

To My Brothers

**THE IMPACT OF VOLITION ON THE RELATIVE VALUES OF
REINFORCERS IN OPERANT CONDITIONING OF A
FLUENCY PERIOD AND A STUTTERING RESPONSE**

**THE IMPACT OF VOLITION ON THE RELATIVE VALUES OF
REINFORCERS IN OPERANT CONDITIONING OF A
FLUENCY PERIOD AND A STUTTERING RESPONSE**

A Dissertation

Presented to

the University of Mysore

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Speech and Hearing


by

G. PURUSHOTHAMA

May 1976

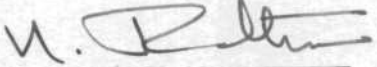
C E R T I F I C A T E

This is to certify that the dissertation entitled "The impact of volition on the relative values of reinforcers in Operant conditioning of a fluency period and a stuttering response" is the bonafide work in part fulfilment for M.Sc in Speech & Hearing carrying 100 marks of the student with 'Register No 63.


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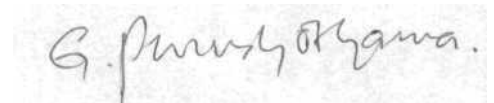
C E R T I F I C A T E

This is to certify that this dissertation has been prepared under my supervision and guidance.


(Dr.N.Rathna)
Guide

DECLARATION

This dissertation is the result' of my own study undertaken under the guidance of Dr. N. Rathna, Professor in Speech Pathology All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other diploma or degree.

A handwritten signature in black ink, appearing to read "G. Prasad", is written on a light-colored rectangular background.

Mysore

Register No 63

___th April 1976

A C K N O W L E D G E M E N T S

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CHAPTER I

INTRODUCTION

" If the experimental method involving as strict objectivity as possible and the formulations of meaningful questions derived from knowledge of general Psychology could be applied to the elucidation of function manifested by a single case then it very soon became obvious that the same techniques could be applied to the treatment of the disorder" (Yates 1970)

Behaviour therapy originated in learning laboratories has been applied to a wide range of behavioral problems. It has been applied in the area of Speech Pathology, especially in the field of stuttering.

It has been shown that the stuttering response is an operant which occurs in the context of another operant, i.e., verbal behavior (Flanagan, B. et al). It is a learnt behavior Krasner (1962) holds that it is a maladaptive behavior which is maintained through habit strength and/or reinforcement and that it is parsimonious to assume a reinforcement contingency for that than a causal core, and that it is possible that it is reinforced by the subject's own feedback in an aperiodical schedule which is highly resistant for extinction.

The concept that the stuttering response is operant has been supported by a number of experimental and therapeutic

studies where the response was contingently reinforced or punished (Flanagan, Goldiamond and Azrin 1958; Martin and Siegal 1966a, 1966b; Quiest & Martin 1967; Haroldson, Martin & Star 1968 Gross, M.S. 1968; Webster & Dorman, 1970; Viswanath, 1972; Dattatreya, 1973; Beattie, 1973; Richard & Broeaa, 1973, and Bharath Raj, 1974).

The application of 'Behaviorism' in treating human beings was begun with Watson's work in 1920, who derived the theoretical foundations of treatment from the work of Pavlov on conditioning. It was assumed, a continuity of behavioral principles across species and rests heavily on methodology and findings from animal researches. The reason for the preponderance of animal experiments over human experiments are possibly easier control on subjects, condition, and environment and also involvement of fewer ethical and moral questions.

After Watson, Jones (1924) applied these techniques in therapeutic situations. Then Wolpe in 1958 systematically applied conditioning principles on a number of psychiatric cases. Even in the field of Speech Pathology, Behavior Therapy has been vastly applied (Perkins, 1971).

However, many of the conditioning techniques applied to stuttering have not given us satisfactory results.

There are numerous points held against the applicability of

behavioral principles to the problems of human beings. The main points of objections held are the crucial differences between the manner in which animals develop behavior and the way in which human beings do so. Differences of a serious kind may well exist because of the major importance of verbal behavior in human activity and the complexity of the nervous system in human beings.

Behavior Therapy considers mostly the environmental stimulation and the organism and is little worried about the internal state - if not physiologically - at an ideational level. The subjective reports including the reports of discomforts, thoughts and feelings and other covert activities are treated only as behaviors serving as responses to whatever internal stimulation has occurred.

It is stated that motive set leads the individual to be especially alert to the relevant stimuli (Maher). Many concepts such as drive, set and volition are excluded from consideration perhaps because they pose problems of quantification.

The present study is concerned with volition. Volition in latin means to wish/will, exercise of the will, power of exercising, a choice of forming an intention or determination , - Verstende psychologie either seep 'will' as a formal principle or divides it according to effect, 'will to learn', 'will to life', 'will to achievement', 'will to value',. Empirical investigations

have derived 'will' from ideas and thoughts processes or elementary emotions. Ach (1905) showed in experiments that the concept of will indicates a special energy potential which is able to overcome strong contrary forces such as associative inhibition fatigue etc., Weakness of volition may be innate or aquired and may be compensated by psychotherapeutic or educational measures volitional acts may be directed inwards; they are directed outwards when they mobilize activities and achievement energies for spontaneous or persistent activity (A. Weneck).

The present study attempts to find the impact of volition in a conditioning situation. In this deal it is considered - either as willingness or unwillingness to learn a given act. In a conditioning experimental situation the volition can be seen in many perspectives. The subject may have implicit volition either to learn or not to learn. The volitional sets can be induced by instructions which has been evidenced to bring a change in a particular response in a specified direction, either to increase or decrease (Ekman, Krasner and Ullman 1963; Rathna & Rangasayee, 1975).

Awareness and highlighting have also been shown to bring about change in behavior in operant conditioning experiments (Siegel & Martin, 1965; Vijayalakshmi, 1972). Even in such studies the direction of change of response could be presumed to be because of the direction of the volition that the subject

has than the type of contingency administered.

It can be attributed to the lack of positive volition in many cases as many conditioning experiments have shown only equivocal results.

In providing the results of behavior therapy Lazarua(1963) states that stammering has yielded least satisfactory results. Eysenck and Rachman (1965) say that stuttering and conduct disorder have not responded well to the techniques in use at present and that it needs to be investigated a great deal. The same authors say that when a symptom is of a socially disapproved type in which the conditioned stimulus evokes parasympathetic reactions (Alcoholism, Fetishism, Homosexuality evoke hedonically positive reactions and also physiologically parasympathetic reactions), treatment (aversion therapy) consists the pairing of stimulus in question with strong aversive stimuli producing sympathetic reactions (physiologically sympathetic and hedonically negative reactions). These are called 'disorders of second kind'. In accounting for the relapse of such disorders they say that those symptoms are less painful to bear as far as the individual is concerned; indeed they may appear quite pleasant and agreeable to him. It is the society, through one of its various ageneies which provides the motivation for therapy, and this imposed drive is likely to be much weaker. This is important because it is well known that the strength of conditioned responses is very much determined by the strength of the drive under which the individual is working.

There is ample justification to believe that the intrinsic motivation to undergo treatment, to eliminate self rewarding behavior is more than that to undergo the process to eliminate the self punishing behavior. The role of motivation, drive and incentive in behavior are not generally well understood (Bollea, 1967). But they play an important role in mediating learning and performance. Eysenck and Beech say that even in a genuinely motivated subject it could be suspected that there is a covert contrary motivation working to prolong the enjoyment of reward of behavior to be eliminated and that it may be misleading to formulate analogies from animal conditioning to human conditioning and may be that there has to be demand on certain aspects such as language, co-operation, influence of the verbal instruction and the like.

A small integral part of motivation - volition - has been taken in this study to be tested for its impact on the operant conditioning of the stuttering response and fluent speech.

Statement of the problem

The problem of the study is to test the impact of volition on relative values of reinforcers of responses in the operant conditioning of a stuttering response and of fluency periods.

Summary of Methodology

Five male stutterers were taken for the study as subjects of age range 19 to 22½ years. Certain number of seconds of

fluent reading (R_1) and one of the stuttering responses (R_2) were taken as responses to be reinforced.

A 100% contingent token reinforcement was used. The ABA paradigm for the single ease studies was used, which consisted of three segments of ten minutes, the second segment being the period when the independent variable was introduced. There were five experimental sessions. The values of reinforcement was changed for each experimental session for each response. The order of presentation of the sessions was also changed to provide some control for residual effects. The order was changed as shown in the following table.

Table - I

Order of presentation of experimental sessions

Case	T	M	G	Ma	A
Experiment sessions					
1	A	E	A	C	D
2	B	D	B	D	C
3	C	C	C	B	E
4	D	B	B	E	A
5	E	A	B	A	B

- A - the experimental session in which reinforcements for R_1 was + and for R_2 was 0.
- B - the experimental session in which reinforcements for R_1 was ++ and for R_2 was +.
- C - the experimental session in which reinforcement for R_1 was ++ and for R_2 also ++.
- D - the experimental session in which reinforcement for R_1 was + and for R_2 was ++.
- E - the experimental session in which reinforcement for R_1 was 0 and for R_2 was +.

'+' signified the value of reinforcement interms of paise which could be exactly doubled to '++' or made nil to '0'.

The purpose of the study

It was the purpose of the study to control both dimensions of volition. For this the values of reinforcement were changed accordingly. The hypothesis forwarded was, 'there will be a greater increase in fluency periods than in the stuttering responses with increases in the values of reinforcers', as the values of reinforcement for either responses changed differently in each experimental session as shown in Table - I.

A comparison was made between the two responses - stuttering and fluency with equal reinforcements, and a sub hypothesis was

put that 'fluency would respond better to the reinforcement than stuttering'. A comparison was made on the difference in response rates between stuttering and fluency periods with variation in reinforcements. For the sake of statistical convenience the following null hypotheses are forwarded :

- (a) there will not be a significantly greater increase in fluency periods than in stuttering responses with increases in values of reinforcers and a sub hypothesis;
- (b) there will not be a greater increase in fluency periods than the stuttering responses when both are reinforced with equal values of reinforcement;

Implications of the study

Theoretical Implications :

- (i) If it is a factor, its importance in dealing with human experiments can be shown.
- (ii) The methodology used may permit techniques of quantification.
- (iii) A weak point can be pointed in the conventional behavior therapies.
- (iv) To test the similar aspect in other speech problems.

Clinical implications :

- (i) If It is a factor it will affect the aversion therapy.
- (ii) Highlighting the importance of volition in subjects under treatment.
- (iii) Subjects can be tested for prognosis using a similar methodology.

Limitations

- (i) A similar study could not be done as a control using a nonverbal activity.
- (ii) Secondary responses of stuttering repertoire were not selected as responses to be reinforced as both the experimenter and the observer had to count time in their watches.
- (iii) More experimental sessions could not be had for want of time and money.
- (iv) Many number of cases could not be tested owing to their non availability.
- (v) Follow-up could not be done for the want of time.

Definitions

Terms need to be defined especially when they are not well established and so can be understood in different ways otherwise.

Volition

Implicit or/and explicit willingness or unwillingness of the subject in the situation.

Stuttering

Is repetition, prolongation, or hesitation whether or not accompanied by other behaviors like raising the eye brows, nodding the head etc.,

Token reinforcement

Token would be a red light and the sound of door buzzer whose number of presentations were counted by electronic count

Schedule of reinforcement

For both the responses selected a 100% contingent token reinforcement was employed.

CHAPTER II

REVIEW OF LITERATURE

"I know you are trying to condition me, I don't care how much you pay me, I will not stutters said a stutterer when he was being positively reinforced for his stuttering (Hegde)"

It is amazing that stuttering has behaved so differently in different conditioning experiments. Since Flanagan, Goldiamond and Azrin (1958, 59) produced stuttering in normally fluent subjects and relative fluency in stutterers, there are many studies which suggest that stuttering is an operant response.

Martin and Siegel (1966a) contingently shocked the stuttering response and in another condition, response contingent shock and discriminative stimuli were introduced. They found that introduction of response contingent shock reduced stuttering frequencies essentially to zero, while removal of shock occasioned a return to base rate frequency and that a specific stuttering behavior could be independently manipulated.

The same investigators (Martin and Siegel; 1966b) in another study to find the effect of simultaneously punishing stuttering and rewarding fluency found that :

- (a) presentation of response contingent verbal stimuli resulted in a decrease in stuttering
- (b) removal of verbal stimuli was followed by an increase in stuttering frequency to base rate level

Haroldson, Martin and Starr (1968) used 'timeout' as a punishment for stuttering. Timeout from speaking operated as a punishing stimulus in that presentation of timeout contingent upon emission of a stuttering response produced a decrement in stuttering.

Halvorson (1971) studied the effects on stuttering frequency of pairing punishment (response cost) with reinforcement. In that study three adult male stutterers spoke spontaneously during five experimental segments. In segment (1) (base rate) stuttering frequency was counted. In segment (2) (punishment) an add-subtract counter was activated, each stuttering response produced subtraction of one point. In segment (3) each stuttering response produced subtraction of one point; and if the first word following was fluent, then 10 points were added. In segment (4) (Extinction) subtraction and addition of points were withheld. During the segment (5) one point was again subtracted for each stuttering. Response-cost (punishment) decreased stuttering below the base rate in all the subjects.

Viswanath (1972) studied the effect of response contingent negative stimulation on selected responses in a moment of stuttering. He found that the selected response decreased significantly, when punished. Repetitions of sounds and syllables did not exhibit a tendency toward increase when punished. They were either decreased or/unaffected. The finding identified repetition as instrumental.

Dattatreya (1973) found that stuttering decreased when negative stimulation was applied contingently and randomly contingent.

Bharath Raj (1974) used shock as aversive stimulus contingent on stuttering and reported a decrease in stuttering.

The studies reviewed show that stuttering is operant and decreases when punished. But in contrary there are studies which show an increase in stuttering response for the application of aversive stimuli or punishment.

In Van Riper's (1937) study the subjects were fastened the electrodes and asked to read aloud the same passage three consecutive times. Prior to fourth oral reading, a sample of shock was delivered and the stutterers were told that at the completion of that trial they would be shocked for each spasm that had occurred. This threat produced increase in fluency failures in

fifteen out of sixteen subjects and an average increment of 5.2 stutterings. When in contrast the stutterers were told that they would be shocked at the end of the reading, but that the number of shocks would not depend on the number of spasms. There was an average increase of only 1.5 stutterings and of the subjects showed no increase at all. On the basis of this statistically significant difference Van Riper concluded that it was the punishment for stuttering that accounted for most of the increase in fluency failure.

Frick (1951) compared fluency and stuttering displayed during control reading and when :

1. shock was delivered following each stuttered word
2. the shock was delivered at the completion of reading with a number of shocks dependant upon the number of stutterings that occurred during the reading
3. shock was delivered immediately following each word spoken fluently or disfluently

Punishment was a factor common in all the experimental conditions. None of the above events produced significant changes in the frequency of stuttering. It did not decrease significantly more when negative stimulation was both contingent and contiguous than when it was contingent but delayed or immediately contingent on all spoken words. Moreover, punishment immediately following each stuttered word failed to produce less stuttering than other punishment conditions. It also failed to produce less stuttering than the nonpunishment control condition, indeed the frequency of stuttering in this condition " was greater on every reading than In the control condition" stuttering was neither reduced nor extinguished.

Even in Frederick's (1955) findings stuttering increased in the presence of punishment. In the control condition the subject read orally receiving a steady electric current twice his threshold. The punishment condition consisted of increase in shock level by when he stuttered and it was maintained until the nonfluency terminated. Stuttering was significantly more frequency in the punishment condition than in the control condition.

Daly (1964) also indicated that response contingent electric shock had no significant effect on the frequency of stuttering, when the subject was shocked both during the stuttering and immediately after the stuttering.

Timmons (1966) using the word "wrong" for the verbal punishment found that its contingent application did not produce a significant reduction in the frequency of stuttering. The stimulus was delivered to the middle five of the fifteen oral readings of the same passage. The experiment concluded that further study of verbally delivered punishment appeared warranted even though its effect was not statistically significant in this study.

Hegde (1971) applied shock contingently upon the stuttering responses in oral reading. Each subject had shock and no shock condition. For each subject more stuttering was evidenced during shock than its absence. The significant difference occurred even

though the subjects were reportedly aware of the presence or absence of contingency. Moreover subjects reported that it evoked anxiety.

Brutten and Shoemaker (1971) pointed that a majority of published reports of speech therapists indicate that punishment of stuttering leads to an increase rather than a decrease that would occur if it acted in accordance with law of effect. They have also given evidences that punishment of stuttering produces inconsistant effects. Some experiments show that there is no apparent effect of punishment on stuttering. Some evidence that there is at-least a temporary reduction of frequency of stuttering. But the data does not permit one to state that the stuttering response is invariably reduced by punishment.

In her study Vijayalakshmi (1973) found two stutterers who increased their stuttering for the application of verbal stimuli "no" contingently and the investigator has not provided any explanation for this.

Hegde (1971) states that "stuttering does not seem to behave like an operant response under punishment, particularly when the shock is used as a stimulus".

One cannot wholly accept the operant conditioners stand that "...if an experimental operation fails to produce change

in the patient the basic assumption to be followed is that the fault lies in the experimental technique and not in the patient" (Yates, 1970).

The possible explanation for the confounding equivocal results of the kinds of studies said can be of two views. It may be that stuttering has an organic base or some equivalent as a casual core and thus it is not operant. Another possible view would be to say that in addition to the already controllable variables there can as well be others which were not controlled e.g., Volition.

Subjective variables in a conditioning situations are also of considerable importance. As Rachman and Teasdale (1969) say "an explanation which relies too heavily on the conditioning of behavior that is under voluntary control seems likely to be inadequate and the operation of cognitive factors in aversive therapy is of crucial significance". Of-course the term "cognitive factors" may include pany aspects but the idea is of considerable importance.

There is some evidence to suggest that subjective factors can influence conditioning even physiologically. Cook and Harris (1937) in addition to demonstrating facilitation of conditioning by means of instructions showed that G.S.R. can be considerably reduced when the subject is told that he will not

receive any further shocks. Bridger and Mandel (1965) demonstrated very rapid extinction of a conditioned G.S.R. when subjects were informed that they were to receive no further shocks. Rachman and Teasdale (1969) state that :

"...the apparent paradox involved in aversion therapy namely, the fact that patients who have undergone such treatment refrain from carrying out the deviant behavior even after they have left the treatment situation and are fully aware that they are no longer in danger of receiving electric shocks".

Whatever the nature of aversion stimuli is, if the subject abstains from carrying out the deviant behavior even when he is aware of the withdrawal of the aversive stimuli, change in behavior can be related to the influence of volition.

Human subject is able to decide whether to get or not to get conditioned as it can be seen in situation where the self control involves mainly self reinforcement which is "a process in which subject has always available reinforcing stimuli but administers it only when reinforcement is appropriate to his own behavior". It was also found that self reinforcement would increase as a discriminative task was learned (Kanfer, Bradly and Marston; 1962).

Marston and Kanfer (1963) trained their subjects to a criterion on a verbal discrimination task with external reinforcement for each correct response and then allowed each subject

to dispense a self reinforcement whenever, in subsequent trials, he was confident he had emitted a correct response. Although in the subsequent trials, the self reinforcement group did not perform as well as the external reinforcement group, it did perform better than a control group given neither self reinforcement nor external reinforcement, indicating that self reinforcement may increase resistance to extinction. Marston (1964) found that self reinforcement was uninfluenced by the nature of self reinforcement obtained.

Stuttering is self reinforcing as it is an effective way of holding the listener's attention or it may become a way of enjoying preferential treatment at home or school. Apart from the implied pity the special attention gained compensates and satisfies the individual who seeks recognition and affection (Robinson, 1970).

The attitude of the subject is also an important factor in learning. Some adult stutterers verbalize that they would not prefer to stutter but their attitudes show clearly that stuttering has not been any real problem to them (Robinson, 1970).

Andrews and Culter (1974) have shown that even when fluency was established in the clinic there was no change in the level of their communication scores. But when it came to every day life and they experienced no stuttering during speech their attitudes became closer to those of nonstutterers.

According to Van Riper (1971) how stutterers feel about their moments of stuttering can reveal much about how they feel about themselves. A marked change in attitude occurs during the early stage of therapy toward both self and stuttering. In techniques like cancellation where he has to stutter freely the subject must surrender many of the defense and disguise reaction which themselves are a part of the symptomatology. The subject becomes interested in and curious about both his fluency and nonfluency, later he finds himself altering his sets and making plans for the subsequent modification of symptoms.

It may be hypothesized that the factor 'will' gives rise to the 'attitude' towards a task in the above experiments and affects the results.

It is quite confusing that studies which employed different types of reinforcement contingencies have reported results which were not according to expectation and some of those results are explained though not quite satisfactorily.

Tollman, Hall and Bretnall (1932) in their article 'A disproof of law of effect' have shown as to how the reinforcement contingencies did not play their role which they should have.

In the study, a metal punch board maze was wired, plunging into one of the holes in each of 30 pairs would deliver buzzer or under certain conditions would deliver buzzer sound + shock.

One group of subjects got buzzer for 'right' responses and another group for 'wrong' responses, 3rd group received buzzer + shock for 'right' responses and 4th group received buzzer and shock for 'wrong' responses. All subjects were told what pattern to learn i.e., to follow holes which ring buzzer and do not ring buzzer.

Both 'buzzer right' and 'buzzer shock right' groups were definitely superior in learning to the other two groups. According to authors these stimuli served to 'emphasize' cognitively the correct response. The 'buzzer right' group was not superior to 'buzzer shock right' group - addition of punishment for right responses did not weaken them. The 'buzzer shock wrong' subjects were not superior to the 'buzzer wrong' subjects - the addition of punishment for wrong responses did not facilitate performance.

In a study by Siegel and Martin (1966) 60 subjects were used half of whom were of high disfluency and half were of low disfluency. Three groups were made each consisting of 10 control and 10 high disfluents and each group was reinforced with three different contingent reinforcers i.e., "wrong", "right" and a buzzer sound.

Subjects in the "right" condition showed no effect when stimulus was introduced however, stuttering increased in the extinction part of the experiment.

In the study by Cooper, Cady and Robbins (1970) on the effect of verbal stimulus words 'wrong', 'right' and 'tree', the results showed that all contingencies reduced the disfluencies which might be interpreted as evidence that any verbal stimuli in the situation would act as a punisher even if the stimuli is generally accepted as being a rewarding are such as good or right.

Richard and Victor (1973) in their study state that "previous research on the effect of contingent stimuli on stuttering has suggested that any event that is contingent on stuttering results in its reduced frequency". In their study both their subjects showed clear reduction in stuttering over 91 hour reading sessions when either gain or loss of money was paired with instances of stuttering, compared with no contingency periods.

In the study by Vijayalakshmi (1973) to find the effect of three verbal stimuli 'Good', 'No' and 'Zehu' on the fluency in stutterers, she has shown that they were equally effective. However, five out of eight subjects showed a decrease in stuttering for all the stimuli which is explained using 'highlighting' hypothesis. It has not been explained as to why one subject increased stuttering for 'good' and another for 'no' and the third for both the stimuli 'good' and 'no'.

It may be hypothesized that the subjects who showed a decrement in their stuttering response had volition.

Cognitivists hold that verbal conditioning can be interpreted as a result of change in the cognitive process that direct the subjects responding. What is learned in verbal conditioning is held to be the correct response-reinforcement contingency and no learning is expected unless a correct or partially correct hypothesis is present in the subject. Thus verbal conditioning effect is said to depend on the subjects awareness, his motivation for obtaining the various reinforcing stimuli, the adequacy with which he can form a hypothesis about the critical response class and other variables that affect these processes (Kanfer and Philips 1970). This must be true with unlearning as well.

There are studies which suggest that the kind of change in response need not be in consonance with the type of contingency. The kind of change of response can be thought to be influenced by the kind of volition the subject has, which can be possibly induced by instructions also.

Wallach and Henle (1941) tested whether the action of rewards is automatic and independent of the subjects intend to learn. They duplicated Thorndike's study but for the instructions.

Thorndike in his study had given a list of paired words and numbers to the subjects and instructed them to guess the number which belonged to each word when presented and they were told "right" or "wrong" immediately. He found that response called right was repeated more and concluded that it was the effect of reward which acted directly and unconsciously on the temporally contiguous connections. Wallach and Henle's subjects were told that they may hear right for occasional number responses and the subjects had no reason to expect that what was right once would be right again. In result they found that the right responses were not repeated at greater than chance frequencies. To check on the probabilities that subjects had recalled their previous responses and intentionally inhibited them, a recall test was given, but there were no differences between the retention of correct and incorrect responses. The investigator say that :

"Overt responses are not the only ones strengthened by reinforcement; appropriate mediation process (modes of perceiving the situation, meanings or implicit reactions depending on one's bias) are also capable of being strengthened and weakened. It was not the avert and specific number vocalization reinforced but the meaningfully appropriate tendency to passively call out numbers - and tendencies of this sort are hard to handle in theory"

In another study Ekman, Krasner and Ullman (1963) instructed their subjects to have a positive or negative set identifying a story telling task as a test of empathy or personal problem Awareness was introduced by calling attention to experimenters reinforcement "mm hm". Positive set awareness subjects

increased use of emotional words, while negative set awareness subjects decreased use of emotional words. The results were interpreted as evidence that awareness can either facilitate or inhibit conditioning depending on subject's set. In discussing they refer to Kanfer Marston's study using instructional set to create 'high threat' and 'low threat' experimental situations. The manipulation of awareness by various instructional sets is better than ascertaining the same after the completion of the task. They conclude that set awareness cannot be considered separately and that induced awareness will differentially affect conditioning depending upon subjects' orientation towards the task. Thus heightening the subjects' attention or alertness to the contingency does not itself predict whether conditioning will be facilitated or inhibited. If the subject believes that the reinforcing behavior is pleasant and is desirable the awareness may lead him to increase the responses or otherwise he may as well inhibit the response being reinforced.

It was shown in the study by Rathna and Rangasayee (1975) that subjects could be instructed to have different volitional sets in the verbal conditioning situation and the results got were accordingly different. They had two subjects who underwent two experimental sessions each. In one session they were instructed that they may hear the word "no" which meant disapproval

and dissatisfaction and in other session they were told to ignore the "no" and not get conditioned. The findings of the study suggest that there is a definite effect of the subject's volition on their getting conditioned.

The following paradoxes are seen in conditioning experiments :

- (i) stuttering increased in certain subjects and decreased in some when punished
- (ii) Subjects do refrain from the deviant behavior after the treatment even though aware of not receiving the contingency (aversive stimuli)
- (iii) Apparently different contingent stimuli have shown to bring the same results
- (iv) induced sets or intentions bring a large difference

These may be explained by the variable volition.

It was found necessary to study this aspect without involving the related variable instructionally induced volitional sets.

CHAPTER III

METHODOLOGY

Selection of subjects

Five male stutterers attending the clinic at the All India Institute of Speech and Hearing were taken for the study. The age range was from 13 years to 22½ years. The subjects chosen

- (i) had repetitions, prolongations and/or hesitations in their response repertoire.
- (ii) were able to read the stimulus material for 30 minutes.
- (iii) could understand the instructions.

Observer experimenter

Two MSc students of Speech and Hearing from the All India Institute of Speech and Hearing were taken as the observer experimenters. They were able to identify the selected response of the stuttering repertoire of the subjects. There was need to have a separate observer experimenter in order to identify the response R_2 and reinforce it, as the experimenter was already engaged in identifying another response R_1 and reinforcing that

Selection of responses to be reinforced

Response - R₁ - Fluency was taken to be a response to be reinforced. The duration of fluency in seconds which would be the unit of response to be reinforced was fixed separately for each subject. The fluency period ranged from 2 to 5 seconds in different subjects.

A mode period of fluency in the response repertoire was selected as a unit of response. It was taken care that the response units were not too-many so that the application of token reinforcement (buzzer sound) would not act like masking not noise and also that they were not so few as/to allow the subject to get reinforced adequately.

Response - R₂ - One of the responses in stuttering repertoire, of the subject was selected as another response to be reinforced. For the selection the following criteria were used ; the response :

- (i) should be marked so that it is easily identifiable.
- (ii) should occur enough number of times to get reinforced adequately.

In all subjects 'repetition' was selected as the most convenient response to be reinforced.

Reinforcement

A 100% contingent token reinforcement was employed.

Money was chosen to be the reinforcer. It was easy to change the value of this reinforcer exactly. It would permit exact doubling of the value or making it nil.

The value of unit of reinforcement was not the same for every subject. It was changed depending on the age and status of the case. It ranged from 2 paise per unit to 5 paise per unit.

A door buzzer and the red light were used as token reinforcements and the amount of money to be given depended on the tokens earned. For the response R_1 (fluency period) a door buzzer on being sounded automatically triggered an electronic counter which kept count of the number of times the buzzer sounded. For the response R_2 (repetition) a red bulb would glow which was also counted in another electronic counter.

Instructions to the subject

Subjects were instructed on each day of the experiment

before the start of the session which was of a duration of 30 minutes.

The instruction was that they were to read the stimulus material presented to them continuously for a period of 30 minutes. After the first 10 minutes a buzzer sound and a red light would keep on appearing. Each time the buzzer sounded the subject stood to gain a certain number of paise and each time the light came on he would gain a certain number of paise (as part of experimental procedure) the total amount of which he would receive at the end of the 30 minute session.

The value or gain he would receive from each sound and light presented to him was made clear before the start of each session. This was done because the values were varied every day and the relative values of the buzzer and the light were varied severally. In order to quell the curiosity of the subject and get him acquainted the tokens he was exposed to the buzzer sound and the red light on the first day before the session started with instructions.

Apparatus

As a delicate electronic instrument could not be fabricated with the required specifications within the time available a simple instrument was used. There were two parts to the instrument, each had a multi-switch which would operate the electronic

counter and the door buzzer/light. A dual power supply was used to provide different (D.C) sources for the above. An Ahuja Hifi Tape Recorder was used to tape the speech sample on the first day to help in deciding the responses.

A stop watch (OMEGA) was used to find out when the fluency period was achieved. The stop watch was started when the subject started reading. It was set to zero whenever the subject stuttered and started again when the stuttering disappeared.

Experimental situation

The study was conducted in a room in the clinic and All India Institute of Speech and Hearing. The subject was seated in a chair in front of a table. A tape recorder and a dual power supply were on another table to the right of the subject. The observer experimenter sat left of the subject at the table and the experimenter sat in front of the subject across the table.

The red bulb was hung above the chair in which subject sat so that when it glowed it would be easily noticeable even though he was reading. The door buzzer was hidden under the table so that it would not sound too loud, but it was clearly audible. The control switches and counters were also on the same table. There was no obstruction to the subject's reading.

Stimulus material

English and Kannada books including stories and novels were given to the subjects as reading material.

Design of the study

The single case study model A.B.A. design was used for each subject. Using this design permitted the control and experimental data to be obtained from the same subjects and the impact of different values of reinforcement could be measured from the same individual subject.

In the design A.B.A. (now onwards A.B.A.) the letters represent three time segments successively in a session. The first letter 'A' represents the first 10 minutes in which no independent variable is introduced but was only a control segment. This is pre*experimental base rate which permits comparison with scores of segments 'B' and 'A,'. The independent variable is introduced in the second segment 'B' for 10 minutes. The third segment 'A,' is similar to that of 'A' the pre-experimental one, in that the independent variable is not present. This segment is useful in knowing the ongoing effect of the independent variable which is not present in this segment.

In this study the subjects read throughout the session of thirty minutes.

Three base rates of 50 minutes each were taken for each subject before the experiment. No independent variable was introduced in any part of the base rate session. The scores of responses selected were noted at the end of each two minutes.

Each subject underwent five experimental sessions successively after the base rate sessions were over. There were five subjects in the study. The order of presentation of the experimental sessions were changed in each case to check order-effects. The sequences of the different orders of experimental sessions for all the cases are given in table 1.

Table - I

Order of presentation of experimental sessions

Case	T	M	G	Ma	A
Experiment sessions					
1	A	E	A	C	D
2	B	D	B	D	C
3	C	C	e	B	E
4	D	B	B	E	A
5	E	A	D	A	B

- A. the experimental session in which reinforcements for R_1 was + and for R_2 was 0.
- B - the experimental session in which reinforcements for R_1 was ++ and for R_2 was +.
- C - the experimental session in which reinforcement for R_1 was ++ and for R_2 also ++.
- D - the experimental session in which reinforcement for R_1 was + and for R_2 was ++.
- E - the experimental session in which reinforcement for R_+ was 0 and for R_- was +.

As the relative value of the reinforcement was to be tested for the impact of volition, the values were kept varying in either direction i.e., increasing or decreasing. '+' signified the value of reinforcement in terms of paise which could be exactly doubled to '++' or made nil to '0'.

Experimental procedure

Experimental sessions started after having base rates for atleast three sessions.

On each day of experiment the subject was to read the stimulus material provided for 30 minutes. Subject was instructed before the session started.

As the subject started reading the experimenter kept on counting the fluency periods and the observer was keeping count of the selected stuttering response. Both the response items were counted using the electronic counter.

After the end of every two minutes the observer tapped on the table and the subject was to mark in the book wherever he was reading and the observer and the experimenter noted down the scores in the counter. The marks of the subject gave an account of the number of words read in two minutes.

At the end of 10 minutes the door buzzer and the light were connected to the electronic - circuit after which the responses were getting reinforced by the red light and the buzzer sound. There would not be light or sound after the end of the second 10 minutes and the third 10 minutes also proceeded as the first 10 minutes without the independent variable being introduced.

After 30 minutes the subject was asked to stop reading. The count of responses in the middle 10 minutes was noted. The exact amount of money for those responses was calculated - the subject was aware of the calculations. The money was paid to the subject.

Report of awareness of contingency

On the last day after the experiment was over, the subject was asked whether he could make out the contingency of the reinforcements.

No subject reported the contingency for the reinforcement of fluency. Two older subjects reported the contingency for reinforcement of stuttering responses i.e., repetitions. A subject reported that he was prompted by his friends that he could gain by stuttering.

Statistical Analysis

Non parametric statistics were used to analyse the data.

The Distribution-Free Test (Friedman, Kendell and Babington Smith) was used to find the differences between the treatments for both the responses. Wilcoxon Matched Pairs Signed Rank Test (Siegel; Conover) was used to test the significance of changes in fluency periods and repetitions across treatments and conditions and among subjects.

CHAPTER IV

RESULTS AND DISCUSSIONS

Non parametric statistics was used to analyse the data.

There were atleast three baserates taken for each subject " before the experiment started. The stability of baserates was tested using the Wilcoxon Matched Pairs Signed Ranks Test (Siegel,S). The A and B segments of the last two baserates was compared to see whether there was any significant difference. The raw scores for both the responses have been given in the Appendix.

The difference in the scores of the last two baserates were ranked and then assigned to the signs positive or negative depending on whether they were more or less. The rank of scores of fewer signs were summed up to be T value. Table II shows T values for all cases, which are higher than the Table G Values indicating that there was no significant difference between the last two baserates for fluency. Table III indicates that the baserate for repetitions was stable for all subjects except the subject T.

The last baserate was taken as the reference for further comparison.

TABLE 2

Testing the stability of baserates
for fluency

Srl No	Subject	N Matched pairs	Table G values	Observed T Values
1	M	8	4	12.5
2	A	9	6	7
3	T	10	8	30
4	Ma	10	8	19
5	G	6	0	4

TABLE 3

Testing the stability of baserates
for baserates

Srl No	Subject	N Matched pairs	Table G values	Observe T Value
1	M	9	6	10
2	A	10	8	18
3	T	8	6	6
4	Ma	8	4	16
5	G	9	6	8.5

Ho - There is no difference between the scores of segment A and B of last two baserates

H₁ - There is difference between the last two baserates

Ho - Gets rejected when observed 'T' value is less than/equal to the given value in Table G for N matched pairs at 0.025 level (Siegel,S)

The differences between the B segment and the A segment for each condition were converted into percentage differences. Thus we had for each subject 10 percentage - difference scores 5 for fluency and 5 for repetitions.

$\% (B-A)_E =$ percentage difference score for the experimental session

$\% (B-A)_B =$ percentage difference score in the baserate taken as reference

The percentage difference scores give the changes of response in the experimental and baserate sessions. The difference of the percentage difference scores of experimental Q baserate session is taken to account for the change in a treatment. Thus we have these scores for each response (Table 4).

A Distribution-Free Test (Friedman, Kendall, and Babington Smith, in Hollander, M and Wolfe, D.A.) was used to test the differences in treatments i.e., with different values of reinforcers (Table 5). It is seen that there was no significant difference between treatments for fluency. This meant that the treatments were almost of the same effect. However, in condition 'B' the increase of fluency periods was significant at 0.05 level than the fluency increase in conditions 'D' and 'E'. The data for this is given in Tables 6 and 7. To test this increase the

Hollander, M and Wolfe, D.A. 1973

Non Parametric Statistical Methods, John Wiley & Sons¹

TABLE 4

Difference of the % difference scores for each response under each condition

$$De = \% (B-A)_E - \% (B-A)_B$$

Fluency session	A	B	C	D	E
Subject	Reinforcement Value +	++	++	+	0
A	7.8 -35.3	23.1 -12	9.1 -13.8	13.4 -17.2	16.1 -32.8
Ma	16.5 -30	4. +3	28 -21	-7 -26	-4 -7
M	-0.7 +14.6	55 9.7	15 13	18.6 4	13.6 18.3
T	00 -45	26.4 -10.6	22 -3.4	00 -44	22.6 -72.5
G	19.1 29	14.6 -22.2	7.8 -17.6	4 6.8	00 -9
	E	D	C	B	A

Repetition's session

Scores in upper portion are of fluency for the respective treatment, and those in the lower part are of repetitions

TABLE 5

A Distribution-Free Test (Friedman, Kendall & Babington Smith)

To test $H_0, T_1 = T_2 = T_3 = T_4 = T_5$

Subjects	T_1	T_2	T_3	T_4	T_5
A	7.8	23.1	9.1	13.4	16.1
Ma	16.5	4	28	-7	-4
M	-0.7	55	15	18.6	13.6
T	0.0	26.4	22	00	22.6
G	19.1	14.6	7.8	4	00

Ranks

n	K	T_1	T_2	T_3	T_4	T_5
A		1	5	2	3	4
Ma		4	3	5	1	2
M		1	5	3	4	2
T		1.5	5	3	1.5	4
G		5	4	3	2	1

Ri 12.5 22 16 11.5 13

$$S = \left(\frac{12}{nk(K+1)} \right) - 3n(K+1) = 5.8 \quad 8.96(\text{from table A-15})$$

H_0 accepted as S value is less than the A

TABLE 6
Testing the increase in Fluency
periods

Subject	Condition B	Condition D	di	Ri	T
A	23.1	13.4	-9.7	1	
Ma	4.0	-7.0	-11.0	3	
M	55.0	18.6	-36.4	5	
T	26.4	00.0	-26.4	4	
G	14.6	4.0	-10.6	2	
	N = 5	W =1			=0

Ho : Scores in 'B' are not be larger than in 'D' condition

Hi : Scores in B are larger than in 'D' condition

Decision : Ho : is rejected if observed T value is less than W , at 0.05
Ho rejected

TABLE 7
Testing the increase in Fluency
periods

Subject	Condition B	Condition E	di	T
A	23.1	16.1	-7	
Ma	4.0	- 4.0	-8	
M	55.0	+13.6	-41.4	
T	26.4	22.6	-3.8	
G	14.6	00	-14.6	
	N = 5			

Ho : Scores in condition 'B' are not larger than scores in condition 'E'

H₁ : Scores in condition 'B' are larger than scores in condition 'E'

Ho : Rejected at 0.05 level

Wilcoxon Matched pairs signed Ranks Test was used (Conover).

Repetitions were also analyzed in the same manner using the distribution free test. The null hypothesis that the treatments were equal was rejected (Table 8). Generally repetitions tended to show a decrease. Case M was an exception in that he allowed an increase in repetitions. The other exception was the case G who showed a decrease in all conditions but one in which maximum reinforcement was given to repetitions subject Ma also showed a little increase in repetitions in only one condition.

There was no significant increase in repetition, instead a general decrease seen. The relative increase in fluency periods was tested against repetitions at different values of reinforcements, reinforcement value being the same for both responses. There was a significant increase in fluency seen in two conditions when the reinforcement values were '++' for both the responses (Tables 9 and 10). It can be observed from the data scores of the Tables 11, 12 and 13 that the scores for fluency are higher than the repetitions the scores are about to reach the significance.

When individuals were compared across the pairs of responses with different treatments, three individuals A, Ma and T have shown the significant fluency increases. Against the repetitions

TABLE 8

A Distribution-Free Test (Friedman, Kendall &
Babington Smith)
To Test $H_0 - T_1 = T_2 = T_3 = T_4 = T_5$

Subject	T_1	T_2	T_3	T_4	T_5
A	-35.3	-12.	-13.8	-17.2	-32.8
Ma	-30.	+3	-21	-26	-7
M	+14.6	+9.7	+13	+4	+18.3
T	-45	-10.6	-3.4	-44	-72.5
G	+29	-22.2	-17.6	+6.8	-9

Ranked Scores

Subject	T_1	T_2	T_3	T_4	T_5
A	1	5	4	3	2
Ma	1	5	3	2	4
M	4	2	3	1	5
T	2	4	5	3	1
G	5	1	2	4	9
Ri	13	17	17	13	21

$$s = \frac{12}{5(5)(5+1)} - 3(\epsilon) (5+1)$$

$$= \frac{12}{5(5)(5+1)}$$

$$= 18.56$$

$$A - 15)$$

$$= 8.96 \text{ (From Table)}$$

= H_0 rejected

TABLE 9

Subject	'++'		di	Ri
	Condition B (Fluency)	Vs Condition D (Repetitions)		
1	23.1	-12.0	-34.1	Z
2	4.0	+3.0	-1.0	1
3	55.0	+9.7	-45.3	5
4	26.4	-10.6	-37.0	4
5	14.6	-22.2	-36.8	3
=0				
N = 5		W = 1		

TABLE 10

Subject	'++'		di	T
	Condition C (Fluency)	Vs Condition C (Repetitions)		
1	9.1	-13.8	-22.9	3
2	28.0	-21.0	-49.0	5
3	15.0	+13.0	-2.0	2
4	22.0	-3.4	-25.4	4
5	7.8	-17.6	-0.2	1
=0				

Ho : The fluency scores are not greater than the repetition scores

H₁ : The fluency scores are greater than the repetition scores

Ho : is rejected when the sums of the values of T is less than the W score

$$= 0.05$$

TABLE 11

Subject	'+' Condition D (Fluency)	Vs	'+' Condition B (Repetitions)	d.	T
1	13.4		-17.2	-30.6	-3
2	-7.0		-26.0	-33.0	-4
3	18.6		+ 4.0	-14.6	-2
4	0.0		-44.0	-44.0	-5
5	4.0		+6.8	2.8	+1
N = 5 .			W = 1		=1

TABLE 12

Subject	'0' Condition E (Fluency)	Vs	'o' Condition A (Repetition)	d.	R.	T
1	16.1		-32.8	-48.9	-4	
2	-4.0		-7.0	-2.0	-1	
3	13.6		+18.3	+4.7	+2	
4	22.6		-72.5	-95.1	-5	
5	0.0		-9.0	-9.0	-3	
N = 5			W = 1		=2	

TABLE 13

Subject	'+' Condition A (Fluency)	Vs	'+' Condition E (Repetitions)	d _i	R _i	T
1	7.8		-35.3	-43.1	-3	
2	16.5		-30.0	-46.5	-5	
3	-0.7		+14.0	+15.3	+1	
4	0.0		-45.0	-45.0	-4	
5	19.1		+29.0	+19.9	+2	
N = 5			w = 1		=3	

- Ho : The fluency scores are not greater than repetitions + score
H₁ : The fluency scores are greater than repetition scores
Ho : Rejected when the sum of the value of T is less than W score

the fluency has increased significantly at 0.05 levels (Tables 14, 15 & 16). It should be pointed out here that the subject T was the one who did not show a stable baserate, has also shown a significant reduction in the same response.

The increase in fluency periods at different values of reinforcement were tested as compared to the baserate. There was a significant increase in baserates for conditions B and C and 0.05 level (Table 17 and 18). In the other three conditions the data shown an apparent increase in fluency scores but the ties make it difficult for them to reach significance (Tables 19, 20 and 21).

The percentage difference scores of repetitions were also compared against their percentage difference scores of baserate. There was no significant increase in any of the conditions of repetitions. In all comparisons the T values were considerably higher than those for fluency.

Using the percentage difference score each subject's score in the experimental session in each response was compared with the baserate. The subjects A, T and G show a significant increase in fluency periods (Table 22, 23 & 24)., It can be seen from the corresponding graphs i.e., I a, II a, and III a, that there is a notable rise in fluency lines which rise especially in segment B. The other two subjects M and Ma also exhibit a definite increase in fluency when we look at the graphs IV a and V at though not as aignificantly as the other three.

TABLE 14

Subject A Sessions	Fluency	Vs	Repetitions	d_i	R_i	T
1	7.8		-35.3	-43.1	4	
2	23.1		-12.0	-35.1	3	
3	9.1		-13.8	-22.9	1	
4	13.4		-17.2	-30.6	2	
5	16.1		-32.8	-48.9	5	
N = 5			W = 1			=0

TABLE 15

Subject Ma Sessions	Fluency	Vs	Repetitions	d_i	R_i	T
1	16.5		-30.0	-46.5	4	
2	4.0		+ 3.0	- 1.0	1	
3	28.0		-21.0	-49.0	5	
4	-7.0		-26.0	-19.0	3	
5	-4.0		- 7.0	- 3.0	2	
N = 5			W = 1			=0

TABLE 16

Subject T Sessions	Fluency	Vs	Repetitions	D_i	R_i	T
1	0.00		-45.0	-45		
2	26.4		-10.6	-37		
3	22.0		- 3.4	-25.4		
4	0.0		-44.0	-44.0		
5	22.6		-72.5	-95.1		
N = 5			W = 1			i=0

Ho : The fluency scores are not larger than repetition scores

H₁ : The fluency scores are larger than repetition scores

Ho : Gets rejected as the sum of T values is less than the W = 1 at a level 0.05

TABLE 17 .**Testing the change in fluency periods in Condition B**

Subject	$(B - A)_E$	$(B - A)_B$	d_i	R_i	T
1	54.0	-30.9	-84.9	-5	
2	11.0	7.0	-4.0	-1	
3	59.0	4.0	-54.0	-4	
4	43.4	17.0	-26.4	-3	
5	14.6	00.0	-14.6	-2	
N = 5		W = 14	W = 1,		=0
Ho rejected					

TABLE 18**Testing the change in Fluency periods in Condition C**

Subject	$(B-A)_E$	$(B-A)_B$	d_i	R_i	T
1	40.3	-30.9	-71.2	-5	
2	35.0	7.0	-28.0	-4	
3	19.0	4.0	-15.0	-2	
4	39.0	17.0	-22.0	-3	
5	7.8	00.0	-7.8	-1	
N = 5		W = 1	$W_1 = 14$		=0

Ho rejected

Decision : If the sum of T is less than W score, it indicates that $(B-A)_E$ is greater than $(B-A)_B$ at 0.05 level. If sum of T is more than \hat{M}_1 score then the $(B-A)_E$ value is significantly lesser than $(B-A)_B$ at 0.05 level

TABLE 19
Testing for the change in fluency periods

Subject	'+' (B-A) _E	(B-A) _B	d _i	R _i	T	
1	44.3	-30.9	-75.2	-4		
2	00.0	7.0	+ 7.0	+2	2	
3	22.6	4.0	-18.6	-3		
4	17.0	17.0	00.0			
5	04.0	00.0	- 4.0	-1		
N = 4					W = 0	W ₁ - = 13
					=2	

TABLE 20

Subject	'+' (B-A) _E	(B-A) _B	d _i	R _i	T	
1	38.7	-30.9	-69.6	4		
2	23.5	7.0	-16.5	2		
3	3.3	4.0	+ 0.7	+1		
4	17.0	17.0	00.0			
5	19.1	00.0	-10.1	3		
N = 4					W = 0	=13
					=1	

TABLE 21

Subject	'0' (B-A) _E	(B-A) _B	d _i	R _i	T	
1	47.0	-30.9	-77.9	4		
2	3.0	7.0	+ 4.0	+1	1	
3	17.6	04.0	-13.6	2		
4	39.6	17.0	-22.6	3		
5	00.0	00.0	00.0			
N = 4					W = 0	W ₁ - = 13
					= 1	

TABLE 22**Testing the change in fluency scores
of Subject 'A'**

Session	(B-A) _g		d_i	R_i	T
1	38.7	-30.0	-69.6	1	
2	54.0	-30.9	-84.9	5	
3	40.3	-30.9	-71.2	2	
4	44.3	-30.9	-75.0	3	
5	47.0	-30.9	-77.9	4	

N = 5 w = 1 =0

Ho rejected at 0.05 level

TABLE 23**Subject T**

Session	(B-A) _E	(B-A) _B	d_i	R_i	T
1	17.0	17.0	00.0		
2	43.4	17.0	-26.4	3	
3	39.0	17.0	-22.0	1.5	
4	17.0	17.0	00.0		
5	39.0	17.0	-22.0	1.5	

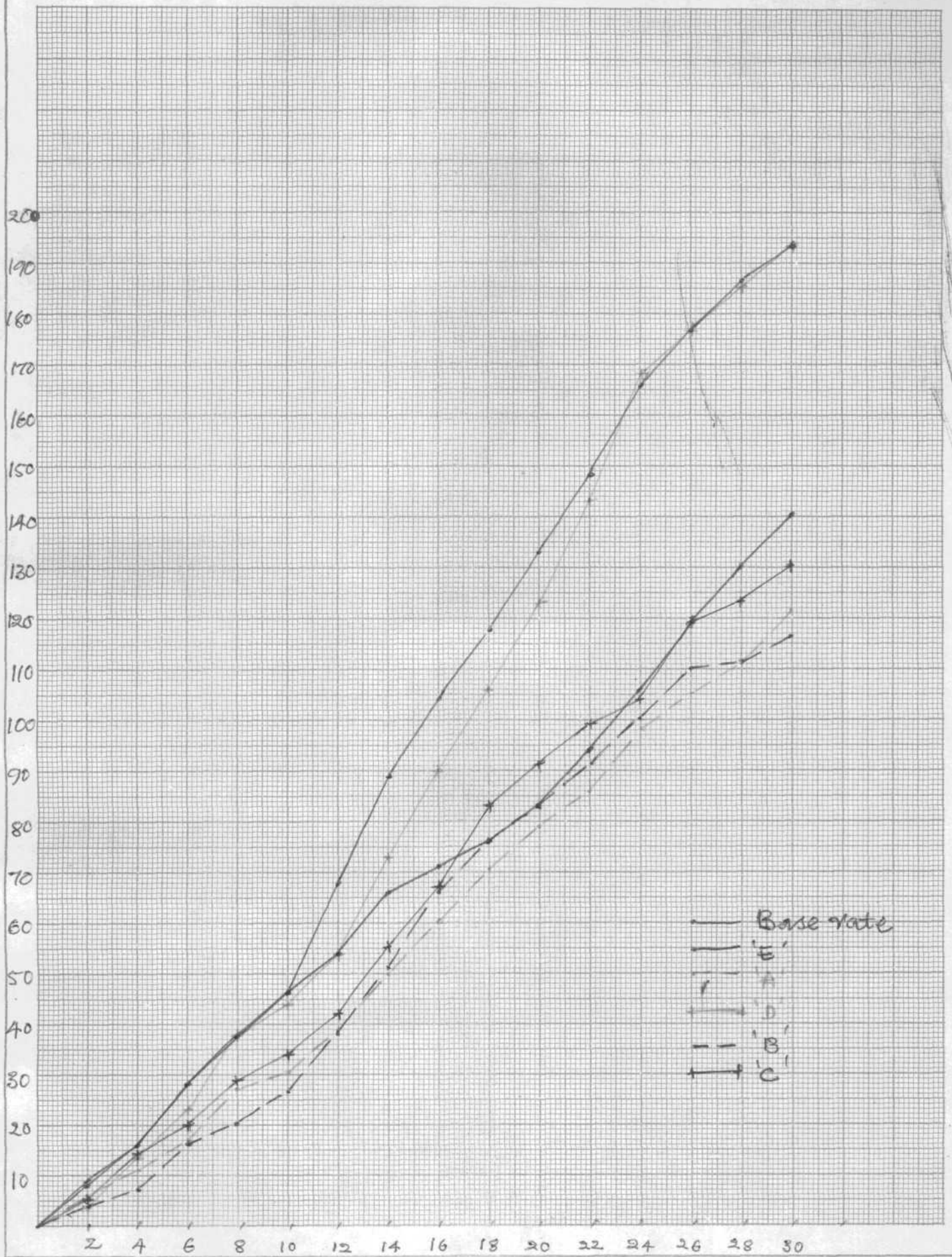
N = 3 W = not available in tables =0

TABLE 24**Subject G**

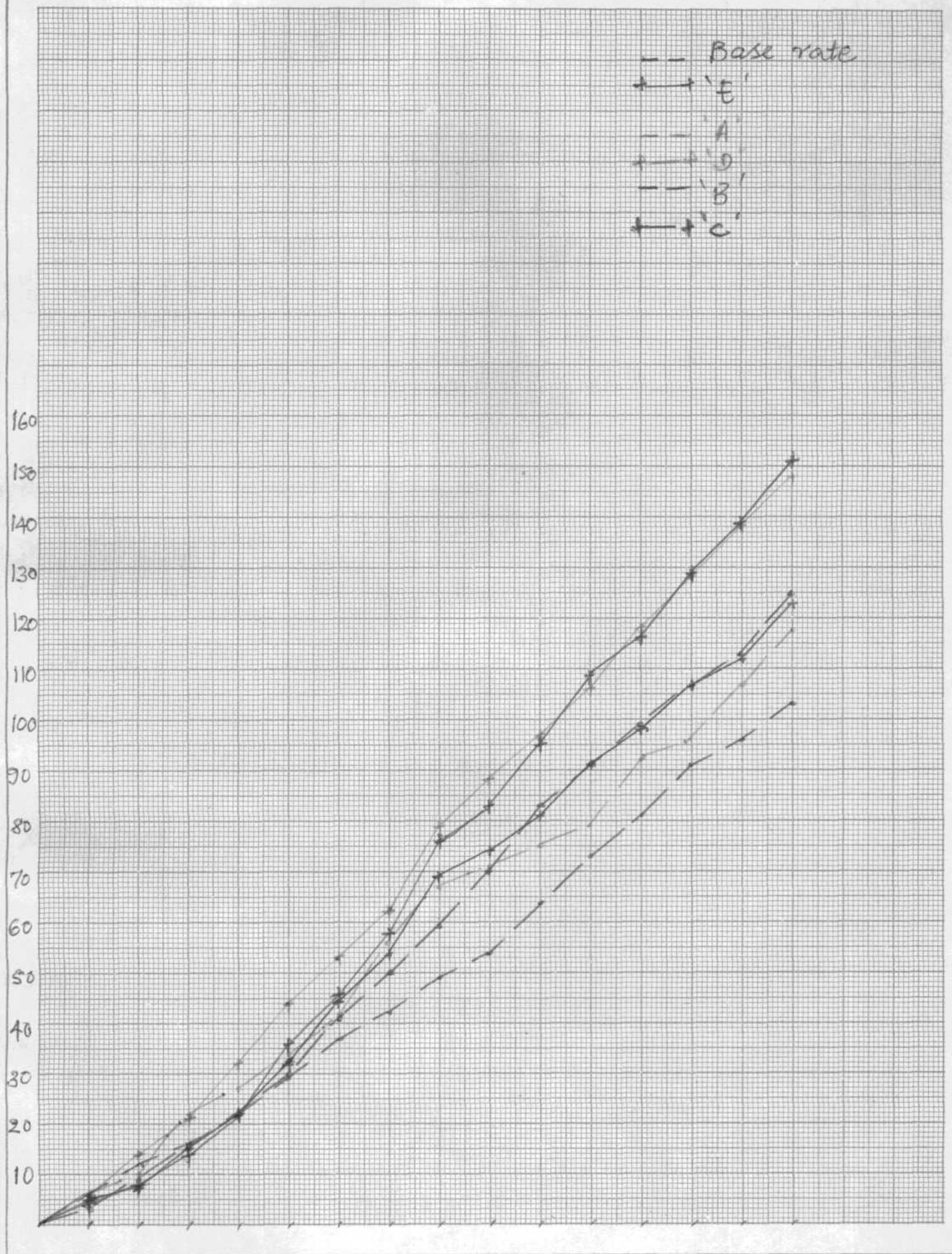
Session	(B-A) _E	(B-A) _B	d_i	R_i	T
1	19.1	00	-19.1	-4	
2	14.6	00	-14.6	-3	
3	7.8	00	- 7.8	-2	
4	4.0	00	- 4.0	-1	
5	0.0	00	0.0		

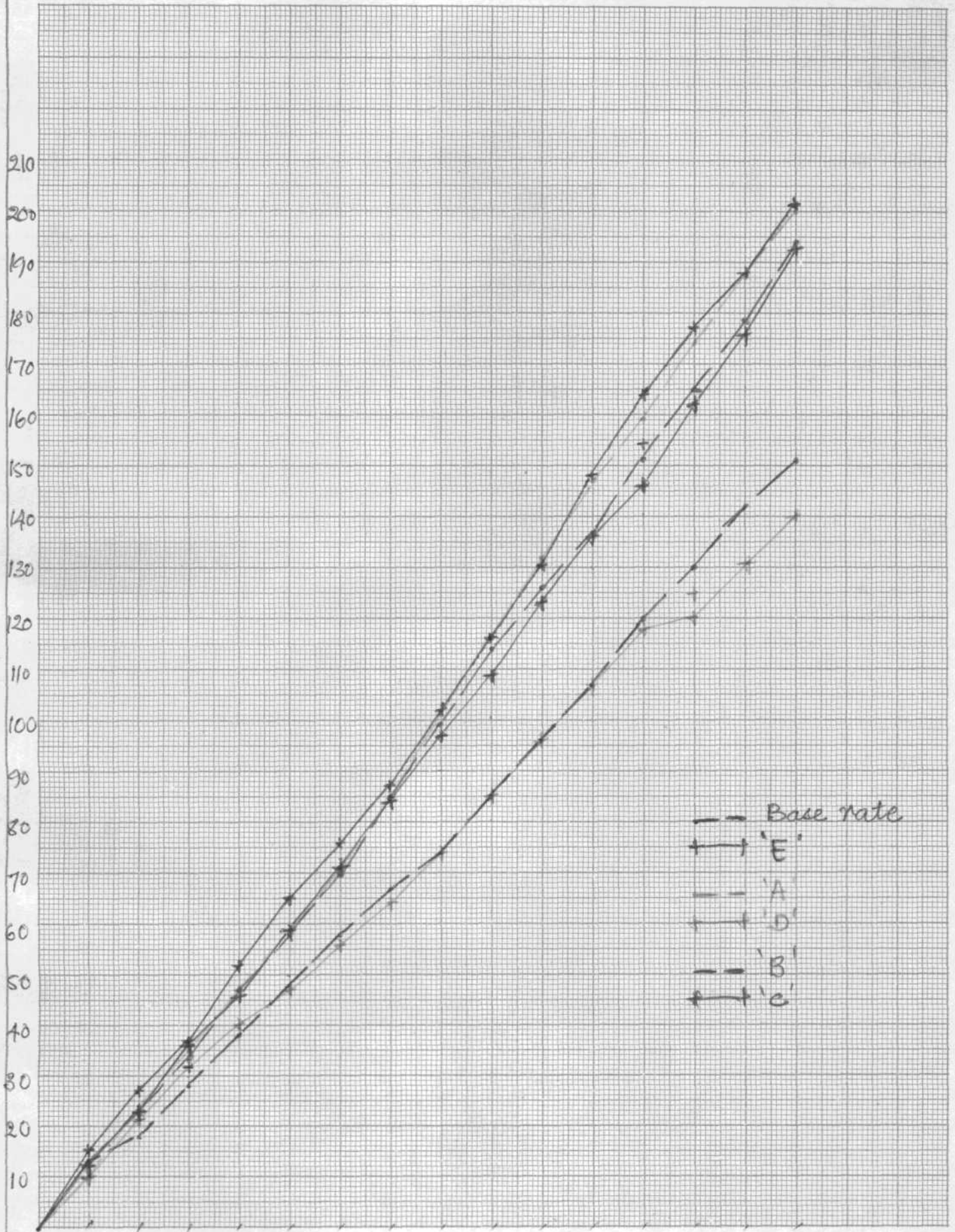
N = 4 W = 0 =0

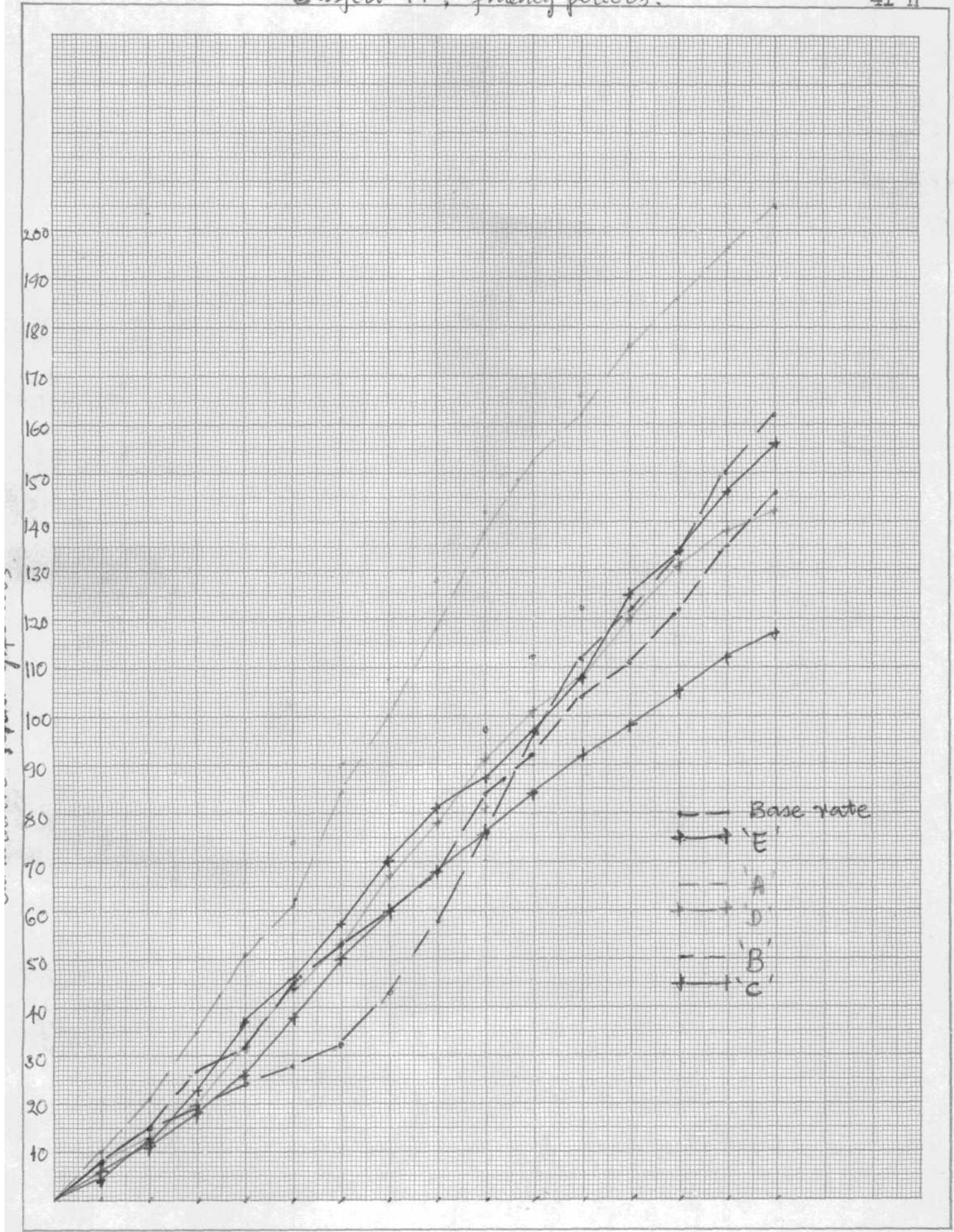
Subject 'A' Fluency periods.

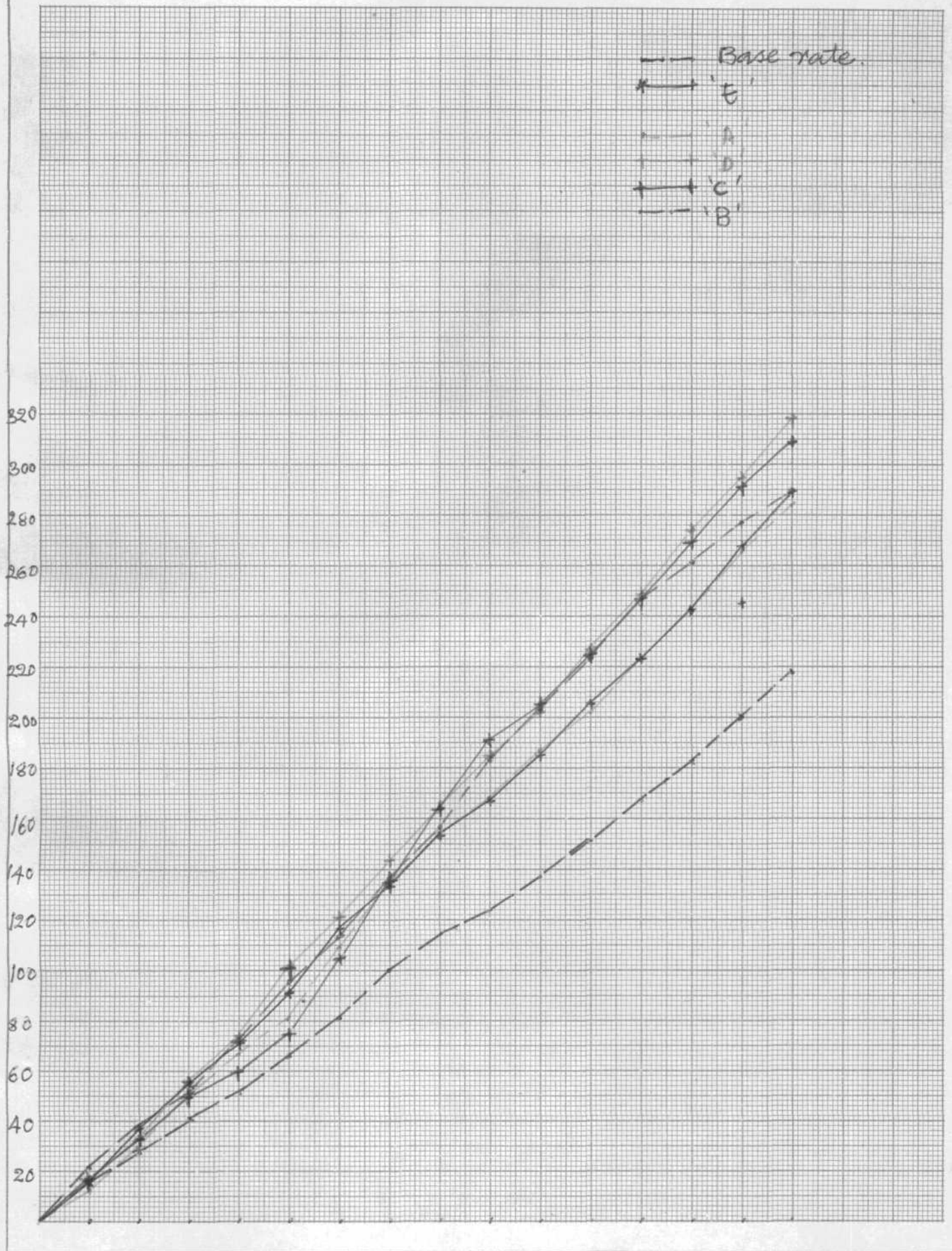


Subject 'T' fluency periods.









There is a significant reduction in repetitions observed in subject A (Table 25). There is also general reduction seen in other subjects except G who show a significant increase in repetitions (Table 26). He is also the one who apparently show an increase in fluency also. It is clear from graphs I b, to V b, that the repetition lines not only fall on either side of the baserates but also don't deviate consistantly.

Another graph VI contains the plotting of changes in both responses when treated with different values of reinforcement. The scores used are percentage difference scores. It can be seen that the increase in either response are not in consonance with the values they are treated, with. For the same value of reinforcement different individuals have changed either responses differently. It is clear that fluency scores have not decreased at all where as most of the subjects have shown decrement in repetitions below the baserate of the experimental session. Even the subject who has not shown the decrease is the one who has shown maximum increase in fluency periods. The increase shown by him in fluency is greater than the increase shown by him in repetitions.

The values of reinforcement for the opposing response also could have effects on one response. It is shown in Table 4 that generally there is a decrease in repetitions. But there can be seen a larger decrease in repetitions when the opposite value was + for fluency and '0' for repetitions, than when it was '+' for repetitions and '0' for fluency.

TABLE 25**Testing change in repetition - Subject A**

Sessions	$(B-A)_E$	$(B-A)_B$	d_i	R_i	T
1	-29.0	3.8	32.8	+4	4
2	-13.4	3.8	17.2	+3	3
3	-10.0	3.8	13.8	+2	2
4	- 8.2	3.8	12.0	+1	1
5	-31.5	3.8	35.5	+5	5
N = 5		$W_1 -$	=14		=15

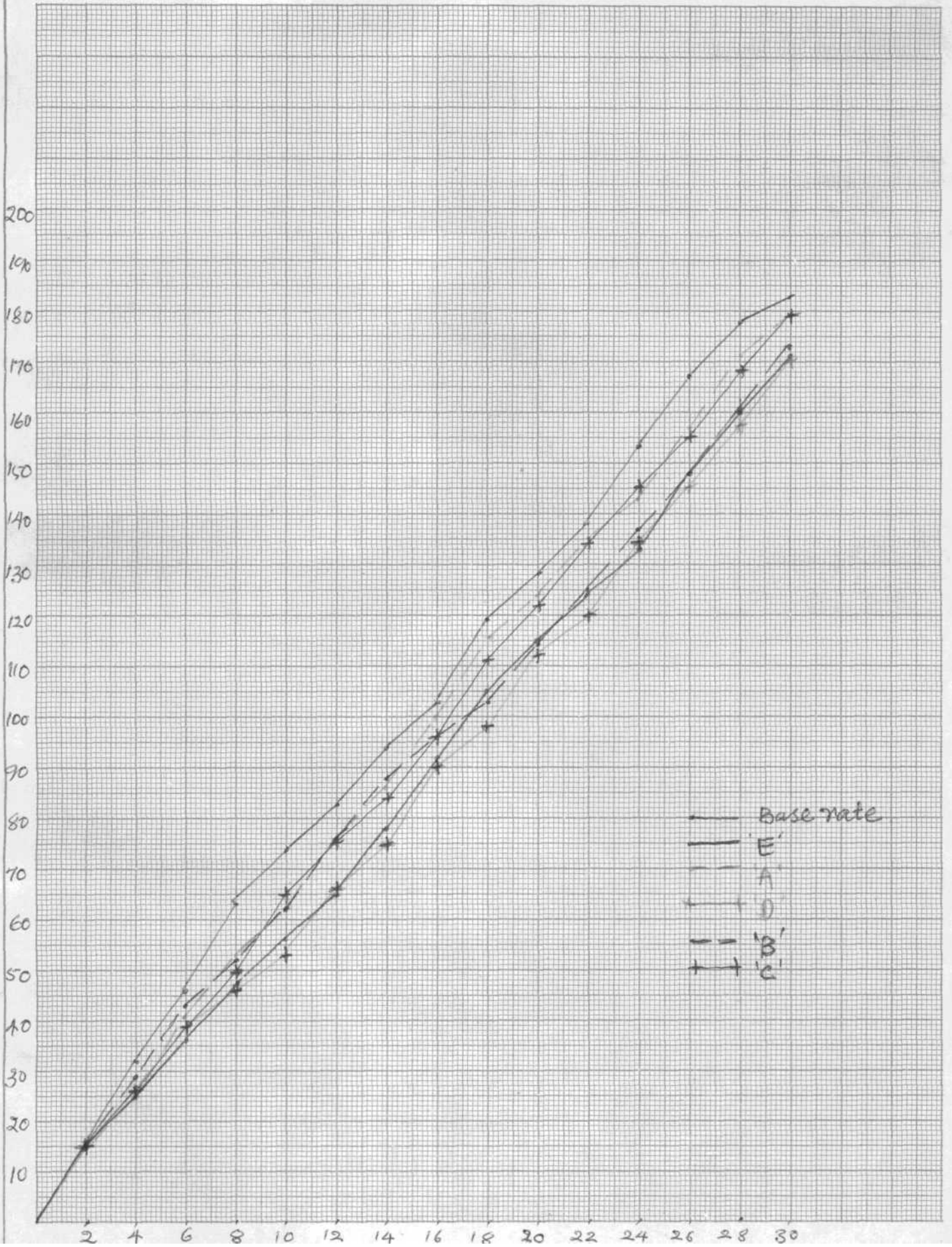
H_0 rejected at 0.05 level (i.e., there is significant decrease)

TABLE 26**Testing the change in repetition - Subject G**

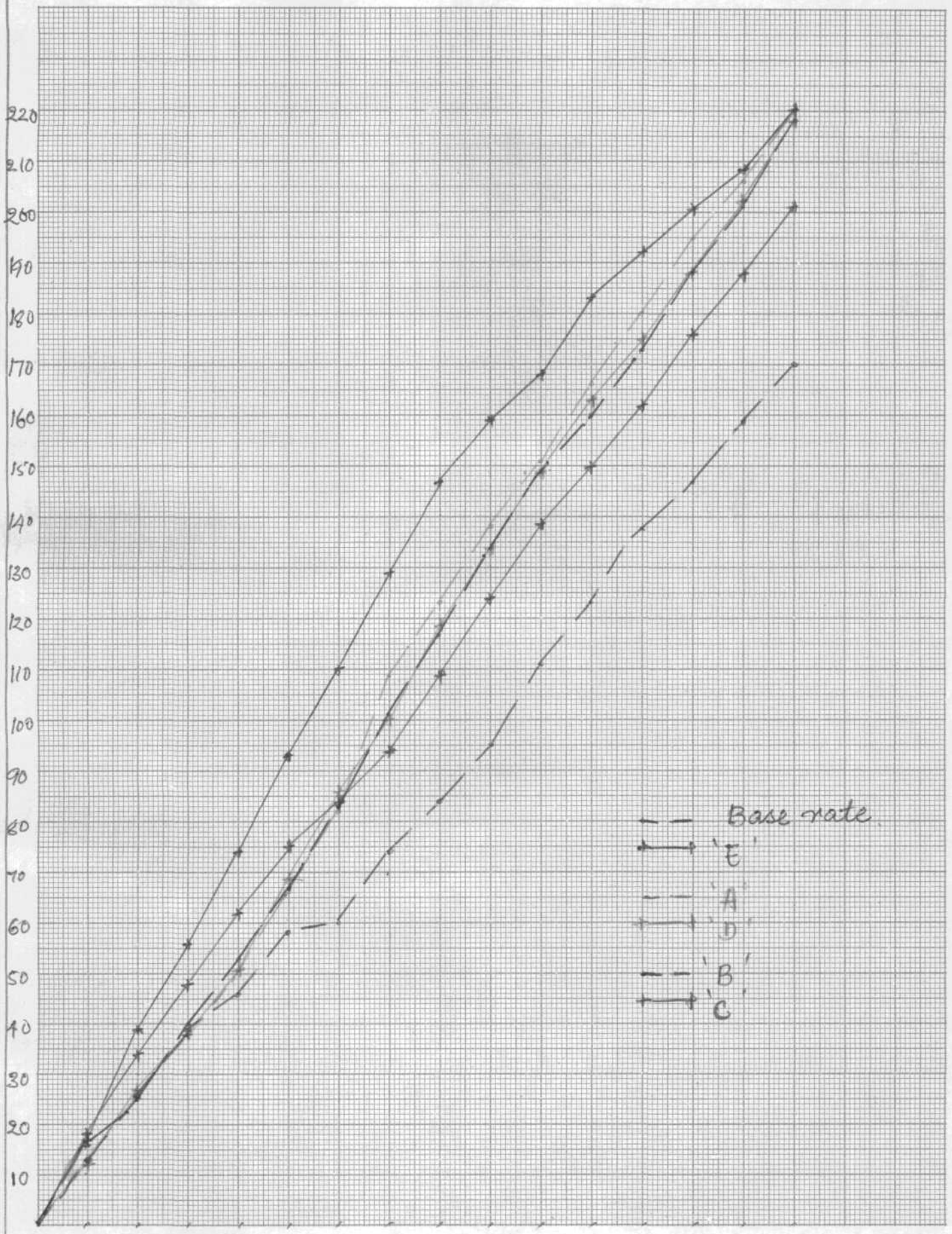
Session	$(B-A)_E$	$(B-A)_B$	d_i	R_i	T
1		-23.2	-14.2	-3	
2	+6.8	-23.2	-30.0	-4	
3	-17.6	-23.2	- 5.6	-2	
4	-22.2	-23.2	- 1.0	-1	
5	+29.0	-23.2	-52.2	-5	
N = 5		$W_1 -$	=14	W =1	=0

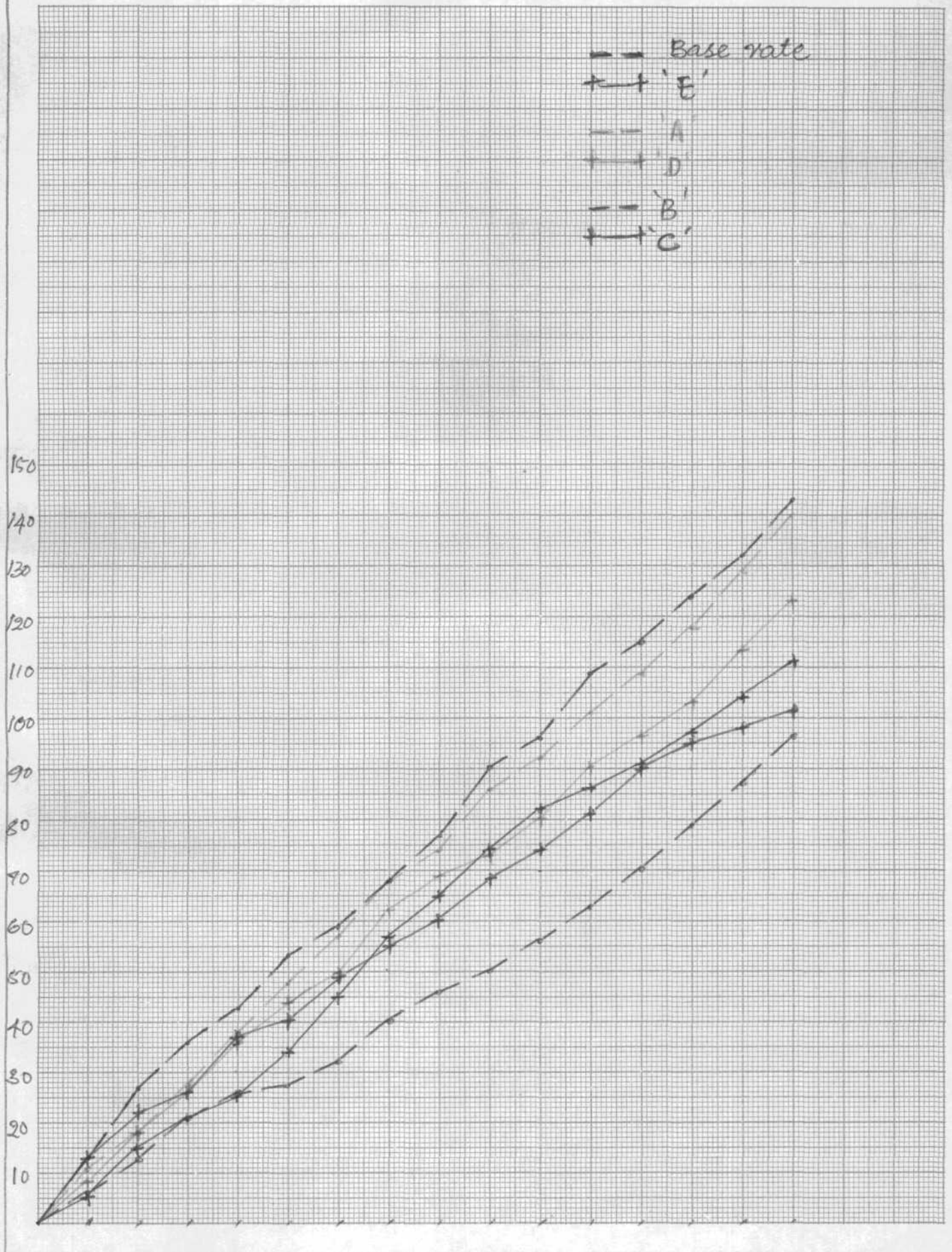
H_0 rejected at 0.05 level (i.e., there is a significant increase)

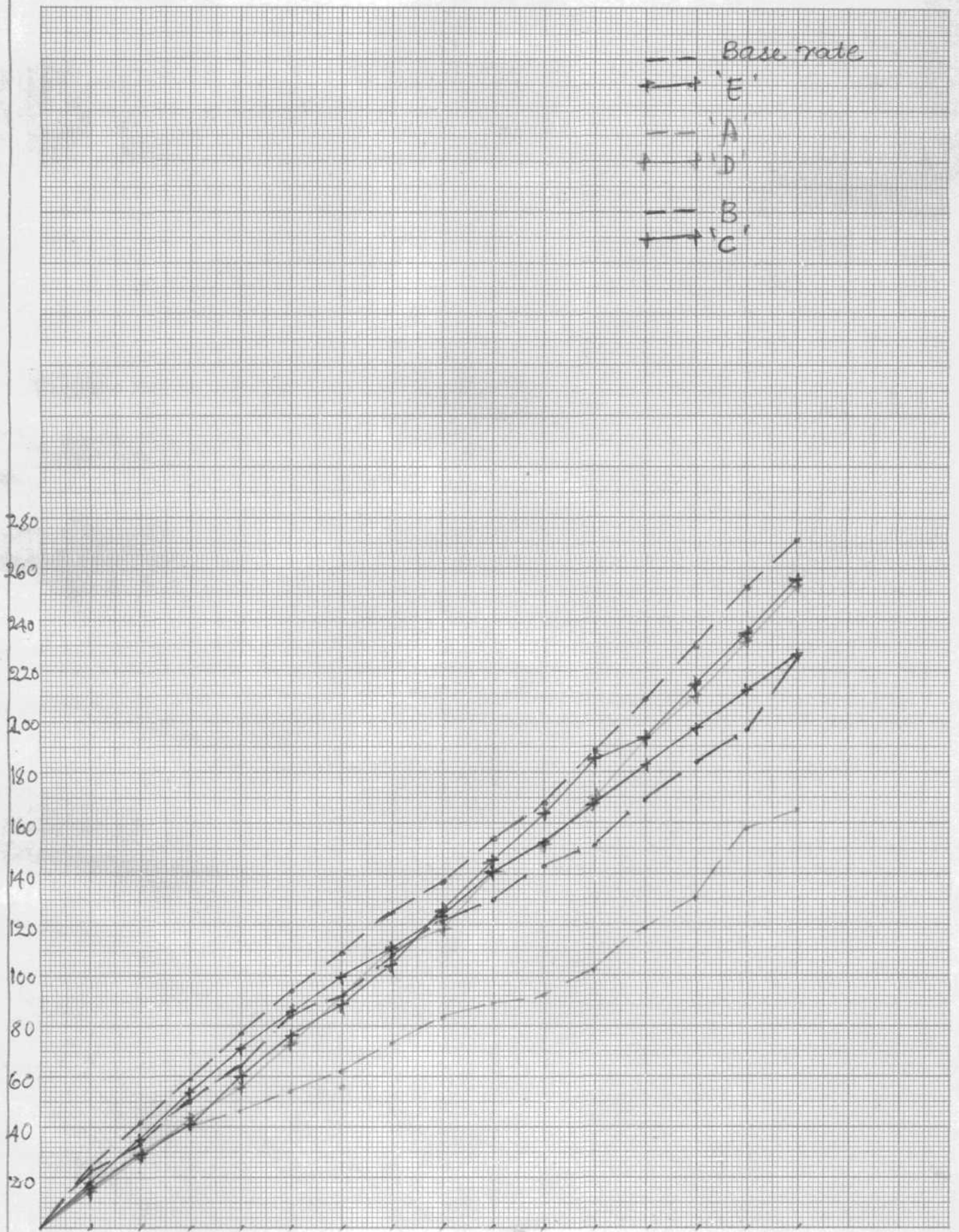
Subject 'Ma' Repetitions.

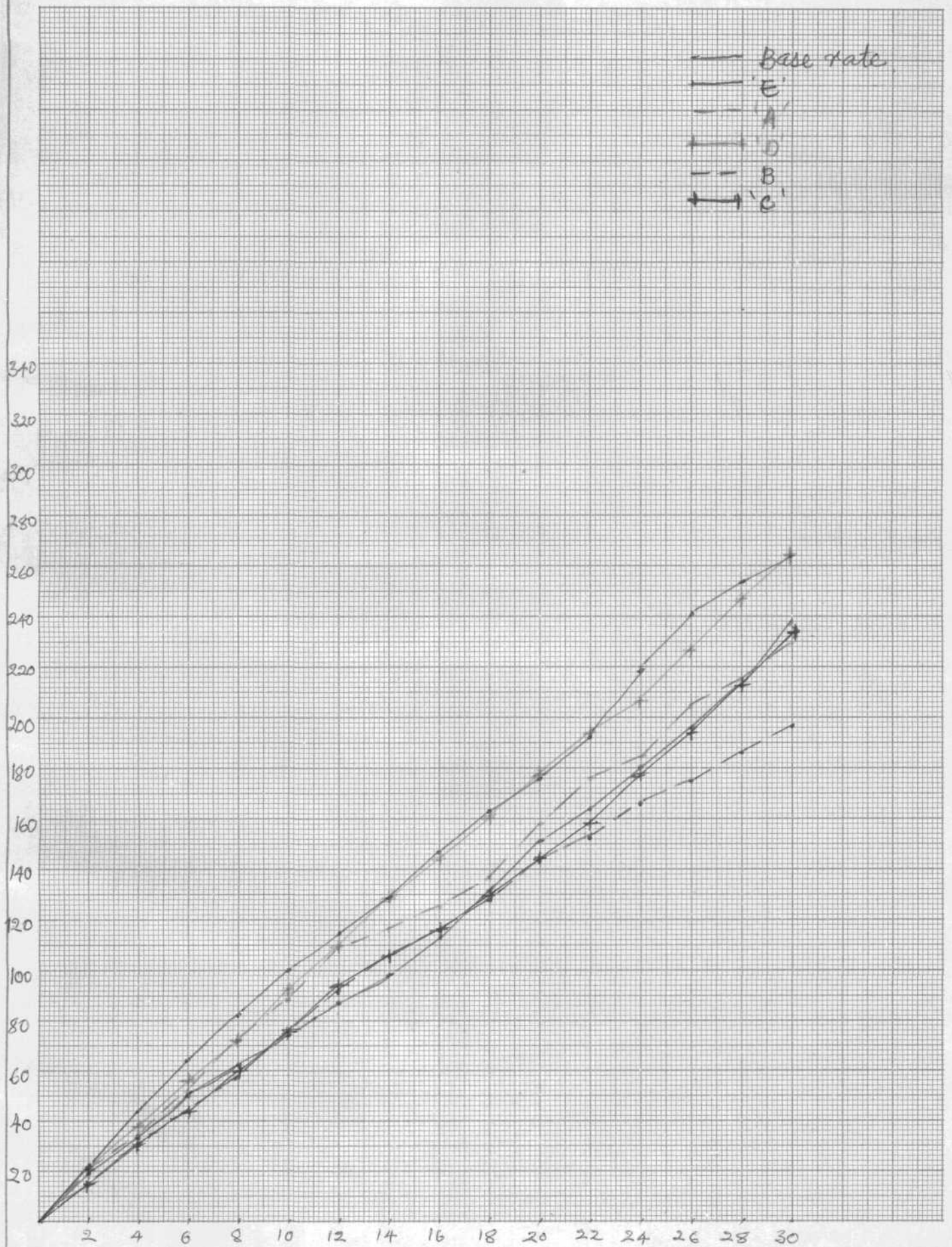


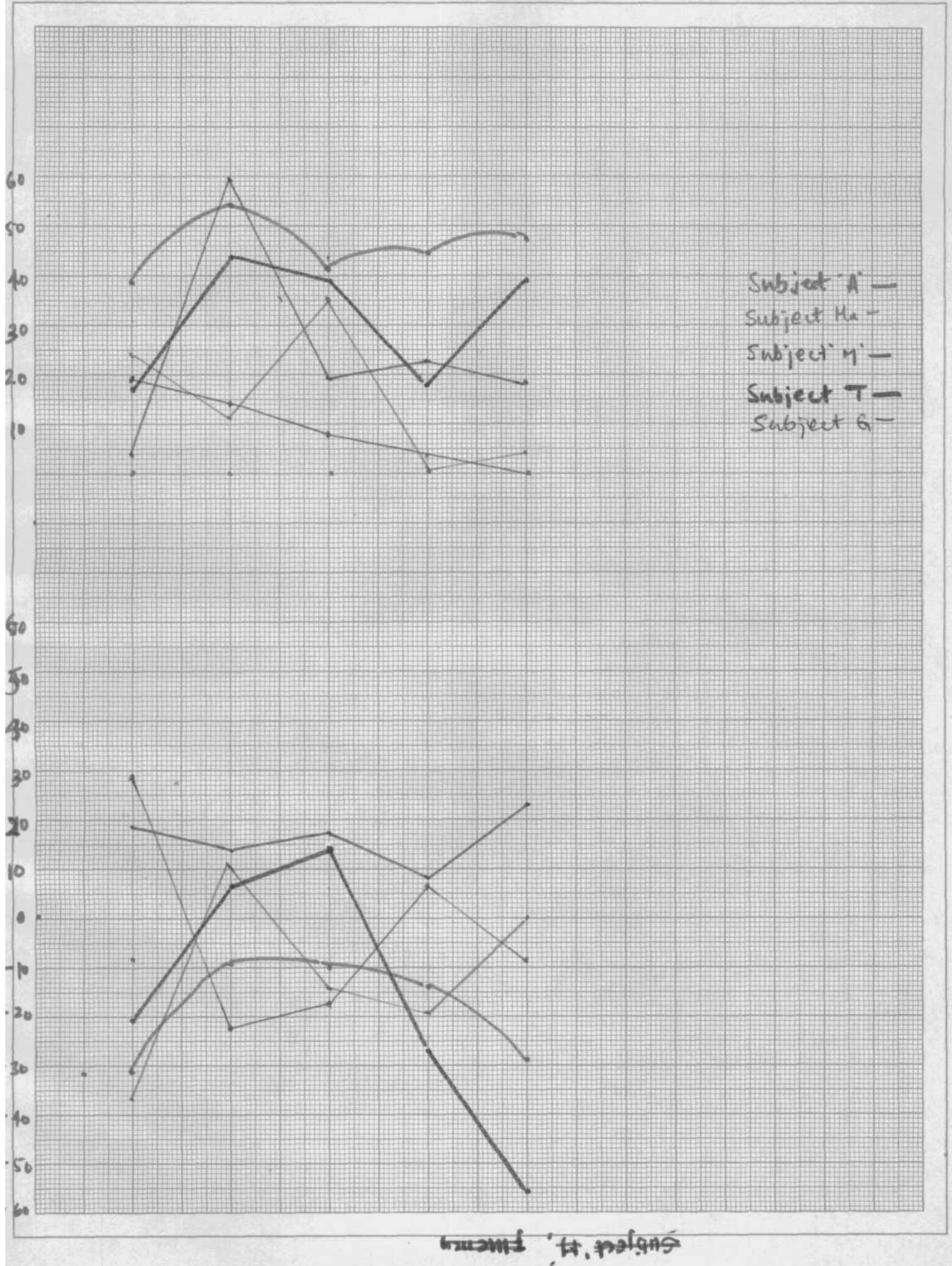
Subject 'M' Repetitions.











The increase in fluency is more when it was reinforced with no value against '+' for repetition than when it was reinforced with '+' and no value for repetitions. Increase in fluency was apparently more when it was reinforced with '++' and to the repetitions value was +, than when repetitions were reinforced with equal value or less. The increase was found significant when the values of reinforcement were '++' for fluency and '+' for repetitions than '+' for fluency and '++' for repetitions, and also when it was '0' for fluency and '+' for repetitions.

But increase in repetitions is not significant when compared with conditions each other. Opposite values for repetitions i.e., values of reinforcement for fluency even if increased there was no significant change in repetitions. Repetitions decrease irrespective of values of reinforcement for fluency whether more or less.

Carryover effects of the treatments were checked using the matched pairs of sequential scores of segment B and A and A and A. For fluency there was expected decrease from segment B to A in all conditions except Owe. Where as for repetitions there was found no significant reduction from segment B to A except in condition E. When individual subjects were analyzed for these changes only subject Ma show no decrease in fluency from experimental segments B to A¹. For repetition only subject A shows an equal reduction in both segments B and A.

increased

Fluency/_when reinforced with different values of reinforcement, but the increase is not in consonance with the values of reinforcement. It has increased significantly when the value of reinforcement was highest, and generally there is an increase seen.

Repetitions have not increased significantly in any of the conditions, generally they have decreased. Even with increase in values of reinforcement there is no increase seen.

For reinforcement there have been different types of changes. The kind of change is not the same in all subjects. Fluency has shown an increase with increased value of reinforcement though not very consistently. But the same reinforcement for repetitions have not brought about such a change.

In the light of the increase in fluency periods in three subjects and conditions significantly and the general increase in the fluency scores as seen from the data across different conditions and among subjects, the first null hypothesis may be rejected that there will not be a greater increase in fluency periods than in the stuttering responses with increases in the values of reinforcers. An additional support for this is that there is a decrement seen in the repetitions generally. This is really apparent from the Table 4.

In the conditions analyzed for the changes in fluency and repetitions and repetition when both the responses were reinforce*

equally two conditions 'C and 'B Vs D' exhibit a greater increase of fluency periods at a significant level 0.05. Even in other three conditions the increase is apparent but has not reached the level of significance. This finding lets the sub null hypothesis rejected. The alternative hypothesis that there will be a greater increase in fluency periods than the stuttering responses when both are reinforced with equal values of reinforcement, is to be accepted.

Discussion

In general it was seen that the increase in responses were not in consonance with the values of reinforcement. Responses change in different ways for equal and different values of reinforcement.

It was generally seen that fluency tended to increase though not in accordance with the value, with increasing values. On the whole in any condition the increment in fluency was relative high.

Repetitions are changed comparatively less. Generally there was no increase but decrease was observed in repetitions. Surprisingly even with increasing values repetitions changed little.

This may be explained by volition. Fluency is a desirable response. The subjects were with positive volition towards

fluency because of its desirability. This has allowed them to increase the fluency. It is noted that no subject reported awareness of the contingency for reinforcement, but even then the maximum change is seen only in this response.

Repetitions have not increased with reinforcement but they decreased. There could have been increase in repetitions but because of its undesirable nature the subjects may have had negative volition towards stuttering which did not enhance the conditioning. Even the subjects who were reportedly aware of the contingency have not increased the repetition scores.

As far as the subjects are concerned it is the relative gain for them which has to be considered. Subjects did not gain from repetitions as much as the relative gain from fluency which is already with a premium over it, as it is desirable. The subject who was prompted by his friends that he could gain by repeating has not shown a significant increase.

So volition could have this role of either enhancing or inhibiting conditioning.

These findings go with those of Martin and Siegel (1966, b) Vijayalakshmi (1973) and Hegde² that fluency increases with positive reinforcement. This also supports the findings of Hegde , M.N. in his Doctoral Thesis (Personal Communication)

Wallach & Henle (1941), Ekman, Krasner and Ullman (1963) and Rathna and Rangasayee (1975) in the sense that subjective variables like volition do play an important role in conditioning.

There is reduction seen in repetitions for positive verbal reinforcers in the study Cooper, Cady and Robbins (1970) and Vijayalakshmi (1973). It was the stand of many studies that the reduction of repetitions were because of the effect of highlighting. It may not be just highlighting but the volition of the subject which determines the direction of the change. As even with reinforcement it is the volition which seems to determine the direction of change which has been supported by the findings of the present study.

CHAPTER V

SUMMARY AND CONCLUSIONS

The problem of volition which poses problems in qualification has not been investigated by behaviouristic methods. It was the aim of the study to test the impact of volition on relative values of reinforcers of responses in the operant conditioning of a stuttering response and of a fluency period. Five stutterers were taken as subjects of the study. In their speech repertoire a certain number of seconds of fluency was taken to be a response (R_1) and repetition was taken as another response (R_2). A 100% contingent positive reinforcement was used. The A B A design was used in this study.

After obtaining the stable base rate every subject underwent five experimental sessions. In each experimental session the reinforcement values differed from each response. It was possible for the subject to gain from either response.

The analysis of the data indicated that - generally there is an increase in fluency periods, and it was significant at higher values of reinforcement. There is no increase seen in repetitions but a general decrease. With this support the null hypothesis.

'There will not be a significantly greater increase in fluency periods than in stuttering responses with increase in values of reinforcers' was rejected.

The sub null hypothesis :

'There will not be a greater increase in fluency periods than the stuttering responses when both are reinforced with equal values of reinforcement' is nearly rejected as out of five in two conditions there was a significant increase of fluencies and in others the increase did not achieve the statistical significance.

Stuttering subjects did not intend to gain by stuttering. With positive reinforcement also there was no increase of frequency of stuttering response but there was a decrease.

There seem to be a definite impact of volition in the conditioning situation. The desirable behavior is easily conditionable, but the undesirable behavior decreases even if reinforced positively.

Recommendations for further research

1. The study may be replicated using more subjects and many reinforcement values. Such a study may provide more confident decisions than the ones made in present study.

2. It may be studied having a non verbal behavior as a control for better establishment of the factor volition.
3. The responses may be individually tested for changes with increasing values of reinforcers instead of using an opposing value as done in the present study.
4. Other verbal maladaptive behaviors may also be studied
5. The differences between the responses of other types of stuttering behaviors including motor responses to reinforcement may be studied.

B I B L I O G R A P H Y

- Ach, N (1905) Uber den willenakt und das, Temperament, leipzig; 1910, Jd : Analyse des willens Berlin 1935, in Encyclopedia of Psychology Vol. 3, Search Press : London
- Andrews, G and Culter, J (1974) Stuttering Therapy : The relation between changes in symptom level and attitudes, J Speech Hearing Dis, Vol. 39 p. 312
- Beattie, M.S. (1973) A Behaviour Therapy Programme for Stuttering - British J Dis Comm. Vol. 8 p. 120
- Bergin, A.B. and Garfield, S.L (1971) Handbook of Psycho-Therapy and Behavior Change - John Wiley and Sons Inc
- Bharath Raj, J (1974) Control of stuttering behavior through response contingent shocks, J All India Institute of Speech and Hearing, Vol. 6, p. 10
- Bolles, R.C. (1967) Theory of Motivations, New York, Harper, quoted by Eysenck and Beech in Bergin and Garfield. 1971
- Bridger, W and Mandel, J (1965) Abolition of the PRE by Instructions in GSR conditioning, J Exp. Psychol Vol. 69 p. 476, in Rachman and Teasdale. 1969
- Brutten, G.T. and Shoemaker, D.J (1971) A Two Factor Learning Theory of Stuttering, in Travis 1971

- Cook, S and Harris, P.E. (1937) The Verbal Conditioning of the G.S.R, J. Exp. Psychol, Vol. 21 p. 202, quoted by Rachman and Teasdale. 1969
- Conover, W.J (1971) Practical non parametric statistics John Wiley & Sons, Inc.
- Cooper, E.B, Cady, B.B and Robbins, C.J (1970) The Effect of the verbal stimulus words 'wrong', 'right' and 'tree' on the disfluency rates of stutterers and non-stutterers - J Speech Hearing Res, Vol. 13, p.239
- Daly, D (1964) Rate of stuttering adaptation under two different electroshock conditions. Unpublished Master's Thesis, Ohio University, Quoted in Travis. 1971
- Dattatreya, T (1973) The effect of continuous contingent, Random Contingent and Random negative stimulation on selected responses in a moment of stuttering. Master's Thesis Univ. of Mysore
- Ekman, P, Krasner, L and Ullman, L.P (1963) Interaction of set and awareness as determinants of response to verbal conditioning, J Abn Soc Psychol. Vol. 66, p. 387
- Eysenck, H.J and Rachman, S (1965) The Causes and Cures of Neurosis. Routledge & Kegan Paul :London
- Flanagan, B, Goldiamond, J and Azrin, N.H (1958) Operant Stuttering ; The control of stuttering Behavior through response contingent consequences, J Exp An. Behv p.173

(1959) Instatement of stuttering in normally fluent individuals through operant procedures, Science 1959, Vol. 130 p. 979 in Ullman and Krasner 1962

- Frederick, C (1955) An investigation of learning theory and reinforcement as related to stuttering behavior - unpublished doctoral Dissertation, Univ of California, Los Angeles
quoted in Travis, 1971
- Frick, J.A. (1951) An Exploratory Study of Effect of Punishment upon stuttering : Ph.D dissertation State Univ. IOWA, quoted by Brutten and Shoemaker (1971)
- Gross, M.S. (1968) The Effect of punishment and reinforcement on the disfluencies of stutterers, Convention address ASHA, quoted in Behv Res The, Vol. 11, 1973, p. 43
- Haroldson, S.R. Martin, R.R. and Starr, C.D. (1968) Timeout as a Punishment for stuttering, J Speech Hearing Res, Vol. 11, p. 560
- Hegde, M.N - Personal Communication (1975) Director Sp.Clinic, Ahna State Hospital, Ahna. Illinois, USA
- Hegde, M.N (1971) The Effect of Shock on Stuttering - J. All India Inst. of Speech and Hearing, Vol.2, p.104
- Jones, M.C. (1924) The Elimination of Children's Fears -
- J Exps Psy, Vol.7, p. 383 - quoted in Behavior Therapy and Speech Disorders
Ed. Rathna, N, All India Instt. of Speech and Hearing, Mysore, India

- Kanfer, F.H, Bradley, U and Marston, A.R. (1962) Self Reinforcement as a function of degree of learning, Psycho. Rep Vol. 10, p. 885
Quoted in Yates 1970
- Kanfer, F.H and Philips, J.S. (1970) Learning Foundations of Behavior Therapy
John Wiley and Sons Ins
- Krasner, L (1962) Research in Behavior Modification, Krasner & Ullmann (Ed) (1965) Holt, Rinehart, and Winston, Inc.
- Lazarus, A (1963) The Results of Behavior Therapy in 126 cases of Severe Neurosis - Behav Res Ther. Vol.1 p. 65
- Maher, B.A. (1970) Principles of Psychopathology, McGraw Hill International Student's Edition
- Marston, A.R. (1964) Variables affecting incidence of self-reinforcement. Psycho. Rep, Vol. 14,p.879 in Yates 1970
- Marston, A.R. and Kanfer, F.H (1963) Human Reinforcement : Experimenter subject controlled. J Exp. Psycho. Vol. 66, p. 91, in Yates 1970
- Martin, R.R. and Siegel, G.M (1966a) The Effects of Response contingent shock on stuttering, J. Speech Hearing Res. Vol. 9 p. 340
- (1966b) The Effects of simultaneously Punishing stuttering and rewarding fluency. J Speech Hearing Res Vol. 9, p. 466

- Osgood, C.E. (1953) Method and Theory in Experimental Psychology - New York : Oxford Univ Press
- Perkins, W.H (1971) Speech Pathology : An Applied Behavioral Science
The C.V Nostry Company St. Louis
- Quiest, R.W. and Martin R.R. (1967) The Effects of Response Contingent punishment on stuttering
J Speech Hearing Res Vol. 10, p. 795
- Rachman, S and Teasdale, J (1969) Aversion Therapy and Behavior Disorders : An Analysis, London
Routledge and Kegan Paul
- Rathna, N and Rangasayee, R (1975) The Role of Volition in Human Conditioning - J All India Instt. of Speech and Hearing - Vol. 6 p. 67
- Richard, L.S. and Brocas, V.S. (1973) The Effect of Contingent Stimuli on Stuttering, in Proceedings of 81st Annual Convension of the APA Montreal Abstracted in Psy Abstracts - Vol. 50 No. 7398
- Robinson, f.B (1964) Introduction to Stuttering : Prentice Hall inc. Englewood Cliffs
- Siegel, G.M and Martin R.R. (1966) Punishment of Disfluencies in Normal Speakers - J Speech Hearing Res Vol. 9, p. 208

- Siegel, G.M and Martin, R.R. (1968) The Effect of Verbal Stimuli on Disfluencies during Spontaneous Speech. J Speech Hearing Res Vol. 11, p. 358
- Siegel, S (1956) Non Parametric Statistics for the Behavioral Sciences - McGraw Hill, International Students Ed.
- Timmars, R.J.C (1966) A Study of Adaptation and Consistency in a response Contingent Punishment Situation. Doctoral Dissertation. Univ of Kansas - Quoted by Van Riper
- Tollman, E.C. Hall, C.S. and Bretuall, E.P (1932) A Disproof of the Law of Effect and a Substitucio of the Laws of Emphasis : Motivation and Disruption. J. Exp. Psy. Vol. 15 p. 601 in Osgood (1953)
- Travis, L.E. (Ed) (1971) Hand Book of Speech Pathology and Audiology
Appleton - Century - Crofts Mereditry Corporation, N.Y
- Van Riper, C (1937) The Effect of Penalty upon the Frequency of Stuttering Spasm - J Genel Psycho Vol. 50, p. 193, Quoted in Travis 1971
- Van Riper, C (1971) Symptomatic Therapy for Stuttering in Travis 1971
- Vijayalakshmi (1973) The Effect of Three Verbal Stimuli on Fluency in Stutterers - Master's Thesis. Univ. of Mysore

- Viswanath, N.S. (1972) The Effects of Response Contingent negative stimulation on selected responses in a moment of Stg.
Master's Thesis. Univ. of Mysore
- Wallach, H and Henle, M (1941) An Experimental Analysis of the Law
J Exp Psy Vol. 28, p. 340 in OsGood(1953)
- Webster, R.L and Dorman, M.E. (1970) Decrease in Stuttering Frequency as a Function of Continuous and Contingent Forms of Auditory Masking
J Speech Hearing Res, Vol. 13, p. 82
- Welleck, A Quoted under the
Encyclopedia of Psychology, Vol.3
Search Press, London
- Wolpe, J (1958) Psychotherapy by Reciprocal Inhibition
Quoted in Behavior Therapy and Speech Disorders, 1968 All India Inst. of
Speech and Hearing, Mysore, India
- Yates, A.J (1970) Behavior Therapy. New York, Johnwiley and
Sons Inc

APPENDIX - A

Subject - M
 Sex - Male
 Age - 14 Years
 Age of onset - Since his speech begun
 Previous history - NIL
 Therapy undergone -
 1. Prolongation
 2. Shadowing

Description of stuttering behaviour

Stuttering is observed more in spontaneous speech and is moderate in reading. Stuttering is characterized by repetitions hesitations, breathing interferences and pauses.

Response selected :

R₁ a fluency period of 2 seconds
 R₂ Repetitions of sounds and syllables

Report of - awareness of contingency
 He couldn't report about the awareness of the contingency

Sequence of experimental sessions

		B	' D	C	' B	A
Experimental sessions	R ₁	R ₂	R ₁ R ₂	R ₁ R ₂	R ₁ R ₂	R ₁ R ₂
	O	+	+++	++++	++	+
Values of reinforcement for respective responses						0

Each '+' meant reinforcement in terms of numbers of pause and

'0' meant NIL reinforcement

APPENDIX - A

Table I

(Raw scores for the selected response R₁ - numbers of 2 second fluency periods)

Minute	Base rate session 1		Base rate session 2		Base rate session 3		
	A	B	A ¹	B	A	B	A ¹
2	8	10	13	9	11	8	12
4	8	10	10	8	8	7	7
6	8	10	9	10	6	12	8
8	16	7	8	9	10	5	16
10	9	10	10	13	13	13	8

Minute	Experimental session E		Experimental session B		Experimental session C		Experimental session B		Experimental session A	
	A	B	A ¹	A	B	A	B	A	B	A ¹
2	4	11	11	8	9	6	12	8	4	15
4	8	13	17	5	14	13	10	6	11	10
6	11	11	9	7	11	11	8	7	4	12
8	14	6	12	12	13	7	8	7	5	16
10	9	10	10	12	10	4	9	5	4	12

APPENDIX - A

Table 2

(Raw scores for the selected response R₂ - Repetition of sounds and syllables)

Minute	Base rate session 1		Base rate session 2		Base rate session 3	
	A	B	A ¹	B	A	B
2	19	16	13	11	16	16
4	10	16	13	7	12	18
6	13	16	15	11	12	16
8	10	14	14	18	10	17
10	18	20	13	13	12	15

Minute ,	Experimental session B		Experimental session D		Experimental session C		Experimental session B		Experimental session A	
	A	B	A	B	A	B	A	B	A	B
2	17	17	12	17	18	9	11	12	13	16
4	22	19	15	14	16	10	12	14	19	27
6	17	18	11	19	14	15	14	10	13	14
8	18	12	13	15	14	15	12	11	7	15
10	19	9	18	15	13	15	13	16	12	13

APPENDIX - B

Subject - T
 Sex - Hale
 Age - 22 Years
 Age of onset - 8 Years
 Previous History - NIL
 Therapy undergone- NIL
 Report of aware- He stated that
 ness of contin- R₂

Responses selected :

R₁ a fluency period of 2 seconds
 R₂ Repetitions of sounds and syllables
 Sequence of experimental sessions

stutter there
 used to be light
 don't know about
 bell"

Experimental sessions	A		B		C		D		E		
	R ₁	R ₂	R ₁	R ₂	R ₁	R ₂	R ₁	R ₂	R ₁	R ₂	
Values of re-inforcement for respective responses	+	0	++	+	++	++	+	++	++	0	+

Each '+' meant reinforcement in terms of number of paise and
 '0' meant NIL reinforcement.

APPENDIX - B

Table -I

Raw scores for the selected response R₁ - Numbers of two seconds fluency periods

Minute	Baee rate session 1		Base rate session 2		Base rate session		Base rate session		
	A	B	A ¹	A	A	A ¹	A	A ¹	
2	6	6	11	5	10	22	6	8	9
4	4	8	11	8	8	12	6	5	8
6	6	9	4	3	6	14	4	7	10
8	9	7	6	5	8	12	6	5	5
10	9	10	21	6	1	10	7	10	7

Minute	Experimental session A		Experimental session B		Experimental session C		Experimental session D		Experimental session E		
	A	B	A	B	A	B	A	B	A	B	
2	6	8	3	11	4	10	14	6	9	5	12
4	4	14	6	9	4	12	7	8	9	2	2
6	12	11	7	9	6	18	13	7	17	10	8
8	5	4	6	11	8	7	10	11	9	10	7
10	7	4	8	13	14	12	12	12	9	10	10

APPENDIX - B

Table - 2

Raw scores for the selected response 2 - Repetition of sounds and syllables

Minute	Base rate session 1		Base rate session 2		Base rate session 3	
	A	B	A	B	A	B
2	7	15	19	12	22	8
4	9	11	29	16	11	18
6	7	15	16	22	17	15
8	13	10	24	22	14	23
10	12	8	17	18	20	18

Minute	Experimental session A		Experimental session B		Experimental session C		Experimental session D		Experimental session E		
	A	B	A	B	A	B	A	B	A	B	
2	15	6	21	15	16	13	22	15	19	20	18
4	15	11	20	16	13	15	8	13	18	22	17
6	10	10	21	12	12	21	21	16	8	17	19
8	6	6	23	17	19	20	20	12	22	21	17
10	10	3	18	14	16	19	20	17	11	22	15

APPENDIX - C

Subject	-	G	Description of stuttering behaviour
Sex	-	Male	Stuttering is mild in both speech and reading. Stuttering is characterized by repetitions. No secondaries observed
Age of onset	-	22 Years	
	-	8 Years	
Previous history	-	Was exposed to his uncle's stuttering	
			R ₁
Therapy undergone	-	NIL	R ₂ Repetition of sounds and syllables

Responses selected :

a fluency period of 5 seconds

Sequence of experimental sessions

Report of awareness of continuity	Experimental session							
	A	B	C	B	B	D		
He stated that "when-ever I repeat there would be light "	R ₁	R ₂	R ₁	R ₂	R ₁	R ₂	R ₁	R ₂
He was also prompted by his friends that he can repeat more to get more money, when he told his friends about this	+	0	0	+	++	++	++	++

Each '+' meant reinforcement in terms of certain number of paise and

'0' meant NIL reinforcement

APPENDIX - C
TABLE-1

Raw scores for the selected response 1 - Number of five seconds fluency

Minmte	Base rate session 1		Base rate session 2		Base rate session 3		Base rate session 4		
	A	B	A ¹	A	B	A ¹	A	B	
2	9	15	12	12	10	8	13	10	11
4	13	11	15	7	9	7	5	9	13
6	12	6	14	16	8	10	10	7	10
8	12	13	13	13	11	10	10	11	12
10	12	13	13	10	10	7	10	11	9

	Experimental session A		Experimental session B		Experimental session C		Experimental session D		Experimental session E		Experimental session F	
	A	B	A ¹	A	B	a ¹	A	B	A	B	A ¹	A
2	10	12	15	18	12	13	13	12	13	12	11	15
4	14	14	12	16	11	10	10	11	13	13	11	12
6	11	16	10	13	13	16	11	13	13	10	15	15
8	12	15	15	11	10	14	13	10	12	15	14	13
10	12	16	13	13	13	17	11	13	14	13	14	13

APPENDIX - C

TABLE-2

Raw scores for the selected response 2 - Repetitions
of sounds & syllables

Minute	Base rate session 1		Base rate session 2		Base rate session 3		Base rate session 4	
	A	B	A ¹	B	A	B	A	B
2	12	8	12	10	11	6	13	13
4	8	11	7	11	21	14	14	6
6	14	18	8	16	17	8	9	9
8	10	8	6	18	15	9	7	13
10	12	9	8	19	19	14	10	6
								11

Minute	Experimental session A		Experimental session E		Experimental session C		Experimental session B		Experimental session A ¹		Experimental session B		Experimental session A		Experimental session B	
	A	B	A ¹	B	A	B	A	B	A ¹	B	A ¹	B	A	B	A	B
2	11	9	9	5	13	9	7	6	5	7	7	8	8	8	6	10
4	7	11	8	10	9	6	9	7	8	7	7	10	10	10	12	6
6	10	6	9	6	4	5	5	6	6	9	9	6	8	8	7	7
8	10	12	11	4	11	8	3	4	5	8	8	4	10	10	4	10
10	10	6	11	9	3	6	3	6	7	6	9	6	8	8	7	10

APPENDIX - D

Subject	-	Ma	Description of stuttering behavior
Age	-	17 Years	Moderate stuttering both in Speech and Reading. It is characterized by repetitions, hesitations and prolongations. Secondaries are also observed like, closing the eyes and clenching of teeth
Sex	-	Male	
Age and onset	-	7 Years	
Previous history	-	NIL	
Therapy undergone	-	1. Shadowing	R ₁ a fluency period of two seconds
Report and Awareness of contingency	-	2. Prolongation	R ₂ repetitions of sounds and syllables
			He couldn't report of awareness of any contingency

Responses selected :

Sequence of experimental sessions:

Experimental sessions	C	D	B	B	A
Values of reinforcement for respective responses	R ₁ R ₂	R ₁ R ₂	R ₁ R ₂	R ₁ R ₂	R ₁ R ₂
	++ ++	+ ++	++ ++	+ +	0 + 0

Each '+' meant reinforcement in terms of certain number of paise and '0' meant NIL reinforcement

APPENDIX - D

TABLE I

RAW acorwa for the response I - Number of fluency period*
of 2 seconds

Minute	1		2		3		4				
	A	B	A ¹	A	B	A	B	A ¹	A	B	A ¹
2	12	15	13	4	19	15	18	24	16	15	14
4	14	14	17	8	15	12	18	19	11	19	16
6	8	13	15	9	21	8	12	17	14	14	16
8	10	17	15	11	16	14	18	17	10	10	18
10	10	24	18	15	21	18	14	16	15	13	18

Minute	C		D		B		A ¹		E		A	
	A	B	A	B	A	B	A	B	A	B	A	B
2	18	30	17	20	22	18	20	16	26	13	28	15
4	21	30	16	23	16	23	22	21	16	17	24	21
6	11	29	22	20	14	20	15	19	20	20	20	20
8	10	27	19	21	20	26	16	15	14	17	15	23
10	25	15	27	17	24	21	13	20	18	14	19	18

APPENDIX - D

TABLE 2

Raw scores for the response 2 repetitions of sounds and Syllables

Minute	Base rate session 1		Base rate session 2		Base rate session 3		Base rate session 4					
	A	B	A	B	A	B	A	B				
2	15	24	19	2t	17	2t	15	11	13	15	9	9
4	18	20	19	19	16	15	7	9	10	10	13	9
6	20	13	10	24	16	31	13	13	11	11	14	15
8	21	22	22	18	16	21	11	15	12	11	13	12
10	20	16	20	18	12	19	12	11	12	9	10	11

Experimental session	Experimental session C		Experimental session D		Experimental session B		Experimental session E		Experimental session A			
	A	B	A	B	A	B	A	B	A	B		
2	15	10	15	13	15	14	11	16	10	15	14	11
4	13	9	11	9	14	12	12	16	11	10	10	8
6	10	12	13	15	14	8	11	14	9	16	14	14
8	12	15	7	8	9	7	12	17	16	12	16	14
10	15	11	7	14	10	11	13	11	9	9	8	8

APPENDIX - E

Subject	-	A	<u>Description of stuttering behaviour</u>
Sex	-	Male	Moderate stuttering both in speech and reading. Stuttering is characterized by hesitations, repetitions and prolongations. Secondaries observed like closing of eyes and head movement.
Age	-	13 Years	
Age of onset	-	2 Years	
Previous history	-	NIL	
Therapy undergone	-	1. Shadowing 2. Prolongation	
Report of Awareness of contingency	-	He could not report awareness of any contingency	<u>Responses selected</u> R ₁ a fluency period of two seconds R ₂ repetitions of sounds and syllables
			<u>Sequence of experimental sessions :</u>

Experimental sessions

Values of reinforcement for respective responses

	D	C	E	A	B
R ₁	R ₂	R ₁	R ₂	R ₁	R ₂
+	++	++	++	0	++
				+	+

APPENDIX - E

TABLE I

Raw acerea for the response I - Number of fluency periods
of 2 seconds

Minute	1		2		3		4		
	A	B	A ¹	B	A	B	A	B	
	A	B	A ¹	B	A	B	A	B	
2	11	9	9	6	12	7	15	8	11
4	9	8	8	7	12	11	9	8	12
6	8	5	9	15	13	10	9	12	13
8	7	8	11	14	14	13	12	10	11
10	8	8	5	11	12	9	10	9	10

Minute	Experimental session D		Experimental session C		Experimental session E		Experimental session A		Experimental session B				
	A	B	A	B	A	B	A	B	A	B			
	A	B	A	B	A	B	A	B	A	B			
2	4	10	5	8	9	22	15	6	9	7	4	12	8
4	9	19	9	13	7	21	18	5	11	12	3	13	9
6	10	17	9	12	12	15	11	6	10	7	9	15	10
8	15	16	9	16	9	13	9	10	10	6	4	9	1
	6	17	5	8	9	16	7	3	9	10	6	8	5

APPENDIX - E

TABLE 2

Raw scores for response 2 repetitions of sounds and syllables

Minute	Base rate session 1		Base rate session 2		Base rate session 1		Base rate session 3		Base rate session 1	
	A	B	A	B	A	A	A	B	A	B
2	18	17	11	15	18	15	16	16	19	13
4	14	9	12	14	16	12	13	16	14	11
6	20	10	11	16	14	f2	15	16	17	15
8	16	13	11	11	9	15	13	15	12	18
10	12	18	8	12	13	11	13	15	12	20

Minute	Experimental session B		Experimental session C		Experimental session B		Experimental session A		Experimental session B		Experimental session A	
	A	B	A	B	A	A	A	B	A	B	A	A
2	20	18	17	15	18	14	21	20	15	15	15	9
4	18	19	12	15	12	19	23	8	14	16	15	14
6	19	15	20	13	10	17	20	8	18	13	10	9
8	15	16	20	17	14	18	18	12	16	14	12	11
10	20	17	18	16	15	21	18	21	13	17	18	10