



CONDITIONING TECHNIQUES APPLIED TO THE  
BEHAVIOUR PROBLEM OF STUTTERING

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SUMMARY

Using a "clinical trial" approach, four studies focussed on developing a therapy program for the treatment of stuttering in adults. As cognitive and behavioural learning principles were employed with conditioning techniques to modify the stuttering R, the "presenting problem" was regarded as a complex multi-faceted behavioural disorder.

Initially the Investigative Phase introduced an operant program to manipulate the speech response directly. "Fluent Rs" were rewarded and "nonfluencies" punished using secondary reinforcement. For 14 male Ss three conditions - FR, FR+P, and FR+P+RC - examined the differential additive and interactional effects of adding "punishment" and RC to a "reward" contingency over 9 sessions. Only FR+P effected any "true" fluency change, with a "plateau of recovery" reached by Session 5. In the absence of "reward" effects, only the punishment variable could be attributed with any R modifying properties. Yet attendant anxiety exacerbating properties of the punishment stimulus made such a result paradoxical when the emotional aspect of the stuttering R was considered.

The second study attempted to overcome the observed "plateau of recovery" using 10 of the original Ss. The focus became the tension or anxiety associated with each individual's stuttering problem. Individual speech stress situations were systematically desensitized within a maximum of 13 sessions. Results showed a concomitant marked increase in fluency, with 6 Ss reporting a "cure". This suggested future therapy planning should consider more comprehensively the stuttering R



complex as opposed to the specific speech R. An 18 month follow-up supported this view.

Accordingly the Structuring Phase adopted a more holistic approach. Several behavioural and cognitive modification procedures were systematically introduced to develop a treatment program that eventually might be expanded to treat the total stuttering disorder. Initially, the third study investigated a selected speech situation "Talking to a Stranger" using 48 male Ss. Using multiple matched experimental and control groups, this study examined the combination of desensitisation of the anxiety R associated with stuttering with direct operant manipulation of the speech R. Contrary to an expected facilitatory effect, the results suggested that operant manipulation using secondary "punishment" of nonfluencies possibly exacerbated situational anxiety and confounded treatment of the anxiety R. This was in contrast to the first study where "punishment" was the only effective variable. Consideration of the "person" aspects of the problem seemed indicated in order to more fully understand the variables maintaining nonfluency, and hopefully to suggest more actual problem-directed treatment procedures.

In this study the presenting "personality profile" of the stutterers did suggest that changes in the stutterers as "persons" might help their adjustment to any newly-acquired fluency. On second-order personality dimensions the stutterers as a group were initially anxious, somewhat introverted, "poor leaders", with apparent tendencies toward neuroticism and psychoticism. Multi-faceted assessment procedures indicated

that as treatment procedures both relaxation training and desensitization produced beneficial effects on the adjustment Rs as well as on the speech R. A subsidiary Advanced Treatment Program further suggested that standardized desensitization might be extended to more than one speech situation.

Consequently, the fourth study massed relaxation training and desensitization to extend modification to 9 specific speech situations using 12 male Ss. Conditioned relaxation, relaxation pre-conditioning phases, cognitive reward and Idealized Self-Imagery were employed to heighten the probable inducement of anxiety management in the S. Although only a short-term program, significant fluency and personality changes strongly suggested future investigation could focus on extending this approach to a generalizable representative standard hierarchy. The problems anticipated in taking this direction are discussed in the concluding chapter, along with the necessary preliminary steps in confirming the validity of present findings. Attention is given to the operation of such variables as suggestion, demand characteristics, expectancy and group processes.

Statement

To the best of my knowledge this thesis contains original material presented by the author, except where reference is made in the text to findings previously published or written by another person; no material is cited which has been accepted for the award of any other degree or diploma in any University.

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Jeannie F. Porter

May, 1975

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CHAPTER I.

GENERAL ORIENTATION



## CHAPTER I

### 1. GENERAL ORIENTATION

Although a multitude of studies have tabulated the characteristics of stutterers and the nature of stuttering (Hunt, 1967; Sheehan, 1970), no clear criteria have been derived to distinguish the stutterer from the nonstutterer (Shatin, 1967). Views have differed widely from regarding the stutterer as "abnormal" with signs of pathological disturbance (Penichel, 1946; Fisher, 1970; Lebrun, 1967; Santostefano, 1960), to having a "disturbance of the communicative functions of speech" (Cheveleva, 1971; Levina, 1969; Soderberg, 1967; Yates, 1963), or having developed a disordered speech habit via a learning process (Brutten and Shoemaker, 1967; Johnson, 1959; Sheehan, 1953, 1958; Wischner, 1950). Nevertheless, comparisons can be drawn between stuttered speech and fluent speech, stutterers and nonstutterers. This information is basic to the planning of a program for the therapeutic modification of the stuttering response (R).

#### 1.) Nonfluency vs Fluency

Comparing the nature of fluency with nonfluency, a stutterer can anticipate his nonfluencies rather consistently but cannot do the same for fluent responses (Martin and Haroldson, 1967). He appears aware of the characteristics that set him apart from "normal" speakers (Bledstein, 1960a,b, 1961), yet remains a victim of the cyclic fluency-nonfluency variation seemingly inherent in the stuttering R (Sheehan, 1969).

When a nonstutterer perceives his speech behaviour to be inadequate he tends to adopt a reticent attitude which may negatively influence his interpersonal interactions (Phillips, 1968). In the stutterer this reticence may become even more marked. Yet the stutterer does not like to view himself as one of a group of stutterers (Fransella, 1965). He may accept that he has a speech problem, but given the choice he will choose to be with nonstutterers rather than stutterers (Sederqvist, 1970) - even though the nonstutterers may place him low on their sociometric choice rating.

Invariably speech, behaviour and personality become complexly interlinked with environmental influences as a consequence of everyday interactions (Levina, 1968). Baratz (1968) demonstrated that economic deprivation can lead to language pathology. By extrapolation, a complex of interactional factors is possibly responsible for many of the baffling observations cited in stuttering studies. For instance, the incidence of stuttering in males has been shown to be at least three times that for females (Andrews and Harris, 1964; Mills and Streit, 1942; Schuell, 1946, 1947; Tapia, 1968). It can be seen that with regard to stuttering pathology a person's present state of fluency may depend on a complex of interacting factors. Griffith (1969) has suggested that the stutterer can perceive his feelings, attitudes and behaviours in relation to (1) himself as a stutterer, (2) his speech, and (3) his interactional environment. Accepting that speech is a behaviour and that perceptions influence behaviour, these ongoing perceptions will influence the stutterer's present state of fluency.

However, the literature reveals that very scarce attention has been given to these related variables of fluency and interactional processes (Bar, 1969, 1971) when attempting either the description or modification of stuttering. Instead a tendency is evident toward viewing the stuturer as a pre-programmed speech response producing mechanism which has broken down (Lee, 1951), rather than as a vulnerable organism interacting within a social milieu with its attendant ever-present cause-effect relationships.

11) The Desirability of Fluency

Investigators have elucidated multiple properties and "facts" associated with stuttering and the stuturer, only to produce a mountain of information and theoretical suppositions with little understanding of the processes involved in the initiation and maintenance of the stuttering R. However, there is at least one platform of agreement. Stuttering is regarded as an unadaptive behaviour not to be encouraged as a future speech form either in the individual or as a general language pattern.

Both therapist and stuturer appear acutely aware of the desirability of modifying and hopefully eliminating the stuttering R. The stuturer may then be accepted into his immediate environment as a normal speaker (Johnson, 1956). As Yates (1970) reflects, it is surprising that there is not a greater incidence of personality disturbance than that observed amongst stuturers when the multiple speech demands of everyday life are considered. Individual adjustment appears a crucial factor. Personality difficulties and breakdowns in social communication may develop concomitantly with a speech disorder,



but are not necessarily causative agents in the genesis or maintenance of stuttering (Hahn, 1956).

### iii) Stuttered Speech vs Nonstuttered Speech

In comparing the speech of stutterers with nonstutterers, there are common as well as disparate characteristics. Accordingly, stuttering has been regarded as both an extension of normal nonfluent speech to a more severe level, and as a qualitatively different speech form (Yates, 1970). Rather than adopt either extreme position, the evidence suggests stuttering should be considered a composite of both views.

Qualitative differences may arise when an extension of nonfluent speech has concomitant interactional effects, both socially and within the stutterer as a self-analysing identity. Yet a cause-effect sequence of events cannot be objectively postulated for the development of the speech form labelled stuttering. Since stutterers differ markedly from each other in speech patterns, and vary individually according to time and circumstance, a whole range of stimulus situations and attending responses could be operational (Yates, 1970, p. 114).

Looking more closely at speech form comparisons, loci of nonfluencies reveal an essential similarity amongst stutterers and nonstutterers regardless of the age variable (Chaney, 1969; Silverman and Williams, 1967; Williams, Silverman and Kools, 1969). Apparent observations that nonfluency instances were related to information value of the word (Lanyon, 1968) have been shown to depend rather on the relationship between information value and word length (Lanyon, 1969; Peterson, 1969). However, Lanyon and Duprez (1970)

did not find this true for nonstutterers in either reading or speaking. Stuttering may differ qualitatively in this aspect from "normal" nonfluency characteristics.

Additional evidence for a qualitative distinction comes from examination of the consistency of nonfluencies in repetitions of speech tasks. In a study by Williams, Silverman and Kools (1969) a greater proportion of stutterers than non-stutterers produced nonfluencies on the same words, with initial performance of stutterers exhibiting the greater frequency of nonfluencies. Stutterers also tended to produce more consistent articulation errors (Williams and Silverman, 1968).

With regard to adaptation trends, stutterers and inferior speakers have been distinguished from superior speakers on criteria of articulation and pronunciation errors and total reading time (Soderberg, 1969b). However, the course of non-stutterers' nonfluency adaptation was shown to parallel that for stutterers (Silverman, 1970a,b; Williams, Silverman and Kools, 1968). Also adaptation is similarly effected by nature of the reading material for stutterers and nonstutterers (Silverman, 1970c). Nevertheless, Carr (1969) cited evidence to suggest that although adaptation trends might be similar, different types of nonfluency may be effected in the speech of stutterers. A qualitative difference in vocal adaptation was indicated. As demonstrated with the consistency phenomenon, adaptation suggests both similarities and differences are evident in comparing speech of stutterers with non-stutterers.

Relating these observations to other findings, Gray and Karmen (1967) suggest subgroups of both stutterers and nonstutterers may differ with respect to anxiety not specifically related to speech and that these groups may require differential diagnostic and therapy procedures. Several findings support this latter contention, as outlined below.

Prosodic aspects of speech may feature in the production of nonfluencies. Inferior phonetic ability can accompany stuttering response patterns (Wingate, 1969). Silverman and Williams (1968) found young stutterers produce more one word utterances than longer utterances when contrasted with matched nonstuttering peers. Furthermore, there is little doubt that stutterers can be discriminated from nonstutterers as a group on a severity dimension (Lanyon, 1967). They are also more sensitive to auditory discomfort (MacCulloch, Eaton and Long, 1970) produced by masking noise. In this respect stutterers appear differentially affected by auditory masking, with fluency increasing under delayed auditory feedback (DAF) (Soderberg, 1969a), as opposed to the decrease in fluency nonstutterers exhibit. Although stutterers and nonstutterers respond similarly to synchronous and delayed feedback, there are definite differences in terms of lip closure errors produced as DAF intensity is increased (Stark and Pierce, 1970). The proposal of Yates (1963) that DAF effects on normal speakers and the stuttering phenomenon may ultimately be subsumed by a single theory, has been shown improbable in a more recent review (Soderberg, 1969a). There seems

to be more involved than a mere breakdown in the auditory feedback system in the initiation and maintenance of the stuttering R.

iv) The Stutterer vs The Nonstutterer

Viewing the "person" aspect of the stutterer against the nonstutterer, a complex of attendant behavioural, attitudinal, cognitive, emotional and physiological factors emerges.

Differences have been found on dichotic listening tasks (Curry and Gregory, 1969); in latency of oral responses on a perceptual closure task (Taylor, Lore and Waldman, 1970); along behavioural and attitudinal dimensions of nonfluency severity (Lanyon, 1967); in communication attitudes (Erickson, 1969); according to physiological aspects of vasoconstriction associated with nonfluency expectation (Kurshev, 1968) and motor coordination (Tugova, 1968). These represent but a few variables that might contribute to psychological differences between stutterers and non-stutterers along various dimensions (Adams, 1969).

From these interactional considerations three separate but related questions arise with regard to the stutterer as a person:

- (a) How does the stutterer view himself?
- (b) How does the stutterer view "others" in his environment and the environment itself?
- (c) How do the "others" in his environment view the stutterer?

In answer to these queries the social context within which a person interacts from birth to the immediate present and future is seen to vitally affect the diagnosis and prognosis of the stutterer.

(a) The stutterer's view of himself

It was mentioned earlier that the stutterer agrees that he stutters, but prefers not to classify himself as like other stutterers (Fransella, 1965). Sheehan and Martyn (1966) have even demonstrated a relationship between "self-concept" and spontaneous recovery from stuttering. Although based on self-analytic retrospective reports, this supposition implies that a stutterer's acceptance of being a "stutterer" rather than denial may reflect a willingness to face his problem constructively. On the other hand, perseveration of stuttering may be enhanced by a negative "self-concept" (Singer, 1970). Stutterers generally are less self-accepting than their matched peers (Gildston, 1967).

Griffith (1969) and Lanyon (1967) have shown a stutterer can perceive the effect of his speech on his own behaviour and various personal feelings, emotions and attitudes, simply by completing sentences cueing various dimensions of the stuttering response (Griffith, 1969) or by answering a true/false inventory (Lanyon, 1967). A person with a speech defect seems more sensitive to hearing himself speak than a normal speaker (Weston and Rousey, 1970). The stutterer tends to see himself as needing to defend himself against a critical environment (Borel-Maisonny, 1966; de Flatero, 1967). Although young stutterers exhibit minor concern about their

speech problem (Silverman, 1970a), with developing awareness speech anxiety can lead to a suppression of communication (Giffin and Heider, 1967). The child's "self-concept" may become a reflection of that attached to him by those who positively or negatively reinforce his speech responses (Sander, 1968; Yairi and Williams, 1970). Consequently, a stutterer's anxiety about his speech may become a problem in its own right that needs to be overcome (Bloodstein, 1959; Lanyon, 1967, 1969).

(b) The stutterer's view of "others" and his environment

Yairi and Williams (1970) suggest that attitudes, beliefs and expectations held by persons with whom the stutterer interacts will affect his speech pattern by way of their influence on the stutterer's own attitudes and self-evaluations. Ludwig and Farrelly (1966) have shown that environmental expectations serve to reinforce various behaviours and to stabilize a person's identity. With regard to the influence of perceptions, Johnson (1955) sees the stutterer becoming anxious in reaction to perceived criticism from his listening environment. Lanyon (1967) distinguished 64 different behavioural and attitudinal criteria that can reflect the stutterer's concern about his speech. Responses to the stimulus statements in this true/false inventory give an overall view of how the stutterer perceives the reactions of "others" toward him and how different his "world" appears to that of the envied nonstutterer. The nonstutterer is seen as different from himself by the stutterer (Sheehan, 1958). Emotions, behaviours and attitudes may be coloured by what

the stutterer perceives as his acceptance or non-acceptance in a given social context (Gildston, 1967; Griffith, 1969). This process may begin early in childhood when he feels he is not accepted by his parents and/or nonstuttering peers (Johnson, *et al.*, 1959).

(c) How "others" view the stutterer

The term "stutterer" appears to evoke a negative connotation in parents (Darley, 1955; Glasner, 1949). By classifying a child as a "stutterer" one may attribute to him expectation of some of the 26 traits held characteristic of stutterers by clinicians (Mairi and Williams, 1970). Considering that 17 of these are regarded undesirable, classification of the stutterer may project into the child's potential life-style a devastating chain of negative influences. Self-evaluations and evaluations from the environment of a negative nature might enhance the probability of speech avoidance reactions and perpetuate a "? → stutter → tension stutter" cycle (Ierodiakonou, 1970).

On leaving the immediate environment of the home, teachers' attitudes toward a child with a speech defect have been shown to influence the way other children accept the child (Gallagher, 1969). Children with speech disorders tend to be negatively evaluated by their classmates (Sederqvist, 1970). At the same time parental correction of the child's speech (Sander, 1968) serves to make the child aware of the impending "stutterer" label. A child who is exhibiting "primary" symptoms of stuttering in terms of speech irregularities may well begin to develop "secondary"

symptoms of self-criticism, tension, anxiety and fatalism with regard to his apparent inability to modify his speech responses (Borel-Maisonny, 1966; McDearmon, 1968).

Parents may even generalize their negative expectation of performance from speech to nonverbal tasks (Quarrington, Seligman and Kosower, 1969). Apart from perceiving he is different from his peers, the child may come to expect such labelling direct or implicit in varied interactions of everyday living. He may virtually become a social "isolate" within the very environment in which other children are protected as they meet predetermined motivational goals.

#### v) The Listener-Stutterer Interaction

Calling attention to stuttering (Wingate, 1959) can also have a negative effect on nonfluency itself (Cooper, Cady and Robbins, 1970). The stutterer "knows" he is different. To continually remind him may make him more anxious and frustrated at his inability to change his pattern of behaviour. The greater the gap perceived between the stutterer's own behaviour and the confidence exhibited by his critical listener, the more likely he is to stutter (Sheehan, Hadley and Gould, 1967). With his speech being associated with negative emotional content (Sheehan, 1958), any uncertainty as to his role may increase the stutterer's feelings of discomfort in the interactional context and also heighten his tendency to stutter (Gould and Sheehan, 1967).

As Bar (1969) has pointed out, the role expected by others of the stutterer and the stutterer's own perception



of that expectation, are variables that constantly influence response contingencies in the listener-stutterer interaction. The listener can exert a powerful influence on the ongoing interaction (Bar, 1967; Cook, 1968; Wingate and Hamre, 1967). Reactions of a group of people to a stutterer's assertive behaviour in their midst can vary from boredom to signs of irritability and hostility on the one hand, to oversolicitude and overpoliteness on the other (Streat, 1967). In such instances the stutterer is obviously not "part of the scene", and the likelihood of recurrence of the experience will be heightened. With any avoidance behaviour a problem also arises. The speech R will not be emitted as often and so will not be available to any chance modification process towards fluency.

#### vi) The Effect of "Diagnosis"

The diagnosis of "stutterer" may not always be warranted by the presenting behaviour of a nonfluent speaker. Considering that stuttering spontaneously remits in 80 per cent of all cases (Sheehan and Martyn, 1970), a parent's concern about nonfluencies (Sander, 1968) exhibited in the first 8 years of childhood perhaps often leads too prematurely to "labelling" either directly or as implied by discriminative responses to the child's speech. Once labelling takes place, the stage is set for the operation of role expectations, anxiety and possible development of other "secondary" symptoms attending the specific nonfluent speech Rs. A greater awareness of this factor with regard to its potential influence on the future life-style of a child who suddenly finds he is

one of "them" (Ostwald, 1970), might well serve to enhance spontaneous remission and aid in therapeutic modification.

vii.) Applied Psychology related to Stuttering Therapy

From the previous considerations, applied psychology may be predicted to offer a valuable service to the field of stuttering therapy (Shatin, 1967). The psychologist may elucidate the potential learning factors and role relationships in the interaction processes between the nonfluent child and "significant others"; and between the adult stutterer and his critical environment. Potential sources of information come from the diverse fields of personality, social psychology, emotion, motivation, cognition and abnormal behaviour. Principles of learning may be systematically applied to the modification of the "stuttering response complex". The many types and parameters of conditioning are available for the enhancement of modification processes.

This thesis represents an attempt to systematically incorporate conditioning techniques into a behaviour modification program for the stuttering R. Beginning with a narrowed operant focus, expansion was made as modification procedures and measurement techniques were shown inadequate for economic establishment of fluency.

The developmental sequence for the four studies may be divided into two phases, an Investigative Phase and a Structuring Phase. Within each phase subsequent studies expanded the scope of previous studies. In the Investigative

Phase the first study looked at systematic application of operant contingencies to both fluent and nonfluent aspects of the specific speech R. The second study aimed at eradicating the "plateau of recovery effect" observed in the operant study, by specific desensitization of the anxiety component of the speech problem. The results of these two studies prompted a change in focus from a molecular symptomatic approach to a more holistic view, in which cognitive and behavioural elements were more successively integrated into the modification process during the Structuring Phase. Before specifically reporting these studies attention is given to methodological and recovery criteria in the following chapter. Such factors are considered vital to the interpretation of successful treatment outcome for any modification program within this field.

CHAPTER II.

FACTORS TO BE CONSIDERED IN THE  
THERAPEUTIC MODIFICATION OF  
STUTTERING

## CHAPTER II

2. FACTORS TO BE CONSIDERED IN THE THERAPEUTIC  
MODIFICATION OF STUTTERING

Attention to these factors is recommended in the development and assessment of a behavioural modification procedure for the treatment of stuttering. Within the development of this investigation it will be seen that limited consideration of these criteria results in inadequate assessment techniques, lack of information available for an overall view of treatment outcome, and inferior treatment modes.

1) Definition of the Response

Definition of the response to be modified should give consideration to the stuttering R complex - the specific speech response, the attendant cognitive and emotional states, and the social consequences of the presenting and changed behaviours.

Brady (1968) suggested stuttering consists of two components, viz:

- (1) the "abnormal" speech pattern (nonfluencies), and
- (2) the anxiety or tension experienced in the speech situation.

One might add the cognitive and social factors. Johnson (1955) defined stuttering as "an anxiety-motivated avoidant response that becomes 'conditioned' to the cues or stimuli associated with its occurrences." Lanyon (1969) viewed stuttering as a response complex and postulated stuttering

to be "the sum total of responses learned by the speaker in an effort to avoid or correct .... perceived inadequacies." These latter two definitions to a certain extent encompass Brady's (1968) dichotomous definition. However, the three definitions each lack the properties of an operational definition necessary for the establishment of response changes consequent to therapeutic modification.

Cooper, Cady and Robbins (1970) determined non-fluencies in the speech response using the definition of Johnson, Darley and Spriestersbach (1963). This definition has been widely adopted in the last decade. Beech and Fransella (1968) presented it as the most adequate classification technique for nonfluencies as yet available. Eight categories are defined for the identification of a nonfluency instance:

- (1) Interjections of sounds, syllables, words or phrases, e.g. "uh", "er", "hum" and "well".
- (2) Part-word repetitions, e.g. "ba-ba-baby", "ruh-ruh-run".
- (3) Word repetitions, e.g. "I-I-I", "was-was", "going-going".
- (4) Phrase repetitions, e.g. "I was .... I was going".
- (5) Revisions, e.g. "I was .... I am going".
- (6) Broken words, e.g. "I was g....oing home".
- (7) Prolonged sounds, e.g. "I was go-o-oing home".
- (8) Hesitations, e.g. "I was going .... (pause) .... home".

Use of this definition in recording of stutter instances, either live or from tape-recorded samples, can give at least a reliable operational estimate of nonfluency production (Cullinan and Prather, 1968). Change in this response aspect can be assessed from before/after treatment data, provided adequate attention is given to the reliability of the individual experimenter's recording as discussed by Beech and Fransella (1968, p. 44).

With respect to the assessment of other aspects of the response complex, measurement techniques may be adopted from various areas of psychology. The choice is somewhat arbitrary until investigation establishes the utility of the tests selected. This investigation found that adequate assessment of response changes required the development of a battery of interrelated tests corresponding to the extension of modification processes that became necessary for the establishment of successful treatment outcome. The tests were chosen to sample behavioural, cognitive, and emotional aspects of the stuttering response as outlined below:

- (1) Severity of the problem as perceived by the therapist, the stutterer himself, and the listener. (Aron, 1967; Bar, 1969; Brady, 1968; Erickson, 1969; Griffith, 1969; Ierodiakonou, 1970; Lanyon, 1967, 1969; Martyn and Sheehan, 1968; Soderqvist, 1970; Sheehan and Martyn, 1970; Young, 1970.)

- (2) Individual differences characteristic of the stutterer and his stuttering behaviour.  
(Crahay, 1967; Griffith, 1969; Lanyon, 1967; Martin, 1970; Toomey and Sidman, 1970.)
- (3) Expectation or anticipation of stuttering.  
(Curlee and Perkins, 1968; Daly and Frick, 1970; Gray and Williams, 1969; Kurshev, 1968; Kurtev, 1969; Martin and Haroldson, 1967; Rosenthal, 1968; Taylor and Taylor, 1967; Toomey and Sidman, 1970).
- (4) The relationship of anxiety to stuttering, both specific to speech  
(Brutten and Shoemaker, 1970; Calef and MacLean, 1970; Lanyon, 1969; Ostwald, 1970; Rosenthal, 1968; Sheehan, 1969; Silverman, 1971; Toomey and Sidman, 1970);  
and as inherent in social interaction  
(Cook, 1968; Dinnerstein and Lowenthal, 1966; Edgren, Leanderson and Levi, 1969; Gould and Sheehan, 1967; Gray and Karmen, 1967; Leanderson and Levi, 1966; Turner, 1969).
- (5) The avoidance characteristics of the stuttering problem  
(Lanyon, 1969; Pechmann, 1966; Rosenthal, 1968; Sheehan, 1969).
- (6) Emotional concomitants of stuttering  
(Cooper, 1968; Crahay, 1967; Edgren, Leanderson and Levi, 1969; Griffith, 1969; Rosenthal, 1968; Sander, 1968).



- (7) The influence of cognitions or awareness on the stutterer's overt and covert behaviour.  
(Gildston, 1967; Griffith, 1969; Lanyon, 1967; Sander, 1968; Sheehan and Martyn, 1966).
- (8) Interaction processes and role expectations influencing the stutterer.  
(Bar, 1969; Bourdon and Silber, 1970; Giffin and Heider, 1967; Griffith, 1969; Ostwald, 1970; Phillips, 1968; Sander, 1968; Sederqvist, 1970; Streat, 1967; Wyatt, 1967).
- (9) The role of social reinforcers in maintenance and change of the response.  
(Browning, 1967; Conger, 1971; Kowrer, 1971; Rosenthal, 1968; Shatin, 1967; Streat, 1967).
- (10) Secondary effects of the stuttering response on the stutterer as a person.  
(Adams, 1969; Borel-Maisonny, 1966; Griffith, 1969; Iwert, 1968; Lanyon, 1967, 1969; Leanderson and Levi, 1966; McDearmon, 1968; Ostwald, 1970; Sederqvist, 1970; Streat, 1967; Rosenthal, 1968; Weinstock, 1968; Williams, Melrose and Woods, 1969).
- (11) Personality correlates of changes induced in the response complex, and the presenting personality in relation to probability of change.  
(Bloch and Goodstein, 1971; Brandon and Harris, 1967; Kraft, 1971; Lanyon, 1966; McHale, 1967; Petrie and Heans, 1969; Phillips, 1968; Porterfield, 1969; Sadoff and Collins, 1968; Weinstock, 1968).

(12) Operant characteristics of the speech behaviour.

(Bar, 1969; Brookshire, 1967; Browning, 1967; Cooper, Cady and Robbins, 1970; Flanagan, Goldiamond and Azrin, 1958; McReynolds, 1970; Pechmann, 1966; Sanders, 1970).

ii) Criteria for the Success of Treatment Outcome

For a stutterer to be considered "recovered" several criteria should be examined:

(1) The final speech pattern should be characteristic of "true" fluency, and not simply a pattern change (Wingate, 1969) that may be termed "artificial" fluency. As stuttering percentage to words spoken decreases total word rate should increase, indicating a higher percentage of correct word production per unit of time (Lanyon, 1965).

(2) The final nonfluency percentage should fall within the bounds evinced by nonstutterers, viz. a 6.5 percent mean within a 0.4 - 20.1 percent range (Johnson, 1961). Correspondingly, total word rate should approximate the average speaker's rate of  $140 \pm 24$  words/min.

(3) Those characteristic speech responses which are readily identifiable as "stutters" should be absent, viz. repetitions, prolongations and blocks (Sander, 1961; Young, 1961).

(4) The fluency produced should be distinguishable from that obtained from temporary inducing fluency conditions (Wingate, 1969, 1970). The aim should not be merely controlled stuttering (Burke, 1969; Jones and Azrin, 1969), but rather a significant progression to a fluent speech

pattern over time. Speech should not exhibit the generalized slowness of production obtained under DAF (Soderberg, 1969a; Webster, Schumacher and Lubker, 1970), auditory masking (May and Hackwood, 1968; Meyer and Mair, 1963; Webster and Lubker, 1968), and syllable-timed speech (Andrews, 1967).

(5) Therapeutically induced effects should generalize to the everyday life speech situations and not be specific to the therapy setting (Cook, 1968; Meyer and Mair, 1963; Gruber, 1971; Lanyon, 1969; Russell, Clarke and Van Sommers, 1968).

(6) Secondary benefits of fluency enhancement should be examined in terms of emotional, attitudinal, cognitive and social effects (Griffith, 1969; Lanyon, 1967; Leanderson and Levi, 1966; Levins, 1969; Manning and Cooper, 1969; Petrie and Haans, 1969).

(7) The reliability of recordings made by the individual experimenter should be ascertained (Cullinan and Prather, 1968; Lanyon, 1965; Young, 1970), and procedures should be adopted to increase reliability wherever feasible (Beech and Fransella, 1968, pp. 44, 46). On response measures where self-recordings are obtained from the stutterer, an effort should be made to ensure they are reliable (Aron, 1967; Simkins, 1971a,b) and that practice, time and motivational effects are exceeded by the supposed treatment effect.

(8) Evaluations of recovery through treatment should take into account the possibility of the spontaneous remission phenomenon (Gray and Brutten, 1965; Martyn and Sheehan, 1968;

Frins, 1970; Sheehan and Martyn, 1970). Prognosis for recovery may depend to a certain extent on age of onset. Andrews and Harris (1964) identified three stuttering types of possible relevance to therapeutic outcome, viz. "developmental" (2-4 years) lasting only a few months, "benign" (mean age of  $7\frac{1}{2}$  years) with a tendency to remit by the age of 10-11, and "persistent" stuttering with onset at  $3\frac{1}{2}$ -8 years. For treatment of the adult stutterer, age of onset falling in the last category may identify a person as having not only a speech problem but also associated emotional and social problems concomitant with awareness of nonfluency.

(9) Failures to recover should be examined to determine the nature of contributing factors (Brandon and Harris, 1967; Martyn and Sheehan, 1968; Ostwald, 1970; Frins, 1970).

(10) Successful cases should optimally be examined again in follow-up studies to establish that the fluency induced was not merely a transitory phenomenon (Andrews, 1967; Brandon and Harris, 1967; Leeder and Francis, 1968; Kondas, 1967).

### iii) Oddities Characteristic of Stuttering

Certain variables which do not fit into any neat theoretical framework of explanation must be taken into account.

#### (1) Sex disparity.

The incidence of stuttering is estimated as at least three times as prevalent in males as in females (Andrews and Harris, 1964; Mills and Streit, 1942; Schuell, 1946, 1947;

Tapia, 1968). Mills and Streit (1942) suggest that greater pressure on males to obtain fluency precipitates stuttering by way of exacerbation of anxiety.

(2) Incidence.

Although estimates vary widely, overall incidence appears to be approximately seven stutterers to every thousand people in a particular population (Schindler, 1955) with culture variations.

(3) Age.

Age of onset appears to exert an influence on prognosis for recovery as outlined in ii(3). Andrews and Harris (1964) also demonstrated a relationship between onset and severity. More severe stutterers showed speech defects early in speech development, while mild cases evidenced only minor disturbance with the onset of speech. Final characteristics of stuttering appear to be related to language development (Bloodstein and Gantwerk, 1967; Neelley and Timmons, 1967). Prognosis for the child stutterer is more encouraging than that facing the adult stutterer. Bryngelson (1935) noted that 40 percent of children spontaneously remit before reaching 8 years of age.

(4) Expectancy.

A stutterer can anticipate with considerable certainty when he will stutter (Curlee and Perkins, 1968; Daly and Frick, 1970; Martin and Haroldson, 1967), and appears unable to alter the potentially distressing chain of events that ensues.

(5) Consistency.

On repetition of a speech task stutterers tend to stutter on the same words (Chaney, 1969; Johnson and Knott, 1937) and under similar circumstances (Berwick, 1955; Brown, 1945; Connett, 1955; Fierman, 1955). Gruber (1970) has presented a computational procedure for derivation of this effect when detailed analysis of speech production is required.

(6) Meaning.

Stuttering instances appear to be related to meaningfulness or the expectancy value of a word (Lanyon, 1968). However, this is more likely to be dependent on the relationship of expectancy to word length (Lanyon, 1969; Peterson, 1969) than to meaningfulness per se.

(7) Rhythm.

Imposed rhythm by means of a pacesetter or metronome (Brady, 1968, 1969, 1971; Fransella and Beech, 1965; Meyer and Mair, 1963; Van Dantzig, 1940; Wohl, 1967) or "shadowing" (Cherry, 1953; Cherry and Sayers, 1956; Kondas, 1968), as well as rhythm naturally invoked in singing (Bloodstein, 1950; Johnson and Rosen, 1937; Reid, 1946) and choral reading (Barber, 1939; Eisenson and Wells, 1942; Pattie and Knight, 1944) produces a changed pattern of speech termed "artificial" fluency (Wingate, 1969). DAF and auditory masking produce similar slow and stilted production effects (Soderberg, 1969a). The apparent ameliorative effects are short-lived, with a return to stuttering on withdrawal of the

stimulus conditions, unless other procedures such as desensitization and operant manipulation are imposed concomitantly. Therapeutic benefits of such procedures should therefore be examined over an adequate time period before drawing conclusions on the basis of the immediate effects on fluency.

#### iv) Factors Crucial to Experimental Control

There are a number of factors that necessitate close examination in order to institute adequate experimental control for the derivation of true treatment effects.

##### (1) Adaptation.

A stutterer can adapt to a speech task or situation on being required to repeat a performance by showing a decrease in stuttering (Johnson, 1955, p. 15). Changes due to treatment effects should be considered against the known effect of the adaptation phenomenon (Lanyon, 1965). Where possible, "practice only" effects should be compared with treatment conditions. Several properties of adaptation are relevant to treatment planning and assessment.

- (a) Two basic processes appear involved in adaptation-familiarity with the prosody of the passage (Beezli and Adams, 1969; Wingate, 1966), and general situational adaptation (Wingate, 1966).
- (b) Nonstutterers also exhibit the adaptation effect (Silverman, 1970b; Williams, Silverman and Kools, 1968).

- (c) The nature of adaptation curves may vary for stutterers and nonstutterers, with initial non-fluency frequency a contributing factor (Silverman, 1970a; Soderberg, 1969b).
- (d) An influence can be exerted on adaptation by the nature of the material read (Silverman, 1970c).
- (e) Satiation of meaning and adaptation are not the same phenomenon (Peterson, Rieck and Hoff, 1969).
- (f) A computational procedure is available to allow standardised comparison of groups with respect to adaptation curves, with abstraction of the confounding influence of absolute frequency of stuttering (Silverman and Williams, 1968).
- (g) Pre-therapy adaptation appears related to therapy progress, but not in a consistent definable fashion (Lanyon, 1965; Frins, 1968).

(2) Severity.

Initial severity of the individual and the treatment groups under comparison should be controlled by either randomization or pre-therapy matching. Both severity of the actual speech response and its attendant emotional, cognitive, and social effects are relevant (Brady, 1968; Erickson, 1969; Lanyon, 1967; Young, 1970). Reliable judgments of speech severity can be made by the investigator (Aron, 1967). However, multiple response assessment necessitates the establishment of pre-therapy equivalence on each variable when groups are compared. The inverse



relationship between initial severity and recovery should be taken into account in statistical analyses and interpretation of treatment outcome (Martyn and Sheehan, 1968; Sheehan and Martyn, 1970).

(3) Sample Size.

Interpretation of the utility of a new treatment technique should be based on a sample size large enough to establish a reliable estimate of statistical significance. Comparison with effectiveness of other procedures should take into account the sample size used in the studies under comparison in relation to the present sample. Case studies serve as impetus for the application of new procedures (Janyon, 1969; Peins, Lee and McGough, 1970; Rosenthal, 1968). However, subjectivity and the possible influence of experimental demand characteristics and expectation of success are not adequately controlled in most cases (Browning, 1967; Trotter and Lesch, 1967; Turner, 1969; Wertheim, 1967). Case studies can demonstrate the appropriateness of removing target symptoms (Kraft, 1969) and inducing internal control of overt and covert behaviours (Johnson, 1971; Lutzer, 1971; Mahoney, 1971). Nevertheless, support for the adoption of a particular procedure for the modification of a behaviour problem comes only from the establishment of statistically significant effects.

(4) Expectancy of success.

True treatment effects should be distinguished from possible spurious effects as a result of expectancy of therapy

outcome. Positive expectancy aspects of the response can be harnessed to increase the probability of success by appropriately incorporating social and cognitive factors (Lick and Bootzin, 1970; Wilkins, 1971). In this case, however, an interpretation of the effective treatment variables should include these factors rather than stipulate isolated treatment modes.

(5) Feedback.

Feedback of progress can influence the response modification process (Wilkins, 1971; Wyatt, 1967). This effect can be made optimal to the establishment of the desired response by social reinforcement of positive changes from the therapist (Lanyon, 1969; Ostwald, 1970; Rosenthal, 1968; Streat, 1967; Weinstein, 1968). However, control must be exercised across individuals and groups if the effectiveness of a particular treatment mode is in question.

(6) Therapeutic relationship.

The perceived and actual role of the therapist can vitally influence experimental effects (Kraft, 1971). Therapeutic atmosphere can be used to enhance the probability of the desired response (Ostwald, 1970; Rothman, 1969) and set the stage for later generalization to real life settings. Contingencies and consequences in speech therapy can come under the control of the therapist (McReynolds, 1970; Shames, Egolf and Rhodes, 1969). Attitudes toward the therapist are shown to vary during the therapy process (Cooper, 1968; Cooper and Cooper, 1969; Manning and Cooper, 1969). Even hostility toward the therapist can be manipulated to enhance

treatment effects (Lieberman, 1970). Establishment of a basic trust relationship between therapist and subject is considered conducive to success (Bar, 1969; Wilkins, 1971). Care has to be taken, however, that personality characteristics of the therapist (Kraft, 1971) do not differentially influence subjects, and that the therapist's own role is kept constant across subjects and treatment groups. The demand characteristics of the experimenter should optimally be kept constant across time, subjects, and circumstances (Lick and Bootzin, 1970). Ethical considerations of utilizing these variables to effect the eventual recovery of the stutterer should be viewed against the perspective of preserving the individual's freedom of choice (Schwitzgebel, 1970).

(7) Therapy procedure.

In order to ensure comparability of treatment procedures across subjects and time, taping of the therapy process is advantageous (Fryrear and Werner, 1970; Miller and Nawas, 1970; Paul and Trimble, 1970). This can control the experimenter variable to a certain extent, as long as artificiality is not introduced into the procedure and the subject pays attention to the recorded instructions. Pre-therapy encouragement by the therapist can enhance the adoption of an appropriate attitude by the subject to the taped therapy. Adopting a supportive role, the therapist would then allow the specific response modification processes to be introduced on the standardised tape-recording.

Another technique available to the therapist in enhancing treatment outcome is the introduction of self-

administered therapy processes. Self-observation itself can be encouraged as an agent for behavioural change (Johnson and White, 1971). More specific self-administered "consequences" to behaviour can be employed (Bucher and Fabricatore, 1970; Conger, 1971; Steeves, Martin and Pear, 1970; Stumphauzer, 1971). Programs for self-management of covert behaviour (Mahoney, 1971) can be implemented in extending the therapy process outside the clinical setting. Such procedures may serve to maximize generalization of treatment effects to everyday life by means of the subject becoming in a sense his own therapist. They may also decrease the probability of resensitisation once therapy is removed (Wilson and Davison, 1971; Wolpe, 1970).

v) Measurement Techniques.

In adequately incorporating the factors already outlined into a therapy program, appropriate measurement techniques must be selected to provide the necessary statistical information and to inclusively sample the aspects of the response that are the object of modification. The literature reveals a multitude of potential tests, but selection is dependent on the subject sample and therapy process in question.

In adopting measures from various fields of psychology "before" and "after" testing can reveal changes in response. However, determination of a treatment effect necessitates the partialling out of the influences of initial response levels, adaptation and practice effects. In considering overall

success of treatment, the changes in various response aspects may be integrated. Computer analysis offers a viable answer to the time necessitated by multidimensional assessment. Reliance may have to be placed on self-recording (Nelson and McReynolds, 1971; Sidkins, 1971a,b) and subjective reports (Erickson, 1969; Griffith, 1969; Lanyon, 1967, 1969; Foomey and Sidman, 1970). Nevertheless, indices of motivational distortion can be incorporated in testing procedures, e.g. the 16PF - Form C (Cattell, 1970) and the EPI Lie Scale (Eysenck and Eysenck, 1964). These measures can be used to indicate the degree of reliability of the general responsiveness of the individual. Subjects with initially high scores can be excluded from the treatment program. Attention will be given to such considerations within the scope of this investigation.

In overviewing this section, it appears that examination of multiple factors in the planning and assessment of stuttering therapy is warranted, as suggested by Griffith (1969). Such has rarely been the case in the past. Few attempts have investigated beyond an isolated variable - in most cases a measure of nonfluency specific to the speech response. Consequently, a review of the literature reveals an accompanying absence of scientific rigor. Among others, six major criticisms emerge - measurement of R change without regard to initial response levels; lack of control groups for time and practice effects as used in balanced experimental designs; inappropriate use of parametric analysis; conclusions drawn on the basis of small subject samples; inadequate definitions of the response.

The present investigation attempts to consider adequately the objective criteria proposed in this section. Nevertheless, practicality and inevitable time restrictions made this course somewhat tenuous along the way. The subsequent progression clearly demonstrated the necessity of planning in advance both controlled treatment proceedings and multiple analytic opportunities.

CHAPTER III.

THE INVESTIGATIVE PHASE -- EXPERIMENT I

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3. THE INVESTIGATIVE PHASE - EXPERIMENT I.

AN OPERANT STUDY : Directed at specific manipulation of stuttering produced during reading and spontaneous speech.

3.1. INTRODUCTION

The genesis and maintenance of stuttering has been formulated in learning theory terms since the 1950s (Brutten and Shoemaker, 1967; Johnson, 1959; Sheehan, 1953, 1958; Wischner, 1950). Yet research studies have given only somewhat cursory attention to the systematic application of reinforcement principles in the therapy process.

For instance, most would agree that a "true" decrement in stuttering logically necessitates a corresponding increment in "correct" speech. Surely this implies an inherent discrimination process that should be considered in any therapeutic manipulation of speech responses. As Andrews and Ingham (1971) aptly maintain, the stutterer's progress in therapy should be marked by "true" rather than "artificial" fluency such as produced by sound or pattern change (Wingate, 1969). Total word rate should increase as stuttering percentage decreases, i.e. "correct" speech must increase. Examination of total word rate becomes an essential concomitant experimental procedure to the establishment of nonfluency decrement. Both criteria must be met to say a fluency change has been effected. It follows that therapists should pay



closer attention to both nonfluency and fluency characteristics (Bar, 1971; McReynolds, 1970) than has been the case in the past. Future attempts at speech modification would then benefit from systematic appraisal of the total speech response, rather than inefficient fixation on one variable (Bar, 1969).

Studies reveal the major emphasis in treating "operant stuttering" (Goldiamond, 1965) has been on the manipulation of nonfluency, with virtually no concurrent attempt at systematically enhancing fluency (Bar, 1969). It should be noted that fluency and nonfluency are not necessarily inverses. Taking stuttering as a type of nonfluency, a reduction in stuttering in terms of frequency of utterance over time may be just as distressing if the resultant speech form is a slow drawn-out pattern of meticulously executed "correct" words. The stutterer may be demonstrating some form of control over his speech, but the aversive consequences of listener impatience and his own frustration would preclude any conclusion of "true" fluency enhancement.

Lanyon and Stelle (1970) comprehensively reviewed studies focusing on the delivery of contingent and non-contingent stimuli in relation to the nonfluency variable per se. It was concluded: "non-contingent stimuli tend to increase stuttering, and contingent stimuli tend to decrease stuttering." Two exceptions were cited: (1) delayed auditory feedback (DAF) and masking white noise are non-contingent stimuli which decrease nonfluency, and (2) Van Riper's (1958) finding of positive contingent stimuli

reducing nonfluency. The latter remains a dubious finding until future replication, since generalization from two case studies is not scientifically tenable.

With regard to fluency enhancement, Rickard and Mundy (1965) demonstrated the use of reward in a case study with a nine-year-old boy. Icecream and bonus points for toys were the effective positive stimuli. As true for nonfluency studies, no attempt was made to combine positive and negative reinforcement principles. The attack was exclusively via one variable - in this case, fluency. Similarly Russell, Clark and Van Sommers (1968) pursued the positive reinforcement avenue exclusively, yet in a more systematic way which foreshadowed possible advantages of combining fluency enhancement with nonfluency reduction. Three stutterers were treated in an experimental manipulative design using a machine reading task. Fluent responses were rewarded on a multiple VR5 schedule, i.e. exposure of a new stimulus, a buzzer sounding, a flashing green light, and a counter moving back to zero. The first three experiments with a 40-year-old male implied the stuttering R was modifiable by the reward contingency. Response decrement was maintained when machine reading itself was made intermittent on a 7:10 schedule with an oral reading task. Effects were said to generalize to outside settings. The findings were replicated with a 48-year-old man and a 15-year-old boy. However, a quick glance at the initial stutter rates of these 2 subjects (8 and 10 percent respectively), and at the final error rate of two percent, makes interpretation difficult - cf. average nonfluency rate of normal speakers as

6.5 percent (Johnson, et al., 1963). The authors made a rather extravagant claim on the basis of what was really only a case study, viz. that the consequences of their treatment "are at least as good as when aversive treatment is used." No objective basis of comparison was cited. Nevertheless, the challenge is advanced to other researchers to submit this claim to the ultimate test of rigorous scientific verification.

Scanning the literature has already revealed the scarcity of research concentrating on systematic reinforcement of fluent speech. Little wonder that a void is met when searching the literature for systematic application of differential reinforcement contingencies with the specific purpose of therapeutic manipulation of nonfluencies. Yet studies utilizing the negative or punishing properties of stimuli to manipulate nonfluency abound. Typical of many areas of human research, the gross suppression of a R considered to be "socially undesirable" has taken precedence while other salient variables of that R have been neglected (Bar, 1969, p. 127).

In this context the token economy approach to stuttering therapy as adopted by Ingham and Andrews (1973) merits mention. Developing initially from the syllable-timed speech stuttering therapy program proposed by Andrews and Harris (1964), this approach applied token reinforcement contingent upon the S's emission of a desired behaviour. A continuously monitored scheduled environment was essential to contingency management and involved a 21 day stay in hospital under strict supervision. Tokens earned under the daily regime were convertible to such essential reinforcers

as food and drink, and luxury items such as magazines, cigarettes, beer within a set token currency system. Only by earning enough tokens could a S survive in any comfort - no items were obtainable free. Tokens were given to reinforce reductions and were withdrawn to penalize increases in stuttering during conversation in small groups. An earlier study (Ingham, Andrews and Winkler, 1972) reports the design and application of the token system.

The report by Ingham and Andrews (1973) assessed further the effect of a contingent punishment schedule integrated with a delayed auditory feedback procedure in order to shape rate of speaking as well as fluency. They showed that adequate shaping of speech patterns was facilitated by using the contingent schedule and suggest this may be particularly amenable to work with token economy conditions. However, there was an intricate integral scheduling of rewards within the program, with size of rewards being a variable, as well as very strong indications of the operation of demand characteristics within the total setting (e.g. if a S moved through the structured hierarchy of speech situations which the program demanded, it was then possible to "escape" the restrictive hospital environment before the set 21 days had passed). Taking such factors into consideration, the partialling out of the actual effect of the punishment variable becomes most difficult.

It becomes most important to keep in mind that in treating stuttering, Biggs and Sheehan (1969) have indicated that both strength and type of punishment when used in

nonfluency-oriented studies may influence the results. Furthermore, individual subject characteristics can affect the outcome. In fact Biggs and Sheehan (1969) found stuttering decreased under both contingent and random tone presentation. Under what might be considered a "punishment of stuttering" condition and an exacerbation of anxiety condition, respectively, the probability of stuttering was heightened in both instances. In proffering an explanation, they suggested that the tone supposedly constituting the punishment stimulus, functioned as a distractive rather than an aversive stimulus and possibly by increasing anxiety, failed to decrease the nonfluency behaviour.

Brookshire and Martin (1967) did demonstrate predicted differential effects using the verbal punishing stimuli "wrong", "no" and "huh-huh" contingent on the nonfluencies of normal speakers. Yet in the verbal punishment study of Cooper, Cady and Robbins (1970) the differential effect was not substantiated. Contingent verbal stimuli "wrong", "right" and "tree" each produced a nonfluency decrement for both stutterers and nonstutterers. The outcome was inconsistent with the presumed affective meaning of the verbal reinforcers. From preconditioning history the secondary reinforcing properties would be expected to be "positive" for "right", "neutral" for "tree", and "negative" only for "wrong". In contrast, all three stimuli produced a generalized indistinguishable negative effect.

Siegel (1970) reviewed and discussed such apparent paradoxes. Evidence from experimental studies on punishment

in fields other than stuttering indicated punishment to be generally ineffective in terms of maintained R suppression - i.e. unless an alternative, acceptable, unpunished R was available for reinforcement on its occurrence. Clarke, Montgomery and Viney (1971) overviewed the psychology of punishment in relation to human R suppression. Emotional, social, and motivational variables were elucidated as requiring consideration when punishment procedures are employed. In most instances elimination or suppression of the undesirable R was shown to be inefficient in terms of a person's total behavioural complex. Rather, it was recommended that means be found to identify and enhance alternative desirable Rs to "fill the void", thereby meeting emotional and motivational needs.

The present study was based on the assumption that, in considering the "stuttering R", nonfluency should be regarded not as an isolated variable but as intimately related to fluency in an overall total speech pattern. Reduction of nonfluency was attempted concurrently with enhancement of fluency, using differential reinforcement contingencies. A discrimination process was assumed operative.

"Correct" and "incorrect" speech Rs were distinguished by the contingent stimuli designed to modify the two variables within an integrative behavioural modification process. For this purpose established reinforcement contingencies were available. As a partial reinforcement mode, the operant fixed ratio (FR) schedule lent itself to the establishment of a

consistent R with resistance to extinction (Ferster and Skinner, 1957) - the R to be increased was "true" fluency, via positive reinforcement. In the nonfluency area, immediate contingent punishment (P) and response cost (RC) paradigms (Siegel, Lenske and Broen, 1969; Wingate, 1959) were amenable to a manipulative experimental design as means of R suppression. While fluency was reinforced positively, nonfluency was reinforced negatively.

The validity of treating stuttering as a behaviour amenable to operant modification (Yates, 1970) may only be established by systematic application of reinforcement principles such as these. This study represents a preliminary attempt to combine differential positive and negative reinforcement in order to modify stuttering. Consideration was given to possible additive and/or interactive effects of positively reinforcing fluent speech under the FR operant paradigm, whilst negatively reinforcing nonfluent speech according to P and/or RC principles. Effectiveness of reward (FR) alone was also examined. The reinforcement system relied totally on assumed secondary reinforcing properties of the stimuli (Skinner, 1953). Instructions to the subjects (Ss) before each session presented the "meaning" of the contingent stimuli (i.e. green lights (FR); red lights (P); lost points on a counter (RC) ).

### 3.2. METHOD

#### 1) Schedules and Experimental Conditions

Three modes of operant reinforcement were used. The FR schedule was the basic condition used to reinforce fluent Rs.

A variable ratio schedule would have been theoretically more ideal (Kimble, 1961), but was impractical for this program. Expected "pauses after reinforcement" (PARs) were considered of negligible consequence in relation to the inherent stuttering R variability (Yates, 1970, p. 144). Contingent P and RC were the other schedule components, negatively reinforcing nonfluent speech. Three experimental conditions were derived, viz. FR, FR + P, and FR + P + RC. In each instance a build-up to FR10 was distributed over 9 sessions - see Table I:1.

Session	1	2	3	4	5	6	7	8	9
Schedule	Baserate	FR1:FR2	FR5	FR5	FR10	FR10	FR10	FR10	FR10

TABLE I:1. Scheduled Build-up of FR10

A control group of Ss receiving "No Conditioning" for 9 sessions (i.e. a "practice only" control) was not included, even though theoretically this was advisable. Partialling out the influence of the probability of mounting boredom, produced by repetition of an essentially monotonous task over 9 weekly sessions, was beyond the scope of the analytical procedures available. In addition, interfering variables produced by these motivational factors would probably have enhanced drop-out rate and artificiality in R.

For present purposes, (1) Ss served as their own controls, and (2) the FR condition was shown to constitute a valid basis for group comparison in elucidating treatment effects. "Live" ratings of stuttering Rs were made by the experimenter (B) immediately after every word spoken under the experimental condition by the S, both fluent and nonfluent.



Reliability of recording was supported by evidence from Cullinan and Frather (1968), and was substantiated within the study. Total words spoken was computed from the sum of "incorrect" plus "correct" Rs for spontaneous speech samples. For reading this data was directly available from the preset tasks. Criteria for distinguishing the stuttering R were adopted from the definition of Johnson, et al. (1963). Of the eight criteria three were selected to operationally define the stuttering R, viz. repetitions, hesitations, prolongations. (Note that "repetitions" subsumed 3 separate criteria of Johnson, et al.) The choice was based on the conclusions of Beech and Fransella (1968, pp. 48, 53) with regard to the operational definition of nonfluency. In the subsequent study this definition was shown to be too restrictive for adequate investigation of the many variables involved in stuttering modification (Experiment II). Consequently, Johnson's entire definition was adopted in the later studies.

#### ii) Subject allocation

14 male volunteers from tertiary courses within the university were distributed: 4 in DR, 4 in FR + P, and 6 in FR + P + RC conditions. Initially there were 6 Ss per group. Preliminary analysis showed defects other than stuttering in the speech of 2 Ss, while another 2 Ss were prevented by circumstances from completing the program. Random allocation to groups was made as Ss came to the E in response to an on-campus "advertisement" (Appendix I:1).

Age ranges and mean ages in years were:

<u>FR</u>	21-24, mean = 22.0
<u>FR + P</u>	18-28, mean = 20.7
<u>FR + P + RC</u>	18-30, mean = 22.1

Overall range was 18-30 years, with a mean = 21.4.

#### iii) Experimental Task

Each S attended nine 35 min. sessions spaced at approximately weekly intervals. Session 1 established stuttering R baserate in spaced reading tasks over 30 min. and spontaneous speech over 5 min. The 8 succeeding sessions had 3 phases: Adaptation (Ad) for 10 min., Reading Conditioning (Rd) for 20 min., and Spontaneous Speech Conditioning (SS) for 5 min.

Reading material was selected from primary level readers recommended for 9-11 year olds (Appendix I:2 presents an example reading sheet). A double randomization process was used to control reader and sequence effects. From a total of 250 typed sheets 63 were selected, i.e. the highest number read by any S over the entire program. Average passage length was 397 words, with SD = 22.6 and a range from 335 to 447 words. Sheet presentation was spaced by a 1-2 min. break allowed before the S read a new sheet, using the principle of distributed practice (Kimble, 1961; Smith and Moore, 1966, p. 134). Spontaneous speech was elicited by presenting a topic typed on a 5" x 3" white card. Preparation time of 2 mins. was granted before the S spoke for 5 mins. on that topic. 9 topics were randomly selected

from a pool of 26 (Appendix I:3). All Ss received the same topics in the same order over the 9 sessions. The E gave a cue if the S became obviously "stuck for words" because of a "mental block", but intervention was kept to a minimum. The 5 min. SS phase was designed to enhance carryover of any reading conditioning effects, and to directly effect conditioning of spontaneous speech. Another aim was to make generalization of the experimentally induced effects to real life more probable with this procedure.

The initial 10 min. Ad phase allowed time for situational adaptation to the reading task (Gray, 1965, p. 180; Beech and Fransella, 1968, pp. 136, 137). This enabled a stable R to be established prior to experimental manipulation. The subsequent 20 min. Rd phase introduced the conditioning mode for manipulation of the stuttering R:

- (a) FR group had correct speech rewarded on a given FR schedule;
- (b) FR + P group experienced a discrimination condition, with FR "reward" of correct speech concurrent with "punishment" of the incorrect R (i.e. stuttering);
- (c) FR + P + RC group had the additional condition of RC, i.e. for each stutter produced the S lost 1 point on a counter from a present 500 points at the onset of each Rd or SS task.

#### iv) Mode of Conditioning Presentation

"Reward" and "punishment" were secondary rather than primary by nature. The basis for the 2 conditions was explained

in "Instructions to the Ss" (Appendix I:4 a,b,c).

(a) The "REWARD" condition consisted of green opalescent lights  $\frac{1}{2}$  inch in diameter coming ON 2 at a time according to the operative FR schedule, until a horizontal array of 10 lights was illuminated. With the next execution of the required number of correct words the machine reverted to 2 lights "on" and continued recycling as the desired number of fluencies were produced.

(b) The "PUNISHMENT" condition was made operative by a red light coming ON every time the S stuttered until a horizontal array of 10 lights were illuminated, recycling back to 1 light "on" with the next stutter.

(c) The "RESPONSE COST" procedure, described previously, utilized a counter positioned above the light arrays. For each stutter the S lost one point from a present 500, with the counter reset for each new Rd sheet and SS task.

Proximity to the S of the red and green light arrays was randomized across Ss for FR + P and FR + P + RC groups. The S sat at a table with a  $9\frac{1}{2}$ " x 5" light panel - angled at  $30^{\circ}$  from the horizontal to the eye - illuminating the typed reading material from beneath. Within the S's visual field the horizontal light panels were mounted above the rectangular light panel at the same visual angle. The RC counter was positioned vertically above these in a central position. A number indicator was clearly visible for the FR + P + RC condition, but was covered with a masking black strip for the other two conditions - see Apparatus diagram in Appendix I:5.

v) Experimental Situation and Mode of Recording

The S sat in front of the experimental array in the right hand corner of a 7' x 8' soundproof room, facing the end wall. The E was positioned behind a desk 3 feet back to the left, at approximately 30° to the S. On the E's desk an enclosed light source illuminated a copy of the S's reading sheet. The E visually followed this copy as the S read in the Ad and Rd phases. On a two-button recording panel connected to counters the E recorded the instances of "correct" words spoken with the second digit of the left hand, and number of "stutters" with the fourth digit. The same method was used for SS recordings. Attention of the S was directed to the red and/or green light panels as he spoke spontaneously in the SS phase. E recordings triggered the appropriate reinforcement as a direct consequence of each previous speech R.

Overhead lights were illuminated only when the S read the instruction sheet before each session. Otherwise the only 2 light sources were as previously mentioned - the light for the S's visual array of the reading material, and the enclosed light for the E's copy. This drew the S's visual attention to the crucial area of the room - the experimental panel. Hopefully this heightened the probability of the S paying attention to the designated task.

Outside the experimental room a Gerbrands cumulative recorder with attached counters produced a cumulative record of correct Rs for each sheet read and each SS task. A paper feed-through speed of 60 cm/hour, with an ordinal scale of 4 Rs/mm (i.e. 1 to 1 ratio),

allowed 400 Rs to be recorded before the recording pen deflected back to baseline. Corresponding stutter instances were indicated by the pulse of a horizontal marker pen mounted on the side of the record. In this way frequency and distribution of stuttering Rs, as well as moment of occurrence in relation to speech production, were available for inspection, e.g. Appendix I:6. Actual number of stutters emitted was obtained directly from the RC counter. This counter was technically operative under all experimental conditions, but was included in the feedback circuit only to the Ss under FR + P + RC. As explained previously, the counter dial was covered for the FR and FR + P Ss. The E took the readings without explanation. These Ss never saw the numbers, nor were they told them during or after any session.

### 3.3. DATA SELECTION : The Basic Scores and Conversion.

In each session Ss read 1-2 prepared sheets in the 10 min. Ad phase, and 1-5 sheets in the 20 min. Rd phase. Individual Ss varied in the number of sheets read per session, for any given session. This meant that the total number of sheets "already read" differed between Ss from session to session. Standardisation of scores was necessary to control for this variability. Number of words stuttered on reading a particular sheet was converted to a percentage score of the total number of words on that sheet for each S. A list of percentage stutter scores was then available for each S for each session.

The stuttering R was characterised by variability from one reading task to the next within a given session. Also individual Ss covered varying numbers of sheets per session. Therefore the median score was computed from the list of percentage scores for each S for every Ad and Rd phase over all 9 sessions. This became the representative score for a S for the Ad or Rd phase under consideration in a given session. Appendix I:7,8 presents a summary of these scores. The median score was chosen after close scrutiny of the raw data to examine consistency between mean scores, variance, and initial stuttering severity. In the absence of consistencies mean scores were precluded as R indicators. Conversion to median scores appeared the most valid transformation amenable to the distribution of scores. For the SS phase, a direct percentage score was attainable from the number of words stuttered in relation to total words emitted in R to the given SS topic (Summary in Appendix I:9). From this data selection 3 basic scores were considered for every S in each session:

1. Stutters as a percentage of total words read in Ad phase (10 min.) - Appendix I:7.
2. Stutters as a percentage of total words read in Rd phase (20 min.) - Appendix I:8.
3. Stutters as a percentage of total words spoken in SS phase (5 min.) - Appendix I:9.

Corresponding to these measures, the total word rate was examined for expected increase as percentage stutters decreased in order to establish that a "true"

fluency change was effected. In this way both fluency and nonfluency aspects of the total speech response were considered in deducing treatment effects.

In conjunction with these measures post-hoc examination of the 16 Personality Factor Profile (Form A) administered before treatment revealed the potential of extending assessment beyond the specific R variables measured in this study. However, in the present case the 16PF (Cattell, 1962, 1970) was used only as an adjunct to prior assessment.

#### 3.4. ANALYSIS REQUIREMENTS

##### i) Requirement I:

To demonstrate a consistent change in R - as measured by stuttering percentage - as Ss moved from Session 1 (base-rate) to Session 9 (final conditioning session) for each experimental phase (Ad, Rd and SS) in any or all of the experimental conditions (FR, FR + P, FR + P + RC).

##### ii) Requirement II:

To show that any change in R indicating suppression of the stuttering R was attributable to more than adaptation only. Furthermore, to establish whether any such R decrement was indicative of a conditioning curve, i.e. a monotonic negative trend.

##### iii) Requirement III:

To see if the 3 experimental conditions FR, FR + P and FR + P + RC produced differential changes in the R according to the addition of possible discriminative cues provided by the P and/or RC contingencies.



(iv) Requirement IV:

To delineate whether final performance on Session 9, in conjunction with R decrement findings, placed the effectiveness of R modification procedures in the relation  $FR + P + RC > FR + P > FR$ . This was predicted if differential reinforcement operated as in discrimination learning procedures (Kimble, 1961) - i.e. FR as the least effective method, FR + P more effective, and FR + P + RC most effective.

v) Requirement V:

To establish that a "true" rather than artificial fluency change was effected (Wingate, 1969) by looking at concurrent changes in total word rate, i.e. satisfying the criterion of increased actual speech production concurrent with stuttering percentage decrease.

vi) Requirement VI:

To look at total word rate in the SS phase as another R indicator to determine whether a differential effect was evinced under FR, FR + P, and FR + P + RC conditions. This measure provided an indicator of any "conditioning" generalization from the Rd to SS phase. It was also a necessary independent indicator of "true" fluency effects.

### 3.5. RESULTS AND DISCUSSION

The reliability of the "live" E judgments of the actual speech R was assessed. After an 18 month time lapse,

tape-recorded samples of the third sheet read and the first spontaneous speech topic from Session 1 were rated by an independent R. The consequent correlation coefficients of  $r = 0.98$  and  $0.97$ , respectively, supported the reliability of the measures employed.

1) Further Conversion of Scores for Comparison

A further conversion was made from the median percentage stutter scores, viz. to Z scores (in terms of the normal distribution). This increased validity of group comparisons by minimizing inter-subject variability.

Conversion was made of each S's session score to a standard score, in terms of that individual's mean and variance scores over the total 9 sessions. The accepted "multiply by 10 and add 50" representation of original Z scores was adopted. This introduced a valuable control across Ss for initial difference in R, and enhanced the meaningfulness of group comparison by making available mean standard scores over each experimental group (Appendix I:10 a,b,c). Appropriate plotting of results enabled comparison to be made across the 3 experimental conditions for each session phase - see Figures I: 1, 2, 3. By combining data over treatment groups (FR, FR + P, FR + P + RC), results in the different phases of the experiment (Ad, Rd, SS) were investigated for each condition - see Figures I: 4, 5, 6.

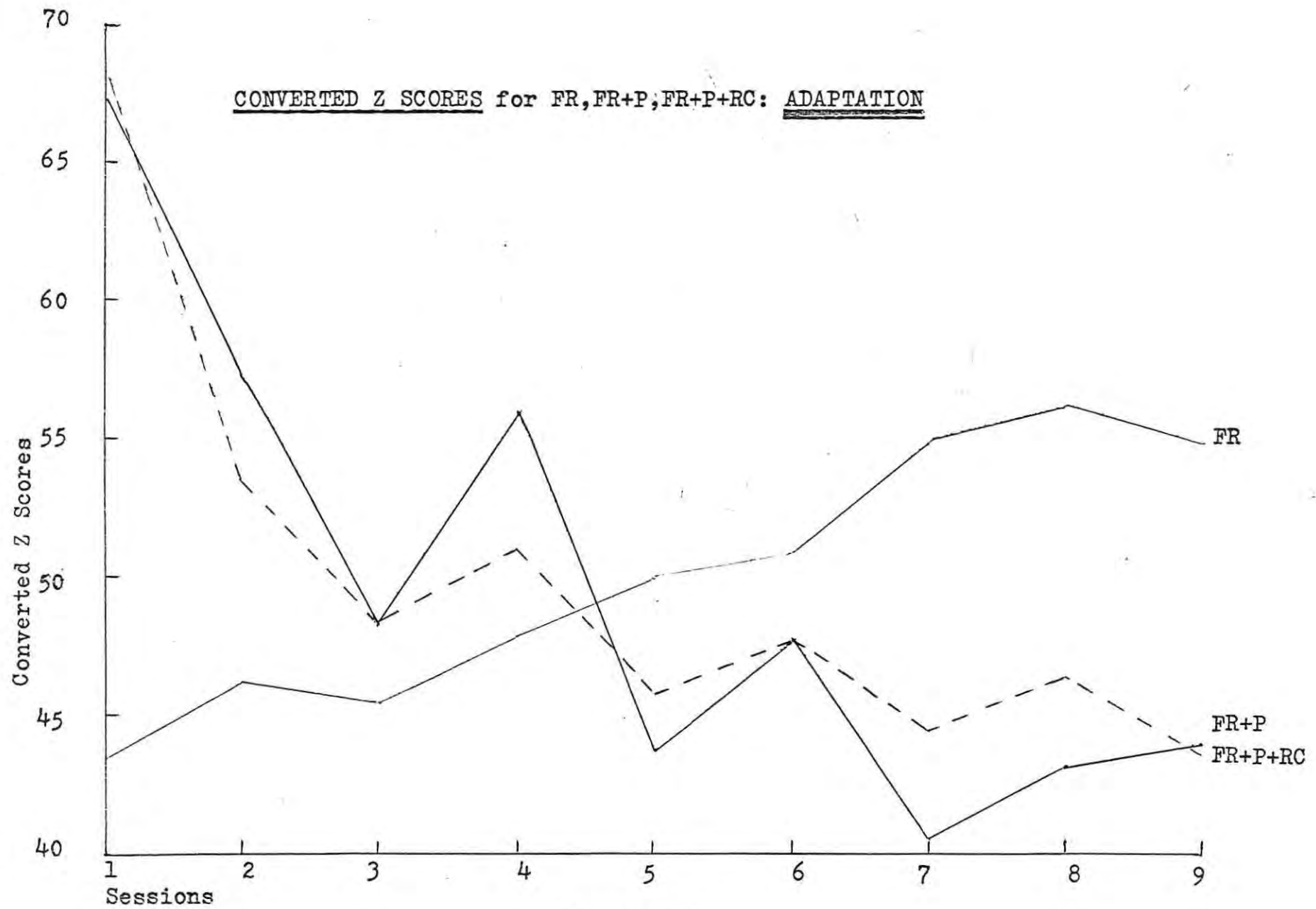


Figure I:1.

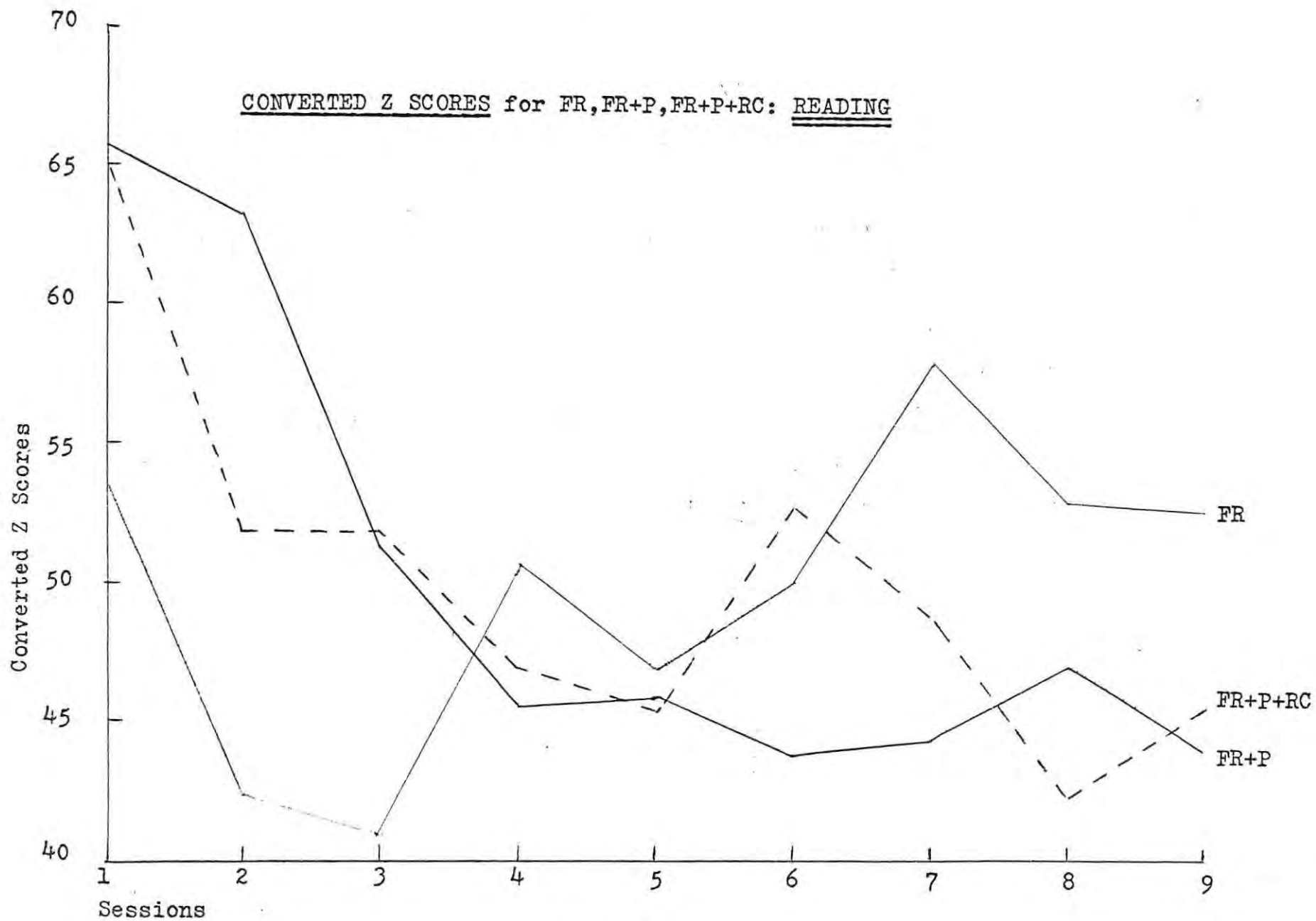


Figure I:2.

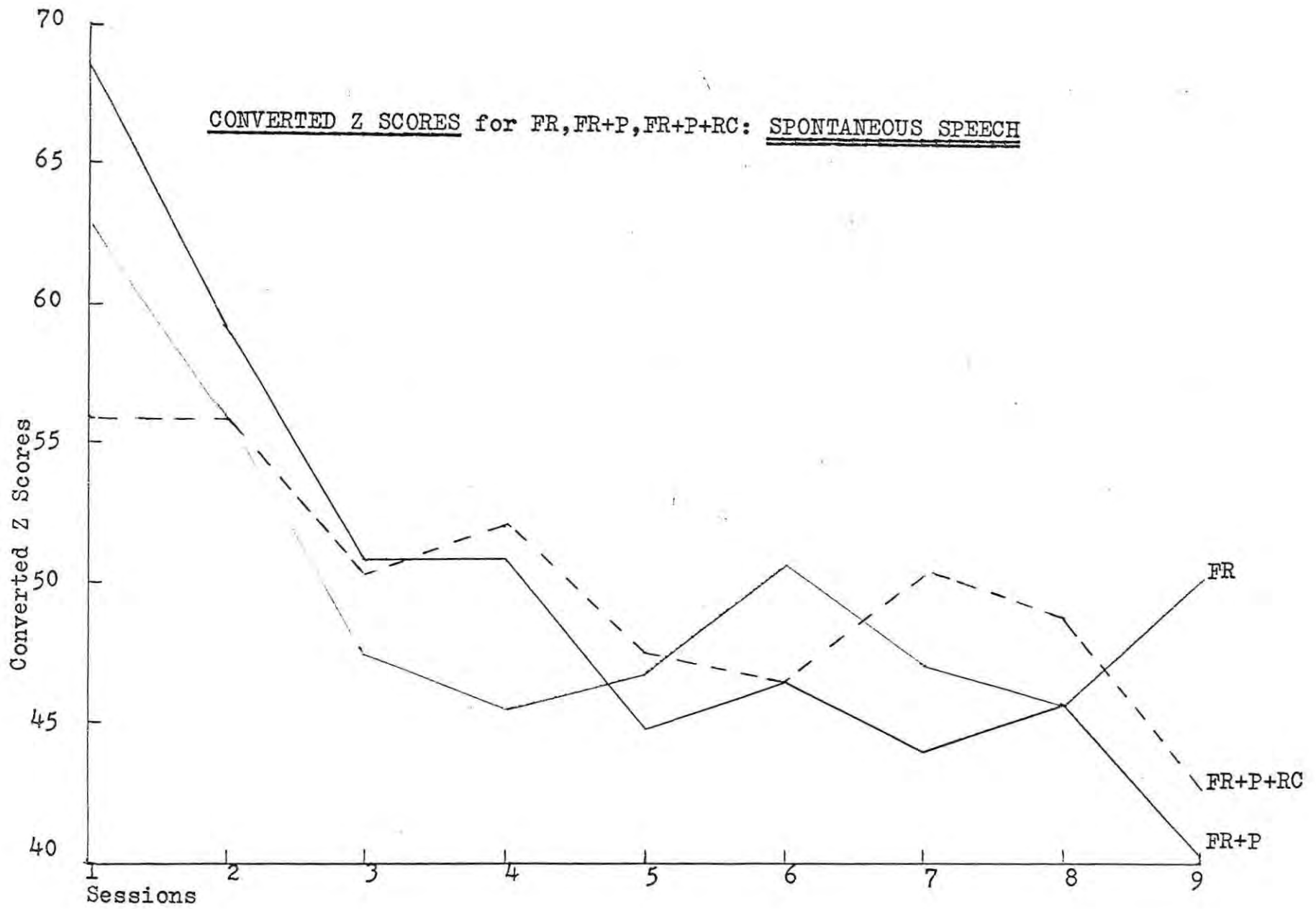


Figure I:3.

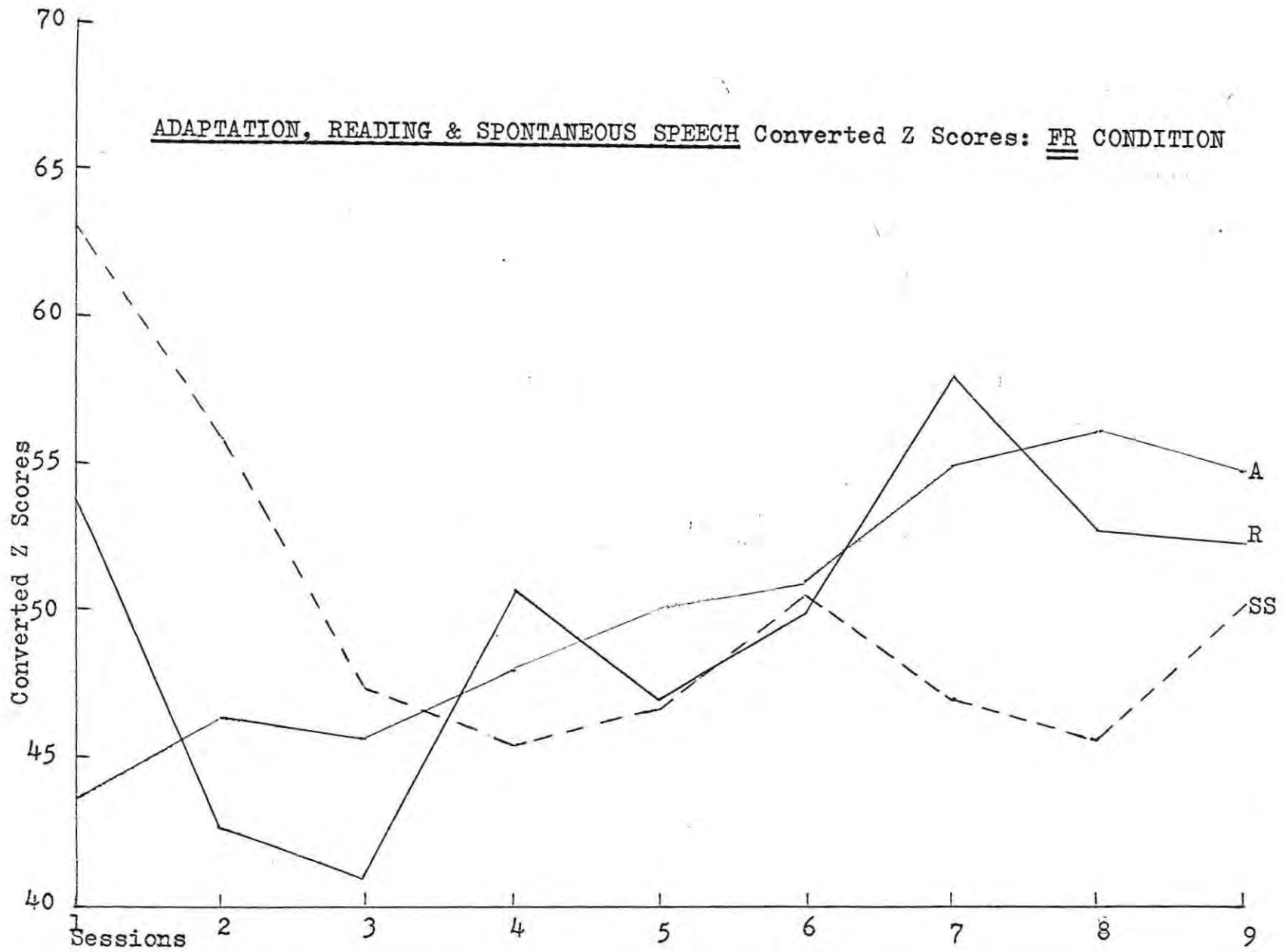


Figure I:4.

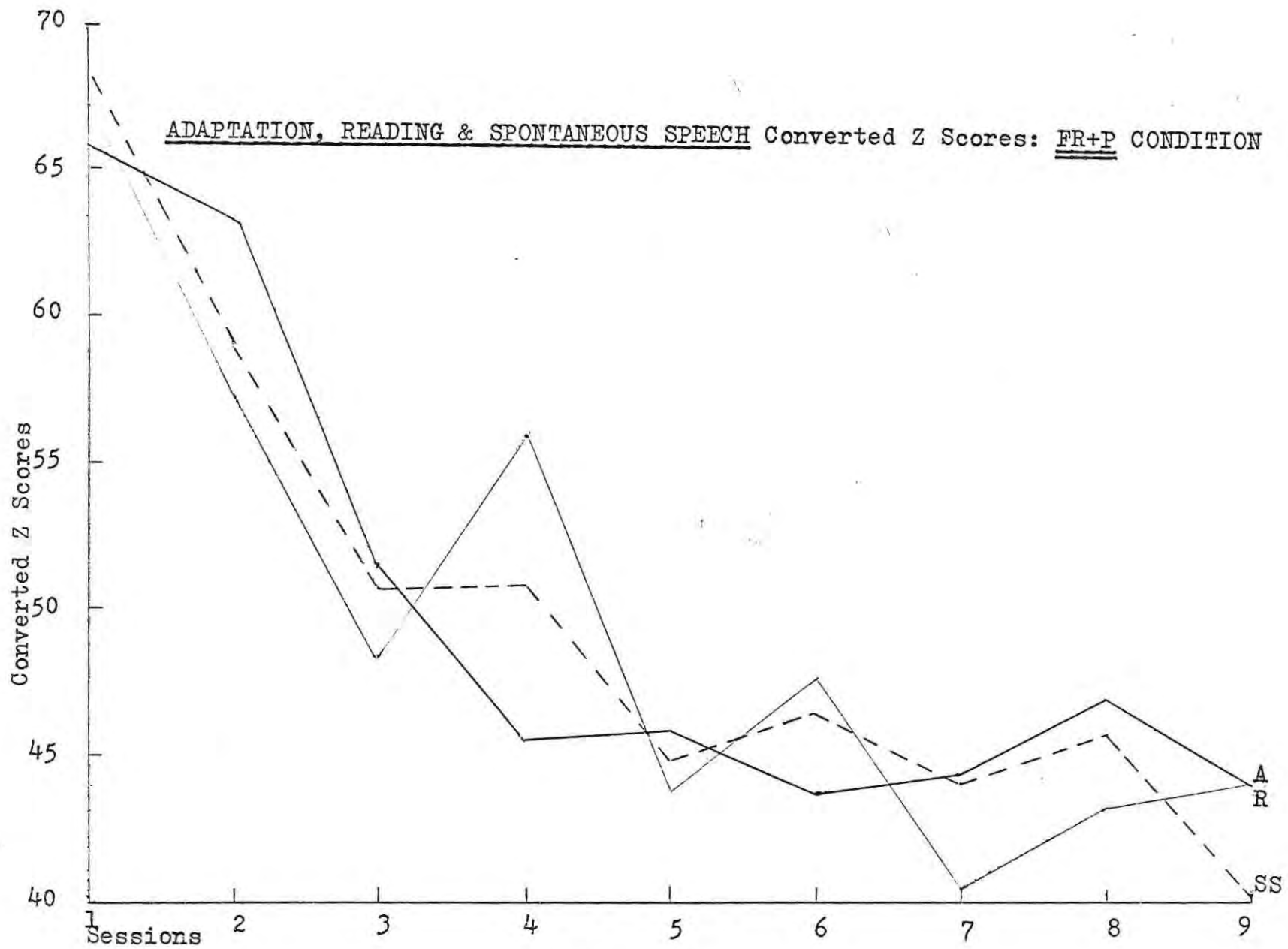


Figure I:5.

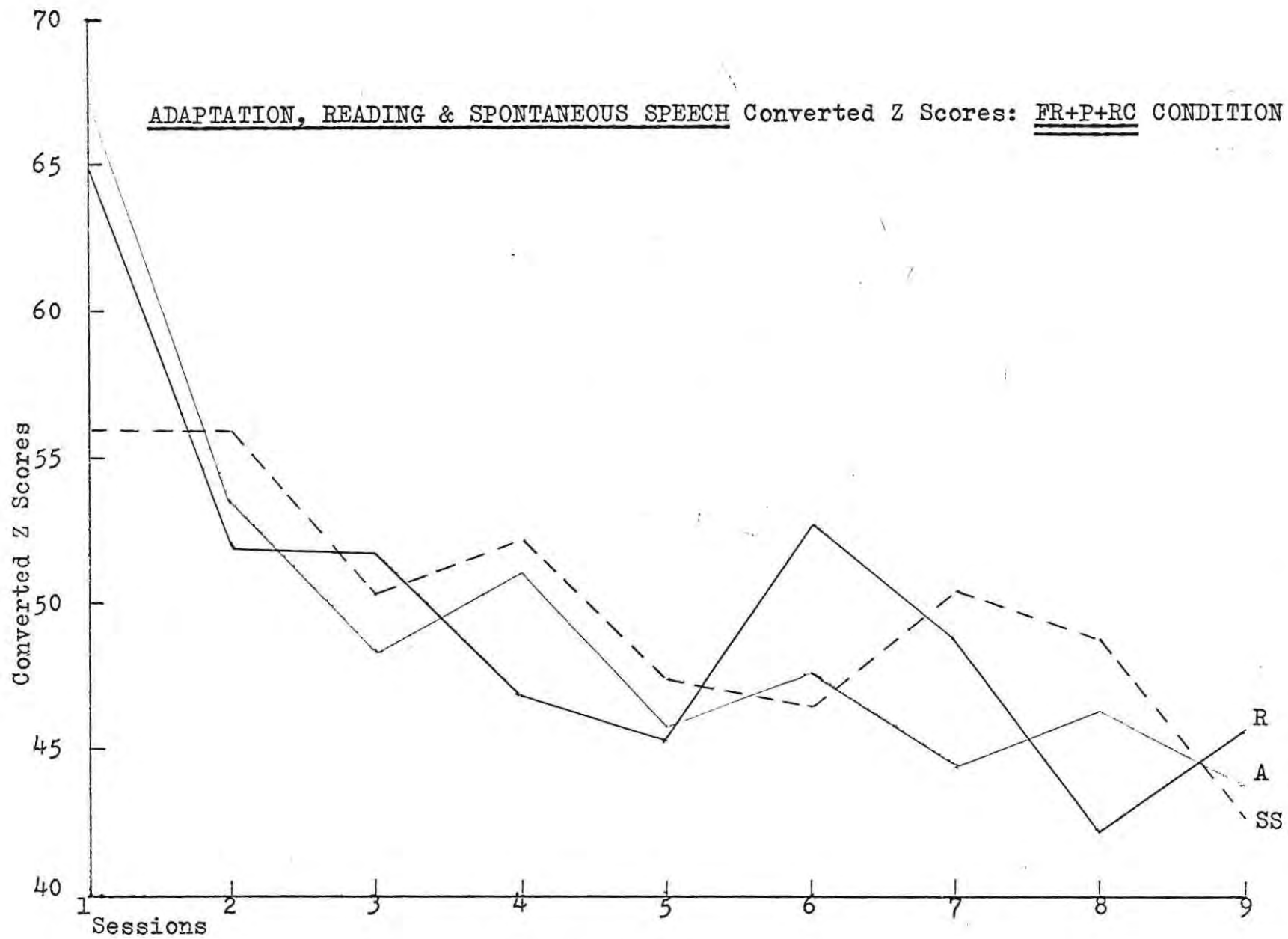


Figure I:6.



11) Requirement I : Change in R (stuttering percentage)

For a true change in R the Ad phase should show a consistent R decrement from Session 1 to 9 : if any effect from the previous session was maintained, the Ad phase should reveal a gradual R reduction.

The graphical representation of the Z scores (Fig. I : 1, 2, 3) indicated two types of trend:

- (a) A consistent overall decrement in R for FR + P and FR + P + RC groups.
- (b) An overall increment in R for the FR condition - the reverse of the expected conditioning effect.

It seems that FR + P and FR + P + RC were hardly distinguishable in effectiveness, with the final and baserate scores essentially equal. Sessions 3 and 6 showed no distinction between the 2 groups at third-way points through the program. Basic similarity in trend is obvious.

Analysis of Rd and SS phases was expected to mirror these findings if consistency over time was operative.

Rd phase indicated (Fig. I:2):

- (a) An initial R decrement for FR, then a substantial increment - levelling off by Session 9 to approximately the baseline level of Session 1.
- (b) An overall R decrement for FR + P and FR + P + RC with baseline and final scores essentially equal.

SS phase indicated (Fig. I:3):

- (a) An initial R decrement for FR, then essentially a "levelling off" of the R.

(b) A consistent R decrement for FR + P and FR + P + RC.  
 The FR + P condition produced the greater overall decrement, yet there was little disparity in actual R level by Session 9 (base R was initially lower for FR + P + RC).

iii) Requirement II : Change in R attributable to more than adaptation, making a conditioning interpretation feasible.

If introduction of the conditioning variables was effective, then within a given session there should be a R decrement from the Ad to Rd phase since the reading task is held constant. Analysis of each experimental group should show the Rd curve to fall lower than the Ad curve, with both following a consistent negative trend. Furthermore, the SS phase should mirror the trend - unless reading and speech tasks were differentially effected.

(1) Graphical Analysis (Fig. I : 4,5,6)

Standard Score trends gave the results:

(a) FR: Ad and Rd curves continually interchanged with no consistency, except that both exhibited an overall increment rather than decrement in R. There was no evidence even of expected adaptation. No conditioning was supported. For the SS curve, the initial R decrement and consequent levelling off was not of the order to support conditioning. Adaptation was the only feasible effect obtained. The negative trend in no way paralleled the positive Ad and Rd trends. It could be that the reading and SS tasks were differentially influenced by the experimental variable.

(b) FR + P: Both Ad and Rd curves followed a consistent negative trend, with the Rd curve of a more smooth nature. Yet the Rd curve was consistently below the Ad curve. The SS trend closely resembled the Rd trend. It should be noted that the overall R decrement evinced over the 9 sessions was greater than shown by the Rd curve. The experimental task again appears an operative factor of possible relevance to subsequent conclusions.

(c) FR + P + RC: Here the trends followed closely the pattern observed with the FR + P group. Both Ad and Rd curves had a concurrent overall negative trend, but were not as closely allied as for FR + P. The Rd curve definitely did not consistently fall below the Ad curve. Actually the Rd curve was more erratic than the Ad curve - the reverse was true of FR + P. The SS trend was a general negative drop, but in no way as apparent as for FR + P.

## (2) Nonparametric Statistical Analysis

Given the graphical analysis, a more stringent test for trend was applied to establish the validity of any assumptions concerning conditioning. Rank scores were derived from the stuttering percentage raw data. If stuttering percentage dropped as sessions progressed, ranking each S's performance from greatest to lowest percentage stutters would have corresponded to the ordering of Sessions 1 to 9. Accordingly, for each S his performance score was ranked from 9 (highest stuttering percentage) to 1 (lowest stuttering percentage) across the 9 sessions

(Appendix I:11). The average score over Ss in each experimental group gave the mean rank for that group (FR, FR + P, FR + P + RC) for each session. Jonckheere's test for "mean tau" was applied to this rank data. Correlation was tested for a monotonic trend between rated performance and sessions completed over individual Ss. A monotonic negative trend over the 9 sessions was accepted as supportive of conditioning trends that were observed in the graphical representation. Considering experimental conditions separately:

(a) FR:

Adaptation Phase (Ad)

Over the 9 sessions analysis gave a z value of 2.50 with  $p = .0062$  in the positive direction. Since this implies the reverse of a negative monotonic trend, there was no evidence that any conditioning obtained in the Rd phase carried over into the Ad phase of the next session as a lasting effect. The reading task was common to both phases. Yet even the expected adaptation effect over trials was absent.

Reading Phase (Rd)

A z of 1.20 with  $p = .1151$  substantiated the interpretation from the Ad phase that conditioning was not supported.

Spontaneous Speech Phase (SS)

A z of 1.72 with  $p = .0427$  implied a slightly negative monotonic trend, substantiating the graphical analysis. Nevertheless the relationship was of such a low

order as to support only an adaptation effect. As already shown, Ad and Rd positive monotonic trends precluded any conditioning interpretation. Yet each SS phase was only 5 mins. in duration compared with the 20 min. Rd phase. In fact there is an implied limitation in practice time for SS relative to the much longer period allowed for Rd. If absolute time available for practice significantly influences conditioning, one would expect less conditioning per se under SS than Rd. Consequently, if the change in SS observed here represents more than adaptation it would seem highly task specific. It would seem unlikely to have obtained unless it was a generalisation from the Rd phase where in this instance conditioning was not supported.

(b) FR + P

Ad Phase

Substantive support for the expected negative monotonic trend was given by a  $z$  of 4.17, with  $p < .00003$ .

Rd Phase

A  $z$  of 4.01 with  $p < .00003$  made a conditioning interpretation highly feasible in accounting for R change.

SS Phase

A conditioning effect was strongly supported. The negative monotonic trend was of the order giving  $z$  of 9.29 with  $p < .00003$ . Any conditioning from Rd seems to have been closely paralleled with the SS task. This could represent either a generalisation effect from the Rd phase

and/or task specific conditioning of spontaneous speech. The latter interpretation seems the more unlikely within the allotted nine 5 min. spaced practice segments, i.e. a total of 15 min. specific SS practice over 9 sessions.

(c) FR + P + RC

Ad Phase

A z of 3.12 with  $p = .0009$  implied a definite negative monotonic trend. Although not as great for FR + P, support exists for a conditioning interpretation.

Rd Phase

Essentially the same evidence of conditioning as for the Ad phase was implied by a z of 3.19 with  $p = .0007$ . It was not as conclusive as for FR + P.

SS Phase

Results again paralleled those for FR + P, but with less strength. Possible conditioning was implied from the negative monotonic trend shown by a z of 3.70 with  $p < .0001$ . The same alternative interpretations apply as under FR + P.

iv) Requirement III: Differential changes in R due to conditioning variables

Given that conditioning was strongly supported for FR + P and FR + P + RC conditions for both Rd and SS tasks, the question arose as to where in the program did the R decrement place. A split-analysis was done for Sessions 1 to 5 and Sessions 6 to 9, for each phase and experimental condition.

The values of  $z$  with corresponding probability values obtained from Jonckheere's test for "mean tau" appear in Table I:2.

<u>GROUPS</u>	<u>Experimental Task</u>		
	<u>Ad</u>	<u>Rd</u>	<u>SS</u>
<u>Sessions 1-5</u>			
FR	1.59* (+.0559)	1.10 (.1357)	2.57* (+.005)
FR + P	3.06 (.0011)	3.31 (.0005)	3.92 (.00005)
FR + P + RC	2.50 (.0062)	2.60 (.0047)	2.50 (.0062)
<u>Sessions 6-9</u>			
FR	0.17 (.4325)	0.17 (.4325)	0.17 (.4325)
FR + P	1.19 (.1170)	0.17 (.4325)	0.00 (.50)
FR + P + RC	0.00 (.50)	1.39 (.0823)	0.97 (.1160)

\* Significant trends in the opposite predicted direction

TABLE I:2. Split-analysis of trends over 9 sessions for all experimental tasks and conditioning variables.  $Z$  value appears first and associated probability values in brackets.

Any practice trends in the FR data were produced in the first 5 sessions, after which there was no further significant change. Previous interpretations of no support for conditioning are substantiated.

For FR + P and FR + P + RC the significant performance change took place in the first 5 sessions, with FR + P appearing the superior treatment mode. A conditioning curve where a plateau of learning has been reached (Kimble, 1961) typifies this R change. FR + P produced an enhanced effect in the transition to the SS task from the Rd task, suggesting a generalization of learning from one task to the next. In the case of FR + P + RC, the observed conditioning effects were somewhat parallel for both tasks. However, the learning effect indicated would appear to have been less cumulative, as seen in the Rd decrement.

v) Requirement IV : Final performance in relation to R decrement findings as an indicator of relative effectiveness of the conditioning variables (i.e.  $FR + P + RC > FR + P > FR$ ).

FR has been shown to be an ineffective conditioning mode. It therefore serves as a convenient baseline R by becoming at least partly a control for the practice effect over 9 sessions. Comparative effectiveness of FR + P and FR + P + RC can be examined against this baseline.

Taking the graphical and trend analysis already cited, the Rd task showed minimal distinction between the 2 groups for final R level and total R decrement (Fig. I:2). Yet FR + P did produce the decrement more quickly and smoothly.



This was also true for the SS task (Fig. I:3). The addition of the RC contingency in the case of FR + P + RC did not enhance R modification. As a discriminative cue with an additional evaluative function, RC did not offer extra benefits by way of differential reinforcement.

vi) Requirement V: A true fluency change

To establish that a "true" rather than "artificial" R change was obtained, data was tested against the criterion of increased total word rate as stuttering percentage decreased.

Comparison of data from Session 1 and 9 was made over all Ss using a Sign test. Ss served as their own controls over time. For  $N = 14$  Ss,  $x = 0$  gave  $p < .001$  in the expected direction - supporting a word production increase concurrent with fluency increase. The mean for all Ss on Session 1 was 51.2 words/min., in the range 10.8-132 w/min. By Session 9 the mean had risen to 85.6 w/min., with a range of 25.6 - 165.8 w/min., indicating a predicted overall positive shift in word production. Ss did not merely lower their stutter percentage, but increased their objective fluency. Final speech rates approached the  $140 \pm 24$  w/min. rate of average speakers (Johnson, 1961) in most cases.

vii) Requirement VI: Total word rate as a differential indicator of true experimental variable effects

Results from the SS phase for FR, FR + P and FR + P + RC were compared for initial baseline equivalence, and for differences on Session 9. A two-tail Mann-Whitney

U test comparing each group with the other gave results:

Session 1:

FR vs FR + P : U = 4, p = .171 ( $n_1 = 4, n_2 = 4$ ) n.s.  
 FR vs FR + P + RC : U = 11, p = .457 ( $n_1 = 4, n_2 = 6$ ) n.s.  
 FR + P vs FR + P + RC : U = 5, p = .086 ( $n_1 = 4, n_2 = 6$ ) n.s.

Session 9:

FR vs FR + P : U = 0, p = .014 ( $n_1 = 4, n_2 = 6$ )  
 sig. FR < FR + P  
 FR vs FR + P + RC : U = 9, p = .305 ( $n_1 = 4, n_2 = 6$ ) n.s.  
 FR + P vs FR + P + RC : U = 3, p = .033 ( $n_1 = 4, n_2 = 6$ )  
 sig. FR + P > FR + P + RC

All conditions can be considered initially equivalent in frequency of speech production. Yet by Session 9 the only experimental condition producing a differential total word rate was FR + P. It should be noted that FR and FR + P + RC were indistinguishable. For FR + P + RC, the fluency enhancement apparent in terms of percentage stutter decrease was not paralleled by the essential increase in total word rate, indicative of true fluency change. If FR + P and FR + P + RC had been essentially equivalent, except in degree of effect, then a  $FR < FR + P + RC \leq$  relation would have appeared. It follows that FR + P was the only condition to satisfy the two criteria that must be met to conclude a "true" fluency change was effected by the conditioning procedure.

viii) Subsidiary evidence from cumulative record data

The angles of elevation produced by correct word rate on the cumulative records were determined for both Rd and SS tasks for comparison of Sessions 1 and 9. The last sheet read in the Rd phase was considered representative of the established reading R for that session. Appendix I:12 presents the angles obtained for each S, and the means for each experimental condition. A one-tail "related samples" t test compared initial and final performance of Ss across all 3 experimental conditions. For Rd the t value was 1.77 ( $p < .05$ ,  $df = 13$ ), for SS t was 5.47 ( $p < .001$ ,  $df = 13$ ). This offered additional support to the evidence that correct word rate increased as the stuttering R decreased over sessions. The relationship was more marked for SS. Previous conditioning and generalization interpretations under Requirement VI are supported by these findings, implying "true" fluency was effected under FR + P.

3.6. CONCLUSIONS

1) Specific Experimental Conclusions

(a) A consistent decrement in R, in terms of percentage stutters, was evident for FR + P and FR + P + RC experimental conditions in each of the Ad, Rd and SS phases over the 9 conditioning sessions. However, with FR an increment was observed for Ad and Rd, placing any conditioning interpretation out of the question. The slight decrement over the first 5 sessions for the SS phase was most likely due to adaptation only.

(b) The decrement in the Rd phase for FR + P and FR + P + RC mirrored that of the Ad phase, with stronger support for the FR + P condition. The Rd curve did not fall consistently below the Ad curve to suggest a distinct conditioning effect. Yet the essential similarity of the 2 curves implied further investigation of possible conditioning effects was in order. FR gave no evidence of conditioning, nor was there evidence of an adaptation effect except in the SS phase. Ad and Rd exhibited positive rather than negative trends.

(c) In terms of percentage stutter decrement, FR + P and FR + P + RC seemed equally effective for the Rd task. The decrement was concentrated in the first 5 sessions, after which a plateau effect appeared. FR + P appeared more effective in producing a greater R decrement in the SS phase than the corresponding FR + P + RC condition. The evidence indicated the experimental effects produced in the SS phase were also enhanced in relation to the previous Rd phase for the FR + P condition.

(d) Final performance showed an apparent equivalence of FR + P and FR + P + RC for the Rd task. Yet FR + P again emerged as superior with the SS task. The addition of RC as a possible additional discriminative cue did not appear to enhance conditioning.

(e) In assessing the nature of fluency change, the overall changes in performance indicated that experimental

manipulation appeared to effect a "true" rather than "artificial" R change, i.e. word rate increased as stuttering percentage decreased.

(f) A more detailed look at fluency characteristics distinguished the FR + P condition as the only one adequately meeting both fluency criteria. The R change was of a greater magnitude than produced by FR + P + RC, and was most likely due to conditioning. FR + P + RC produced the required direction change in R but other confounding influences implied possible "artificial" fluency effects.

(g) Cumulative record data analysis provided valuable substantiation of the previous conclusions concerning fluency change.

#### ii) General Conclusions

In brief, this operant program showed that the stuttering R could be modified by presentation of stimuli contingent on utterance of stutters and correct words (Holland, 1967; Rhodes, Shames and Egolf, 1971). However, the method used was vital to the consequences. On its own, the secondary reward system (FR) was inadequate. Yet the addition of a discriminative "punishment" component produced the best mode of R modification, i.e. FR + P. The secondary reinforcement was merely introduced by presenting a discriminative value system in the "Instructions" to the Ss, as applied to "correct" versus "incorrect" speech Rs. Combining the principles of positive and negative reinforcement (Millenson, 1967, Ch. 11), the acquired reinforcers exerted

control over the stuttering R in question. There was no way of isolating the effect produced by the "punishment" component per se from the possible "discriminative process" under FR + P. Although FR was ineffective on its own this does not preclude its effectiveness under FR + P.

In view of the review on use of punishment in modifying disfluencies (Siegel, 1970) these findings present a possible paradox. One would expect a "punishment" component to introduce an element of threat and thereby possibly heighten anxiety and the probability of stuttering. Yet the only effective component to clearly emerge in this operant manipulation of the speech R was the punishment variable. Perhaps the secondary nature of the stimulus used, rather than being a direct primary "punishment stimulus", reduced much of the perceived threat that would usually be expected in employing a punishment paradigm in this context.

The inverted U relationship postulated to relate observed performance with arousal level under stress (Stennett, 1957; Welford, 1973) may in part explain this paradox. With the addition of the punishment variable, performance may be pushed toward that expected under very high arousal to give poorer speech production and thus an increase in stuttering at the extreme end of the inverted U-curve (Corcoran, 1965). Considering that stutterers are found to be more introverted than normals (Hegde, 1972), and the finding that introverts behave as highly aroused subjects, punishment might be expected to exacerbate stuttering under the condition of increased threat.

111) Subsidiary Conclusions relevant to planning

Subsequent Investigations

(a) Subjective reports from Ss implied corresponding generalization of conditioning effects to everyday speech situations (Gruber, 1971; Lanyon, 1969; Marshall, 1970; Ostwald, 1970). Both specific and generalized benefits were reported. All Ss were aware of a learning plateau effect by Session 7, and reported tension and anxiety associated with their speech problem (Sheehan et al., 1962; Wischner, 1952). Requests from the Ss for additional help in this regard prompted the next study. It appeared that stuttering might be regarded as more than a unitary speech behavioural disorder (Bar, 1971; Brady, 1968; Brutton and Shoemaker, 1967). Along these lines emotional, motivational, cognitive and social aspects of the total interactive process were seen of possible relevance to therapeutic planning and outcome. In addition the role of the listener may assume greater importance than given cognizance in the limited interactional framework of an operant program (Beech and Fransella, 1968, p. 10).

With these considerations in mind, the Before-Treatment 16PF profile for the 14 stutterers was examined for possible leads as to interactional variables that might be relevant to the modification process. The present sample was compared with the "standard" profile of 68 speech disorders Ss (Cattell, 1970) shown in Figure 1:7. An unequivocal disparity in trends was evident. The group mean profile (N = 14) suggested that if stutterers overcame their speech problem as a group they might move closer to the norms (4.5 to 6.5 range) on sociability (A),

Before Treatment 16PF PROFILE for N=14Ss (using mean Sten Scores): EXPERIMENT I

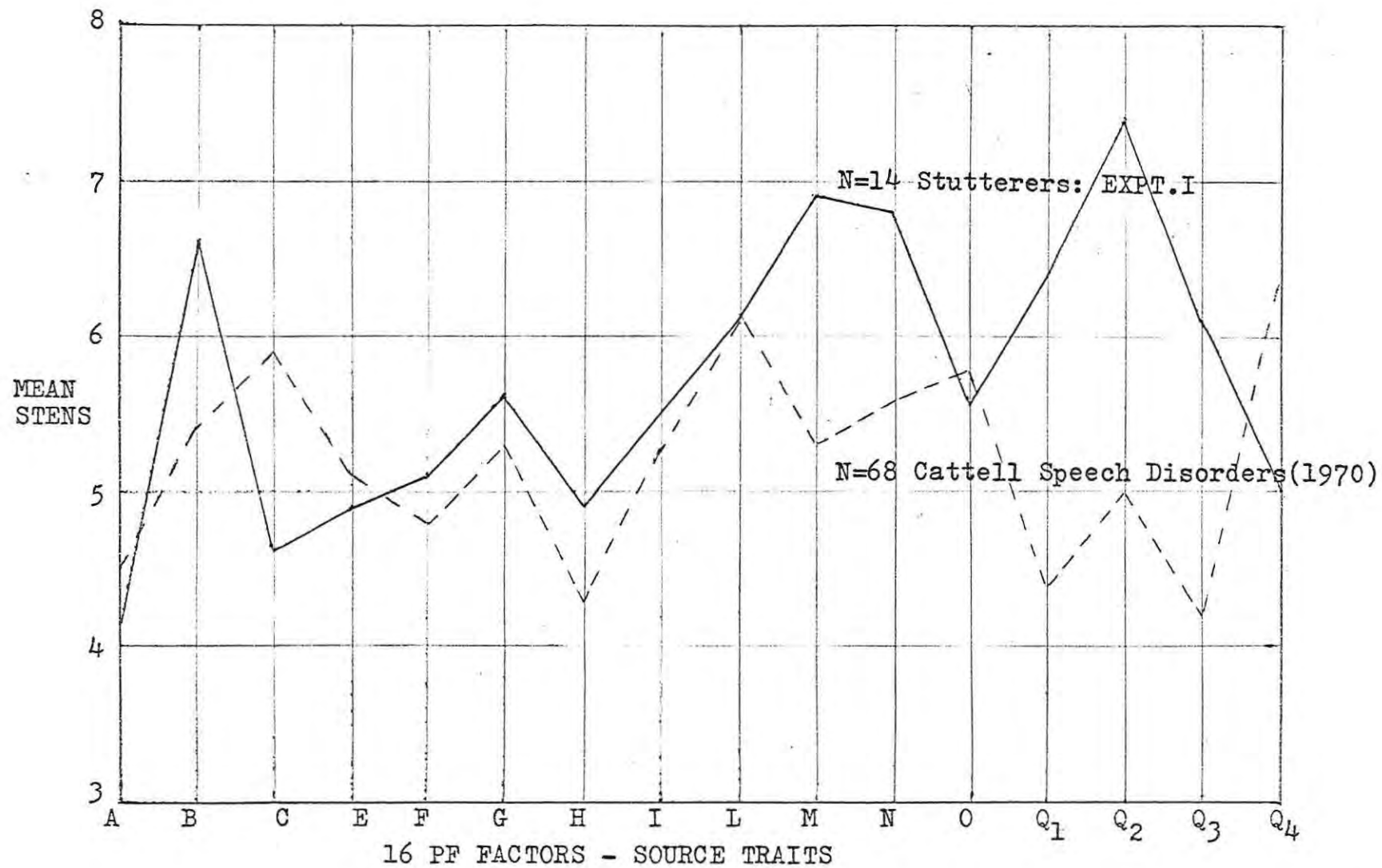


Figure I:7.



and self-sufficiency (Q2). These tertiary level Ss were above average on general intelligence (B). Their highly developed self-sufficiency (Q2) as a group may have resulted from individual tendencies to act on their own initiative rather than ask for help within the restrictions of their communicative ability. The observed absorption in personal ideas (M) may have developed concurrently with this self-sufficiency. Table I:3 presents the 16 PF group means and standard deviations for closer examination.

FACTOR	A	B	C	E	F	G	H	I
MEAN	4.14	6.64	4.64	4.86	5.07	5.57	4.93	5.50
SD	1.35	1.69	2.44	1.61	2.61	2.31	2.09	2.62
	L	M	N	O	Q1	Q2	Q3	Q4
	6.07	6.93	6.78	5.57	6.36	7.43	6.07	5.00
	1.82	1.64	1.80	2.10	1.86	2.28	1.94	2.35

TABLE I:3. Group mean and SD scores for N = 14 Ss on 16PF - Form A.

Various second-order mean trait scores and criterion estimate scores (Cattell, 1970, pp. 128-129) appear below:

<u>Exvia:</u>	5.09, SD = 1.20	<u>Anxiety:</u>	4.75, SD = 1.92
<u>Independence:</u>	7.40, SD = 1.32	<u>Neuroticism:</u>	4.80, SD = 1.92
<u>Leadership:</u>	5.91, SD = 1.50	<u>Psychoticism:</u>	4.69, SD = 1.75

No deviations from the normal range are evident except for the overall heightened Independence. It appears these stutterers may have developed an independent personality trait

as a possible adjustment to their problem. Perhaps this represents a safety factor which checks the possible continual influence of specific speech-associated anxiety on the more gross personality dimensions of anxiety and neuroticism. However, since the Independence score is elevated almost two standard deviations above the expected mean score of 5.5, this may represent a pathological tendency in these stutterers to become so self-sufficient as to steer away from the integral dependency in normal everyday social interactions, i.e. an inability to mix socially and a possible tendency to withdraw from the communication process, thereby reinforcing the maintenance of stuttering.

Considering the apparent level of individual trait anxiety falling within an expected range of one SD from the mean against independence exhibiting the only evidence of elevation, it would seem that intrapersonal factors may be less affected within a group of stutters than the interpersonal factors so basic to the total communication process. This is only conjecture at this stage, but it is important here to briefly reconsider the complex role of the anxiety component of the stuttering problem. Punishment may well exacerbate anxiety in the performance situation, as earlier discussed, merely by its aversive arousal properties. The possible influence on the supposed more stable trait anxiety, as reflected in the 16PF, may well be unlikely. Unfortunately, in the present instance the initial low level of trait anxiety across the group made it highly unlikely that any change would be observed subsequent to treatment intervention. The group

score was already below the expected mean of 5.5, making determination of a treatment effect on trait anxiety rather improbable if an anxiety reduction is predicted. Later studies will consider more closely the more transient manifest or state anxiety dimensions as response components in their own right.

In brief, this study showed treatment of the speech R in a strictly operant manner may pose restrictions in effecting a change in the more personalistic aspects of the speech problem that accompany specific disfluency behaviour, e.g. anxiety and personality factors. The observed plateau effect emerging by the fifth session limited any subsequent effectiveness of the FR + P successful modification process. It is suggested that self-reported situational anxiety may well have contributed to the impasse reached at this stage. Consequently anxiety and personality aspects that were merely included as side issues in this study appear to be more directly relevant to further investigation in enhancing the development of a modification process for stuttering.

CHAPTER IV.

THE INVESTIGATIVE PHASE - EXPERIMENT II

## CHAPTER IV

4. THE INVESTIGATIVE PHASE - EXPERIMENT II

## A DESENSITIZATION STUDY:

Longitudinal and directed at the anxiety aspects of the speech problem.

4.1. INTRODUCTION

The spontaneous self-analytic subjective reports from the Ss of Experiment I indicated an important factor to be considered in further investigation. General speech - and stutter-related anxiety appeared to cause concern as the program progressed. 11 of the 14 Ss had stated their awareness of this variable by Session 7 and requested help to overcome it. Some had mentioned it as early as Sessions 3 to 5 of the total 9 sessions. It was possible that this component had held back progress under the operant tasks. The "plateau of recovery" reached after the initial five sessions suggested this was probable.

The reliability of self-recorded behaviours has recently been discussed by Siskins (1971a,b), and by Nelson and McReynolds (1971). Although no objective evidence of the Ss' perceptions of covert variables was available, self-recordings were used in this study to investigate the possibility of reducing general speech-related anxiety and anxiety arising directly as a consequence of stuttering or expectancy to stutter. Any subsequent effects on the actual stuttering R were also investigated. Two possibilities arose:

(1) That reduction of speech anxiety would not directly alter stuttering percentage or total word rate significantly; but it would reduce the anxiety component to a manageable state to allow more successful operant manipulation at the termination of the anxiety-reduction program.

(2) That reduction of speech anxiety would act on the "total person" complex, and by reducing the effect of autonomic reactivity (Costello, 1971), allow resultant experiences of reduced stress in speaking situations. These in turn would alter the person's own perceptions of himself as a stutterer (Fransella, 1965) and repressed social being (Sheehan, 1958). Released from the influence of such cognitive and perceptive interfering variables (Gould and Sheehan, 1967), the chance occurrence of fluent speech would result in increased confidence and modify the usual stutter → tension → stutter cyclic pattern of R.

Sheehan and Martyn (1965) were able to conclude that persistence of stuttering is related to self-concept — "how the stutterer views himself and how he feels about himself in relation to others" (p. 30) has a definite bearing on recovery. The influence of this factor has been given little systematic therapeutic application, except in the last few years (Cooper, 1968; Cooper and Cooper, 1969; Manning and Cooper, 1969).

It is proposed that in altering "self-concept" the stage is set for both associative and operant processes to influence conditioning of the S's speech (Krop, Calhoun and Verrier, 1971). As the person attends to his fluency rather

than exclusively to nonfluency (Bar, 1971), and experiences control over what seemed to be erratic internal anxiety states, these internal states would become positive reinforcers strengthening the probability of enhanced fluency. The attending social reinforcers inherent in listener reactions (Beech and Fransella, 1968, pp. 35-43) would also act as powerful secondary reinforcers (Greenspoon, 1962; Krasner, 1958). An association between growing self-confidence and self-esteem with the perceived fluency changes (Fransella, 1968) would make recurrence of stuttering to its original level unlikely. Except in cases of trauma or behavioural breakdown caused by say depression or a "nervous breakdown", the S would be expected to adopt a system of "coverant" control (Hosme, 1965, 1966; Johnson, 1971; Mahoney, 1970, 1971). Build-up of anxiety would be checked before it passed beyond the bounds of control by the S's own cognitive and physical modification processes (e.g. by conscious relaxation, cognitive thought retraining, assertive responses).

Although theoretical systems have included anxiety in the explanation and maintenance of the stuttering R (Brady, 1968; Brutten and Shoemaker, 1967; Johnson, 1955; Sheehan, 1951, 1958; Toomey and Sidman, 1970; Wischner, 1950), little evidence has accrued relating to the actual measurement of anxiety amongst stutterers (Boland, 1952; Hamre, 1968; Karsen, 1964; Santostefano, 1960; Toomey and Sidman, 1970). However, psychotherapeutic approaches to the disorder have long stressed the importance of this

factor on the S's self-perception and ability to recover (e.g. Barbara, 1962; Barbara, Goldart and Oram, 1961; Hejna, 1960; Sadoff and Siegel, 1965).

Learning theorists have looked closely at the anxiety component, as well as the instrumental speech activity, only since the propositions of a two-stage approach to therapy were made by Brutten and Shoemaker (1967). Case study evidence began to accrue for the use of systematic desensitization in treatment of stuttering. Although mentioned briefly by Brady (1968) as useful in focusing on "high anxiety" situational stress, Rosenthal (1968) and Lanyon (1969) produced the first substantive evidence of the amenability of this technique to the treatment of anxiety, resulting not only in decreased stress reactions but also corresponding fluency enhancement. Wolpe's chapter in "Stuttering and the Conditioning Therapies" (Gray and England, 1969) has more recently advocated the incorporation of systematic desensitization and assertive training in the deconditioning of the emotional factor in stuttering. It seems apt that, as the widely acknowledged original proponent of the theoretical bases of desensitization therapy (Wolpe, 1958, 1960, 1964, 1969; Wolpe and Lazarus, 1968), Wolpe should apply these principles to the modification of stuttering.

The desensitization technique rests on the assumption that: "When a response is inhibited by an incompatible response, and if a major drive reduction follows, a significant amount of conditioned inhibition of the response will be



developed" (Wolpe, 1958, p. 30). As Lovibond (1970) points out, Wolpe assumes anxiety reactions are conditioned fear responses. Therapy involves the unlearning of these responses, by evoking in the organism a physiological state incompatible with the anxiety R. In most cases relaxation is used as the induced incompatible R. According to a Hullian concept of conditioned inhibition, anxiety Rs evoked by asking the S to imagine himself in the stress situation are suppressed by the incompatible relaxation Rs. The reduction of the anxiety drive produces an increment of conditioned inhibition. This in turn weakens the bond between the anxiety R and the eliciting stimuli. The principle of generalization is incorporated (Kimble, 1961) to enable transfer of desensitization in the imaginal sense to real life situations.

As a therapy procedure, systematic desensitization has gained wide acceptance in relation to management and elimination of anxiety states (Locke, 1971). The role of social and cognitive factors inherent in the process is adequately outlined by Wilkins (1971) and acknowledged by Wolpe (1969) himself. Alternative mechanisms of operation have been suggested. Amongst these, the Sokolov (1963) model of deep relaxation being accompanied by widespread cortical inhibition, such that desensitization becomes essentially a mechanism of Pavlovian inhibition, presents the most cogent explanation in learning theory terms in accounting for such parameters as order of stimulus presentation (Lovibond, 1970, pp. 127-128).

The present study assumed the operation of cognitive and social factors in the classical conditioned negative emotional R attending the specific motor aspect of the stuttering R (Adams, 1969). Specific desensitization of stutter- and general speech-related anxiety situations was attempted in accordance with the systematic desensitization principles proposed by Wolpe in Chapter 7 of his book, "The Practice of Behaviour Therapy" (Wolpe, 1969). The aim was to establish evidence of successful individual desensitization of a group of Ss each having differing R hierarchies and exhibiting varying degrees of stuttering severity.

#### 4.2. METHOD

##### 1) Subject Pool

Of the 14 Ss from Experiment I, 10 were available for this program. Nine Ss completed the treatment. One S was unable to do so because of transfer to another city. All Ss were full or part-time tertiary students. Mean age was 21.6 years, within the range 18 to 30 years.

##### 11) Definition of the Response

Change in stuttering was assessed in 3 ways:

(a) Subjective estimates of recovery were made by both E and S, with reports from outside sources considered in an ongoing assessment from session to session. The S was encouraged to remember instances of fluency control, especially those remarked on by listeners.

(b) A before-after measure was obtained by comparing the S's performance on the last trial of Experiment I with results obtained from returning the S to the operant task under a baserate condition (i.e. no operation of experimental variables). Stuttering percentage and total speech production were specifically measured under controlled conditions. The restricted definition of stuttering instances was used as in Experiment I. Analysis of this study elucidates the limitations inherent in this definition.

(c) A self-improvement rating task was employed for perceived stuttering and anxiety changes, as described more fully later.

Subsidiary evidence of final performance came from post-treatment administration of the Lanyon Severity Scale (Lanyon, 1967), the Taylor Manifest Anxiety Scale (Taylor, 1953), and the Johnson Job Task (Johnson, et al., 1963). The nature of these tests is presented later in discussion of the results.

iii) Mode of Treatment: systematic desensitization aimed at the modification of the anxiety associated with stuttering and/or speech in general.

Treatment sessions were on a weekly basis of 45 mins. average duration, within a 40-60 min. range. In an initial interview Ss were acquainted with the basic principles employed in the application of systematic desensitization in relation to the proposed modification of their anxiety associated with stuttering and/or speech demands in general.

Adopting an optimistic approach, the E indicated a possible additional benefit might be actual fluency improvement concomitant with reduced anxiety relevant to the total speech R complex. The S was encouraged to expect generalization to everyday real life situations of experimentally induced effects.

The rationale for expected effects was presented in simplified terms to the S along the following lines:

It was suggested that the S could modify the reactivity of the sympathetic part of the autonomic nervous system (ans) by "central nervous system control", using such processes as "tension control" and "mental calm". By so doing, the parasympathetic counterpart was said to "take control" in "dampening down" and/or preventing sympathetic Rs that were usually evoked by previously stress-associated speech tasks. Special emphasis was given to the role of the depth of relaxation achieved, both in the experimental situation and in home "practice sessions". The control obtained by the S was stressed as integrally dependent on his motivation and cooperation. The role of the E was presented primarily as a guiding influence only: the realization of the goal of controlled bodily and mental relaxation was to depend almost entirely on the S. Biofeedback research and autogenic training (Luthe, 1969) indicate the feasibility of this implied voluntary control over internal states (Davidson and Krippner, 1972). There appears to be a change in mental state concurrent with the feeling of voluntary control exercised as the S experiences being the locus of control (Green, Green and Walters, 1970).

In accordance with these suppositions the present approach presented two premises:

(1) The aim to minimize S dependence on the E - thereby reducing the probability of transference and treatment dependence effects.

(2) The decision to convey to the S the belief that he, as a "unique" individual, was "licking his own problem" rather than resorting to a "cure" from a therapist. This stressed the S's own pride in achievement and reinforced "personal dignity" by presenting stuttering as just another problem in life to which a "learning process" could provide the solution via concentrated effort and practice.

In this way the active role of the S was incorporated to maximize generalization of treatment effects to situations outside the clinical setting. Therapy became a continuous process, rather than merely a spaced series of weekly treatment sessions. Hopefully such desensitization might effect a generalised reduction in autonomic activity (Costello, 1971) so facilitating the growth of a more adequate ability to cope with stress. In this way changes produced in the stuttering R as a social interactional process might be successfully sustained without relapse or symptom substitution.

a) Introductory Procedures

A week after the initial interview, Ss were first introduced to the actual relaxation procedure. This followed closely the first session guide in Lanyon's desensitization manual (Lanyon, 1968) - a copy appears in Appendix II:1.

Body relaxation was induced in this first session.

The S rested in a reclining chair with added footrest and arm supports similar to an airline passenger seat. A soft rug could be positioned by the S to support his head in a comfortable position. The S was at a distance of 3 feet at an angle of  $40^{\circ}$  to the E's desk. At the desk the E used a stop watch to time instructions to the S and entered relevant objective and subjective data on the S's file. Overhead lights were turned off during the "treatment" stage of the session, and blinds were drawn. The only source of illumination was the E's desk light. A background noise level of pleasant character came from low volume 30 min. music tapes (e.g. "Music for Lovers", "Guitars for Easy Listening", "My Way of Music"), providing an alternative focus for attention when the E was silent and minimizing many of the extraneous sounds. Instructions were given at the commencement of each session to effect concentration on the E's voice or the music.

At the conclusion of the first session, each S was directed during the intervening week to make a list of all the specific speech situations or demands that evoked anxiety, tension, or a feeling of being under pressure either before, after or during the S's exposure to them. In the last phase of the second session the list was used as a basis for the E to draw up a more comprehensive list of the S's stress situations - according to criteria such as age of person, time of day, distance from person, number of people present, time of exposure to the stressful situation, etc.

Each item was then typed on a 3" x 5" white card ready for Session 3. During the main part of the second session body relaxation training was completed, following the Lanyon sequence.

The third session reinforced relaxation training and introduced imagination training. The S was to imagine a given situation "as though he was really there", in detail and colour. Questions from the E elucidated any problems the S met. Daily imagination practice was stipulated in conjunction with relaxation practice, using both active and passive situations with either positive or neutral affect. Relaxation and imagination expertise was to be acquired like any other skill, by practice and determination.

At termination of the third session the S sorted the stack of cards denoting his speech stress situations into hierarchical order - from the least to the most anxiety provoking situation. This was first done within categories of related items, as predetermined by the E's judgment (e.g. authority of listener, size of audience, etc.) A pre-requisite was the S's agreement that the items were related meaningfully in his individual perception of the categories selected. Then category types were placed by the S in a gross ordering, from least to most anxiety provoking. Among the 9 Ss, number of categories ranged from 5 to 10 with a mean of 7.2, while total number of items ranged from 17 to 32 with a mean of 26 items.

In the fourth session relaxation and imagination training were completed and reviewed to clarify any of the

S's misconceptions. Instructions were given for 15 minutes daily relaxation practice for the maintenance and improvement of the relaxation level already achieved. This was a prerequisite to the desensitization phase to be started in the next (5th) session, and was to be maintained for the rest of the program. Similarly practice instructions had been given for the previous 3 sessions. A subjective report of practice done was taken at each session commencement. The S had a summary guide to follow as to the sequence of physical relaxation and inducement of "mental calm" (Appendix II:2).

Lanyon's manual (Appendix II:1) was used as the basic therapy guide in evoking and maintaining the essential relaxation level. However, this more physically-oriented approach was extended to emphasise "mind" relaxation. "Mental calm" was employed to institute higher order control over physiological reactivity (Rachman, 1968; Yates, 1971, p. 154). Support for this procedure came from the E's personal observations and experience of "mental" relaxation induced in the meditation phase of yoga sessions. Some of the effective yet simple relaxation sequences from yoga were incorporated into the relaxation training to emphasise "mental calm" and maintain "total relaxation" during subsequent desensitization sessions. The transcript of a tape used in the later studies (Appendix III:3) provides examples of these instructions. Mental exercises such as focusing "in one's mind" on a black mass or wall, or "a soft black velvet curtain" - with instructions to "let the mind rest", "bringing



all thoughts to the present .... forgetting about the past, not worrying about the future", - encouraged the S to attend to relaxation only with minimal interference from external and internal variables.

b) Desensitization Procedure

This closely followed Lanyon's manual (1968). From Session 5 till termination of treatment, each session began with the S reporting his progress and difficulties encountered over the past week. Then 5-10 minutes of general relaxation instructions emphasised the attainment of "mental calm", with duration dependent on the reactivity of the individual S. Generally as therapy sessions progressed less time was necessary in this initial phase to induce sufficient relaxation.

Items were then presented to the S in each individual's pre-determined hierarchical order. On first presentation the item was presented for a 10 sec. "think about" period, enabling the S to orient to the situation. On the subsequent command "IMAGINE" the S imagined himself in the situation for a 5 sec. period, terminated by the S's command, "STOP IMAGINING" and subsequent RELAXATION instructions for 30 sec. Second presentation was for imagination of 10 sec. duration. If the S signalled disturbance of any kind, by raising the forefinger of the left hand, imagination was immediately stopped and a 2 min. RELAXATION interval was allowed to regain the former relaxation level. The item was then presented again for only 2-3 secs. If no further anxiety was evident, a 5 sec. and 10 sec. presentation followed, each spaced by a 30 sec. relaxation interval.

On successfully imagining an item for 5 and 10 secs. consecutively without tension, the S was presented with the next item in the hierarchy. A limit of 4 items per session was imposed, with session completion always preceded by a successfully completed item. Every new session was begun with the last successfully completed item. Individual progress determined the number of sessions necessary to complete the entire hierarchy, taking into account initial difference in the number of items to be desensitized. Actual time taken by a S in the "treatment" phase of each session ranged from 20 to 25 mins. in the 4 introductory training sessions, increasing to a range of 26 to 33 min. allotted to "desensitization only" after Session 5. Mean duration of the desensitization phase was 30 min. (i.e. without the 5-10 mins. initial relaxation).

#### 4.3. ANALYSIS AND DISCUSSION

##### 1) Requirement I:

To determine whether desensitization resulted in an increase in fluency, in terms of percentage drop in stutters to words read or spoken spontaneously.

Before and after treatment objective test measures were available. In the previous operant program the last session recorded stuttering Rs in terms of:

- (1) stutters as a percentage of words read from pre-selected randomized prose passages for the first 10 mins. of the session (Ad phase) and for the next 20 mins. (Rd phase during which operant contingencies were imposed).

- (2) stutters as a percentage of words evoked in spontaneous speech by a random topic as a speech cue (SS phase where operant contingencies were also present). A post-desensitization-treatment exposure to this same situation, with operant contingencies absent, provided an objective test situation. Three scores enabled before/after comparison using Ss as their own controls: Ad score, Rd score, and SS score (Appendix II:3).

A sign test analysis gave no evidence of fluency increase (one-tail test,  $\alpha = .05$ ).

Ad Scores:  $x = 4$ ,  $N = 9$ ,  $p = 0.50$

Rd Scores:  $x = 4$ ,  $N = 9$ ,  $p = 0.50$

SS Scores:  $x = 3$ ,  $N = 9$ ,  $p = 0.25$

A Wilcoxon Matched-Pairs Signed-Ranks test affirmed these results:

AD  $T = 15.5$ ,  $p > 0.5$

Rd  $T = 14.0$ ,  $p > 0.5$

SS  $T = 17.0$ ,  $p > 0.5$

Parametric analysis was inappropriate because inherent individual variability and between S variability in a small sample could not allow assumption of a normally distributed R (Gray and Karmen, 1967, p. 144).

It appeared no fluency change was effected. However, Session 9 scores of Experiment I were of such a low magnitude as to make a change in R very difficult to determine. The limitation of the 3-criteria definition of stuttering

instances becomes apparent. Nonfluencies that had seemed characteristic of the average nonstutterer's nonfluencies had not been recorded, e.g. pauses, interjections, revisions, incomplete phrases and words that seemed typical of "changes in thought" in spontaneous speech or "racing ahead" in reading.

The full 8-criteria definition of Johnson *et al.* (1963) may have elucidated changes not observable in the present data form. Unfortunately the more stringent criterion could not be applied even on a post-hoc basis because tape-recorded samples had not been taken for both comparison sessions. The subjective evidence from S reports and the E's ongoing assessment did not match the objective conclusion of no change. At treatment termination 5 of the 9 Ss considered themselves no longer as stutterers. The other 4 Ss acknowledged considerable improvements and were optimistic at their ability to cope with their speech problem. A six-month and eighteen-month follow-up supported these conclusions. The "recovered" stutterers had taken on active roles in society (e.g. President of the Student Council), with only one S returning to mild stuttering. The "improved" Ss continued to practise relaxation and self-desensitization sporadically, with 2 Ss remaining constant in their improved fluency and the other 2 Ss reporting additional improvement.

#### 11) Requirement II:

To establish whether any other objective criteria might provide alternative indicators of fluency increase.

For a "true" fluency change an increase in rate of total speech production must occur as therapy takes effect. This was tested by analysis of the SS phase before/after test data (Appendix II:4), using Ss as their own controls. The frequency of words produced in the 5 min. SS segment of Session 9 for Experiment I was compared with that produced in the post-desensitization test situation. A one-tail Sign test gave  $p = .02$  ( $x = 1, N = 9$ ) significant for  $\alpha = .05$  in the expected direction of greater used frequency. The Wilcoxon Matched-Pairs Signed-Ranks confirmed this ( $p = .005$  for  $T = 2, N = 9$ ).

This result adds credence to the subjective evidence of fluency enhancement but is not sufficient in itself to allow interpretation. The cumulative record data provided another information source. "Angles of elevation" were in direct relation to production of correct words. The last reading sample and the spontaneous speech task of the operant program were compared with that of the post-desensitization samples for the 9 Ss (Appendix II:5). A "related samples" one-tail  $t$  test indicated the angle of elevation increased for spontaneous speech supporting evidence of a positive fluency change ( $t = 2.80, p < .025$ ). For the reading task a  $t$  of 1.78 ( $p > .05$ ) did not indicate a positive fluency change.

iii) Requirement III:

To delineate the presence of any other treatment effects that ensued with desensitization.

The Reading change in fluency, measured in terms of

percentage stutters, was compared with that for Spontaneous Speech (Appendix II:6). Of the 9 Ss, 2 exhibited changes toward greater fluency for both Rd and SS. However, 7 Ss showed discrepancies in the direction of change produced by the different tasks. A negative correlation was found between Rd and SS improvement implying that when Ss improved in SS their Rd fluency dropped ( $T = 8.92$  with  $df = 8$  gave  $p < .001$ ). 6 of the 9 Ss moved in the overall direction of better spontaneous speech. As indicated under (ii), the target behaviour of "spontaneous speech" appeared to be the R that was modified. The "Reading" R was not the specific target of the desensitization process which covered an overall hierarchy of each individual's general speech stress situations.

iv) Subsidiary evidence from Descriptive Data and Post-treatment Tests

a) Ss in the Operant study had been sampled for their 16 Personality Factor (Form A) Profile. On conclusion of desensitization treatment in this study the test was readministered to discover any changes in personality factors or traits concomitant with overall speech improvement. Table II:1 presents the before/after mean stens for the 16 primary traits, with the corresponding t value from a "related-samples" two-tail test for  $df = 8$ .

There were no significant changes on any factors. Six second-order personality factors and criterion measures were derived for further investigation, as shown in

FACTORS	A	B	C	E	F	G	H	I
BEFORE Mean	4.25	6.75	5.00	5.25	6.25	4.75	5.75	4.63
S.D.	1.67	1.67	2.56	1.28	1.49	2.38	1.91	2.77
AFTER Mean	4.62	6.87	4.75	5.62	7.00	4.00	5.50	5.62
S.D.	2.61	2.64	2.66	1.68	1.93	2.67	2.07	1.99
t value	0.81	0.13	0.55	0.66	1.53	1.42	0.61	1.67
	L	M	N	O	Q1	Q2	Q3	Q4
BEFORE Mean	5.88	7.00	6.12	5.12	6.50	7.62	5.87	4.37
S.D.	1.89	1.60	1.46	1.96	1.60	2.13	1.96	2.33
AFTER Mean	5.50	7.12	4.75	5.25	6.12	6.25	6.25	4.37
S.D.	2.51	2.10	1.58	3.19	2.64	2.60	2.12	2.20
t value	0.88	0.13	2.10	0.14	0.50	2.20	0.81	0.00

TABLE II:1 Comparison of mean 16PF scores before and after the operant plus desensitization R modification programs.

Table II:2 with the corresponding t test result for before/after comparison.

FACTOR	ERVIA	ANX.	NEUROF.	INDEP.	LEAD.	PSYCHO.
BEFORE Mean	5.09	4.75	4.80	7.40	5.91	4.69
S.D.	1.20	1.92	1.92	1.32	1.50	1.75
AFTER Mean	5.70	4.80	5.04	7.29	5.71	4.72
S.D.	1.88	2.44	2.40	1.43	2.34	1.55
t value	1.10	0.13	0.73	0.16	0.48	0.04

TABLE II:2 Comparison of second order factors and criterion measures for before/after combined treatment effects of operant and desensitization programs.

Again Ss remained essentially static on all measures.

The sample of stutterers showed no evidence of pathological disturbance in terms of Neuroticism or Psychoticism elevations. The high Independence manifest before treatment was maintained. As discussed in the previous study the observed high level of Independence (7.4) suggests a possible tendency in this group of stutterers to withdraw from social interaction to an extent that is reflected in their personality type. Whether this means that from outset stutterers tend to find social interaction difficult to cope with in daily living, or whether this becomes a consequence of their communication disability as stuttering itself effects their communication skills, most remain conjecture. It is important, however, to consider the possible limitation that such a trait might pose in terms of modifying the stutterer's behaviour. Focusing only on the speech aspect of the problem may well retard the process of change if the stutterer's ability to interact per se is not given adequate attention as a precursor to the inevitable adjustment that would be necessitated as his communication skills undergo change.

No change occurred on the trait Anxiety dimension, although speech-related anxiety was the focus of treatment. It is interesting to note that the original anxiety level was lower than the expected average (5.5) anyway, making it unlikely that a measurable change would be effected. As suggested in the previous study, the surprisingly high level of Independence cited above may well serve to help



the S cope with his specific speech-anxiety without the exacerbation of general trait anxiety. The initial anxiety score (4.75) was within one SD of the mean. It would appear that this remained stable through the treatment intervention giving a "no change" result on this dimension. This agrees with the observed group levels in the previous study. "No change" might be expected if one sees the stuttering response as constantly part of an ongoing transient situational anxiety dimension by virtue of its place in the social context of the communication process. The personality trait dimension would then be predicted to be more intrapersonal and perhaps more resistant to such a minor interruption in the total life pattern as represented by the present treatment program.

b) Another aspect of anxiety was measured by the Taylor Manifest Anxiety Scale (Taylor, 1953) - see Appendix II:7 for the 50-item inventory (MAS). Validity of using this scale for Australian Ss was established by Stanton (1969). This test was completed after the desensitization of speech-related anxiety was terminated. Results reflected manifest anxiety rather than "trait" anxiety as measured by the 16PF.

It is possible that although stutterers may not be inwardly more anxious than average speakers, they may exhibit manifest signs of anxiety which make them appear more anxious to the observer. If this were the case one would expect treatment for the anxiety aspect of their problem to bring about a change in the distribution of MAS scores to approximate that of the average population. Taylor (1953) reported a sample

population mean of 14.56 for "normal" Ss with scores assuming a skewed distribution. The 50th percentile fell at approximately 13, the 20th at 7, and the 80th at 21, within the 1 to 50 range of the true/false inventory.

Ss in this study ( $N = 9$ ) fell within the range 5 to 24, with a mean score of 13.44 ( $SD = 5.91$ ) and median of 13. This indicates that the S sample was not characterised by high manifest anxiety at treatment termination. However, since this measure was not taken prior to treatment, unavailability of a prior-treatment baseline precludes the measurement of the extent of any change toward an expected reduction in manifest anxiety. It is quite possible that the subject sample was within the normal range on this dimension from treatment outset and remained relatively static as a group while undergoing treatment.

c) The Lanyon Severity Scale (Lanyon, 1967) was another post-treatment criterion measure (Appendix II:8). 64 items were answered "true" or "false" to reveal various aspects of the stuttering R complex, in the ratio of 72% behavioural to 28% attitudinal. As an independent measure of stuttering severity on an ordinal basis, comparative means are available for a sample of nonstutterers ( $N = 50$ ) and stutterers ( $N = 50$ ). These were respectively 8.6 ( $SD = 6.8$ ) within the range 1 to 36, and 40.6 ( $SD = 11.9$ ) within the range 20 to 57.

For the present sample ( $N = 9$ ) the post-treatment mean was 35.0 ( $SD = 12.1$ ) within the range 15 to 59. This result classifies the Ss as a whole still as mild-moderate "stutterers", midway between Lanyon's 2nd (mean = 31.4) and

3rd (mean = 41.2) ordinal grouping of stutterers on a 1 to 6 severity rating based on clinicians' severity judgments. After treatment 3 of the Ss still considered themselves stutterers. It is interesting to note that these 3 stutterers had the highest severity scores, viz. 39, 46 and 59. The other 6 "recovered" Ss fell within the range 15 to 38, compared with Lanyon's range for nonstutterers of 1 to 36.

d) Another post-treatment test was given to provide an independent measure of percentage stutters and average total word production rate. This was the Johnson Job Task (Johnson, et al., 1963). Ss simply were asked to speak about their occupation for 5 mins. into a microphone connected to a tape-recorder. By listening to the taped data, the E recorded stutters and correct Rs, giving both percentage stutter and total word rate scores.

The results gave a mean percentage stutter score of 9.6 (SD = 7.93) in the range 2.2 to 29.6. Compared with the percentage of nonfluencies in nonstutterers (N = 100) of 6.5% in the range 0.4 to 20.1 reported by Johnson (1961), the present sample approached the average fluency range after treatment. To obtain further support for a "normal" fluency interpretation total word rate was considered. The 9 Ss had a mean rate of 125.6 words/min. (SD = 38.4), which compared favourably with the normal speech rate of  $140 \pm 24$  words/min. (Johnson, et al., 1961).

With exclusion of the datum from the most severe stutterer, the mean became 136.5 (SD = 24.0) in the range 100.6 to 174.2. The corresponding stutter percentage mean

became 5.9 (SD = 2.5) in the range 2.2 to 14.8 for the 8 Ss.

With this latter speech assessment the E used the 3-criteria stuttering definition of Johnson et al. (1963, p. 109) to increase validity of measurements. Two judgments of the R were averaged to increase reliability (Beech and Fransella, 1968, p.44). In a task resembling the real-life situation, it appears that the Ss as a whole exhibited essentially "normal" spontaneous speech after treatment.

e) As a final post-treatment assessment a Rating Scale was devised to analyse Ss' own perceptions of their speech-associated anxiety and their stuttering level for the actual situations in their individual desensitization hierarchies. Each desensitization item was rated from 1 to 5 on the two criteria:

- T: tension, anxiety, or discomfort produced by the situation.
- S: stuttering level in the situation.

Rating Rs were highly skewed in the positive direction toward lowered tension and stutter levels. No situations became more distressing (Rank 5) to the Ss. For both tension and stuttering level at least 50 percent of the Rs were concentrated in the first 2 levels. This indicated considerable lowering of perceived speech-related anxiety, and a corresponding drop in self-perceptions of stuttering in the situations covered in the desensitization sequence.

(a) TENSION LEVEL in specific speech situation

RANK	Meaning	Group mean - % items under a given category
1	No tension	29.6
2	Much less tension than before treatment	29.8
3	Less tension than before treatment	28.3
4	Same tension as before treatment	10.6
5	More tension now than before treatment	0.0

(b) STUTTERING LEVEL in a specific speech situation

RANK	Meaning	Group mean - % items under a given category
1	Don't stutter at all	27.4
2	Stutter much less than before treatment	38.0
3	Stutter less than before treatment	21.3
4	Stutter the same as before treatment	13.3
5	Stutter more than before treatment	0.0

TABLE II:3 Distribution of rating scores expressed as a percentage of desensitization items ranked under each level.

Table II:3 (a) (b) presents the overall group means in terms of percentage items rated under each category.

#### 4.4. CONCLUSIONS

A crucial finding appears to be the insensitiveness of the stuttering R definition adopted in the first two studies. Yet failure of this percentage stutter measure to elucidate a "true" fluency change should not be directly interpreted as suggesting that desensitization was not effective in modifying the stuttering R. Apart from subjective reports, the other criterion essential to fluency change was supported, viz. increased rate of speech production. Also cumulative records of correct word rate supported a "fluency" increase in spontaneous speech. At termination of treatment 6 of the 9 Ss considered themselves "recovered" and no "plateau of recovery" was apparent. The weight of the evidence pointed to a significant modification of the stuttering R complex by desensitization treatment, even though a percentage stutter decrement was not observable in the data at hand. However, with the speech R itself not amenable to specific post-hoc examination the evidence can only be considered supportive and not unequivocal.

With no records to enable post-hoc analysis of taped speech samples, one can only assume that if the proposed fluency change did take place it was effected in the non-fluency characteristics that were not given much cogency in this study, e.g. interjections, incomplete phrases, and broken words.

The finding that the majority of Ss improved in spontaneous speech, while reading fluency either deteriorated or remained static, indirectly supported the effectiveness

of desensitization. Spontaneous speech is the most probable speech R in real life situations, rather than reading. The individual hierarchies for desensitization covered a wide range of spontaneous speech items. Yet in the intervening period from the operant program no directions were given to practise reading, nor was reading specifically desensitized within the treatment program. The lack of reading improvement might therefore be expected. The only changes observed were in relation to the "spontaneous speech" under treatment.

Post-therapy assessments of various aspects of the speech R gave some interesting additional information. In general they supported the possibility of desensitization. There were no personality changes consistently related to possible changes in speech anxiety. However, final stuttering severity, as perceived by the S, approached the nonfluency range for nonstutterers indicating only a mild-moderate level of stuttering. The presenting personality of this sample of stutterers indicated that on second-order dimensions they were independent and within normal range on "trait" anxiety. These characteristics did not change appreciably with treatment. At close of therapy their "manifest anxiety" level was within the range for the average population. If manifestations of anxiety had been present before treatment, they were not present at close of treatment. Subjectively, the Ss perceived their own tension and stutter levels in relation to the situations desensitized to be markedly reduced after treatment. Stuttering level was judged as either negligible or zero on 60 percent of the personal

hierarchy items across the 9 Ss at treatment termination.

At this stage consideration must be given to possible "expectancy of success" effects (Wilkins, 1971) before concluding that a treatment effect was obtained. By invoking the interpretations of "mental calm" and "tension control" as explanatory agents of possible change to the Ss, the procedure may have produced a positive "mental set" incorporating both suggestion and demand characteristics (Orne, 1962; Rosenthal, 1966). Even so, supportive evidence of "true" change did come from the separate assessment of final spontaneous speech. In addition to the subjective reports of therapy success, both fluency and word production fell to within the normal range for the majority of Ss.

It is suggested that desensitization may offer an effective treatment process for the modification of stuttering, given adequate R assessment and using a more inclusive definition of stuttering. On the basis of lack of evidence in this study no firm conclusions can be made. However, the anxiety variable does appear relevant to treatment of the stuttering R complex. Within the scope of this study specific concentration on only the anxiety variable associated with speech rather than on the speech R itself, led to suggestive indications of change in the latter. These suggested changes in the actual speech behaviour presented the challenge to further this investigation of the anxiety variable with the aim of facilitating the modification of the speech component of the stuttering R complex.



CHAPTER V.

FORMULATING A NEW APPROACH

## CHAPTER V.

5. FORMULATING A NEW APPROACH

The results from the Investigative Phase suggested that the role of anxiety in the maintenance of stuttering may be of greater import than implied by brief accounts in the literature of anxiety-reduction procedures for the modification of stuttering (e.g. Falck, 1969). Researchers have been concerned with the role of anxiety in relation to stuttering and the stutterer, but have done little towards systematic alleviation of this R component (Gray and Karmen, 1967).

The "vicious circle" aspect of stuttering (Sheehan, 1969), recognized alike by stutterers and therapists, has been attacked specifically by both operant and classical conditioning in the "metronome-conditioned speech retraining" of Brady (1971). Speech was directly manipulated by inducement of fluency at very low rates using the metronome beat, and subsequent shaping of normal speech in a gradual approximation to real-life situations. The principle of reciprocal inhibition was employed, but to the speech first. It was assumed that associated anxiety would be affected as a consequence, and allow a fluency → confidence → fluency cycle to start operation. Desensitization to specific speech situations was sometimes used by Brady (p. 139), but he reports this was "not necessary" in most cases.

In the last study the primary attack was on speech-associated anxiety, with no direct manipulation of the speech

R per se. Economy of time and acceptability of the therapy are perhaps more likely with this approach. The longest number of sessions required to complete treatment was 13, with a mean over the group of 10 sessions. No artificial device was necessary. Only 15 mins. daily practice of a non-aversive nature was required, viz. relaxation and imagination training emphasising achievement of "mental calm" (Wolpe, 1969, 1970).

Lanyon (1969), in pioneering the successful application of systematic desensitization to stuttering in a case study with a 27-item hierarchy, established a precedent in extending treatment to the total behavioural complex. Since anxiety appears to both exacerbate and maintain stuttering, it may play a central role in the modification process. Other earlier studies (Browning, 1957; Lazarus, 1961; Lazarus and Rachman, 1957; Rosenthal, 1968; Wolpe, 1958) support the contentions formulated by Lanyon. Brady (1968, p. 847) foresaw advantages in the anxiety approach. Yet Yates (1970) gave only cursory attention to the desensitization therapy technique in his chapter on "Stuttering" (p. 126). Although Brutten and Shoemaker in 1967 had formulated a total treatment program incorporating the principle of desensitization of the anxiety R with extinction of instrumental behaviours, clinicians in the later studies already cited have done little to systematically explore their proposals. Their program was presented as "complex", making "extensive demands of the therapist". The present investigation implies that although the therapy process may by no means be simple to administer,

desensitization treatment may bring results with less difficulty than foreshadowed by Brutton and Shoemaker. A vital influence may well rest with the role of the therapist (Kraft, 1971) in confirming the progress reported by the S and maintaining the S's motivation at each stage of the program.

It appears that treatment may benefit from incorporation of more aspects of the stuttering R complex as the object of therapy. At this juncture in the investigation a new approach was adopted. Looking beyond an exclusive focus on either the speech R or the associated anxiety, possibilities were explored in the Structuring Phase as to the integration of behavioural, social, personality, attitudinal, perceptive and cognitive attributes of the stuttering R as targets for modification. The question arose as to the feasibility of obtaining a total integrative view of "multiple" changes brought about by a multi-faceted therapy process. Extensions were necessary in both the assessment area and treatment planning to adapt to these considerations.

A re-evaluation (May, 1969) of the adequacy of the available assessment procedures in the field of speech pathology revealed the necessity of deriving more inclusive change measures in the form of a battery of before/after tests. Increased fluency is the usual measure taken by investigators - as measured by percentage stutter decrement and word rate increase. Yet on its own this measure could hardly indicate an overall change in the speech behaviour or the stutterer as a person. Along these lines it seems



appropriate to adopt a more "holistic" viewpoint, in which the stuttering is seen as a R complex and is related to selected aspects of the "total person". This approach was adopted in the two studies to be described in the Structuring phase. As the research progressed treatment planning involved successively close integration of principles from cognitive therapy with those of behaviour therapy (Beck, 1970). This being the case, a brief outline is now given of the possible role of covert events in the implementation of behavioural control. Discussion of the subsequent studies will focus more specifically on the pertinent considerations to be made in this regard.

Given the growing evidence that autonomic responses can be brought under operant verbal control (Ascough and Sippelle, 1968; Miller, 1969), it would appear that the physiological correlates of fear associated with speech may be open to systematic manipulation from internal cognitive events — either as instigated from an external source (e.g. therapist) or as spontaneously occurring as integral components of the subject's self-analytic processes. The possibility has been presented of systematically employing expectancies, attitudes and beliefs to effect both cognitive and behavioural change (Lazarus, 1971). This rests on the assumption that the same reinforcement principles apply to covert as to overt behavioural responses (Mahoney, 1970). It is maintained that the inaccessibility of covert responses (English and English, 1958) to observation and measurement does not necessarily preclude their existence or possible

modifying properties (Mahoney, 1970). Consequently, self-management of covert behaviour (Mahoney, 1971) is proposed as a viable agent for effecting both behavioural change and maintenance. Following this line of reasoning, cognitions may well be formulated in behavioural terms and treated to similar examination processes as are applied to other human behaviours (Ullman, 1970). Studies over the past five years strongly suggest that principles of extinction and reinforcement may be applied at the cognitive level (Cautela, 1970, 1971) according to known learning principles. Accordingly, Bergin (1970) contends that it is somewhat meaningless to separate the overt and covert responses peculiar to a particular behaviour. He goes on to advocate a multi-dimensional approach to derive the most economical and expedient process in expediting change in the pattern of responses in question to a more desirable mode of responding.

The present investigation attempts to encompass the cognitive and behavioural aspects of change in focusing on the more holistic aspects of the "total" stuttering behaviour pattern. The techniques adopted in the studies to follow incorporated the principles of covert reward (Cautela, 1970) with the addition of intermittent reinforcement principles (Kimble, 1961), the Idealized Self-Image (Susskind, 1970), "thought stopping" (Wolpe, 1969), expectancy of treatment outcome (Locke, 1971), demand characteristics of the experimenter (Ick and Bootsia, 1971), social reinforcement within a group setting (Bar, 1971), and conditioned relaxation (Lutker, 1971). The aim was not

only to effect fluency enhancement, but also a corresponding social adjustment within the individual to the extent that speech as a communication mode influences one's integration and acceptance in society.

Due to the practical demands on time and subject samples available, it will be seen that isolation of the effective variables becomes a speculative task within the limits of the present investigation. Unfortunately, the empirical establishment of change in response (as measured along multi-modal dimensions of speech, personality and adjustment criteria) had to be adopted within a limited focus. Suggestions will be made in discussing the present findings for a more rigorous extension into main and interactional effects as a direction for further investigation. One could say that a "clinical bias" is temporarily adopted, where empathetic attention is given to the welfare of the stutterers as individual members of society in need of help. The experimenter in being inevitably cast in the role of a therapist by the very nature of the problem under study, and in also being human, becomes cogently aware of the personal influence that he may have over the process of change (Wilkins, 1973).

Since demands characteristics per se can be powerful determinants of change (Orne, 1962; Wilkins, 1963) the partialling out of "pure" treatment effects becomes a difficult task when such factors as instructional set, communication of expectancy, inadvertent reinforcement and shaping of behaviour etc. may be operative in the more clinically

oriented situation to be seen in the latter part of this investigation. The limitations on interpretation of these and subsequent results are recognized. Unfortunately one also comes to admit that the rigorous criteria set forth in the introductory chapters as the desirable approach to treatment, become increasingly more difficult to approximate. It will be seen that a certain amount of sacrifice of rigour became inevitable as one met with the practical difficulties of establishing a workable treatment mode. However, the present pursuit is not regarded as the terminal goal of this research. Hopefully, a follow-up with specific attention to isolating treatment variables will expand, develop and perhaps redirect the present lines of investigation. Discussion of these considerations is amplified in the concluding comments to this series of studies.



CHAPTER VI.

THE STRUCTURING PHASE - EXPERIMENT III.

## CHAPTER VI.

6. THE STRUCTURING PHASE - EXPERIMENT III

## AN INTEGRATIVE STUDY:

A short-term program combining specific desensitization and operant manipulation applied to a specified speech situation.

6.1. INTRODUCTION

Experiments I and II focussed fairly specifically on two different aspects of the stuttering R with regard to its modification. To reiterate briefly, the former looked at the actual speech R, the fluencies or nonfluencies emitted; the latter at the anxiety or tension associated with various stutter-related speech situations. Looking at operant manipulation of the speech R the operant study revealed only one effective technique, i.e. FR + P. Secondary "punishment" of nonfluencies appeared the most likely operative variable in the absence of any reward effects. Yet the suppression of stuttering was not sufficient to support adoption of this technique as an economical therapy procedure. The "plateau of recovery" reached by Session 5 implied the necessity of a more adequate procedure. As the "punishment" procedure itself yields such paradoxical effects by evoking individual reactions of anxiety within the treatment situation (Siegel, 1970), it did not seem a feasible technique to employ in providing a "safe" and generalizable treatment procedure, available to groups as well as individual Se.

Consequently, in moving away from this approach the desensitization study of Experiment II attempted to remove the observed plateau effect by modifying speech- or stutter-related anxiety. The evidence suggested a lowering of subjectively reported tension associated with the various speech situations desensitized, along with possible changes in non-fluency production, although any direct manipulation of the speech R was at no stage attempted. Since difficulties were met in using a fairly restricted yet commonly adopted definition of nonfluencies, it was decided in attempting further investigation of desensitization as a possible therapy mode to use all 8 aspects of the stuttering instance definition as outlined by Johnson *et al.* (1963).

In linking the two earlier experiments, the present study examined the feasibility of combining desensitization (D) and operant (O) procedures within a treatment mode. It was considered possible that both additive and interactional effects of this treatment combination might facilitate recovery from stuttering within a therapeutic context.

A specific speech situation "Talking to a stranger" was selected as the target of the therapy process. It was envisaged that a later extension might be made to a wider range of situations in a follow-up study with the focus on treating the "total" stuttering problem. Preliminary observations had indicated that the speech situation "Talking to a stranger" evoked stress in most stutterers when asked to itemize speech anxiety situations. All Ss from Experiment II had included this situation in their

hierarchies, and observation showed an overall high rating made by the Ss in terms of the "subjective units of disturbance" evoked by the thought or experience of "Talking to a stranger." It was therefore assumed that at least two Rs to be modified would be evoked, viz. both actual nonfluencies produced and the speech or situation related anxiety experienced as the S experienced the task in question.

In relating this study to the previous two studies several research questions were posed for investigation:

- (1) Was the change in anxiety and/or stuttering due to the actual desensitization component per se in Experiment II?
- (2) Could the relaxation training, considered a necessary precursor to desensitization, produce a change in R as a variable in its own right?
- (3) Could the "punishment" contingency, implied by Experiment I as a possible modifier of nonfluencies, actually produce a decrement of its own accord without being part of a discrimination procedure as in FR + P?
- (4) Could this "punishment" contingency be made more effective by linking it with relaxation and desensitization, or to relaxation alone, in the therapy process?
- (5) What would the effect of "practice alone" be versus the corresponding "punishment" contingency used in operant manipulation of nonfluencies?

From such considerations four variables emerged as the foci of systematic investigation, the experimental design controlling the actual speech situation (Talking to a stranger) to allow standardized comparisons in establishing

treatment effects:

- a) RELAXATION (Rel) training prior to desensitization.
- b) DESENSITIZATION (D) to the speech situation  
"Talking to a stranger".
- c) OPERANT (O) manipulation of the nonfluencies  
evoked within the situation "Talking to a stranger".
- d) PRACTICE (Pr) production of speech within the  
situation "Talking to a stranger" with no operant  
manipulation of nonfluencies - a necessary control  
in order to assess any "true" operant effects.

i) Initial Conception of the Experimental Design

In partialling out possible differential singular, additive and interactive effects of the four variables Rd, D, O and Pr, an interactive research design with multiple controls was conceptualized. This was seen in two parts. PART A held "relaxation" constant and manipulated "desensitization" and "operant" vs. "practice" as experimental variables. PART B used 5 individual control groups in a subsidiary analysis to support singular experimental effects and isolate control variable effects. Evaluation of "true" conditioning effects was considered via a split-analysis.

PART A: (4 equal groups of 6 Ss)

Desensitization (D) and operant (O) manipulation were examined for additive and interactional effects in a 2 x 2 design. Table III:1 indicates the conditions with presence (+) or absence (-) of D and O as shown. The practice (Pr) condition controlled for the effect of verbal interaction per se and the "time-between-treatments" factor.

## DESENSITIZATION (D)

		+	-
OPERANT	+	Grp. 2: Rel + D + O	Grp. 5: Rel + O
	-	Grp. 1: Rel + D + Pr	Grp. 4: Rel + Pr

TABLE III:1 Allocation of groups in a two-factor design for assessment of treatment variables D and O.

Relaxation (Rel) was held constant across the groups, being a necessary precursor to D. Random group allocation and initial S matching across groups enabled the application of a parametric Two-way Analysis of Variance (AOV) to indicate group comparability on initial scores and to partial out main experimental treatment and interaction effects using final performance scores.

PART B: (5 equal groups of 6 Ss)

Five matched and randomly assigned control groups were used to elucidate differential treatment and control variable effects and to support any main effects: (The necessity of control groups in identifying desensitization effects was demonstrated by Nawas, Mealia and Fishman (1971), e.g. their "relaxation only" control).

- (1) N: "no treatment" or time control - where no experimental variables or treatment components were introduced. (Group 6)
- (2) O: "operant" only - tested specific manipulation of the speech R as a treatment variable per se using "secondary punishment" contingent on nonfluencies. (Group 7)
- (3) Pr: "practice" only - controlled for the practice inherent in the speech R evoked under operant manipulation. (Group 8)
- (4) Rel: "relaxation" only - tested the possibility of this component (basic to the desensitization process) producing a change in speech or tension level in its own right. (Group 3)
- (5) Rel + O + D: "reverse order" control - reversed the order of the two treatment variables used in the main treatment condition Rel + D + O in PART A. (Group 9 - previously Group 6)

Compared with Rel + D + O from PART A, the fifth control group Rel + O + D gives an indication of the ordering effect of D preceding the actual experience of the situation under direct operant manipulation of the speech evoked (O). These 6 Ss came from the previous Group 6 under the N control condition to give the 9th condition. Data from the first 4 groups could be analysed with a One-way AOV to support group comparability using initial scores and then to show differential

variable effects using final performance scores. Table III:2 presents 8 possible comparisons that would be subsidiary to the main analyses. Expected effects are shown in relation to the possible effects of operant manipulation (O) and anxiety modification (Rel).

Comparisons	GROUPS UNDER COMPARISON		Expected effect
	Variable	Control	
(1)	Gp.3: Rel	Gp.6: N	Relaxation (+)
(2)	Gp.7: O	Gp.6: N	Operant (+)
(3)	Gp.8: Pr	Gp.6: N	Practice (Nil)
(4)	Gp.7: O	Gp.8: Pr	Operant (+)
(5)	Gp.5: Rel+O	Gp.7: O	Relaxation (+)
(6)	Gp.4: Rel+Pr	Gp.8: Pr	Relaxation (+)
(7)	Gp.5: Rel+O	Gp.3: Rel	Operant (+)
(8)	Gp.4: Rel+Pr	Gp.3: Rel	Practice (Nil)

TABLE III:2 Between group comparisons using control groups and experimental variable groups to partial out specific effects.

ii) A more viable Conceptualisation of the Design in the light of the evidence

The data obtained and the preliminary results from the above split-analysis design suggested that a more viable mode of representing the design would be to use "planned comparisons" as the analytical form. Divergence from the more "traditional" approach of using ANOV gave essentially no conflicting results. Instead treatment effects became more directly available for



interpretation. The results reported are consequently those obtained from planned comparisons.

This design adopted post hoc designated four main independent variables with respect to treatment given or withheld. The dependent variable was represented by percentage decrease in nonfluencies on the speech measures; or the other various test measures relating to anxiety and adjustment processes (see 6.2 ii) on page 118).

In brief the independent variables were:

<u>TREATMENT</u>	Levels:	<u>Given</u>	<u>Withheld</u>
Relaxation		Rel(+)	Rel(-)
Desensitization (to "Talking to a Stranger")		D (+)	D (-)
Operant conditioning ("punished" for nonfluencies when "Talking to a Stranger")		O (+)	O (-)
Practice (at "Talking to a Stranger")		Pr (+)	Pr (-)

Of the 16 possible treatment combinations ~~eight~~ were investigated. Since desensitization required the prior experience of relaxation no group received Rel(-) + D (i.e. "D only"). "Practice alone" was instituted to control for the practice effect inherent in the operant condition. The design can be seen in Table III:3 which indicates both the tested and untested treatment combinations.

Effect of temporal order of Rel, D and O could be tested by comparing Group 2 (Rel + D + O), receiving the normal order proposed to minimize anxiety, against Group 9 (Rel + O + D). As mentioned previously, Ss for this latter

group came from the no-treatment control group (Group 6). In this case analysis used an independent samples t test independently of the main design.

		Rel(+)		Rel(=)	
		D(+)	D(-)	D(+)	D(-)
O(+)	Pr(+)	-	-	-	-
	Pr(-)	Group 2	Group 5	-	Group 7
O(-)	Pr(+)	Group 1	Group 4	-	Group 8
	Pr(-)	-	Group 3	-	Group 6

TABLE III:3 Derivation of treatment effects using planned comparisons for the basis of the experimental design.

The main analysis involved a series of planned comparisons, with tests for each of the treatment effects and some of their interactions (Hays, 1963). To do this the eight within-group variances were combined to utilise all the available degrees of freedom for the estimation of error variance. In summarising the relevant comparisons seven experimental hypotheses were tested. These are postulated below; along with the various limits indicated in relation to "nesting" of variables, and the groups contrasted.

(a) Hypotheses

- A. Relaxation treatment (Rel +) improved performance more than no relaxation treatment (Rel -)

(no S involved in this comparison received desensitization)

<u>Comparison:</u>	Groups 3	Rel	vs. 6	N
	4	Rel+Pr	8	Pr
	5	Rel+O	7	O

- B. Desensitization treatment (D+) improved performance more than no desensitization treatment (D-)

<u>Comparison:</u>	Groups 2	Rel+D+O	vs. 5	Rel+O
	1	Rel+D+Pr	4	Rel+Pr

- C. Operant treatment (O+) improved performance more than no operant treatment (O-)

(no S involved in this comparison received desensitization or practice treatments)

<u>Comparison:</u>	Groups 5	Rel+O	vs. 3	Rel
	7	O	6	N

- D. Practice (Pr+) improved performance more than no practice (Pr-)

(no S involved in this comparison received desensitization or operant treatments)

<u>Comparison:</u>	Groups 4	Rel+Pr	vs. 3	Rel
	8	Pr	6	N

- E. The combined effect of relaxation and operant treatment (Rel+O) improved performance more than the sum of the effects of the two treatments given separately (Rel+), (O+)

(no S involved in this comparison received desensitization or practice)

Comparison:    Groups 5    Rel+O        vs. 3    Rel  
                                6    N                          7    O

- F.    The combined effect of relaxation and practice treatment (Rel+Pr) improved performance more than the sum of the effects of the two treatments given separately (Rel+), (Pr+)

(no S involved in this comparison received desensitization or operant treatment)

Comparison:    Groups 4    Rel+Pr        vs. 3    Rel  
                                6    N                          8    Pr

- G.    The operant treatment (O+) improved performance more than practice (Pr+)  
  
(all Ss involved in this comparison also received relaxation treatment)

Comparison:    Groups 2    Rel+D+O        vs. 1    Rel+D+Pr  
                                5    Rel+O                          4    Rel+Pr

(b) Mode for Calculation of Comparisons

The various weighting values (w) appropriate to the seven comparisons are set out in Table III:4.

Group	Comparison						
	A	B	C	D	E	F	G
1	0	$\frac{1}{2}$	0	0	0	0	$-\frac{1}{2}$
2	0	$\frac{1}{2}$	0	0	0	0	$\frac{1}{2}$
3	$\frac{1}{3}$	0	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	0
4	$\frac{1}{3}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$
5	$\frac{1}{3}$	$-\frac{1}{2}$	$\frac{1}{2}$	0	$\frac{1}{2}$	0	$\frac{1}{2}$
6	$-\frac{1}{3}$	0	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	0
7	$-\frac{1}{3}$	0	$\frac{1}{2}$	0	$-\frac{1}{2}$	0	0
8	$-\frac{1}{3}$	0	0	$\frac{1}{2}$	0	$-\frac{1}{2}$	0

TABLE III:4 Weighting values (w) appropriate to the different groups in relation to each planned comparison

For each comparison, separately, the following formulae were applied:

Given: w = weighting value from Table III:4

x = group mean

S = group standard deviation (Population estimate)

Formulae:

1)  $C = \sum w \cdot x.$

This is the value of the contrast, i.e. the difference in improvement due to the effect tested

2)  $E = \sum S^2/s$

This is the within-group error estimate, and is the same for all comparisons

$$3) t = \sqrt{c^2 \cdot n / (E \cdot \sum W^2)}$$

This gives the calculation of the t value where  $df = 40$  and  $n = 6$ , to test for significance of the difference in improvement. For Comparison A the value of  $\sum W^2$  is  $2/3$ , and 1 for Comparisons B to G.

This study used male Ss to keep the sex factor constant in comparing results with the two previous studies. Matched equal numbers in the 3 different S groups (one group used twice as previously explained) enabled parametric statistical analysis of an order not amenable to the previous studies. Also the E variable was more adequately controlled by using taped "relaxation" and "desensitization" procedures. However, the two conditions "operant" and "practice" could only be feasibly introduced "live" as the S spoke in the real situation "Talking to a stranger". The "stranger" variable was controlled (as shown in 6.2) for both the O/Pr treatment segment and the before/after test measures also taken of "Talking to a stranger". Instances of nonfluency were determined using the full definition of Johnson *et al.* (1963). The actual response data used in all the analyses discussed came from a battery of before/after test measures which aimed to assess more fully the overall change produced not just in production of nonfluencies but in varied aspects of the stuttering R complex. Selection of the tests was somewhat arbitrary since few investigators have adopted a holistic assessment of therapeutic gain in the past. The choice of procedural details for the various treatment models was

based on the work by Nawas and his colleagues on desensitization of snake phobia. Firstly, the practicability of a taped procedure for Rel and D was established by Miller and Nawas (1970). The facilitation of relaxation by this means was discussed by Martin (1970). Massing of trials within a D session was shown to facilitate systematic desensitization by Suinn, Edie and Spinelli (1970), and Suinn and Hall (1970). This provides a more economical procedure as suggested by Nawas, Welsh and Fishman (1970) and Nawas (1971). In contrasting a hierarchy, the necessity of desensitization of each item before proceeding to the next was circumvented by graded presentation of the stimuli in terms of exposure time. Presentation did not follow an exact sequence of hierarchical ordering in relation to the anxiety arousing properties of the stimuli (Ihli and Garlington, 1960; Miller and Nawas, 1970; Nawas, Fishman and Pucel, 1970). Rather standardisation of the procedure was adopted (Nawas, Fishman and Pucel, 1970; Nawas, 1971; Melamed and Lang, 1967). Relaxation training was incorporated to facilitate desensitization by making relaxation more reinforcing than anxiety (Premack, 1969). This assumed maximization of nonreinforcement of any exposure to anxiety-arousing stimuli, by increasing the probability of anxiety-competing Rs (Wilson and Davison, 1971). It was considered vital to this process to establish relaxation as an integral part of the S's behavioural repertoire.

The assumed reliability of using a short-term desensitization procedure was supported by evidence from Suinn, Edie and Spinelli (1970) and Suinn and Hall (1970)

indicating that complete desensitization could be effected in a 24 hour period for test-taking anxiety. Locke (1971) reviewed the implication that desensitization affects autonomic reactivity. An implicit premise was suggested that "the patient's conscious purposes affect the actions of his body (muscles)" (Locke, 1971, p. 322). Evidence from Farmer and Wright (1971) and Costello (1971) supported this contention. Consequently, the inherent roles of cognitive and social variables in the desensitization process were deliberately used as facilitatory influences in this study (Locke, 1971; Valins and Ray, 1967; Wilkins, 1971, 1972; Wolpe, 1969, 1970). The study of McGlynn and Mapp (1970) gives an example of the influence of expectancy on treatment outcome.

In this context, the role of the therapist (Kraft, 1971; Locke, 1971, p. 324) appeared a vital factor influencing the results. A special effort was maintained by the therapist in this study to (1) induce trust in the S by reference to the expected "learning effects" within a scientific rationale presented to the S, and (2) to minimize dependence on both the E and therapy situation by reinforcing the idea that the S was "his own master". The S was told the "learning processes" would work if he was patient and determined in meeting all the experimental requirements. Generalization of desensitization from the therapy situation to real life was presented as an expected concomitant of the learning process (Cotler and Garlington, 1969; Ihli and Garlington, 1969). This became a possible additional



motivating factor to maintain the S's attention and cooperation in complying with all the experimental demands.

It is readily seen from the preceding two paragraphs that both implicit and explicit demand characteristics would appear to be operative in this study (Orne, 1969; Wilkins, 1973). Hopefully the "good" data recognized as expected by the "good" subject (Orne, 1969, p. 145) would act as a variable effecting each experimental group to a certain degree, but still allowing partialling out of treatment effects above a baseline of expected "good responding" per se. However, in this program practical considerations would make it most difficult to show whether this expectancy factor did have such an implied general facilitatory influence, or whether in fact its overall effect was tied to the demand unique to each experimental treatment variable. For instance, on a priori grounds, N can be seen as virtually a non-demand situation whereas Rel + D + O might be considered high-demand in terms of expected R change, i.e. in fluency, anxiety indicators, etc. This follows from a simple consideration of the interaction inherent under the differing conditions. As such it must be borne in mind when any apparent differential effectiveness of the procedures is suggested by the analysis.

## 6.2. METHOD

### 1) Subject Selection and Allocation

48 male Ss in the age range 15-37 years, with mean age 23.0 years volunteered for the program. They came from a pool of Ss who contacted the E in response to a radio

and television interview concerning the E's previous and planned research.

Age means and ranges in years for 8 groups of 6 Ss were:

(1) 24.0 (18-34)	(2) 22.0 (15-32)
(3) 22.7 (15-34)	(4) 22.8 (16-32)
(5) 22.8 (16-32)	(6) 23.0 (18-32)
(7) 27.7 (17-32)	(8) 24.3 (19-37)

Ss were randomly assigned to groups, then cross-matched for age and occupational/social status criteria using a 1 to 6 rating scale to order the 6 Ss within each group. An outside observer did an independent rating to support the validity of the E's categorization. The ratings from E and independent observer only differed in any instance by one rating unit. In this case, both raters re-assessed the nominal data to decide the most likely rating for that S, interpolating both 1 to 6 ratings for age and perceived status.

The 8 groups were then assigned at random to the experimental conditions. On establishment of no positive R change after the necessary time-lapse the "no treatment" (N) control group was used for the reverse order (Rel+O+D) condition to provide the 9th experimental condition.

All Ss completed the program. Total treatment period was controlled across groups, so that all experimental components were experienced in the same time sequence and with comparable time lapse from before-treatment assessment. The "maximal treatment" condition Rel+D+O (or Pr) determined the time lapses necessary for the other conditions. Treatment

sessions were spaced at approximately weekly intervals, giving a maximum total number of 7 sessions completed in a minimum 7 week period. Session distribution followed the order:

Session 1 : Interview and before-treatment assessment	<u>BT</u>
Session 2 : Relaxation training	<u>Rel<sub>1</sub></u>
Session 3 : Relaxation training plus imagination training	<u>Rel<sub>2</sub></u>
Session 4 : Mind relaxation training	<u>Rel<sub>3</sub></u>
Session 5 : Specific desensitization	<u>D</u>
Session 6 : Operant manipulation of the speech R or practice control	<u>O/Pr</u>
Session 7 : Post treatment assessment and instructions for an advanced treatment program	<u>PT</u>

The experimental manipulation under the 9 conditions is summarized in terms of sessions in Table III:5.

		EXPERIMENTAL GROUPS									
		SESSION	1	2	3	4	5	6	7	8	9
Contin- gencies imposed in relation to a time sequence	1	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT
	2	Rel <sub>1</sub>	Rel <sub>1</sub>	Rel <sub>1</sub>	Rel <sub>1</sub>	Rel <sub>1</sub>	N	N	N	Rel <sub>1</sub>	
	3	Rel <sub>2</sub>	Rel <sub>2</sub>	Rel <sub>2</sub>	Rel <sub>2</sub>	Rel <sub>2</sub>	N	N	N	Rel <sub>2</sub>	
	4	Rel <sub>3</sub>	Rel <sub>3</sub>	Rel <sub>3</sub>	Rel <sub>3</sub>	Rel <sub>3</sub>	N	N	N	Rel <sub>3</sub>	
	5	D	D	N	N	N	N	N	N	O	
	6	Pr	O	N	Pr	O	N	O	Pr	D	
	7	PT	PT	PT	PT	PT	PT	PT	PT	PT	

TABLE III:5 Experimental conditions distributed according to sessions and S groups.

### ii) Definition of the Response

Stuttering was defined according to the 3 criteria of Johnson et al. (1963) for the identification of specific speech nonfluencies, as outlined in Chapter 2 of this study. In addition a battery of before/after measures was administered to elucidate various changes in the total stuttering R complex:

#### (1) Johnson Job Task (Spontaneous Speech): JJT(SS)

The S was required to speak spontaneously into a tape-recorder for 5 mins. about his occupation (Johnson et al. 1963) Percentage stutters in relation to total words spoken and total word rate in words/min. were computed.

#### (2) Specific Situation Test: 10 minutes "Talking to a stranger" :SST

Immediately after test (1), the S was told he was "to talk to someone whom he had never met before" about "anything he liked" for 10 minutes. An experimental assistant acted as the listener (stranger). The procedure was repeated in the post-treatment testing situation. The S was unaware that the "stranger" was under instructions to refrain from leading the conversation and to interact only in a passive manner. When silence ensued the S was forced to break the silence as the stranger waited for the S to steer the verbal interchange. Questions from the S were answered as briefly as possible, or "thrown back" on the S for comment. Reliability in using this method could be estimated by taking nonfluency and speech rate ratings from

tape-recorded samples and repeating the process after a time lapse, using correlational analysis as reported in the results. However, the validity of the test could only rest on the assumption that within the time given (10 minutes) some adequate sampling of each particular S's speech would be obtained in both the pre- and post-treatment conditions. Circumstances and intra subject variability could well have made this a nonsensical assumption, but no test of this was available within the confines of this study.

The aim was to create a stressful speech test situation. It was assumed that this would test the strength of any newly acquired change in R by making breakdown more imminent as situational anxiety made stuttering more probable (Toomey and Sidman, 1970). Initial adjustment to the condition "before treatment" was to be compared with "final performance" to indicate any enhancement of the S's ability to cope after treatment intervention. Three different strangers (two aged 25 and one 28 years) were used, with the allocation to a particular S randomly derived for the before-treatment and post-treatment tests, as well as for the operant (O) and practice (Pr conditions). This allocation reduced the probability of habituation to the stranger accounting for any fluency enhancement after treatment.

(3) Lanyon Stuttering Severity Scale (Lanyon, 1967) : LSS  
(Appendix II:8)

As mentioned briefly in Experiment II, this was a 64 item true/false inventory giving an ordinal final score

corresponding to the S's perceived severity of his speech problem along both behavioural and attitudinal dimensions. This provided an independent criterion measure of overall stuttering severity, including both primary and secondary factors, which could be compared with the primary indicator of severity, viz. stuttering percentage in conjunction with slowness in speech production. Lanyon (1967) reports a reliability of 0.93 in using this scale. Validation in distinguishing stutterers from nonstutterers gave a stable mean difference (39.2 compared with 12.0) between the two groups, with a wide range of scores within the group of stutterers (21-57). Correction for defensiveness of social desirability response set did not enhance the validity. Despite the large proportion of items expected to be "keyed" true with increasing stuttering severity, the final scale of 64 items surviving empirical validation from the original 120 items appears to offer a viable measure of stuttering severity. It is considered the best available for present purposes.

(4) Taylor Manifest Anxiety Scale (Janet Taylor, 1953) :

MAS (Appendix II:7)

As seen in Experiment II, this 50 item true/false inventory sampled manifest anxiety rather than underlying "trait" anxiety. Tendencies were revealed toward worrying, emotional lability, lack of confidence, and reactivity to internal and external stress. In addition, various aspects of the "self-concept" were available for evaluation. The aggregate score placed the individual on a scale designating

his "manifest anxiety" level. Median data available for normal, psychotic and neurotic Ss enabled tendencies toward "abnormal" reactivity to be identified in Ss with high scores.

The validity of using this scale as a stable measure of manifest anxiety remains such a matter of the experimenter's judgment that these particular items reflect the type of anxiety observed in conjunction with the behaviour under study - in this case, stuttering. Originally drawn from the Minnesota Multiphasic Personality Inventory through a clinician selection procedure the 80 items are reported to give a retest reliability of between .8 and .9 (Taylor, 1953). The scale has not been exhaustively standardized or validated or published in the usual test form. It does not appear to have any special merit in the individual clinical case as a diagnostic or predictive tool (Cronbach, 1961, pp. 477-8).

However, a closer examination of the items suggests that the scale lends itself to group comparison procedures in the present study. It appears to sample those sensitivity areas that might be predicted to accompany stuttering - including such factors as inability to cope with stress, lack of confidence and avoidance of social situations which are so readily reported by stutterers themselves as debilitating factors in their everyday lives (as discussed in the preliminary chapters to this investigation). Since Kraft (1971) has also shown this scale to be useful in measuring R changes when desensitization is employed as a treatment mode, the adoption of this measure in the present study is supported.

(5) Sheehan Sentence Completion Test (Griffith, 1969) :

SCT (Appendix III:1)

From Sheehan's (1958) 80-item sentence completion (SCF), Griffith (1969) derived a scoring key dividing the Rs into 6 categories. Category types and number of relevant items under each type were:

- Category I : Feelings toward others (16 items)
- Category II : Emotional states or attitudes (11 items)
- Category III : Stuttering or speech behaviour (12 items)
- Category IV : Self-referent attitudes (25 items)
- Category V : Abstract and miscellaneous concepts (9 items)
- Category VI : Family relationships (7 items)

By examining the content of the eliciting items, Griffith (1969) proposed two possible uses of the scale that lend themselves to investigation (p. 347):

- a) Use of the SCT index as a possible correlate of stuttering severity, i.e. an index of initial severity of the problem.
- b) Use in a therapeutic sense as an indicator of change resulting from institution of a therapy process, i.e. an indicator of recovery.

This study used Griffith's (1969) ordering of the 80 sentence roots (pp. 347-349). Data on the reliability and validity in using this measure is not available. The interpretation of what the actual written responses do reflect in terms of adaptive or maladaptive self-perception on the part of the S remains a judgment of the therapist. It was prepared



as a diagnostic supplement to indicate how stuttering behaviour affects the stutterer's view of himself and his relationships with others. Clinical usefulness was extended by using the instrument as an indicator of change during therapy where the focus of attention was the change in self-perception. It is as the latter that the scale was adopted in the present study, rather than as a sensitive instrument measuring total change in the stuttering response. The implied limitation on response interpretation was recognized. Yet it was felt that if the stutterer "as a person" changed in his outlook and reactions to his environment as changes in his speech behaviour affected his total communication process, then the SCF might provide an indicator of such changes.

(6) Specific Situation SUD Scale : Spec SUD

Using an ordinal procedure, a "subjective anxiety" scale was constructed in terms of "subjective units of disturbance" (suds) that would be evoked in the S by various aspects of the experimental speech stress situation. Wolpe's (1969, p. 116) method of derivation was used to measure the S's perceived stress evoked by the test situation "Talking to a stranger".

The seven selected aspects of this stimulus situation appear below. They were rated by the S on a scale from 0 to 100. The score 0 represented the state of "absolute calm"; 100 represented "the worst anxiety, tension or pressure" the S had ever experienced or could imagine experiencing. Format of the scale was:

	<u>S's rating</u>
A. Being introduced by someone to a stranger	_____
B. Beginning a conversation with a stranger you have just met	_____
C. Continuing a conversation with a stranger by chatting about yourself, finding out about the stranger as a person, and discussing topics of interest	
FOR 2 mins	_____
5 mins	_____
10 mins	_____
20 mins	_____
30 mins	_____

The scores entered by the S gave an estimate of the predicted "suds" for

- a) the before/after 10 min test situation (i.e. for R measure (2) cited earlier)
- b) the 30 min period used for the operant/practice (O/Pr) conditions, and to which specific desensitization was made for groups receiving the D treatment component.

Items C(3) and C(5), respectively, corresponded to the test (a) and treatment (b) conditions. The desensitization procedure for groups with D in common followed the format of this "sud" scale to give a standard hierarchy.

- (7) The 16 Personality Factors Profile (Cattell, 1962, 1970) : 16PF (Bipolar scales appear in Appendix III:2)

Ss completed Form A of the 16PF test before and after treatment. The 16 primary factors were assessed and the second order factors and criterion measures derived for Anxiety, Neuroticism, Ecvia (Extraversion), Independence, Leadership and Psychoticism.

The possible effects of treatment on underlying "trait" anxiety and the social aspects of the individual's personality were open to investigation. The sample of 48 Ss enabled the derivation of a profile for stutterers that could be compared with speech-disordered and pathological norms (Cattell, 1970) of a neurotic type. With regard to primary scores emotional and social effects of stuttering on the personality were seen as possibly producing the following pattern with regard to 8 of the 16 primary factors:

- (a) Factor A : low scores - reflecting a reserved social responsiveness
- (b) Factor C : low scores - indicating emotional lability and changeability
- (c) Factor E : low scores - a submissive, dependent yet considerate nature
- (d) Factor F : low scores - an incommunicative, introspective, reflective type
- (e) Factor H : low scores - indicative of timidity, emotional caution and restricted interests
- (f) Factor O : high scores - reflecting an anxious, depressed, lonely type

- (g) Factor  $Q_2$  : high scores - implying high self-sufficiency developed of necessity in order to make adjustments
- (h) Factor  $Q_4$  : high scores - indicative of a high general tension level

In relation to second order factors it was considered that the stutterers' concern over their problem and with perceived attitudes of others might be revealed in higher Anxiety scores than average (above a sten score of 6.5, being one standard deviation above an expected mean score of 5.5); a tendency away from Extraversion to a more introverted personality (below the 4.5 sten score on Exvia, representing one SD below the expected mean 5.5); low Leadership scores (below the 4.5 sten score) due to restricted social activity and integration; high Independence (above a sten score of 6.5) because of a tendency toward "self-preservation" Es. Pathological disturbance could be implied from high weightings on Neuroticism and Psychoticism indices (above a sten score of 7.5, representing two Sds above the mean 5.5).

The extensive investigations reported in the most recent Handbook for the 16PF (Cattell, Ever and Tatsuoka, 1970) support the use of this measure as a valid and reliable indicator of a set of personality traits. Earlier studies reporting low reliability in particular sub-scales (Cronbach, 1961, p. 497) and questioning factorial homogeneity (Levonian, 1961) have been superseded by more recent establishment of (a) test-retest reliability over

4-7 days within the range .61 - .83 (N = 146), over a two month interval .63 - .88 (N = 132), and over a four year lapse .21 - .64 (N = 432 and 204); (b) concept validity of the order .41 to .83 (N = 958), over the 16 different scales (pp. 30, 31, 36 of the 1970 Handbook).

#### iii) Conditioning Presentation and Experimental Procedure

Individual hour-length treatment sessions were spaced at weekly intervals, or longer in the case of 4 control groups (i.e. Rel, O, Pr, N) or the absence of D (Rel+O and Rel+Pr). The initial interview involved the completion of a history-taking questionnaire (Martyn and Sheehan, 1968) and the 7 tests for before-treatment assessment. Subsequent sessions introduced the treatment procedures:

##### A. RELAXATION TRAINING (Rel)

Ss receiving Rel as a treatment component began training in Session 2. Three taped procedures provided standardisation across groups, with a female voice giving relaxation instructions against a "soft" music background. An example transcript (Rel<sub>1</sub>) appears in Appendix III:3. A summary of the concepts introduced and procedures used in the 3 training sessions follows:

##### (a) SESSION 1: INTRODUCTION of Relaxation Training

- a) An overview of anticipated benefits of relaxation.
- b) Explanation for taped presentation in terms of:

1. Strict timing of instructions to the brain.
  2. Greater likelihood of relaxation if the therapist were not present for most of the time while the S was learning to relax.
  3. Heightened probability of internalization of instructions, so that dependence on the therapy situation is minimized - the S becomes his OWN master.
- c) Reassurance that there was "nothing to be afraid of". The S was told the "mind" would be aware and in control; at any time he could get up and "walk out", but this would defeat his purpose in seeking therapy.
- d) Introduction to the taped procedure. The S was asked to rest in the recliner chair in a symmetrical position with eyes closed. After the tape was turned on, the therapist came in once in a while to check that the S had not gone to sleep, the tape was running on right volume, etc. The S was forewarned, and told that he was to take notice of nothing except the voice on the tape, and the music background when the voice was not heard. Relaxing was presented as being "learnit" not so much by trying, as trying "too hard" could heighten anxiety. Instead it was to involve a process of "letting go" by the S as he cooperated, with the realization that it was to his own benefit to be positive rather than sceptical.

in his attitude toward the therapy. The S was told of the success with previous patients (Experiment II) and that he would be very unlikely to prove an exception.

- e) RELAXATION TAPE I involved: (30 mins) Rel<sub>1</sub>  
General instructions to relax and get over initial fears and doubts.  
Specific instructions to relax various parts of the body in turn - with stress on gaining deep physical relaxation, so that all muscles were in a "resting state".  
Introduction to imagery - imagining pleasant scenes only, for 5-10 secs.  
Tension exercise of muscles in arms (see Lanyon manual, Appendix II:1), in order to demonstrate the vast difference between tension and relaxation states in the body. The aim was to be the opposite of tension.  
Introduction to some "mind" relaxation in a pleasant soothing way.  
 A recapitulation of the physical relaxation sequence; plus instructions to practise relaxation for a half hour daily.
- f) In closing the session, the E stressed that relaxation practice was vital to the success of the program - without it failure could be expected. The S received the summary sheet

for relaxation inducement used in Experiment II (Appendix II:2); plus a four foolscap page "relaxation overview" (Appendix III:4). This outlined the processes presented more fully and suggested how to incorporate relaxation into a daily routine and achieve the chain R RELAXATION → CALM → CONFIDENCE → STRENGTH which would enable the S to face stress situations and cope adequately with everyday problems (Proctor and Malloy, 1971).

Considerable importance was accredited to the "advice, reassurance, support, encouragement and clarification" (Wolpe and Lazarus, 1968, p. 27) given by the therapist, both directly and indirectly. The technique of persuasion (Locke, 1971, p. 321) was used in this way to precondition the S for therapy manipulation. Ss were given Practice Report Sheets similar to the one in Appendix III:5 to complete each day and return to the therapist at the next session. A crucial issue becomes the inevitability of demand characteristics being invoked by such procedures. This has already been alluded to (p. 120) and will be taken up again in the discussion of the results.

(b) SESSION 2: Relaxation Training continued with  
Specific IMAGINATION Training

- a) A check on relaxation practice done over the last week, with examination of the practice report sheet and explanation of difficulties. Stuttering and general tension level report.



- b) Instructions that the tape would ask the S to tense and relax the rest of the major muscle groups involved in nervous system tension states. The aim was to increase his awareness of nervous system reactivity in order to recognize the type of relaxation that would lead to the desired relief from tension.
- c) Complete outline of the details of imagination training, with instructions to practise this skill during daily relaxation practice sessions. The S was to aim at switching on an image in the mind as though "really there" at the command "IMAGINE", and then to switch it off and return to relaxing when told to "STOP IMAGINING".
- d) RELAXATION TAPE II involved: (40 mins) Rel<sub>2</sub>  
 General physical relaxation  
 Specific physical relaxation, then more emphasis upon mental relaxation  
Tensing/relaxing of muscle groups (legs, hips and stomach, neck and shoulders, face) with aim to retain depth of relaxation in between tensing  
Imagination training - 5 to 10 sec. presentations of pleasant or neutral images  
Recapitulation on physical and mental relaxation  
 Reminder of the necessity of practice, patience,

and determination. Basically the learning of both relaxation and imagination "as a skill" was stressed. The maxim "SKILL IS PRACTICE" was presented as a guiding principle and motivator.

(c) SESSION 3: Relaxation Training COMPLETION

- a) A check on practice; examination of report sheets; questions answered.

Report on stuttering and general tension level.

- b) Instructions to consider the tape as a MODEL of the relaxation to be adopted in all following sessions and everyday life.

- c) RELAXATION TAPE III involved: (30 mins) Rel<sub>3</sub>  
Less time given to physical relaxation - the initial 5 mins.

Major emphasis on mental relaxation, and the adoption of this approach as an ATTITUDE TO LIFE offering potential benefits to everyday living.

Aim of inducing a state of relaxation enabling "thoughts to become still" with an associated sense of peace and inner calm.

Time, space, and identity presented as not relevant to the present task in hand, viz. relaxation and enjoyment of the same.

Telling the S to "really LET GO" in order to "break down" any remaining resistance.

- d) The summary guides were again called to the S's attention in order to heighten the

probability of achieving deep mental relaxation in the shortest possible time.

- e) In concluding, the E stressed relaxation was the KEY TO SUCCESS for the rest of the treatment sessions. The benefit of using relaxation in a controlled systematic way in the later desensitization session (for Ss under that condition) was proposed as even greater than general use of relaxation.

As Locke (1971, p. 322) noted, the S's "awareness", "intellect", "self-concept" and "emotional reactions" were all implicitly invoked in the proposed modification of the S's reactivity to stress and the subsequent adoption of internalized control of autonomic reactivity (Proctor and Malloy, 1971).

#### B. DESENSITIZATION (D) : (50 mins.)

Aimed at the specific speech situation "Talking to a stranger for 30 mins."

Three groups (Rel+D+O, Rel+D+Pr, Rel+O+D) were desensitized to this specific speech situation using a standardised tape with massed practice of the 7 different aspects appearing in the Spec SUD Scale, i.e. A, B, C(1) to C(5).

Ten minutes of relaxation induction was given. Then desensitization of each item was attempted by a 3, 3, 5, 10, 30, 60 second presentation sequence, with an inter-stimulus interval of 30 secs. in each case emphasizing

maintenance of mental relaxation as the R incompatible with any anxiety evoked by the stimulus presentation (Miller and Nawas, 1970). This graded presentation used: (1) as the lower limit the 3 sec. stimulus presentation after an anxiety R signal from Lanyon's (1968) manual; (2) as the upper limit the 60 sec. stimulus presentation successfully used by Nawas, Welsh and Fishman (1970) for all stimulus presentations.

Before being told to imagine a new stimulus item a 10 sec. period was allowed for the S to orient his thoughts to the situation by the instruction "think about" A, or B, etc. The tape concluded with a general relaxation induction and the suggestions that new Rs of "calm" and "ease of mind" might generalize from the situations imagined to their real life counterparts. In concluding the session, the E told the S to continue his daily relaxation practice till the E saw him again. Reassurance as to the effectiveness of the technique was given, but no specific instructions to carry on self-desensitization to this or other speech situations were given at this stage.

C. OPERANT CONDITIONING (O) : (30 mins.)

Aimed at specific manipulation of the speech R during actual involvement of the S in "Talking to a stranger for 30 mins."

For Groups 2 (Rel+D+O), 5(Rel+O), 7(O) and 9(Rel+O+D) operant manipulation of the speech R was attempted. From Experiment I contingent "punishment" was the only contingency

that might be assumed to have properties of an operant procedure for modification of the speech R. Instead of an array of 10 lights specific to the experimental task in Experiment I, a single red light of 1" diameter adapted the "punishment" principle to this study. While "Talking to a stranger for 30 mins." the S sat in an armchair facing the STRANGER seated at approximately 45 degrees four feet away as shown in Figure III:1.

The S had no prior knowledge that this behaviour would be required. On coming to the session a general assessment of stutter and tension levels was made. Then the E simply stated that the S was to talk to Mr. X for the next 30 minutes about anything he liked. The red light was positioned in the S's natural line of vision on avoiding eye contact with the stranger, and gave a brilliant red "flash" on activation. The S was told the light would come on every time he produced a nonfluency, both "normal" (e.g. hesitation) and characteristic of stuttering (e.g. repetition or block). Immediately after this instruction the STRANGER was introduced and the 30 min. "treatment" period commenced. The E was seated 10 feet to the side of the S and activated the red light for every nonfluency according to the S criteria of Johnson et al. (1963). A counter automatically recorded the number of "punishments" delivered.

As for Experiment I, the "punishment" was based on secondary reinforcement (Kinable, 1961) according to the "meaning" instituted by the E's instructions. The S was instructed to keep the red light "off", i.e. to reduce his

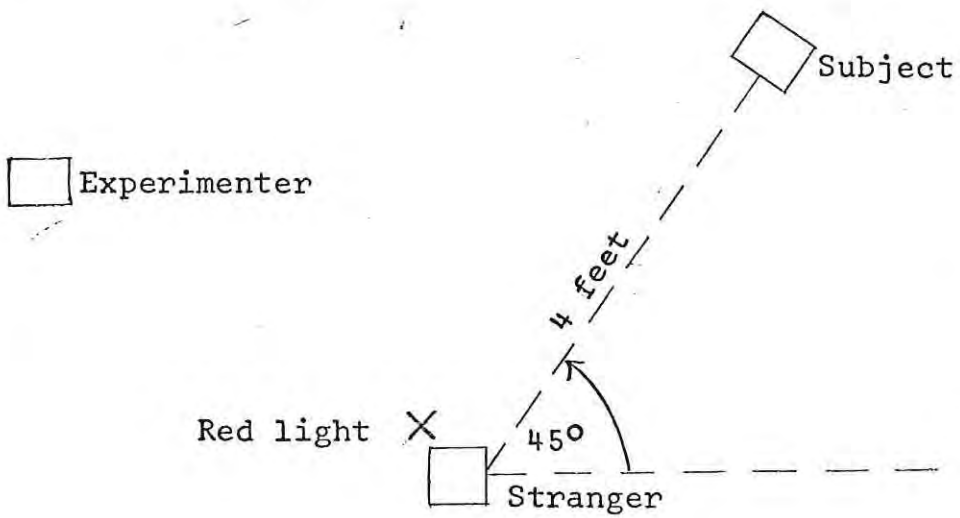


Figure III.1. Experimental Layout for the Operant Task.

nonfluencies. The aversiveness of the feedback from the light "flashes" implying the S was not functioning as directed, was assumed to act as a "punishment" stimulus at a cognitive level (Mahoney, 1970). At termination of the 30 mins. the S was told how many errors he had made. Instructions to continue relaxation practice till the next session were given to the appropriate groups (Rel+D+O, Rel+O, Rel+O+D). The control group (O) did not receive these instructions.

D. PRACTICE CONTROL (Pr) : (30 mins.)

Aimed at partialling out the true effect of operant manipulation by controlling for the practice effect over time.

The procedure was as for operant manipulation, except that the red light was not present and no instructions were given to the S to attempt nonfluency reduction. Nonfluencies were recorded by the E and the S was told his score at the end. The rationale presented the procedure as providing an opportunity to "try out" a stressful speech situation. For Ss previously under Rel this became a test of how the S could use his new "control" over emotional reactivity (Rel+D+Pr, Rel+Pr). Ss under Pr only were informed this was merely a "part of the normal therapy procedure". For all Ss the E's presence was explained as necessary only for recording. The conversation was to be between the S and the STRANGER as though the E were absent. As in the 10 min. test situation "before-treatment" measure, the pressure was placed on the S

to do all the talking by prior instruction to the stranger to act as a passive listener for most of the interaction. The resulting stress situation forced the S to speak in order to break the silence (Gould and Sheehan, 1967), and maximized the possibility of recording "true" experimental variable effects by evoking the stuttering R in question. Three different strangers were used with random allocation to Ss as described for the SST.

### 6.3 ANALYSIS AND DISCUSSION

Analysis collated data from the 7-test battery of before/after measures to test treatment and control variable effects. Reliability of E recordings of stuttering instances using the full definition of Johnson *et al.* (1963) was determined by correlating initial recordings from the JJT(SS) and SST with 30 sec. samples taken from the tapes 8 months later. The values  $r = 0.98$  ( $p < .001$ ,  $df = 46$ ) and  $0.97$  ( $p < .001$ ,  $df = 46$ ), respectively, indicated the reliability of these measures.

Table III:6 summarises the data for the 4 main treatment conditions for the 6 tests: JJT: SST: ISS: MAS: Spec SUD C(3), C(5) and combined "sud" scores; 16PF second-order-factors. Mean initial and change scores are reported with SD scores included in brackets within the block format:

Rel + D + O	Rel + O
Rel + D (+Pr)	Rel (+ Pr)

A change score was the difference between the final performance score and the initial score expressed as either a percentage of the initial performance level, or where appropriate as a direct difference score (16PF data).



TABLE III:6 Initial and Change Scores for  
the 4 main Treatment Conditions

TEST	Initial Scores				Change Scores			
	(+)	D	(-)		(+)	D	(-)	
<u>JJT:</u>					<u>% change</u>			
	(Gp.2)		(Gp.5)		(Gp.2)		(Gp.5)	
0(+)	49.7	(15.6)	29.2	(11.1)	59.2	(14.8)	39.4	(22.6)
	(Gp.1)		(Gp.4)		(Gp.1)		(Gp.4)	
0(-)	20.7	(11.3)	43.0	(12.7)	53.3	(20.3)	42.4	(19.5)
(% stutters)								
<u>SST:</u>					<u>% change</u>			
0(+)	51.3	(17.3)	33.0	(11.5)	68.6	(7.3)	51.8	(17.3)
0(-)	30.5	(6.8)	50.9	(11.8)	59.0	(16.0)	53.2	(24.6)
(% stutters)								
<u>ISS:</u>					<u>% change</u>			
0(+)	49.8	(4.6)	43.3	(7.7)	32.8	(27.0)	20.9	(22.1)
0(-)	40.8	(11.3)	45.0	(9.6)	36.8	(19.0)	25.4	(26.6)
<u>MAS:</u>					<u>% change</u>			
0(+)	19.0	(8.9)	18.5	(6.4)	17.9	(26.2)	7.2	(28.1)
0(-)	12.8	(5.7)	18.7	(7.2)	4.8	(18.7)	16.6	(30.2)
<u>Spec SUD:</u>					<u>% change</u>			
<u>C(3):</u>								
0(+)	35.8	(21.3)	28.3	(14.8)	-10.0	(76.4)	-28.0	(75.4)
0(-)	33.3	(22.1)	39.2	(24.2)	-35.6	(70.8)	28.5	(10.2)
<u>C(5):</u>								
0(+)	36.7	(22.1)	21.0	(24.8)	-7.6	(50.5)	153.2	(300.6)
0(-)	25.8	(17.9)	22.5	(12.2)	-13.9	(48.5)	16.1	(42.4)
<u>Combined Means:</u>								
0(+)	38.9	(18.5)	28.2	(11.3)	20.6	(38.4)	-25.1	(95.3)
0(-)	34.5	(21.6)	40.3	(18.1)	33.4	(66.3)	23.5	(24.3)

TABLE III:6 (continued)

	Initial Scores				Change Scores			
	(+)	D	(-)		(+)	D	(-)	
<u>16PF</u>								
<u>Exvia:</u>					<u>Difference score</u>			
0(+)	3.00	(0.99)	4.37	(3.02)	0.73	(2.34)	-0.42	(1.26)
0(-)	4.80	(2.42)	4.08	(1.85)	0.4	(1.08)	-0.27	(1.37)
<u>Anxiety:</u>								
0(+)	7.77	(2.19)	7.32	(2.08)	1.27	(2.32)	0.10	(2.14)
0(-)	7.78	(1.80)	8.37	(0.92)	0.03	(0.87)	0.10	(0.44)
<u>Independence:</u>								
0(+)	6.45	(1.10)	5.73	(1.21)	0.07	(0.65)	0.37	(0.80)
0(-)	6.72	(2.08)	6.42	(1.01)	0.02	(0.97)	0.20	(1.36)
<u>Neuroticism:</u>								
0(+)	8.43	(2.07)	7.48	(1.24)	1.32	(1.61)	-0.48	(1.56)
0(-)	8.32	(1.97)	8.12	(1.25)	0.16	(0.69)	-0.25	(1.60)
<u>Leadership:</u>								
0(+)	2.58	(1.76)	4.35	(1.45)	1.00	(2.17)	-0.67	(1.22)
0(-)	2.90	(1.69)	2.48	(1.69)	0.48	(0.50)	-0.53	(1.26)
<u>Psychoticism:</u>								
0(+)	6.90	(2.86)	6.33	(1.74)	0.38	(1.78)	-0.63	(1.98)
0(-)	8.05	(1.08)	7.67	(0.58)	-0.30	(1.61)	0.62	(1.92)

Similarly, Table III:7 tabulates the Change Scores for the 4 control groups with the corresponding One-way ANOV "F values" on the whole indicating before and after equivalence across groups ( $V_1 = 3$ ,  $V_2 = 23$ ). The one significant change result was shown to support a facilitatory effect of Relaxation in comparison with time control (N) in terms of lowering manifest anxiety (MAS). An "independent samples" two-tail t test gave 2.98 ( $p < .02$ ,  $df = 10$ ).

The data was analysed by planned comparisons with regard to these 6 tests. For the Spec SUD scale C(3) represented the 10 min. test situation, C(5) the 30 min. operant/practice treatment condition, and Combined  $\bar{X}$  an estimate of overall anxiety associated with "Talking to a Stranger". With the 16PF only the second-order factors were analysed systematically since preliminary examination indicated that the primary factors showed little evidence of consistent change effects. Table III:8 cites the t values obtained under the various hypotheses along with the error estimate basic to each calculation.

TABLE III:7 Control group mean and SD Change scores and One-way ANOV results.

\* implies significant at .05 level

TEST	Control Group				F Initial	F Change
	Rel (Gp.3)	N(Gp.6)	O(Gp.7)	Pr(Gp.8)		
<u>(percentage change)</u>						
<u>JJT:</u> (% stutters)	30.4 (19.2)	24.8 (14.8)	13.4 (25.7)	10.6 (16.5)	0.02	1.14
<u>SST:</u> (% stutters)	16.3 (26.0)	12.9 (26.5)	11.9 (29.3)	- 4.5 (30.1)	0.40	0.55
<u>LSB:</u>	12.0 (28.4)	- 2.7 (11.0)	- 7.1 (14.5)	- 1.5 ( 4.5)	0.52	1.18
<u>MAS:</u>	31.9 (39.2)	-31.1 (26.2)	-15.7 (14.3)	1.7 (21.4)	1.84	5.06*
<u>Spec SUD</u>						
<u>C(3):</u>	-28.3 (74.3)	- 4.6 (22.5)	-109.7 (95.3)	-47.2 (64.1)	0.71	2.11
<u>C(5):</u>	-50.8 (122.5)	-50.5 (112.1)	-152.8 (88.4)	-105.5 (183.2)	0.45	0.70
<u>Combined Mean:</u>	- 8.5 (58.3)	-19.1 (23.3)	-100.5 (77.3)	-22.1 (52.4)	3.87*	2.83

TABLE III:7 (continued)

TEST	Control Group			F Initial	F Change
	Rel (Gp.3)	N(Gp.6)	O(Gp.7)		
16PF (difference score)					
<u>Exvia:</u>	-0.22 (0.41)	0.20 (1.36)	0.66 (1.33)	0.73 (0.79)	0.64 1.23
<u>Anxiety:</u>	-0.33 (1.23)	-0.28 (1.21)	-0.62 (0.59)	0.35 (0.78)	1.12 0.85
<u>Independence:</u>	-0.52 (0.74)	-0.05 (1.51)	-0.47 (0.52)	0.63 (0.66)	0.38 1.60
<u>Neuroticism:</u>	0.20 (1.99)	-0.22 (1.41)	-0.45 (0.54)	0.53 (0.83)	0.52 0.55
<u>Leadership:</u>	-0.30 (0.81)	0.02 (1.39)	-0.12 (1.05)	0.58 (0.99)	0.59 0.62
<u>Psychoticism:</u>	-0.37 (0.65)	0.23 (1.67)	-0.67 (1.53)	-0.52 (1.34)	0.82 0.52

TABLE III:8

Values of t from planned comparisons analysis for 7 hypotheses:

\* indicates significant at .05 level (one-tail), df = 40.

(critical level of t is 1.684 for df = 40); (neg.) indicates significance in opposite to predicted direction.

		A	B	C	D	E	F	G	Conditions
		Rel vs No Rel	D vs No D	O vs No O	Pr vs No Pr	(Rel+O) vs (Rel)+(O)	(Rel+Pr) vs (Rel)+(Pr)	O vs Pr	
		3,4,5 vs 6,7,8	1,2 vs 4,5	5,7 vs 3,6	4,8 vs 3,6	5,6 vs 3,7	4,6 vs 3,8	2,5 vs 1,4	Groups
TESTS	$\Sigma s^2/8$								
JJT	380.32	3.25*	1.93*	0.15	0.14	1.28	1.64	0.18	
SST	544.56	4.33*	1.19	1.81*	1.02	1.91*	2.85*	0.43	
LSS	430.50	3.35*	1.37	0.26	0.86	0.78	0.72	0.50	
MAS	702.91	3.80*	0.05	0.43	0.81	1.85*	2.22*	0.17	
Spec SUD	4482.05	2.00*	0.84	1.92* (neg.)	0.26	1.93*	1.82*	0.56	
C(3)									
C(5)	20751.26	0.84	0.98	1.74* (neg.)	0.10	0.00	1.04	1.38	
Comb. $\bar{X}$	3525.71	2.22*	1.15	2.02* (neg.)	0.60	1.34	0.72	1.27	

TABLE III:8 (continued)

		A	B	C	D	E	F	G	Conditions
		Rel vs No Rel	D vs No D	O vs No O	Pr vs No Pr	(Rel+O) vs (Rel)+(O)	(Rel+Pr) vs (Rel)+(Pr)	O vs Pr	
		3,4,5 vs 6,7,8	1,2 vs 4,5	5,7 vs 3,6	4,8 vs 3,6	5,6 vs 3,7	4,6 vs 3,8	2,5 vs 1,4	Groups
TESTS	$\frac{E}{\Sigma s^2/B}$								
<b>16PF</b>									
Ex.	1.78	1.87*	1.67	0.24	0.44	0.60	0.53	0.16	
Anx.	1.86	0.31	0.99	0.08	0.95	0.69	0.18	1.11	
Ind.	0.92	0.06	0.63	0.60	1.79*	1.67	0.05	0.28	
Neur.	1.87	0.28	1.98*	0.81	0.27	0.40	1.07	0.83	
Lead.	1.59	1.57	2.60*	0.49	0.32	0.22	0.77	0.37	
Ps.	0.36	0.36	0.07	0.88	0.18	0.49	1.32	0.43	

According to analysis of the various hypotheses, there was evidence to suggest that:

(1) Relaxation (Hypothesis A) effectively modified various aspects of the stuttering R. It appeared to significantly reduce stuttering instances (JIT : SST), perceived stuttering severity (ISS); manifest anxiety (MAS); anxiety specifically related to the test situation "Talking to a Stranger" (Spec SUD:C(3)) and in general (Comb.  $\bar{X}$ ), and to produce a change toward a more extraverted personality type (16PF). However, it will be seen later that the latter result may represent mainly an expected regression toward the mean: before-treatment mean = 4.16 (SD = 2.25), after-treatment mean = 4.38 (SD = 2.36), where the mean sten score would be 5.5.

(2) Desensitization (Hypothesis B) produced a significant drop in nonfluencies in the independent speech test situation (JIT), but not in the situation under modification (SST). Of the 6 second-order 16 PF scores, two showed significant changes toward a more adjusted level with desensitization treatment. Yet these effects must be considered against an expected regression toward the mean. Neuroticism dropped from 8.13 (SD = 1.89) to 8.02 (SD = 2.01); Leadership increased from 3.08 (SD = 1.97) to 3.14 (SD = 1.82) over the 48 Ss.

(3) Operant manipulation (Hypothesis C) of the speech R itself appeared to produce a positive change toward decreased nonfluencies in the situation under modification (SST). However, it also appeared to produce a possible confounding



effect with regard to desensitization treatment by exacerbating the anxiety related to the speech situation in question as measured by the Spec SUD scale (C(3), C(5), Comb.  $\bar{X}$ ). This is in line with Siegel's (1970) contentions as to the paradoxical effects observed when the punishment variable is used to manipulate stuttering behaviour, in that there is almost certain concurrent elicitation of anxiety factors.

(4) It would appear that Relaxation may have an interactional effect (Hypotheses E & F) when used in a treatment combination with either Operant manipulation of the speech R (Rel+O) or the equivalent practice at speaking in the speech situation under operant modification (Rel+Pr). It could be that this interactional effect represents a facilitatory influence of Relaxation, since

- (a) "Pr alone" (Hypothesis D) produced only one significant R change (increased Independence on the 16FF which could have been only a regression effect) and,
- (b) "O alone" produced only one positive change and three negative changes (see (3) above).

However, this influence was confined to

- (1) the reduction of nonfluencies in the speech situation under modification (SST),
- (2) the general manifest anxiety level of the Ss (MAS), and
- (3) the reported subjective anxiety in the speech situation under modification (Spec SUD:C(3)).

It appears that the responses affected are related to the anxiety aspect of the stuttering R (when viewed in conjunction with the Hypothesis A results).

This might be expected from the accredited use of relaxation in modifying anxiety per se. It could well be that the present findings show the anxiety components of the

stuttering R to be amenable to change through relaxation. However, further more detailed investigation of the relaxation variable per se would be necessary to delimit its unique merit, as opposed to possible expectancy effects differentially producing a desired R change (Orne, 1969).

(5) Operant manipulation of the stuttering R appeared to have no facilitatory influence over a simple practice of speaking in general (Hypothesis 6).

With regard to the fluency changes effected under Rel and D conditions for the JTT and SST, the total word rate (TWR) was examined to indicate whether this increased as nonfluencies decreased to support a "true" fluency modification. Using a "related samples" one-tail t test on the JTT before and after measures (a generalization indicator), the only treatment combination to meet this criterion was Rel+D+O ( $t = 5.28, p < .005, df = 5$ ). However, the "live" test situation (SST) of fluency changes in the situation under modification showed an increase in 3 of the 5 groups with Rel in common, viz. Rel+D+O, Rel+O+Pr and Rel+Pr. The corresponding t values ( $df = 5$ ) were 4.66 ( $p < .005$ ), 2.79 ( $p < .025$ ), and 3.07 ( $p < .025$ ). Various subsidiary analyses cast additional light on the above six main findings. They are presented under the tests in question, as follows:

MAS:

Taking into account the suggested positive influence of Rel elucidated by the planned comparisons, the 5 groups with Rel in common were examined with respect to the

before/after MAS distributions of the R. The average population distribution from Taylor (1953) was used as the basis of comparison: the nominal score of 7 marked the 20th percentile, 13 the 50th, and 21 the 80th percentile. Shift in R was indicated by the percentage of scores above the 80th and 50th percentile. Initially this was 36.7% and 66.7%, respectively. After treatment only 10% of the Ss fell above the 80th percentile and 53.3% above the 50th. This supported an approximation to a "normal" manifest anxiety level in Ss who received at least Rel treatment. A Sign test on before/after measures substantiated a significant positive shift in R. For  $x = 7$  and  $N = 30$  a value  $p < .044$  (two-tail) was obtained. By contrast, the 3 control groups N, O and Pr with  $x = 5$  for  $N = 18$  gave  $p < .096$  (two-tail) in the negative direction indicating no significant change in R.

16FF:

As discussed earlier second-order factors were essentially insensitive to treatment effects, except for: a Leadership increase and Neuroticism decrease under D; an Extraversion increase under Rel; and an Independence increase under Pr. In all cases regression toward the mean most probably account for these results, especially when it is observed that the overall mean change was fairly small in each case. The before/after mean and SC scores appear in Table III:9 across all 48 Ss.

FACTOR	EXVIA.	ANX.	INDEP.	NEUROT.	LEAD.	PSYCHO.
BEFORE Mean	4.16	7.74	6.33	8.13	3.08	7.18
SD	2.25	1.85	1.53	1.89	1.97	1.95
AFTER Mean	4.38	7.66	6.36	8.02	3.14	7.33
SD	2.36	1.65	1.70	2.01	1.82	1.74

TABLE III:9 Before/after mean and SD second-order scores across all 48 Ss.

Initial responses suggested an overall tendency toward emotional disturbance and inadequate social ability, but not of a magnitude to be regarded pathological. Except for Independence, the direction of the scores suggest that realization of what might appear a more adjusted personality type would require overall change on the remaining five second-order factors on which scores fell more than one SD from the expected mean 5.5. However, this change was not effected within the confines of this program. Ss appeared to remain somewhat introverted, rather anxious, "followers" rather than leaders, with apparently strong tendencies toward neuroticism and psychoticism as a group.

As mentioned earlier, preliminary investigation of differential influence of treatment variables on the 16 primary factors precluded meaningful detailed analysis. However, taking into account the possible influence of Rel indicated by the previous results, the groups with Rel in common were analysed separately to the 3 control groups N, O and Pr for each primary factor. The "related samples"

two-tail  $t$  test was applied to before/after mean and SD scores for the 4 main treatment groups plus the Rel and the Rel+O+D "reverse order" control groups, giving an overall sample of 36 Ss. Results are summarised in Table III:10.

There was no evidence of a personality change concurrent with the observed changes under Rel in fluency (JFT, SST), manifest anxiety (MAS) and perceived stuttering severity (ISS). Control groups N, O and Pr also showed no change. Results are summarised in Table III:11.

FACTOR	A	B	C	E	F	G	H	I
BEFORE Mean	6.11	5.28	2.78	4.66	4.64	4.80	3.50	6.64
SD	1.78	1.97	1.80	2.08	2.89	2.49	1.82	1.72
AFTER Mean	6.19	5.19	3.00	4.58	4.66	4.53	3.92	6.47
SD	1.98	1.88	1.79	2.32	2.85	2.53	2.13	1.83
(N = 36) $t$	0.09	0.30	0.71	0.23	0.10	0.81	1.32	0.92
	L	M	N	O	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
	7.03	7.42	4.28	7.36	5.66	7.16	5.08	7.50
	2.37	1.88	1.63	2.14	2.07	1.94	2.36	2.22
	7.11	7.64	4.72	7.28	5.44	7.03	4.80	7.00
	1.68	1.96	1.85	2.67	2.05	2.34	1.93	2.44
	0.75	1.52	1.12	1.32	0.79	0.00	0.15	0.87

TABLE III:10 Before/after mean and SD primary 16PF scores for 36 Ss receiving Rel.

TABLE III:11 Before/after mean and SD primary  
16PF scores for 18 control Ss.

FACTOR	A	B	C	E	F	G	H	I
BEFORE Mean	6.33	6.22	2.94	4.28	5.00	4.44	4.06	6.72
SD	2.11	1.55	2.12	2.05	2.45	2.36	2.55	2.18
AFTER Mean	6.28	6.00	2.28	4.33	5.50	4.17	4.44	6.72
SD	2.13	1.67	1.85	2.26	2.27	2.24	2.29	2.18
(N=18) t	0.70	0.61	1.72	0.14	1.53	0.81	0.89	0.00
	L	M	N	O	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
	7.11	7.67	4.18	6.78	5.50	6.78	5.00	7.39
	1.82	1.67	2.19	2.12	1.98	2.17	2.83	2.00
	7.06	8.06	3.56	6.72	4.94	6.33	4.89	7.72
	2.25	2.22	1.26	2.20	1.27	2.33	2.49	1.82
	0.15	0.78	1.83	0.51	1.57	2.04	0.33	1.33

TABLE III:12 16PF scores for 48 stutterers  
(Experiment III) and 14 stutterers  
(Experiment I).

FACTOR		A	B	C	E	F	G	H	I
EXPT. III.	Mean	6.06	5.58	2.69	4.65	4.67	4.73	3.69	6.75
(N=48)	SD	1.92	1.95	1.89	2.12	2.76	2.50	2.18	1.47
EXPT. I.	Mean	4.14	6.64	4.64	4.86	5.07	5.57	4.93	5.50
	SD	1.35	1.69	2.44	1.61	2.61	2.31	2.09	2.62
		L	M	N	O	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>
		7.23	7.46	4.15	7.46	5.63	7.10	4.94	7.44
		1.98	1.79	1.79	1.99	2.13	2.01	2.43	2.17
		6.07	6.93	6.78	5.57	6.36	7.43	6.07	5.00
		1.82	1.64	1.80	2.10	1.86	2.28	1.94	2.35

With regard to magnitude of primary scores and a predicted presenting personality the following was observed (see Table III:12 for profile scores over 48 Ss).

Low A : not supported  
 Low C : supported  
 Low E : not supported  
 Low F : not supported  
 Low H : supported  
 High O : supported  
 High Q<sub>2</sub> : supported  
 High Q<sub>4</sub> : supported

5 of the 8 predictions were supported. This sample of stutterers appeared to be emotionally labile (C), withdrawn (H), anxious and insecure (O), self-sufficient ( $Q_2$ ) and tense ( $Q_4$ ). This sample of 48 Ss resembled more closely a predicted profile than did the 14 Ss taken from Experiment I. Table III:12 presents the comparison of these two samples of stutterers.

The present sample was also matched against the diagnostic profiles for various neurotic types (Cattell, 1970, p. 267) and the "speech disorder" profile for 68 Ss (Cattell, 1970, p. 262). Using a relative rank correlation between group profiles (p. 139) the following values of  $r_p$  were obtained:

0.85	:	Stutterers (N=48)	vs	Anxiety Reaction	(N=90)
0.88	:	Stutterers (N=48)	vs	Depressive Reaction	(N=70)
0.56	:	Stutterers (N=48)	vs	Speech Disorders	(N=68)
0.88	:	Stutterers (N=48)	vs	General Neurotic	(N=272)

There was a closer resemblance of stutterers to the clinical profiles rather than the speech disorder type, adding support to the validity of looking at the anxiety aspect of the speech problem.

SCT:

This gave an indication of the S's concern about his speech problem, with scores greater than 12 showing projection of concern into answers not specifically cued concerning the influence of stuttering on adjusting to everyday life.

Original scores varied from 12 to 43 for the 48 Ss, with a



clustering between 12 and 20. Initial disparity between groups plus the weighting toward low scores precluded parametric differential analysis. As with the 16PF primary scores, the 18 Ss for N, O and Pr control conditions showed no significant change with a Sign test analysis. Results of  $x = 6$  and  $N = 16$  gave  $p < .454$  (two-tail). Before-treatment means was 19.3 (SD = 6.7); after-treatment mean was 18.2 (SD = 6.2). However, the 6 groups with Rel in common, including control groups Rel and Rel+O+D, gave a significant result. For  $x = 7$  and  $N = 29$ ,  $p < .044$  (two-tail) implied a decrease in concern after treatment. Before-treatment mean was 20.2 (SD = 7.4); after-treatment mean was 18.1 (SD = 6.1).

Analysis of the "Reverse Order" Control: Rel+O+D:

This "reverse order" control was compared with Rel+D+O to indicate whether desensitization of a particular situation before "trying it out" (Rel+D+O) had an advantage over being desensitized after experiencing the situation. This was tested specifically with the SST. An "independent samples" two-tail  $t$  test supported the superiority of the logical procedure Rel+D+O ( $t = 3.00$ ,  $p < .02$ ,  $df = 10$ ).

Comparison of TWR Rs suggested this to be a "true" fluency enhancement ( $t = 2.58$ ,  $p < .05$ ,  $df = 10$ ).

In terms of generalization of treatment effects, indicated by the JTT, Rel+D+O again appeared superior for stuttering percentage decrease ( $t = 2.96$ ,  $p < .02$ ,  $df = 10$ ). However, increase in TWR results did not support a "true"

fluency difference ( $t = 1.58, p < 0.2, df = 10$ ). A glance at the actual speech improvement on the SST placed Rel+O+D in considerable doubt as a modification procedure. Whereas Rel+D+O gave a 59.2 stuttering percentage decrease and 44.5 percent TWR increment, Rel+O+D produced only a 5.95 percent decrement in stuttering percentage and a 18.5 percent increase in TWR. For the latter, 3 of the 6 Ss showed a stuttering percentage increase and TWR decrease! No differences were observed between the 2 conditions on the ISS, MAS, SCT and Spec SUD "combined mean" measures. The two-tail "independent samples"  $t$  test values ( $df = 10$ ) were 1.06 ( $p < 0.5$ ), 0.10 ( $p < 0.8$ ), 1.05 ( $p < 0.5$ ), 1.67 ( $p < 0.2$ ) respectively.

#### 6.4. CONCLUSIONS

##### 1) Major Findings

(a) Relaxation appeared to exert the only consistent influence in treating the various aspects of the stuttering R complex within this study. Relaxation training is a usual precursor to any desensitization treatment, and was included as such to enable desensitization effects to be tested. It was initially not considered as perhaps the main variable under study, but rather as subsidiary to examination of the two treatment variables under study, viz. desensitization of specific speech-related anxiety and operant manipulation of nonfluencies. The interactional effect of relaxation with operant or practice conditions may have been attributable to:

- a. reduction of situational stress within the treatment (O/Pr) setting by means of the S's internal control induced by the relaxation training (Proctor and Malloy, 1971),

and/or

- b. equipping the S with the ability to cope with the social stress inherent in the verbal interchange between therapist and S (Ascough and Sippelle, 1968)

and/or

- c. the demand characteristics inherent in the present experimental situation (see pp. 114, 115, 116, 125-131) both in terms of subject and experimenter expectancy effects (Rosenthal, 1966). This possibility will be returned to later in the discussion.

(b) Desensitization did not appear to be an effective treatment variable in modifying the various aspects of the stuttering R complex. No significant changes were observed in the target speech R "Talking to a Stranger" or in associated anxiety, perceptual and conceptual R indicators. A probable positive influence was indicated in a fluency enhancement in the generalization speech test situation (JIT), and possibly with regard to the observed increase in Leadership and decrease in Neuroticism along personality dimensions. It should be remembered in this regard that desensitization was confined to one intensive session and aimed at only the

one target speech situation. By contrast, relaxation training took place over 3 sessions and was more general in orientation. This implied differential exposure to relaxation as opposed to desensitization may have in part contributed to observed lack of effect of desensitization within the limited period of the study.

(c) Operant manipulation using a secondary "punishment" paradigm for modification of nonfluencies did not produce predicted changes in the speech R. It appeared rather to produce a possible confounding effect by exacerbating situational anxiety with regard to the target speech situation. Since situational anxiety should optimally be minimized during a modification procedure if anxiety is an inherent part of the stuttering problem (as suggested by (a)), operant manipulation of this kind does not offer much potential as a treatment mode. This reinforces the results of the previous two studies, and further illustrates the paradoxical influence of punishment on fluency as outlined by Siegel (1970).

(d) Practice of speaking in a situation appears to offer no advantage in reducing nonfluencies or enabling adjustment to the situation. This result, along with that related to direct operant manipulation of the speech R(3), suggests that confinement to treating nonfluencies without regard to associated anxiety and adjustment variables may not be the most viable approach to treatment of stuttering.

(e) The "presenting personality" of this sample of stutterers suggests that these individuals could benefit

from a process aimed to enhance general adjustment along with fluency enhancement. (Stutterers as a group appear introverted and anxious, with poor leadership potential and possible tendencies toward emotional disturbance.) This presents a challenge to treat the "total person" aspect of the stuttering R. To do this, both the present treatment method and R assessment techniques could well need further expansion to both identify and measure the R characteristics in question. The subsequent study attempts more in this direction.

ii) Subsidiary Observations

(a) Procedural Advantages

1) Use of a test battery seemed confirmed as advantageous in this study. Although few expected results were obtained, multiple testing gave subsidiary evidence which would otherwise have been unavailable for investigation. Overall this served to increase validity of reported findings.

2) Cognitive and social variables became relevant to the overall analysis by virtue of the self-report involved in reporting "suds", perceived stuttering severity (ISS) and manifest anxiety (MAS) (Locke, 1971; Wilkins, 1971). This was also revealed in the subjective impressions of their present state reported by the Ss. It is impossible to determine, however, to what extent these implied introspections sensitized the subjects to expect changes in these emotional R dimensions. The cueing of desired R changes might well have confounded the treatment variable influence, since expectancy effects are observed most readily along anxiety related symptom dimensions (Friedman, 1963).

- 3) Taping appeared an effective mode of presenting controlled relaxation instructions (Paul and Trimble, 1970).
- 4) Self-recording of behaviour in the form of the test battery appeared a viable means of gaining information beyond the direct recording of speech Rs (Nelson and McReynolds, 1971; Simkins, 1971a,b). However, the possible contamination of expectancy effects must be constantly considered as a side-effect of such an introspective process (Rosenthal, 1969).
- 5) The inclusion of adequate control groups was shown essential to the elucidation of true treatment effects (Nawas, Mealia and Fishman, 1970). They also helped to suggest that isolated treatment of nonfluencies may not be the most efficient approach to the treatment of stuttering (Bar, 1971). Beech and Fransella (1968, p. 124) have suggested that lack of control groups and restricted statistical analysis may have attributed in the past to inadequate evaluation of treatment effects. This study represents a step toward rectifying this problem.

However, a major shortcoming of this study was the restriction incurred by too few Ss in each matched group. Ideally at least 10 Ss should have been allocated to each condition to satisfactorily apply the analysis made. Unfortunately the S population available made this impossible, yet partialling out of any treatment effects still necessitated the use of the present analysis. Perhaps the observed absence of a consistent desensitization effect may be, in part at least, a function of insufficient data available

to demonstrate the effect. Taking into account what has been previously mentioned about only one session given to desensitization training, whereas three sessions were allotted for relaxation training, the "true" treatment effects may not be confined only to the relaxation treatment variable. With balanced practice under both conditions and adequate Ss desensitization might well become an effective variable in this context. Accordingly the subsequent study increases the number of Ss under treatment and allocates more time to desensitization as a step toward testing this proposition.

(b) A Sequel to Treatment: An Advanced Program

Prior to embarking on further investigation into the use of desensitization and relaxation with a new and enlarged sample of Ss, an Advanced Program of Treatment was outlined to the Ss of this study. The aim was to test out the desensitization principles already applied over a more extended period of time. It is recognised that the previous treatment would bias any objective determination of treatment effects. However, it was considered advantageous to make use of the present overall "adequate" sample of Ss to put to the test the E's hunches before embarking more objectively on the next study with a fresh sample of Ss. The necessity of making use of Ss available was invoked by the increasing difficulty in obtaining sufficient Ss for investigation within the E's geographical location.

Procedure:

Ss constructed their own hierarchy of speech-related anxiety items, and by daily practice desensitized themselves

to the original effect of these stimuli on their "arousal system". The importance of maintaining daily practice and "trying out" the situation as they met desensitization criteria was explained to the Ss. The summary of "Advanced Program Instructions" given to the S appears in Appendix III:6. Progress was ascertained by sending the Ss an "Advanced Program Report Sheet" every 4 weeks (Appendix III:7). The nature of the questions on this sheet prompted the S as to what he should have been doing. The implied demand characteristics are recognised and may be seen as motivational facilitators causing both the R to be changed and expectancy of improvement (Meyer and Chesser, 1970, p. 212). Aspects of progress sampled were: conformity to relaxation and desensitization practice sessions, length of time spent in practice, effects produced on both tension and speech levels, generalization to self-concept and social interaction, adoption of relaxation as part of the S's life-style, satisfaction with treatment received, proposed improvements to the program. At any time the S could telephone the therapist for assistance.

#### Subjective Findings:

Of the 48 Ss, 30 responded to this program. Over 6 months all Ss who practised as instructed reported marked improvement. Ss overall indicated that the procedures presented offered the "key to the solution of their problem". Time and practice were seen as the effective variables influencing attainment of fluency. Extra help was not requested. At close of follow-up 8 Ss considered themselves



"self-cured". Many Ss used the general desensitization sequence to cope with other tension areas including exam and interview anxiety, social anxiety with respect to "class distinction", tension associated with competitive sport, depression, migraine headache, and general lack of confidence.

Although the data was subjective and nominal, the replies suggested extension of research in this area to be a viable proposition along two avenues:

- (1) expanding the desensitization focus to include more everyday situations, and
- (2) integrating relevant behavioural and cognitive learning principles into the program to enhance expediency and the stutterer's motivation for therapy (Meyer and Chesser, 1970, p. 204-212). The absence of disparaging reports from these "advanced program" Ss motivated the E in this regard to structure the subsequent study toward a more adequate objective determination of a possible desensitization treatment effect.

However, before proceeding to the next study, it is important to re-iterate that demand characteristics may well have vitally influenced the results in this study. The possible effects have been reported in the discussion of the results and must be kept in mind when the overall interpretation of the treatment effects is taken to suggest the line of approach in the following study. It is fully evident at this stage that the inherent "applied" nature of this overall investigation makes it more a "clinical trial"

(Lazarus, 1973) than a readily definable succession of stringent experimentations. This being the case, the limitations are recognised and the possible effects of demand characteristics and expectancy effects are expanded and given due consideration in the final chapter.