful Others	Internal	SD			
Feeling different	•58***	•32**	20*	1.08			
Tough looking people	.57***	.48***	30**	0.93			
Angry people	•55***	.27**	26**	1.09			
Looking foolish	.51***	•50***	29**	1.10			
Being ignored	•51***	.49***	21*	1.11			
Responsible for a decision	.51***	•27**	30**	0.98			
Feeling angry	•51***	.19*	40***	1.07			
Feeling disapproved of	•49***	•49***	33**	1.11			
Sick people	•48***	•54***	26**	1.06			
Feeling rejected by others	•48***	•51***	34**	1.15			
Being touched by others	•48 ***	•30**	29**	0.77			
Making mistakes	•46***	•49***	23*	1.00			
Darkness	•46***	•43***	04	0.97			
Strange shapes	•45***	•48***	.09	0.78			
Speaking in public	•45***	•29**	31**	1.22			
Losing control	•45***	•28**	33**	1.24			
Prospect of a surgical							
operation	•45***	•19*	28**	1.24			
Being with a member of							
theopposite sex	•44***	•24*	11	0.69			
People in authority	•42***	• 4 4***	- •27**	0.92			
One person bullying							
another	•42***	.18	-•37***	1.12			
Being criticised	•41***	•26**	23*	1.12			
People with deformities	•41***	•25*	13	0.97			
Being teased	•41***	•23*	24*	0.95			
A lull in conversation	•39***	•57***	20*	1.01			
Crowds	•39***	•42 ***	33**	1.07			

1 Interestingly, one of the factors to emerge from a factor analysis

of responses to the FSS III consisted of these items (Kartsounis, Mervyn-Smith and Pickersgill, 1983). T

Locus	of	Control	Scale

Item	Chance	Powerful others	Internal	SD
Ugly people	.38***	.22*	15	0.79
Dead animals	•37***	•32**	40***	1.13
Entering a room where		} -	l I	-
others are seated	•37***	•28**	23*	1.00
Sudden Noises	.37***	•23*	15	0.95
Flying insects	•36***	.17	20*	1.11
Parting from friends	•34**	.27**	03	1.14
Sight of deep water	•34**	.14	13	0.87
Dead people	•33**	•44***	24*	1.33
Strangers	•33**	•34**	04	0.85
Doctors	•33**	.17	44***	0.79
Witnessing surgical			1	Į
operations	•32**	•26**	41***	1.36
Sight of knives or				
sharp objects	•32**	•23*	18	0.87
Taking written tests	•32**	.18	15	1.12
Premature heart beats	•31**	•25*	20*	0.99
Journeys by Bus	•31**	•11	30**	0.50
Dull Weather	•30**	•28**	23*	0.89
Enclosed places	•30**	.19*	16	1.11
Seeing other people				
injected	•29**	•43***	-• >>**	1.17
Sight of fighting	•29**	•21*	18	1.17
Becoming nauseous	.29**	.15	23*	1.21
Loud Voices	1.29**	•15	11	1.05
Dirt Relief	•28**	• 24*	-• 24*	עיר ב ו
railing Teiler	• 20**	•21*	-,00 _ 10*	
Open weens -	• 20** >0++	•10 15	_ <u>-</u> ,	1 10
Upen woulds Human blood	• 20^ * 96 **	ر <u>ب</u>	22"	1,15
Looking down from high	• 207 8	• 10	•	
nlees nown from utgu	- 25*	4	08	1.02
Fainting	-25*	.14	08	1.02
Aeroplanes	-22*	.24*	06	0.99
Being in an elevator	.22*	.19*	.05	0.88
Fire	.21*	•28 * *	12	1.25
Medical odours	.20*	.04	35**	0.86
Being watched working	•19*	.21*	25*	1.02
Becoming mentally ill	•19*	.18*	02	1.53
Being alone	.19*	.16	•00	1.02
Animal blood	.19*	.11	25*	1.07
Crawling insects	.18	.16	 15	1.15
Journeys by train	.18	.02	05	0.34
Automobiles	•17	.11	01	0.72
People who seem insane	.15	•17	.08	1.03
Lightning	15	02	.16	0.87
Weapons	•14	.18	18	1.15
Imaginary creatures	•14	•17	• 17	0.61
Spiders	•14	10	1/	1.77
being in a strange place	•12	•02		V.40
Dentists	•11 17	•00		1.20
Thunder		- 19	• - 4	0.44
Large open spaces	010	10	• • • •	V • 44
Changed and the states of	י חר ו	י זה י	<u> </u>	0.63
Crossing the street	.10	•16 •10	05 07	0.63

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		Locus of co	ntrol scale	
Item	Chance	Powerful others	Internal	SD
Dogs Bats Worms High places on land Journeys by car Birds Sirens Snakes Mice	.09 .08 08 .05 .05 .03 .02 .00 .00	09 .13 .00 .15 03 .21 .19* .11 .02	.03 09 05 .03 .03 .03 .03 .02 .00 .00	0.77 1.24 0.91 1.02 0.57 0.49 0.87 1.20 0.95

* p < 05; ** p <.01; *** p < .001 (one-tailed tests)

DISCUSSION

The above results indicate that Locus of control orientation as measured by Levenson's Locus of Control scales, is strongly associated with trait anxiety and self-reported fearfulness. More specifically, the results show that significant positive correlation exist between externality (measured by the Chance and Powerful Others Scales) and both trait anxiety and fearfulness (indexed by TFSs), while significant negative correlations exist between internality and these variables. In short these correlations suggest that a tendency to perceive that events are beyond control is significantly associated with higher levels of trait anxiety and self-reported fearfulness.

The coefficients of correlation between subjects' scores for the three locus of control scales and their scores for each of the FSS III items, indicate significant positive correlations between the Chance and Powerful Others scale scores and scores for 62 and 46 of the items respectively, while significant negative correlations exist between Internal scale scores and scores for 40 of the items. In addition, a comparison of the coefficients for these items also

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revealed a significant tendency for the Chance by item coefficients to be larger than the Powerful others by item coefficients which, in turn, tend to be significantly larger than those for Internal and item scores. Therefore, consistent with expectations, these comparisons suggest that a tendency to perceive that events are both beyond personal control and unpredictable, indexed by the Chance scale, is most strongly associated with fearfulness. This finding also adds validity to Levenson's sub-division of the concept of externality into the Chance and Powerful Others dimensions.

It is possible that some of the small and statistically non-significant coefficients to emerge from this analysis partly reflect the degree of dispersion of item scores : the standard deviations for some item scores were relatively small indicating relatively less dispersion or spread of scores. It is conceivable that with a greater spread of scores the hypothesised correlations between fearfulness of these items and locus of control orientation would become evident. However, it must be noted that indexed by standard deviations, scores for some items were reasonably dispersed relative to other items, but nonetheless unrelated to locus of control scale scores. Therefore, it seems reasonable to conclude that fear of these items is unrelated to locus of control orientation. Interestingly, these items include: crawling insects, spiders, bats, worms, snakes and mice, all of which load on the fourth factor to emerge from a factor analysis of responses to the FSS III (Kartsounis, Mervyn-Smith and Pickersgill, 1983).

When considering these findings and their interpretation it must be considered a possibility that the observed correlations between externality (measured by the Chance and Powerful Others Scales), internality and both Trait Anxiety and TFSs, reflect externals

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greater willingness to report on these aspects of their lives, rather than real differences in anxiety and fear between these subjects. (See Phares, 1976, p 142, for a discussion of this point in relation to other findings). However, such an explanation cannot readily account for the observed correlations between externality, internality and reported fearfulness of the FSS III items. A greater willingness on the part of externals to report fear could account for the significant correlations but many of the correlations were not significant, indicating that for some items internals and externals did not differ in terms of reported fearfulness. It is of course possible that internals reponded to some of the FSS III items in a defensive way and underscored their fearfulness but were more willing to admit their fear of other items, although why this should be so is open to speculation and further research. An examination of the relationship between externality and other indices of fear may help to determine whether internals and externals simply differ in terms of reporting fear of some stimuli or whether their reports reflect real differences in fearfulness.

EXPERIMENT 8

AN INVESTIGATION INTO THE DECODING OF THE EMOTIONAL EXPRESSION OF PUBLIC SPEAKERS:

The ability to judge the meanings of nonverbal cues of emotion has been the focus of a good deal of research conducted over the course of many years. (See Ekman, 1979, for a review of the main findings of this work).

In one of the studies in this literature Geer (1966) examined the decoding of the emotional expressions of subjects who were either high ¹ or low in their fear of public speaking. Specifically, these subjects were asked to present an impromptu speech and then judges were asked to rate recorded segments from each of the speeches for their emotional content. These ratings were made on four 7-point rating scales, the poles of which were labelled: 'Tense - calm', 'Bored - interested', Pleasure - anger', and 'Accepting - rejecting'. Interestingly, Geer found that the ratings on the 'Bored - interested' and 'Fleasure - anger' scales distinguished between the groups, with the high fear speakers being perceived as significantly more angry and bored than the low fear subjects. However, contrary to expectations the ratings on the 'Tense - calm' scale did not, even though other indices ² had suggested that the high fear group were significantly more fearful.

This finding is interesting given that recent research (Ekman, 1979) strongly suggests that people are quite good at recognising the nonverbal expression of fear and distinguishing it from other emotions, especially when the subject, or sender, shares the same or similar culture as the judge.

 This distinction was made on the basis of their response to the item 'speaking in front of a group' on Geer's (1965) Fear Survey Schedule (FSSII).
Speech anxiety was indexed by subjective reports and the duration of silence in the speeches. One possible interpretation of this finding is that it reflects the fact that the judges only heard the speeches they rated and did not see the speakers. While some contradictions exist within the literature, most experiments (see Ekman, 1979) have found that the face compared with voice or speech, is more accurately judged, produces higher agreement or correlates better with judgements based upon full audiovisual input. Thus it is possible that the judges in Geer's study accurately decoded differences between the groups in terms of expressed anger and boredom ¹ but were unable to detect differences in tension because of the absence of visual cues. Alternatively, it is possible that under such conditions non-verbal cues of tension are inaccurately decoded in terms of anger and boredom.

An additional factor which may have influenced Geer's findings was the sex ratio of his judges (36 males and 24 females). In a recent review of the literature Hall (1978) concluded that females are significantly more accurate than males at decoding non-verbal cues of emotion, i.e. distinguishing one expression of emotion from another. Thus it is unfortunate that Geer did not look at possible sex differences as it is conceivable that his findings were influenced by the decoding inaccuracy of the larger number of male judges.

Lastly, it must be noted that Geer expected that the differences in fearfulness between high and low fear speakers would be reflected in significantly different ratings of 'tension'. Hence, he appeared to be equating fearfulness with tension. However, it is possible that presenting an impromptu speech is a stressful task for both high and low fear speakers which produces tension indpendent of fear.

1 Unfortunately, Geer did not take independent measures of these emotions (e.g. speaker's subjective ratings of boredom and anger) with which to test this hypothesis.

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Thus, it is possible that while the groups differed in terms of fearfulness they did not differ in terms of tension. Therefore, the judges' failure to perceive a difference between the groups in terms of the 'Calm - tense' dimension may reflect their accurate decoding of the relevant emotional cues. Alternatively, of course, it may simply reflect their random use of this scale.

The purpose of the present study was to extend Geer's work by providing a further investigation into the decoding of the emotional expressions of high and low fear public speakers. However, because of the points discussed above it differed from Geer's study in several important respects. Firstly, the judges in the present study were asked to rate the speakers they observed on the dimension 'Calm-fearful' in order to provide a test of the primary hypothesis that fearful speakers are perceived as being more afraid, when speaking, than fearless speakers. Specifically, it was predicted that naive ¹ judges would rate high fear speakers ² as being significantly more fearful than low fear speakers 2 on a 7 point scale ranging from 'calm' to 'fearful'. Secondly these judges observed audio-visual recordings of subjects presenting impromptu speeches, rather than listen to audio-recordings as the judges did in Geer's study. Thirdly, an adequate examination of the effect of sex upon decoding accuracy was precluded by the unavailability of a sufficient number of suitable male judges

1 Judges unaware of the experimental hypothesis.

2 Subjects were assigned to these groups on the basis of their response to the item 'Speaking in Public' on Wolpe's (1973) Fear Survey Schedule (FSSIII). This procedure is described in the Method section.

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and therefore in order to control for possible sex effects all of the judges in this study were female.

In addition, the present study explored the possibility that a specific observer characteristic, i.e. their degree of public speaking anxiety, influences the perception of the non-verbal cues of emotion expressed by public speakers. Hall (1978) and Ekman (1979) concluded in their reviews of the literature that the only personality variable to be found to influence observers' decoding accuracy with significant consistency was their sex: as noted above females are significantly more accurate than males when it comes to distinguishing one expression of emotion from another. However, it is conceivable that while individuals of the same sex are comparable in terms of decoding accuracy, they vary in a systematic way, in terms of their perceptions of the intensity of another's emotional experience; this variability correlating with personality and/or stimulus (e.g. sex of speaker) variables. Thus, female observers may be able to accurately decode fearful speakers' nonverbal cues of anxiety, and therefore distinguish between high and low fear speakers (this was the primary hypothesis) but vary sys tematically in their perceptions of the intensity of fear experienced by public speakers. The hypothesis tested in this study was that this variability is a function of observers' degree of public speaking anxiety. More specifically, it was predicted that observers (judges) with a high ¹ level of public speaking anxiety themselves, would rate high fear speakers as being significantly more anxious than observers with 1 High and low fear judges wereselected on the bais of their response to the item 'Speaking in Public' on Wolpe's (1973) Fear Survey Schedule (FSSIII). The details of this selection procedure are described in the Method section.

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a low level of speech anxiety.

The judges in the present study were also asked to rate the speakers they observed on two other scales: 'Bored - interested' and 'Pleasure - anger'. As noted above, Geer's study found that judges perceived that high and low fear speakers differed in terms of their nonverbal expressions of anger and boredom. Therefore, it was not considered a contradiction to expect that ratings of more than one decoded emotion would distinguish between the high and low speakers in this study. Although Geer's study differed from this one, his results were the only ones available on which to base predictions and therefore consistent with his findings it was predicted that judges would rate the high fear speakers as being significantly more angry and bored than the low fear speakers.

No specific predictions were made about the effect of judges' level of speech anxiety (i.e. high or low) upon their ratings on these scales.

METHOD .

Subjects:

The ten female judges were selected from a medical student population. They had completed Wolpe's (1973) Fear Survey Schedule (FSSIII) at least one month prior to their pariticipation in the following experiment. They were selected on the basis of their response to the item 'Speaking in Public' on the schedule: five had indicated their fear to be 'Much' or 'Very much' (High Fear Judges) and five had checked the column 'Not at all' in response to this item (Low Fear Judges).

They were selected from a medical student population in order to minimize the possibility that they would know any of the speakers they were to rate, all of whom were university undergraduates. It

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was considered that such knowledge might influence their ratings and therefore be an unwelcome source of error.

Equipment and Materials:

The judges watched, on a television monitor, an audiovisual recording of ten 30-second segments of speech presented by ten different speakers. These segments were selected from the twenty impromptu speeches, each of two minutes duration, which had been recorded ¹ in Experiment 3 of this series.

The procedure for selecting these segments was as follows : a segment was taken from each of the speeches of the five high fear speakers with the highest ratings of subjective fear experienced at the beginning of the speeches. (The mean rating on a 10-point fear thermometer was 8.7). In addition, a segment was taken from each of the speeches of the five low fear speakers with the lowest ratings of subjective fear for the same phase of their speech, i.e. the beginning. (The mean rating was 2.4). Consistent with this criterion the segments were taken from the first 60 seconds of each of the speeches. Furthermore, in order to control for the possibility that judges' ratings would be a response to long periods of silence in the high fear speakers' speeches (this measure distinguished between the high and low fear speakers in Experiment 3), the re-recorded segments taken from the first 60 seconds of each speech were 30 seconds of uninterrupted ² speech.

- Details of this procedure are described in the Method section of Experiment 3.
- 2 Specifically, no single silence or pause was longer than two seconds in duration.

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Procedure:

The judges volunteered to take part in an experiment, the nature of which was kept from them until they arrived at the test room. Upon arrival, the judges were seated at a desk in front of a television monitor and given the following instructions which were typed on a sheet of A4 paper :

"I am going to show you a video recording of ten people talking about college life. You will see each person separately, talking for thirty seconds. After each person's talk there will be a sixty second pause. During this pause I want you to rate the person you just saw in terms of the emotion you think they were experiencing while they were talking. I want you to do this by circling the number you feel is most appropriate on each of the three rating scales you will find on the attached pages. Please ensure that you encircle a number of each of these three scales for each of the ten people you see. Please remember that you are not rating the content of the speech but the emotion you think the speaker is experiencing. If these instructions are not clear, please ask for clarification. Finally, if you know any of the people you see on the tape please inform me."

After ensuring that the judges were clear about their task the video tape was played to them. The ten segments of speech had been recorded on to the tape in a random order and this order was fixed for the presentation.

After each speech the judges completed a set of three rating scales which were typed on sheets of A4 paper. The 7-point scales were :

Bored	1	2	3	4	5	6	7	Interested
Calm	1	2	3	4	5	6	7	Fearful
Pleasure	1	2	3	4	5	6	7	Anger

Following this procedure the judges were debriefed: they were told the nature of the experiment and any questions they had were answered. In addition, they were asked not to divulge the nature of the study to anyone.

RESULTS

A judges' ratings on each of the scales were averaged for the five high fear and five low fear speakers she observed. Thus the ratings were reduced to a mean rating from each judge on each scale for both the high and low fear groups of speakers. These mean ratings for each of the scales (n = 20) were then subjected to a two way analysis of variance (ANOVA): Judge (High Fear vs Low Fear) x Speaker (High fear vs Low fear). (F ratios are presented in Table 39 and ANOVA summary tables are presented in Appendix 18). 'Calm-Fearful' Scale:

The analysis of judges' ratings on the 'Calm - fearful' scale revealed a statistically significant ¹ main effect of Speaker (F = 76.95, df 1, 8, p<.001). Consistent with expectations the means (which are presented in Table 37), show that the High fear speakers were rated as being more fearful than the Low fear speakers.

This analysis also revealed that the main effect of Judge (F = 1.10, df 1, 8, p > .05) and the Speaker x Judge interaction (F = 1.78, df 1, 8, p > .05) failed to reach statistical significance. Therefore the prediction that the High fear judges, compared to the Low fear judges, would rate the High fear speakers as being more fearful was not supported.

'Pleasure - Anger' scale:

The analysis of ratings on the 'Pleasure - anger' scale revealed a statistically significant main effect of speaker (F = 5.37, df 1, 8, p < .05). The mean ratings which are presented in Table 37 suggest 1 The .05 rejection region was used in the evaluation of all statistical analyses.

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that the judges perceived that the High fear spakers experienced less pleasure during their presentations than the Low fear speakers.

The main effect of Judge (F = 1.66, df 1, 8, p < .05) and the Speaker x Judge interaction (F = 0.91, df 1, 8, p < .05) failed to reach statistical significance.

Table 37 Means (M) and standard deviations (SD) for the ratings of High and Low fear speakers by all judges on each scale.

SPEAKER							
	HI	GH FEAR	LOW FEAR				
SCALE	M	SD	М	SD			
'Calm - fearful'	5.06	1.41	3.22	1.62			
'Bored - interested'	3.96	1.44	4.40	1.64			
'Pleasure - anger'	3.86	1.05	3.52	1.25			

Table 38 Means (M) and standard deviations (SD) for the ratings of High and Low fear speakers by High and Low fear Judges on each scale.

	 		-	· <u> </u>	· _ · · · · · · · · · · · · · · · · · ·
	SPEAKER				
		HIGH	LOW FEAR		
SCALE	JUDGE	м	SD	М	SD
'Calm - fearful	High fear Low fear	5.12 5.00	1.13 1.66	3.56 2.88	1.56 1.64
'Bored - interested'	High fear Low fear	3.64 4.28	1.32 1.51	4.52 4.28	1.50 1.79
'Pleasure - anger'	High fear Low fear	3.76 3.96	0.83 1.24	3.28 3.76	1.14 1.27

Table 39

F ratios emerging from the analyses (ANOVAs) of all measures

the state of the local data and the state of									
		SCALE							
		'Calm-fe	arful'	'Bored - in	nterested'	'Pleasure - anger'			
Source of Variation	DF	F ratio	P*	F ratio	P*	F ratio	P*		
Judge	1	1.11	>. 05	0.35	>.05	1.66	▶.05		
Residual	8								
Speaker	י ו	76.95	< 001	1.39	>. 05	5•37	<. 05		
Speaker x judge	1	1.77	> 05	1.37	>. 05	0.91	>.05		
Residual	8								

1 Complete ANOVA summary tables are presented in Appendix

* The .05 rejection region was used in the evaluation of all statistical analyses.

'Bored - Interested' scale:

The analysis of ratings on the 'bored-interested' scale revealed statistically non-significant effects of speaker (F =1.38, df 1, 8, p >.05) and Judge (F = 0.35, df 1, 8, p >.05). Similarly, the Speaker x Judge interaction failed to reach statistical significance (F = 1.37, df 1, 8, p >.05). (Mean ratings are presented in Tables 37 and 38). Therefore, the expectation that the judges would perceive the High Fear speakers as being more bored than the Low Fear speakers was not supported.

DISCUSSION

Consistent with expectations the judges in this study rated the high fear speakers they observed as being significantly more fearful than low fear speakers. Therefore, the result supports the hypothesis that female observers can accurately decode the nonverbal cues of fear expressed by fearful public speakers and hence perceive them as being more fearful than low fear speakers.

However, the findings fail to support the hypothesis that an observer's own degree of public speaking anxiety influences her perception of the intensity of fearfulness experienced by the speakers she observes. Contrary to expectations the high and low fear judges did not differ significantly in their ratings of fearfulness for the high fear speakers.

As expected and consistent with Geer's (1966) findings, the judges ratings on the 'Pleasure - Anger' scale distinguished between the high and low fear speakers. However, the mean ratings do not readily suggest, as predicted, that the high fear speakers were perceived as being more angry than the low fear speakers. While the mean rating for the former group (i.e. x = 3.86)¹ was the closest of the two to the 'anger' end of the scale, it was still below the mid-point of the scale and therefore nearer to the 'pleasure' end of the scale.

1 Unfortunately Geer did not present means for inspection in his report and therefore a comparison of means was not possible. Thus, it might be more accurate to suggest that the low fear speakers were perceived as experiencing more pleasure while talking. However the possibility that the judges decoded non-verbal cues of anger cannot be discounted, or indeed, the possibility that they decoded and rated cues of anger in the high fear speakers and pleasure in the low fear speakers. In short it is apparent that while the 'pleasure - anger' rating scale was sensitive to perceived differences between the speakers, firm conclusions about the nature of these perceptions cannot be made.

A more illuminating examination of observers' perceptions of these emotions in public speakers, and indeed other emotions, could be achieved in future research by having judges use separate rating scales for each emotion. So for example, they could be asked to rate anger on a 7-point scale ranging in intensity from 'not at all' to 'very much' rather than use scales the extremes of which are labelled by words presumed to reflect opposite ends of an emotional continuum, i.e. 'pleasure - anger '.

In contrast to Geer's (1966) findings, ratings on the 'bored interested'scale did not distinguish between the high and low fear speakers. The reason for this discrepancy is not altogether clear although several interpretations are possible. Firstly, if it is assumed that real differences exist between high and low fear speakers in terms of the experience and expression of boredom/interest, then it follows that the judges in Geer's study accurately decoded these differences while the judges in the present study did not. This may have been a function of the mode of presentation of the speakers. Specifically, Geer used an auditory presentation which may result in judges attending to those cues of emotional expression pertinent to the accurate decoding of boredom and interest. In contrast,

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judges who observe an audio-visual presentation, as they did in this study, may selectively attend to cues in the visual channel and not decode those cues presented in the auditory 'channel'. However, it must be noted that to date (Ekman, 1979), there is no evidence to suggest that judges selectively attend to different 'channels' when decoding emotional expressions.

A second, and perhaps more plausible interpretation of these discrepant findings assumes that the perceived difference between the high and low fear speakers in Geer's study was not veridical and reflects the inaccurate decoding of nonverbal cues. In contrast to this study Geer did not match high and low fear speakers on the basis of the duration of silence in their speeches and therefore the judges in his study heard groups of speakers who differed significantly in terms of this variable. It is conceivable that this difference was decoded in terms of boredom and/or interest, with the low fear speakers being perceived as more interested because they talked more.

If these speculations are to be examined in future research (or indeed any investigation of observers' perceptions of the emotional expressions of public speakers) it is apparent from this discussion that there is a need for some criterion - independent of judges ratings - for establishing which emotions are experienced while people are presenting speeches. A criticism of this study is that while several measures established the fearfulness of the speakers independently of the judges ratings, there were no independent measures of pleasure or anger. Thus, there is no real basis for arguing whether or not the judges' ratings were accurate perceptions of real differences between high and low fear speakers.

This is not to say that indpendent validation is easily achieved. Indeed, Ekman (1979) has suggested that the 'problem of independent

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validation has been the greatest obstacle to research on decoding accuracy' (p 541.) In his discussion of the literature he critically evaluates the use of subjective reports and moreover concludes that since there is no single infallible way to determine a person's 'true' emotional state researchers should use multiple convergent measures to gain a more reliable index of the emotion experienced.

Two studies which have used multiple measures were conducted by Kleck and his colleagues, (Kleck, Vaughan, Cartwright-Smith, Vaughan, Colby and Lanzetta, 1976; Lanzetta, Cartwight-Smith and Kleck, 1976). These researchers found that a positive relationship existed between indices of facial expressiveness, physiological response (skin conductance) and subjective ratings of pain in subjects given electrical shocks. Indeed, it seems intuitively obvious that at times indices in these three channels (i.e. facial, physiological, subjective) will be strongly associated; one can imagine many potent emotional happenings in which this would be the case. Eowever, there is an increasing literature (e.g. Buck, Miller and Caul, 1974; Notarius, Wemple, Ingraham, Burns and Kollar, 1982) which suggests that the relationship between facial expressiveness and other indices of emotion can, under certain circumstances, be a complex one. For example, Buck et al (ibid) found that less facially expressive subjects, as determined by judges ratings, responded to emotive slides with greater heart rate acceleration and skin conductance responses. Similarly, Notarius et al (ibid) found that the less facially expressive subjects in their study responded to an interpersonal stresser with a significant increase in heart rate and, in addition, appraised the stressful situation as more threatening and reported feeling more guilt than facially expressive subjects.

In short, these findings suggest that under some conditions an inverse relationship exists between facial expressiveness and both physiological reactivity and self-report of emotional state. Consequently, these findings are not consistent with the idea that emotion is a unitary phenomenon which predicts a positive relationship among the components of an emotional reaction. Instead they suggest a more complex conceptualisation of emotional expression which necessarily complicates Ekman's plea for the independent validation of judgements of emotional expressions: if a person is judged, from their facial expression, to be afraid, but shows little physiological reactivity and reports low levels of fear, do we assume that the judgements are inaccurate ? Similarly, if a person responds to a particular stimulus with marked physiological arousal and reports subjective fear but is perceived by other judges as being unafraid, do we assume that they cannot detect nonverbal cues of fearfulness ?

Perhaps the best way forward is to incorporate these and similar findings into the 'Three-Systems-Model' ¹ of fear and emotion originally proposed by Lang (1968). Specifically, Lang suggests that in humans emotional behaviour should not be regarded as a unitary phenomenon but is best conceptualised as comprising at least three imperfectly related components: subjective report, behavioural response and physiological disturbance, which, as research shows (Rachman and Hodgson, 1975), can co-vary, vary inversely, or vary independently. If facial expression is considered as a fourth response system or component of an emotional reaction, then we might expect that it too would co-vary, vary inversely or vary independently with the other components.

If such a model is adopted then researchers can attempt to 1 This 'Three-Systems-Model' is discussed more fully in the opening chapter of this thesis.

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determine the situational parameters and the idiographic dispositional characteristics that produce these variable relationships. Such research may give us some insight into why these patterns of response occur and hence the nature of emotions.

To date, Buck et al. (1974) have found several personality correlates of facial expressiveness. Specifically, they found that subjects who responded to emotive slides with low facial expressiveness and large physiological responses (internalisers), tended to be higher in introversion and lower in self-esteem than those individuals high in facial expressiveness and less physiologically reactive (externalisers). In addition, they found that internalisers tended to be male and extenalisers tended to be females. Using the experimental procedure employed in this study for producing & recording spontaneous facial expressions, future research might determine if these relationships hold for fearful public speakers.

It is also possible that facial expressiveness is a function of situational as well as personality variables. Buck (1980), for instance, argues that facial expressions seem to be subject to strong personal monitoring and voluntary control and serve as a 'controlled readout' of central affective processes. Thus we might expect them to vary as a function of the display rules operative in any given situation. So, for example, we might expect that some fearful speakers are more facially expressive when addressing one type of audience rather than another because of the emotional display rules associated with audiences. By using the experimental procedure used to produce the recordings judged in this study, it might be possible to examine the influence of audience variables (e.g. size and composition) upon facial expressiveness. The manipulation of these variables might effectively be achieved by varying the instructions given to the speakers about the type of

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audience that will see the recording of their speech.

Interestingly, however, if facial expressiveness is modified by situational variables, then according to the 'discharge' model of emotional expression (Notarius et al. ibid), we might also expect concomitant changes in physiological responding. Specifically, this model states that when 'an emotional reaction is directly expressed through the facial musculature or other overt expressive channels, physiological reactivity is attenuated'. Conversely, when these direct channels of expression are controlled or inhibited, Notarius and his colleagues suggest that an emotional reaction is discharged somatically, i.e. in terms of increased physiological response. To date the results of a few studies (e.g. Buck et al, 1974; Notarius et al, 1982) offer indirect support for this model by demonstrating an inverse relationship between facial expressiveness.and physiological responses to emotive stimuli. However, those studies which have directly manipulated facial expressiveness have reported findings inconsistent with this model (e.g.Lanzetta et al, 1976; Kleck et al., 1976; Colby et al. 1977). Typically in these studies subjects who were given electric shocks were asked to conceal the emotion they experienced by controlling their facial expressions. Interestingly, this control was accompanied by decreases, rather than increases, in both skin conductance responses and subjective ratings of pain. Notarius et al (ibid) speculate that these findings may reflect the artificial manipulation of facial expression via instruction, although as yet there is no evidence to suggest that more natural changes in emotional expressiveness are accompanied, as they predict, by inverse changes in physiological responses. If it is demonstrated that the facial expressiveness of fearful public speakers varies as a function of the audience size or composition, then the

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measurement of their concomitant physiological responses would provide a test of the prediction that an increase in facial expressiveness is associated with a decrease in physiological arousal. Conversely, it would be possible to determine whether a reduction in facial expressiveness is associated with an increase in physiological arousal and/or an increase in other indices of fearfulness, i.e. behavioural or subjective.

Summary and Conclusions:

In conclusion the results of this study suggest that observers can accurately decode the nonverbal cues of fear expressed by public speakers and therefore can distinguish between high and low fear speakers. The above results show that judges' ratings on the dimension 'pleasure - anger' distinguished between high and low fear speakers. However, it is not clear whether the former group were perceived as being more angry or the latter group as experiencing more pleasure.

Finally, it is proposed that the experimental procedure which was used to produce and record the spontaneous expressions of the fearful speakers judged in this study, may be used in future research to examine the relationships between facial expressions of fear, behavioural, physiological and subjective indices of fear and certain personality and situational variables.

CHAPTER 6

SUMMARY OF FINDINGS AND THEIR IMPLICATIONS FOR THEORIES OF FEAR, TREATMENT INTERVENTIONS AND FURTHER RESEARCH

The Effect of Coping Strategies upon Fear:

A number of theories of fears and phobias have been proposed (e.g. Beck, 1976; Ellis, 1962; Meichenbaum, 1977) whose basic premise is that fear is mediated by cognitions. However, while this premise has some intuitive appeal, there is no direct empirical evidence to support it. (This point was discussed in Chapter 3). Indeed, Meichenbaum (1977) has questioned whether it is possible to provide a direct test of this hypothesis. Nonetheless, cognitive behaviour therapy, which is theoretically underpinned by this premise, has received enormous interest from researchers and clinicians over the last two decades. In this time several variations of cognitive restructuring have been developed (e.g. Ellis, 1977; Beck, 1976; Meichenbaum, 1977). They differ in their emphasis (see Chapter 3; Mahoney, 1974) but still adhere to the notion that thoughts generate emotions, including fear.

The initial focus of interest in this thesis was on the effect upon fear of a component common to several cognitive interventions (discussed in Chapter 4), namely coping self-statements (CSS). Several researchers (i.e. Wine, 1970; Glogower et al. 1978) have suggested that CSS are the major fear-reducing component of these interventions. However, there is no consensus in the literature about the nature or definition of adaptive coping self-statements. Indeed, in the studies of cognitive restructuring reviewed in Chapter 4, most researchers had failed to adequately describe the CSS used by their subjects. However, two researchers (Evans, 1977; Meichenbaum, 1971) have described CSS which they consider to be adaptive. Both of them have argued that the maladaptive self-statements which mediate fear are based upon the individuals' perceptions of the physiological concomitants of fear. In simple terms, these self-statements are seen to reflect a fear of being physiologically afraid. Accordingly, the CSS these researchers devised encourage fearful subjects to cope with these concomitants, although interestingly in very different ways. Specifically, Evans' CSS encourage subjects to passively expect and accept this aspect of fear, while those devised by Meichenbaum encourage subjects to actively cope with physiological arousal by self-instructing to relax and keep calm.

In Experiment 4 in this series, the effects of these two coping strategies upon speech anxiety were examined. The results lend some support to the suggestion that CSS can have a significant fear-reducing effect and furthermore, support Meichenbaum's notion that effective CSS include those which encourage subjects to actively cope with the physiological concomitants of fear. Specifically, the subjects who rehearsed these CSS experienced a significant inter-speech reduction in fearfulness. In contrast, it was found that those subjects who rehearsed Evans' CSS experienced a significant inter-speech increase in fear (indexed by subjective report).

This latter finding is interesting, not only because it suggests that some self-statements can have a detrimental effect upon fearfulness, but also because it is apparently contrary to the findings of the first study in this series. Specifically, it was found in that study that these CSS had a significant fear-reducing effect, indexed by the approach behaviour of a group of spider-fearful students. It is possible that this finding reflects demand characteristics: the subjects receiving this treatment may have felt obliged to approach the spider despite the fact that, indexed by subjective report and heart rate, their fearfulness did not seem to change. However, it must also be considered possible that these

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subjects did experience reductions in subjective and physiological fear but that due to the method of measurement employed it was not detected. Until further research is done then, it must remain a possibility that Evans' CSS have a different effect upon these fears, i.e. a detrimental effect upon speech anxiety but a beneficial effect upon fear of spiders.

Returning to the findings of Experiment 4, it is considered that several mechanisms may have been responsible, singly or in interaction, for the observed changes in fearfulness. Firstly, it will be noted that both Evans' and Meichenbaum's coping strategies focus upon subjects' perceptions of the physiological concomitants of fear. Thus it is possible that the observed changes were mediated by actual changes in arousal. Specifically, the increase in subjective fear for those subjects using Evans' CSS may have reflected an increase in arousal, while the reduction in fear for those subjects using Meichenbaum's CSS may have been a function of a decrease in arousal. However, it must be noted that the physiological measure (i.e. heart rate) recorded in this study does not support this interpretation. It was found that the coping strategies did not have a significant effect upon heart rate. However, it must also be noted that this measure was restricted to only one of the two speeches and furthermore is considered to only reliably index anticipatory anxiety. Thus, unobserved changes in arousal may have occurred. This possibility might be examined in future studies.

Alternatively, it is proposed that the observed changes were a function of changes in subjects' perceptions of arousal rather than arousal per se. There is some evidence from biofeedback studies (e.g. Gatchel et al. 1979) to suggest that perceived control over heart rate results in a reduction in subjective fear. Thus it is considered possible that those subjects who were encouraged to actively cope with the physiological concomitants of fear by self-instructing to relax etc. perceived a degree of control over this component of fear which mediated changes in subjective and behaviourally expressed fear. In contrast, those subjects who were encouraged to passively accept the physiological concomitants of fear may have perceived a lack or loss of control which mediated their increase in fear. Future research may evaluate this hypothesis by measuring subjects perceptions of control over physiological arousal in relation to their use of these two strategies.

A third mechanism which may have influenced the observed changes in fearfulness, is subjects' perceived control or selfefficacy (Bandura, 1977) in terms of their performances. Specifically, during the first speech the performances of the subjects who used Meichenbaum's CSS were significantly superior to those of the subjects who rehearsed Evans' CSS. It is possible that the performances of the former subjects increased their expectations of competence with regard to the speaking task and thus contributed to the reduction in fear they experienced during the second speech. In contrast, the poorer performances of the latter subjects may have decreased their perceived self-efficacy to present a speech, and thus lead to an increase in fear during their second speech.

The behaviour of one of the control groups in experiment 4 prompted the consideration of a fourth mechanism by which coping strategies may produce a reduction in fear. To reiterate, the subjects in this group were asked to devise and rehearse their own coping strategy. Interestingly, they expressed significantly less fear (indexed by the behavioural measures) than a no treatment control group during both of their speeches. An inspection of their strategies revealed that the majority of them had devised task-oriented CSS such as: 'Concentrate on what you have to say next.' It is possible

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that such CSS result in a reduction in fear by replacing those maladaptive self-statements which are presumed to mediate fear, or by distracting subjects' attention from the presumed (Meichenbaum 1977) source of maladaptive self-statements, i.e. their physiological arousal. Future research might fruitfully provide a more thorough examination of the effects upon fear of task-oriented coping strategies and the possible mechanisms of their effects. <u>Some Comments upon Cognitive Theories of Fear:</u>

The suggestion that fearful individuals can use self-statements to effectively cope with their fears developed from a premise common to all cognitive theories of fear, namely that thoughts create emotions. The results of experiment 4 suggest that coping selfstatements do have a beneficial effect upon fearfulness. However, some of the observations of this study also highlight the theoretical inadequacy of the notion that a simple causal relationship exists between thoughts and fear. Specifically, it was observed that for all the groups of subjects in this study, to varying degrees, the indices of fear changed in a desynchronous fashion from the first of their speeches to the second. Such observations are not new (see Rachman, 1978a), but importantly they demonstrate that complexity of fear. Indeed, it is widely accepted (Sartory et al. 1978) on the basis of such observations that fear cannot be regarded as a unitary phenomenon. This is the point. Cognitive models of fear which postulate a one-to-one relationship between thoughts and fear, conceptualised as a unitary phenomenon, cannot account for such observations. If thoughts do mediate fear then these observations suggest that the relationship is far more complex. For example, it must be considered possible that some thoughts generate behavioural but not physiological or subjective fear, while others produce subjective and physiologically expressed fear which is not evident behaviourally ... Without considering all the possibilities, it is

evident that the simple, and intuitively appealing notion that thoughts cause fear, a unitary phenomenon, must be reconsidered.

Locus of Control Orientation and the Expression of Fear and Anxiety

The results of experiment 7 indicate that externality, as measured by Levenson's (1973) locus of control questionnaire, is positively correlated with trait anxiety, while internality is negatively correlated with this variable.

It is possible that these correlations reflect real differences between internals and externals in terms of trait anxiety. Alternatively, it is possible that they reflect externals greater willingness to admit to anxiety and conversely a tendency for internals to deny anxiety. As Phares, (1976, p 141) has pointed out, internals typically deny the common indicants of anxiety on most personality scales and verbally deny stress; denial which is belied by evidence of their greater concomitant physiological arousal (Houston, 1972). Indeed, it seems quite consistent with the concept of an internal locus of control, that internals attempt to control their emotions by denying them.

In addition, the results of experiment 7 indicate that externality is positively related to, and internality negatively related to reported fearfulness of many of the items on the FSS-III (Wolpe, 1973). These relationships were particularly strong when externality was measured by the Chance scale of Levenson's questionnaire, suggesting that fearfulness is most strongly associated with a tendency to perceive that events are determined by chance or luck. However, it must also be noted that reported fearfulness of some of the items (e.g. spiders, snakes, bats and mice) was unrelated to locus of control orientation, suggesting that internals or and externals do not differ in their fear of these stimuli.

One possible interpretation of these findings is that externals are more fearful than internals when actually exposed to some stimuli but not others. If this is the case then a number of related questions will arise. 'Does externality cause fear of some stimuli but not others or does a fear of some stimuli contribute to an external locus of control? Or is both externality and fear of some stimuli determined by a third variable?' Alternatively however, it is possible that these findings reflect a tendency for internals to deny some of their fearfulness of some stimuli but not others. If this is the case the question will arise: 'why do internals deny some fears but not others?' Hopefully future research will allow us to decide between these interpretations and shed some light upon the related questions.

The results of experiments 5 and 6 suggest that internals and externals who report high, but comparable levels of fear of public speaking, express significantly different levels of fear when actually presenting an impromptu speech. Specifically, it was found that both subjective and behavioural measures indexed higher levels of fear for externals, who also experienced significantly greater reductions in subjective fear with repeated exposure, i.e. presenting a second speech.

It was argued that these differences reflected the degree of congruency between subjects' locus of control orientation and the experience of fear. More specifically, it was suggested that being afraid implies a loss of inner control (in terms of being physiologically aroused) and that such a loss is incongruent with an internal locus of control but congruent with an external locus of control. Futhermore, incongruency between situational and general (i.e. locus of control orientation) expectations of

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control has been found to be associated with higher levels of anxiety (e.g. Watson and Baumel, 1967). Therefore, it was expected that high fear internals would express more fear than high fear externals. The results of experiments 5 and 6 are consistent with this expectation.

However, while it was found that high fear speakers do expect to experience uncontrollable arousal while speaking (experiment 5), research is still needed to demonstrate that the observed differences between high fear internals and externals are caused by such expectations interacting with their locus of control orientation.

Some Comments on Fear Reduction

If, as suggested above, high fear internals express more fear than high fear externals because the experience of the uncontrollable physiological concomitants of fear is incongruent with the locus of control orientation of the former group, but congruent with the locus of control orientation of the latter group, then the question arises: 'Do these groups respond differently to different therapies?' We might speculate that fearful internals derive most benefit from those therapies which, consistent with their locus of control orientation, increase their perceptions of personal control over the physiological concomitants of fear. So for example, it is possible that these individuals experience the greatest reductions in fear from interventions such as desensitization presented as an active coping skill, or the use of coping strategies like the active coping strategy examined in experiment 4, both of which emphasise the active

role of the individual in coping with, and controlling his fear. Conversely, fearful externals might respond most readily to these therapies which, consistent with their locus of control orientation, allow them to perceive change as being determined by an external agent or a powerful other (i.e. the therapist). So, for instance, it is possible that externals experience the greatest reductions in fear from interventions such as flooding or medication, both of which allow the individual to perceive himself as the passive recipient of therapeutic change.

In short, the suggestion is that therapeutic efficacy may be increased if the therapy is congruent with the individuals locus of control orientation: therapies which emphasise personal control and self-efficacy may be more appropriate for internals, while therapies which emphasise external control may be more appropriate for externals. Hopefully, future research will shed some light upon these speculations.

The Nature and Measurement of Speech Anxiety

A number of observations were made in experiments 3, 5 and 8 concerning the nature and measurement of speech anxiety.

In experiment 3, a procedure for investigating speech anxiety was described. Specifically, it consisted of having subjects present an impromptu speech to a video camera in the knowledge that the film of their performance would be seen by an audience at a later date. The results of this study revealed that behavioural subjective and physiological measures of anxiety distinguished between groups of high and low fear speakers. More specifically, high fear speakers experienced higher heart rates and reported higher levels of subjective fear just prior to speaking. In addition, both the number of words spoken and duration of silence distinguished between the groups when intra-speech trends in these measures were considered: indexed by both measures, the high fear subjects produced significant intra-speech deteriorations in performance. Moreover, the high fear speakers reported (retrospectively) higher levels of subjective fear while speaking. Interestingly, speech disruptions and heart rates recorded during the speeches did not distinguish between the groups. It was argued that these measures may be more sensitive indexes of fear when speeches are prepared rather than impromptu. Indeed, the results of experiment 5 suggest that this is so for speech disruptions, although whether it is so for heart rate is a question for future research.

It is considered that the procedure employed in experiment 3, along with aforementioned measures of fear, would provide a useful and practically convenient method for examining many aspects of speech anxiety.

Using some of the recordings made in this study, one aspect of speech anxiety, namely the recognition of anxiety by naive observers, was examined and reported in experiment 8. The results of this study suggest that observers are capable of decoding the non-verbal expressions of speech anxiety. Specifically, it was found that observers rated the high fear speakers they observed as being significantly more fearful than a group of low fear speakers. This finding also adds further validity to the use of video-recording as a method for examing speech anxiety. Interestingly, observers' ratings on the dimension 'Pleasure -Anger', also distinguished between the high and low fear speakers. However, a definitive interpretation of this result could not be offered in the absence of measures of the speakers' experiences of pleasure and anger. Therefore, further research is needed to determine whether this result reflects observers' accurate decoding of speakers non-verbal expression of these emotions.

Another line of enquiry which might also be pursued using the procedure described in experiment 3 to record the spontaneous expressions of fearful speakers, is an investigation of the relationships between situational and personality variables and the expression of fear. For instance, Buck (1980) has argued that the facial expressions of emotion are subject to strong personal monitoring and voluntary control and serve as a 'controlled readout of affective processes' (p 822). Thus we might expect them to vary as a function of the emotional display rules operative in any given situation. So for example, we might speculate that fearful speakers are more facially expressive when addressing one type of audience rather than another, because of the display rules associated with the audiences. It might be possible to examine such relationships by using the videorecording technique and varying the instructions given to subjects about the composition and/or size of the audience who will see the recording of their speech.

Interestingly, if it can be shown that situational variables influence the facial expressiveness of fearful public speakers, then it would be possible to provide a test of the discharge model of emotional expression (Nortarius et al 1982). Specifically, this model states that when an emotional reaction is directly expressed through the facial musculature or other overt expressive channels, physiological reactivity is attenuated. Conversely, when these direct channels of expression are controlled or inhibited, an emotional reaction is discharged physiologically. Thus, if the facial expressiveness of public speakers varies as a function of situational variables, then this model suggests that we can expect to observe concomitant but inversely related changes in physiological and possibly behavioural (as another overt channel of expression) expressions of fear.

In terms of personality variables, it is possible that a relationship exists between locus of control orientation and the expression of fear. It was suggested above that internals may tend to deny their fearfulness. If this is the case then all fearful responses within their voluntary control may be influenced by this tendency, including the facial expression of fear which as Buck (1980) suggests, is subject to voluntary control. Specifically, we might expect internals to be less facially expressive when afraid than externals. If they are, then we might also expect, on the basis of the discharge model, that internals would discharge their fearfulness physiologically or via some involuntary behavioural response, and with respect to these responses, be more fearful than externals. Again the procedure described in experiment 3 could be used to examine these possibilities. **REFERENCES:**

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APPENDIX 11. Experiment 1: ANOVA summary tables for all measures

Measure: Approach scores

Source of variation	DF	SS	MS	F
Group Residual Total	1 24 25	1.231 301.538 302.769	1.231 12.564 12.111	0.098 11.598 11.179
Assessment Assessment x Group Residual Total Grand Total	1 1 24 26 51	9.308 7.692 26.000 43.000 345.769	9.308 7.692 1.083 1.654	8.592** 7.101*

Measure: Subjective Fear rating

Group	1	8.481	8.481	2.337
Residual	24	87.077	3.628	2.802
Total	25	95.558	3.822	2.952
Assessment Assessment x Group Residual Total Grand Total	1 1 24 26 51	0.942 0.481 31.077 32.500 128.058	0.942 0.481 1.295 1.250	0.728 0.371

Measure: <u>Heart Rate</u>:

Group	1	35.56	35.56	0.104
Residual	24	8192.92	341.37	3.469
Total	25	8228.48	329.14	3.344
Assessment Assessment x Group Residual Total Grand Total	1 1 24 26 51	76.33 196.17 2362.00 2634.50 10862.98	76.33 196.17 98.42 101.33	0.776 1.993

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* p <.05

** p < .01 *** p < .001

Appendix 2. Experiment 1:

Spearman correlation coefficients for B.A.T. scores, subjective ratings of fear and heart rates (A post hoc analysis).

Group	Experin (n =	nental 13)	$\begin{array}{c} \text{Contro} \\ (n = 1] \end{array}$	5)
Assessment	Pre-treat ment	Post-treat ment	Pre-treat ment	Post-treat ment
Measures correlated				
B.A.T. scores with subject- ive fear ratings	36	31	20	•04
B.A.T. scores with heart rates	10	.08	01	61*

* p <.05 (two-tailed test)

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Appendix 3

Experiment 2: ANOVA summary table for heart rates

Measure	Source of variation	DF	SS	MS	ዋ	P
Baseline heart rates	Group Resid- ual	3 44	1003.5 4674.2	344.5 106.2	3.14	< .05
Heart ratē scores -5 to 0 secs	Group Resid- ual	3 44	360.0 10968.0	120.0 249.2	•48	> .0 5
Heart rate scores 10 sec	Group Resid- ual Period	3 44 1	2898.1 15977.8 7.0	966.0 363.1 7.0	2.7 0.3	>• ⁰⁵ >• ⁰⁵
prior to & after presen- tation	Period Residual	3 44	175.13 1151.8	58.4 26.2	2.2	>• 0 5

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Periods in five-second intervals



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Appendix 5:

Experiment 3: ANOVA Summary tables for all measures:

Measure	Source of variation	DF	SS	MS	F	P
Silence	Group Residual Pariod	1 18 2	1037.50 1557.96	1037.50 87.66 75.80	11.84	<.01
	Group x Period Residual	2 36	340.03 996.06	170.02 27.60	6.16	< .01
Word count	Group Residual Period Group x Period Residual	1 18 2 2 36	5920.30 27370.40 786.70 3653.90 3212.20	5920.30 1520.60 393.35 1826.70 89.30	3.90 4.41 20.50	>• 05 <•05 <•01
Dis- ruptions	Group Residual Period Group x Period Residual	1 18 2 2 36	3.20 254.20 9.70 13.80 47.88	3.20 14.12 4.85 6.90 1.33	0.20 3.64 5.20	>.05 <.05 <.05
Heart [.] rate	Group Residual Period Group x Period Residual	1 18 2 2 36	1250.35 17545.31 213.30 122.43 2658.58	1250.35 974.74 106.65 61.21 73.85	1.28 1.44 0.83	>.05 >.05 >. ⁰⁵
Subject- ive fear ratings	Group Residual Rating Group X Rating Residual	1 18 1 1 18	136.90 108.88 10.00 0.40 35.35	136.90 6.05 10.00 0.40 1.96	22.6 5.1 0.20	>.01 <.05 >.05

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Source of Variation	DF	SS	MS	F
Group Topic order Residual	3 1 24	6993.3 1050.0 71009.1	2331.1 1050.0 2958.7	0.788 0.355 13.158
Total	51	81584.5	2631.8	11.704
Speech	1	772.0	772.0	0.913
Speech x Group Speech x Topic order Speech x Group x	3	1988.6 59.6	622 . 9 59 . 6	0.784 0.071
Topic order	3	2533.6	844.5	0.999
Residual Total	24 32	20299.0 25652.8	845.8 801.7	3.565
Period	2	4829.2	2414.6	11.224**
Period x Group Period x Topic order Period x Group x	6 2	6342 . 3 55.8	27 . 9	4.913** 0.130
Topic order	6	923.2	153.9	0.715
Residual Total	48 64	22476.7	351.2	1.562
Speech x Period	2	1356.8	678.4	3.017
Group	6	964.3	160.7	0.715
Topic order Speech x Period x Group x Topic	2	91.2	45.6	0.203
order	6	549.0	91.5	0.407
Residual Total	48 64	10793.4 13754 .7	224.9 214.9	
Grand Total	191	143468.5		

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APPENDIX 6	•	Experiment	4:	ANOVA	summary	table_fo	r Word	Count Scores	J
	•	and the second se							-

* p < .05 ** p < .01 *** p < .001

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Source of variation	DF	SS	MS	F
Group Topic order Group x topic order Residual Total	3 1 3 24 31	1710.38 181.16 231.88 7461.51 9584.93	570.13 181.16 77.29 310.90 309.19	1.834 0.583 0.249 9.478 9.426
Speech Speech x Group Speech x Order Speech x Group x Topic order Residual Total	1 3 1 3 24 32	1.98 844.89 1.60 412.90 3266.93 4528.29	1.98 281.63 1.60 137.63 136.12 141.51	0.015 2.069 0.012 1.011 4.150 4.314
Period Period x Group Period x Topic order Period x Group x Topic order Residual Total	2 6 2 6 48 64	1121.82 563.98 23.32 167.98 1653.58 3530.67	560.91 94.00 11.66 28.00 34.45 55.17	16.282** 2.729* 0.338 0.813 1.050 1.682
Speech x Period Speech x Period x Group Speech x Period x Topic order Speech x Period x Group x Topic order Residual Total	2 6 2 6 48 64	- 56.30 234.97 18.94 108.71 1574.42 1993.33	28.15 39.16 9.47 18.12 8.02 10.15	0.858 1.194 0.289 0.552 32.80 31.15
Grand Total	191	19637.22		

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APPENDIX	7.	Experiment 4:	ANOVA	Summary table	for Silence	scores
Contraction of the local division of the loc			a state of the second se	V		

* p ∠ .05 ** p < .01 *** p ∠ .001

Source of variation	DF	SS	MS	F
Group Topic order Group x Topic order Residual Total	3 1 3 24 31	5.543 0.879 6.324 87.219 99.965	1.848 0.879 2.108 3.634 3.225	0.508 0.242 0.580 3.458 3.069
Speech Speech x Group Speech x Topic order Speech x Group x Topic order R _e sidual Total	1 3 1 3 24 32	17.535 1.293 0.191 1.637 25.219 45.875	17.535 0.431 0.191 0.546 1.051 1.434	16.688** 0.410 0.182 0.519
Grand Total	63	145.840		

Fear Ratings and Anticipatory Heart Rate:

Measure : Anticipatory heart rate:

Group Topic order Group x Topic order Residual Total	3 1 3 24 31	1551.0 722.0 1275.0 6796.0 10344.0	517.0 722.0 425.0 283.2	1.826 2.550 1.501
Grand Total	31	10344.0	•	

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* p <.05 ** p <.01 *** p <.001

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Experiment 4: ANOVA Summary table for Subjective Fear Ratings:

Source of variation	DF	SS	MS	F
Group Topic order Group x Topic order Residual Total	3 1 3 24 31	13.422 0.070 38.477 192.156 244.125	4.474 0.070 12.826 8.007 7.875	0.559 0.009 1.602 6.464 6.357
Rating Rating x Group Rating x Topic order Rating x Group x Topic order Residual Total	1 3 r 1 3 24 32	4.500 12.078 0.070 8.945 57.156 82.750	4.500 4.026 0.070 2.982 2.382 2.586	1.890 1.691 0.030 1.252 1.923 2.088
Speech Speech x Group Speech x Topic orde: Speech x Group x Topic order Residual Total	1 3 r 1 3 24 32	5.281 42.797 1.320 10.820 37.531 97.750	5.281 14.266 1.320 2.35 1.564 3.055	3.377 9.122** 0.844 2.306 1.262 2.466
Rating x Speech Rating x Speech x Group Rating x Speech x Topic order Residual Total	1 3 1 27 32	0.500 0.359 0.945 33.445 35.250	0.500 0.120 0.945 1.239 1.102	0.404 0.097 0.763
Grand Total	127	459.875		

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* p <.05 ** p <.01 *** p <.001

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Source of variation	DF	SS	MS	Ŧ
Group Topic order Group x Topic order Residual Total	3 1 3 24 31	3612.67 1190.04 2501.71 19462.75 26767.17	1204.22 1190.04 833.90 810.95 863.46	1.485 1.467 1.028 10.769 11.466
Period Period x Group Period x Topic order Period x Group x Topic order Residual Total	2 6 2 6 48 64	119.07 417.16 242.41 497.78 3614.75 4891.17	59.53 69.53 121.21 82.96 75.31 76.42	0.791 0.923 1.609 1.102
Grand Total	95	31658 .33		

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ALIGNDIA IO Experiment 4 <u>ANOVA Summary</u> table for neart rat	tes	3
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* p <.05 ** p <.01 *** p <.001

Appendix 10a. Experiment 5

Rating Scale for subjects' expectations of control over the

physiological concomitants of fear while presenting a prepared speech

Question:

"How much do you expect to be able to control the physical effects of fear (e.g. sweating, palpitations, breathlessness) you may experience during the presentations of your projects ?"

Completely

Not at all



Rating Scale used to measure subjects' fear of speaking in public.

Question: "Can you please use the scale below to rate your degree of fearfulness of speaking in public ?"



APPENDIX 11. Experiment 5:

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Measure	Source of variation	Sum of squares	DF	Mean square	F
Expectation of physio- logical control	Group Locus of control Group x Locus of control Residual	42.33 0.14 1.72 59.70	1 1 1 21	42.33 0.14 1.72 2.87	14.75** 0.05 0.60
State Anxiety (S.T.A.I.)	Group Locus of control Group x locus of control Residual	828.38 124.88 376.32 1165.60	1 1 1 21	828.38 124.88 376.32 58.30	14.20** 2.10 6.45 [*]
Speech disruptions	Group Locus of control Group x locus of control Residual	180.80 0.70 87.50 319.20	1 1 1 21	180.80 0.70 87.50 15.20	11.90 ** 0.05 5.76 *

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ANOVA 1 Summary Tables for all measures

* p <.05

** p < .01

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1 The Least Squares Solution described by Winer (1971, p 498).

APPENDIX 12, Experiment 6 : ANOVA Summary table

Measure: Word Count

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Source of variation ,	DF	SS	MS	F
Group Locus of control Group x Locus of control Residual Total	1 1 16 19	26403.3 2050.1 7394.7 26040.8 61889.0	26403.3. 2050.1 7394.7 1627.6 3257.3	16.22 ** 1.26 4.54 8.95 17.92
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	918.5 116.0 4538.7 3718.5 16507.2 25799.0	918.5 116.0 4538.7 3718.5 1031.7 1289.9	0.89 0.11 4.39 3.60 5.67 7.09
Period Period x Group Period x Locus of control Period x Group x Locus of control Residual Total	2 2 2 32 40	1550.8 1322.8 88.6 258.6 8289.4 11510.3	775.4 661.4 44.3 129.3 259.0 287.8	2.99 2.55 0.17 0.49 1.42 1.58
Speech x Period Speech x Period x Group Speech x Period x Locus of control Residual Total	2 2 2 34 40	201.8 1195.3 309.0 6178.8 7885.0	100.9 597.7 154.5 181.7 197.1	0.55 3.28 0.85
Grand Total	119	107083.3		

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p < .05 p < .01 p < .001

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<u>Measure : Silence</u>

Source of variation	DF	SS	MS	F
Group Locus of control Group x Locus of control Residual Total	1 1 16 19	5346.68 425.63 616.53 1664.50 8053.34	5346.68 425.63 616.53 104.03 423.86	51.39 ** 4.09 5.92 * 4.75 19.37
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	104.53 97.20 639.41 594.07 1676.70 3111.92	104.53 97.20 639.41 594.07 104.79 155.60	0.99 0.92 6.10 * 5.66 * 4.79 7.11
Period Period x Group Period x Locus of control Residual Total	2 2 32 40	328.09 174.99 16.35 648.40 1212.83	164.04 87.49 8.18 20.26 30.32	8.09 ** 4.31 * 0.40 0.92 1.38
Speech x Period Speech x Period x Group Speech x ^P eriod x Locus of control R _e sidual Total	2 2 2 34 40	81.78 - 105.11 75.53 743.91 1006.33	40.89 52.56 37.76 21.88 25.16	1.86 2.40 1.72
Grand Total	119	13384.42		

* p < .05 ** p < .01 *** p < .001

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APFENDIX 14. Experiment 6;

ANCVA Summary table

Measure : State Anxiety

Source of variation	DF	SS	MS	F
Group Locus of control Group x locus of control Résidual Total	1 1 16 19	1863.22 133.23 11.02 3024.00 5031.47	1863.22 133.23 11.02 189.00 264.81	9.85.** 0.70 0.05 6.30 8.83
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	126.03 21.02 50.63 189.22 479.60 866.50	126.03 21.02 50.63 189.22 29.98 43.33	4.20 0.70 1.68 6.31 *
Grand Total	39	5897.97		

p < .05 p < .01 p < .001

Measure : Subjective Fear Ratings:

Source of variation /	DF	SS	MS	F
Group Locus of control Group x locus of control Residual Total	1 1 16 19	105.80 1.80 0.05 151.80 259.45	105.80 1.80 0.05 9.48 13.65	11.15 ** 0.19 0.00 9.06 13.04
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	16.20 18.05 0.45 1.80 25.00 61.50	16.20 18.05 0.45 1.80 1.56 3.07	10.36 ** 11.55 ** 0.28 1.15 1.49 2.93
Rating Rating x Group Rating x Locus of control Rating x Group x Locus of control R sidual Total	1 1 1 1 16 20	14.45 7.20 3.20 0.45 42.20 67.50	14.45 7.20 3.20 0.45 2.63 3.37	5.47 * 2.73 1.21 0.17 2.51 3.22
Speech x Rating Speech x Rating x Group Speech x Rating x Locus of control Residual Total	1 1 f 17 20	3.20 1.25 1.25 17.80 23.50	3.20 1.25 1.25 1.04 1.17	3.05 .1.19 1.19
Grand Total	79	411.95		

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* p < .05 ** p < .01 *** p < .001

APPINDIX 16. Experiment 6: ANOVA Summary Table

Measure : Anticipatory heart rate

Source of variation	DF	SS	MS	F
Group Locus of control ` Group x Locus of control Residual Total	1 1 16 19	2452.36 34.60 112.90 6281.86 8881.70	2452.36 34.60 112.90 392.62 476.46	6.24 * 0.08 0.28 6.04 7.20
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	125.32 767.38 147.46 4.36 1038.82 2083.32	125.32 767.38 147.46 4.36 64.93 104.17	1.93 11.81 ** 2.27 2.27.
Grand Total	39	10965.02		

p **< .**05 p **< .**01 p **< .**001 ***

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APPENDIX 17. Experiment 6: ANOVA Summary Table

Leasure : Heart rate

Source of variation	DF	SS	MS	F
Group Locus of control Group x L _o cus of control Residual Total	1 1 16 19	1875.46 82.67 0.05 11263.96 13222.14	1875.46 82.67 0.05 704.00 695.90	2.66 0.11 0.00 10.49 10.37
Speech Speech x Group Speech x Locus of control Speech x Group x Locus of control Residual Total	1 1 1 16 20	1374.99 1088.42 25.58 84.34 5660.61 8233.93	1374.99 1088.42 25.58 84.34 353.79 411.70	3.88 3.07 0.07 0.23 5.27 6.13
Period Period xGroup Period x Locus of control Period x Group x Locus of control Residual total	2 2 2 32 40	1195.87 12.97 138.89 367.40 1557.55 3272.68	597.94 6.48 69.44 183.70 48.67 81.82	12.28 ** 0.13 1.42 3.77 * 0.72 1.22
Speech x Period Speech x Period x Group Speech x Period x Locus of control Residual Total	2 2 2 34 40	29.12 32.85 37.68 2280.67 2380.31	14.56 16.42 18.84 67.08 59.51	0.21 0.24 0.28
Grand Total	119	27109.05		

* p < .05 ** p < .01 *** p < .001

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Scale : 'Calm - Fearful'							
Source of variations	DF	SS	MS	F	P		
Judge Residual	1 8	0.80 5.81	0.80 0.72	1.11	> •05		
Speaker Speakerx JUDGE Residual	1 1 8	16.93 0.39 1.76	16.93 0.39 0.22	76.95 1.77	<.001 > ^{.05}		

Appendix 18 . Experiment 7: ANOVA summary tables for all measures

Scale : 'Bored - Interested'									
Source of variations	DF	SS	Ms,	F	P				
Judge Residual	1 8	0.20 4.55	0.20 0.57	0.35	> • ⁰⁵				
Speaker Speaker X Judge Residual	1 1 8	0.97 0.96 5.63	0.97 0.96 0.70	1.39 1.37	> • ⁰⁵ > • ⁰⁵				

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Scale : 'Pleasure - anger'									
Source of <u>variation</u>	DF	SS	MS	F	P				
Judge Residual	1 8	0.58 2.80	0.58 0.35	1.66	> • ⁰⁵				
Speaker Speaker and judge Residual	1 1 8	0.58 0.10 0.86	0.58 0.10 0.108	5•3.7 0.91	<•05 > • ⁰⁵				

Appendix 19.

Listed below are the 24 questions which make up Levenson's (1973) locus of control questionnaire. Each of the three scales of the questionnaire, i.e. Internal, Powerful Others, and Chance, consists of 8 questions. The questions comprising each scale are indicated by the letter in the brackets which follow each question, i.e. Internal scale questions - (I); Powerful Others scale questions - (P); Chance scale questions - (C).

Subjects respond to each question on a 7-point Likert-type scale ranging from 'Srongly agree' to 'Strongly disagree'.

The following directions preceed the questions: Below is a series of attitude statements. Each represents a commonly held opinion. There is no right or wrong answer. You will probably agree with some items and disagree with others. I am interested in the extent to which you agree or disagree with such matters of opinion. Read each statement carefully. Then indicate the extent to which you agree or disagree by putting a tick on the scale to the right of each question. First impressions are usually best. Read each statement, decide if you agree or disagree and the strenght of your opinion and then tick the scale.

GIVE YOUR OPINION ON EVERY STATEMENT.

The questions are as follows:

Whether or not I get to be a leader depends mostly on my ability. (I)
 To a great extent my life is controlled by accidental happenings. (C)
 I feel like what happens in my life is mostly determined by
powerful people. (P)

continued over...

Appendix 19 continued:

4.	, Whether or not I get into a car accident depends mostly on	
	how good a driver I am.	(1)
5.	When I make plans, I am almost certain to make them work.	(I)
6.	Often there is no chance of protecting my personal interests	
	from bad luck happenings.	(c)
₹.7.	When I get what I want, it's usually because I'm lucky.	(c)
8.	Although I might have good ability, I will not be given leadership	
	responsibility without appealing to those in positions of power.	(P)
9.	How many friends I have depends on how nice a person I am.	(I)
10.	I have often found that what is going to happen will happen.	(c)
11.	My life is chiefly controlled by powerful others.	(P)
12.	Whether or not I get into a car accident is mostly a matter of	
	luck.	(c)
13.	People like myself have very little chance of protecting our	
	personal interests when they conflict with those of strong	
	pressure groups.	(P)
14.	It's not always wise for me to plan too far ahead because many	
	things turn out to be a matter of good or bad fortune.	(c)
15.	Getting what I want requires pleasing those people above me.	(P)
16.	Whether or not I get to be a leader depends on whether I'm lucky	
	enough to be in the right place at the right time.	(C)
17.	If important people were to decide they didn't like me, I	
	probably wouldn't make many friends.	(P)
18.	I can pretty much determine what willhappen in my life.	(I)
19.	I am usually able to protect my personal interests.	(I)
20.	Whether or not I get into a car accident depends mostly on the	
	other driver.	(P)
21.	When I get what I want, it's usually because I worked hard for it.	(I)
22.	In order to have my plans work, I make sure that they fit in with	
	the desires of people who have power over me.	(P)
23.	My life is determined by my own actions.	(I)
24.	It's chiefly a matter of fate whether or not I have a few friends	
	or many friends.	(c)
Appendix 20.

Listed below are the questions which comprise the State and Trait scales of Spielberger et al's (1973) State-Trait Anxiety Inventory (STAI).

State scale:

The questions on this scale are preceeded by the following directions: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your feelings best.

The questions are answered with a response of: 'Not at all', 'Somewhat', 'Moderately so', or 'Very much so'. They are as follows:

1. I feel calm. 2. Ifeel secure. 3. I am tense. 4. I am regretful. 5. I feel at ease. 6. I feel upset. 7. I am presently worrying over possible misfortunes. 8. I feel rested. 9. I feel anxious. 10.I feel comfortable. 11. I feel self-confident. 12. I feel nervous. 13. I am jittery. 14. I feel 'high strung'. 15. I am relaxed. 16. Ifeel content. 17. I am worried. 18. I feel over-excited and 'rattled'. 19. I feel joyful. 20. I feel pleasant.

Trait scale:

The questions on this scale are preceeded by the following directions: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

The questions are answered with a response of: 'Almost never', 'Sometimes', 'Often', or 'Almost always'. They are as follows:

- 1. I feel pleasant.
- 2. I tire quickly.
- 3. I feel like crying.
- 4. I wish I could be as happy as others seem to be.
- 5. I am losing out on things because I can't make up my mind soon enough.
- 6. I feel rested.
- 7. I am 'calm cool and collected'.
- 8. I feel that difficulties are piling up so that I cannot overcome them.

9. I worry too much over something that really does'nt matter

- 10. I am happy.
- 11. I am inclined to take things hard.
- 12. I lack self-confidence.
- 13. Ifeel secure.
- 14. I try to avoid facing a crisis or difficulty.
- 15. I feel blue.
- 16. I am content.
- 17. Some unimportant thought runs through my mind and bothers me.
- 18. I take disappointments so keenly that I can't put them out of my mind.
- 19. I am a steady person.
- 20. I get in a state of tension or turmoil over my recent concerns and interests.

Addendum:

Issues related to the collection of heart rate data.

In two of the studies reported above data analysis revealed an expected difference between groups of subjects in terms of heart rate. Specifically, the high fear speakers in experiments 3 and 6 experienced significantly higher heart rates in anticipation of presenting a speech than low fear speakers. However, this measure failed to reveal predicted differences in all five of the studies in which heart rate was measured. Some possible interpretations for these failures were offered, although negative findings are always difficult to interpret. The present discussion considers a number of general problems associated with the collection and interpretation of heart rate data and, where relevant, the possibility that these problems contributed to the negative results reported above is noted. These problems are discussed in some brevity as lengthy, detailed discussions are available elsewhere (e.g. Siddle and Turpin, 1980). Moreover, solutions to these problems will not, for the most part, be considered. Again possible solutions to these problems are detailed elsewhere (e.g. Siddle and Turpin 1980). These problems will be considered under the following headings: Subject Variables; Experimental/Environmental Conditions; Transduction; and Measurement and Quantification.

Subject Variables

There are a number of subject variables which may influence both heart rate level and responsivity and should therefore be considered by researchers collecting data on cardiac activity. For instance variation emong individuals can result from intrinsic variables such as sex, race and age. To date the studies examining the effects of these variables upon tonic and phasic cardiac responses have been few and the findings produced with regard to sex and age equivocal (see Siddle and Turpin, 1980; pp 155-156). However, it seems reasonable to suggest that error variance will be reduced if these variables are controlled.

In addition, the effects of heart disease and drugs can have significant effects upon heart rate and common stimulants such as coffee and tobacco also have clear cardiovascular effects. Furthermore, degree of physical fitness can contribute to between-subjects variability. It has been suggested (Jennings et al, 1981) that such variance can be reduced by eliminating subjects or arranging experimental sessions to prevent the direct effects of menstruation and such agents as coffee, tobacco and alcohol.

Experimental/Environmental Conditions

Heart rate is sensitive to environmental change and therefore when recording cardiac activity care should be taken to control intrinsic variables such as temperature and humidity. Attempts should also be made to eliminate extraneous noise. Such variables, along with posture, are suggested to account for a substantial proportion of the variance associated with measures of 'resting heart rate'.

A number of researchers (e.g. Siddle and Turpin, 1980) have also suggested that time of day and time of last meal can alsoaffect the value of heart rate level. However, whether such factors affect phasic reactivity is difficult to assess since there have been no studies which have specifically addressed this question.

Body movements can both disturb heart rate electrodes, thus producing recording artifact, and physiologically induce heart rate change. Therefore, where possible, subjects' movements should be minimized. If the task involves the subjects moving, then electrodes and cable movement artifacts may be reduced by appropriate placement e.g. chest electrodes. Other solutions to movement artifact also exist (see Siddle and Turpin, 1980; pp 157-158). Postural adjustments also affect breathing patterns which in turn can alter heart rate. Comfortable positioning of the subject can help to minimize these unwanted changes in heart rate.

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Fertinent to the speaking tasks employed in several of the studies reported above, is the fact that when subjects are speaking charges in muscle activity occur which influence heart rate: Obrist (1%8) has observed momentary 3-4 beat increases in heart rate in resting humans associated with such subtle activities such as mouth movements. Moreover, changes in respiration occur when subjects are speaking which also influence heart rate (Sayers, 1980). The relevance of these points for the studies reported above, is that in some of them the experimental groups differed significantly in terms of measures of speech production (i.e. words spoken and silence). The effect of such differencesupon heart rate would confound the interpretation of observed differences thought to reflect differences in anxiety. A final point to note concerns subjects' cognitive appraisal of the experimental setting: care should be taken to allay any unnecessary (i.e. not a part of the experimental manipulation) anxiety - and concomitant physiclogical responses which may result from the subject finding himself in a novel situation.

A more detailed discussion of the environmental requirements of a laboratory designed for psychophysiological experiments has been presented by Gale and Smith (1980).

Transduction:

In the measurement of heart rate the transducer usually takes the form of silver or stainless-steel surface electrodes or a photoplethysmograph (PPG). There are problems associated with both of these methods of transduction.

By definition these indirect methods of cardiac activity are made from the skin surface: movement of either the person or the device (electrode or PPG), due to being loosely attached, will invariably alter the signal being measured. In the case of the PPG any extraneous light allowed to impinge upon the light-sensitive-cell will produce artifical measurements. As noted above artifacts may also arise from the movement

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of the cable connecting the device to the preamplifier, thus care should be taken to minimize the movement of the subject and cable.

If electrode straps are attached too tightly blood circulation in the part of the limb distal to the strap will be reduced and muscle tremor may also occur, resulting in EMG artifacts. However, since this EMG activity is predominantly of a higher frequency than the components of the EKG, it can be filtered out. (Brener, 1980; p 182).

When photoplethysmographic techniques are used it must be noted that the common practice of taping a device to the skin or employing bulky housing units with spring tension (as was the case in the above studies), may produce significant alterations of the vascular bed (i.e. a change in the radii of the blood vessels), at the measurement site and such distortion may make interpretation of data impossible. Moreover, such attachments may prevent free air circulation at the measurement site thus exacerbating the problem of heat generated by the broad band (white) light lamp characteristically used in photoplethysmographic transducers - and used in the transducer employed in the studies reported above. Specifically, heat will tend to dilate the vasculature under study and create artificial measurements. For a detailed discussion of the problems and possible solutions associated with photoplethysmographic transducers see Jennings et al (1980).

Artifacts associated with recording the EKG also result from the improper nature and application of the recording electrodes. These points are discussed by Brown (1972).

With regard to photoplethysmographic transduction it must be noted that measurement variability can result from hydrostatic pressure variation due to the position of the transducer relative to the level of the heart: both posture and position of the measurement site must be constant.

An additional point that must be noted about PPG techniques is that pulse amplitude varies with the respiratory cycle and often changes

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with stimulation. As Siddle and Turpin (1980) have noted, this may raise difficulties in relation to the detection of interbeat intervals. With regard to this problem Stern (1974) has shown that stimulation produces little change in pulse amplitude at the ear lobe and has therefore suggested the use of lobe photoplethysmography for reliable signal detection.

Measurement and Quantification

The present discussion of the measurement and quantification of cardiac activity will be limited to a brief overview of the problems encountered and the decisions to be made by researchers, as detailed discussions of these issues have been presented elsewhere (e.g. Siddle & Turpin, 1980).

The basic unit of heart rate measurement is the interbeat interval (IBI). The IBI is reciprocally related to heart rate (IBI(s) = 60/HR (bpm)). Although it is often assumed that there is little difference between the two units, the transformation of IBIs to HR is a non-linear one and therefore both measures cannot have the same linear relationship with a third variable. The question arises: 'which measure is the more appropriate?' This question has been discussed throughly in the literature and it seems that no clear consensus has been reached concerning which measure shall be followed and through which kind of time, i.e. for successive beats or for successive real time (Graham, 1980; p 193). Either measure or either kind of time may be suitable depending upon the research problem and the resources available (Jennings et al, 1981). However, there are restrictions upon the combinations of measure and time that are optimal (Graham 1980; pp 193-195).

It must be noted at this point that photoplethysomography is considered (Jennings et al, 1981) to be an adequate procedure if pulse counts over a period of a minute or longer are the dependent variable. However they suggest that this procedure is less acceptable for beat-by-beat or second-by-second measures of heart rate:

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'First detection of a standard point, e.g. peak, on the plethysmographic output is usually more difficult than detecting a standard point, e.g. R wave peak, on the EKG. Second, propagation of the pulse is influenced by peripheral vascular change. Thus, using the plethysmographic technique two beats with equal R to R wave times (that is with identical heart rate) will appear different if one is accompanied by significant vasoconstriction.'(p 227)

With the measurement of tonic (on-going) cardiac activity a 'major problem concerns the appropriate choice of statistic to represent such data.' (Siddle and Turpin, 1980; p 160). A serious limitation of using mean measures of such activity is that they do not take into account the fact that cardiac activity is usually not monophasic but cyclical. Moreover, such approaches ignore the possibility that cardiac variability itself might be a useful measure. (Siddle and Turpin, 1980; p 160). The durations of these cycles vary from seasonal, menstrual, diurnal cycles to trends of relatively short periodicity known as sinus arrhythmia (SA). A detailed discussion of some of the methods available for analysing such variability havebeen presented by Sayers (1980).

The short-term (phasic) changes in heart rate that are typically recorded in laboratory experiments are superimposed upon these ongoing biorhythms. Siddle and Turpin (1980) suggest that the most important cycle when it comes to quantifying phasic activity is sinus arrhythmia, as several cycles may occur during the course of an analysis period. Furthermore, they describe the respiratory SA as usually being the most dominant, consisting of a resting cardiac wave-form with a periodicity of about 3-12 seconds and a peak-to-trough amplitude of 2-20 bpm. As Siddle and Turpin (1980) point out the difficulty in quantifying phasic activity is that it represents the summation of phasic responses and such ongoing stimulus - irrelevant cardiac activity. Thus accurate measurement of phasic responses must try and take account

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of both prestimulus level (initial level) on post stimulus responses and the variability inherent in prestimulus cardiæ activity.

In terms of the effect of initial level Wilder (1962) has posited the law of initial values (LIV) which proposes a relationship between prestimulus level (x) and either post stimulus level (Y) or the difference score (Y-X). This view has been supported by numerous researchers (e.g. Graham and Jackson, 1970). Jennings et al (1931) suggest that initial data exploration should consider whether initial levels appear to be related to degree of change and whether these levels differ between groups and variables. In addition, they suggest that where a tonic-phasic relationship exists it may be corrected by either covariance analysis or by range correction procedures. However, they stress that care must be taken to ensure that the assumptions of these techniques are met (see Winer, 1971; Turpin, Lobstein and Siddle, 1980). It must also be noted that these techniques are not seen as being completely satisfactory. For a discussion see Turpin et al (1980).

In terms of the prestimulus variability of cardiac activity it could be considered (as was the case in the studies reported above) that the effects of such variability is averaged out when scores are collapsed across groups of subjects or trials. However, as Turpin and Siddle (1978b) have observed this does not appear to happen, even in the case of a pseudostimulus. It seems clear then, that methods which reduce the error variance of phasic responses by accounting for prestimulus variability are desirable. Three approaches have been adopted and are described in some detail by Turpin et al (1980, pp 210-217), along with the advantages and disadvantages of their use.

A final point to note with regard to the measurement of cardiac activity is the suggestion made by Jennings et al (1981) that data collection should include, whenever possible, measures of respiration and vascular activity, as they note:

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'Respiratory manoeuvers have clear effects on heart rate (e.g. Sroufe, 1971; Levenson, 1979). Ideally respiration should be measured and quantified with the same accuracy and care as heart rate. Minimally, respiration should be maintained so that consistent respiratory maneuvers induced by experimental events¹ are identified... Psychophysiologists commonly measure heart rate as an index of the activity of cardiac autonomic nerves. Blood pressure and flow changes in the peripheral vasculature can, however, affect heart rate independently of neural effects on the heart. Monitoring of both the cardio and vascular parts of the system can thus be important for adequate interpretation'. (p 227)

¹ Such as the speaking task employed in the studies reported above.

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