Abstract

CHILDREN'S REACTIONS TO FRUSTRATION

AS REVEALED IN MOTOR PERFORMANCE AND AGGRESSIVE FANTASY

The present study was an attempt to determine certain response effects of frustration in children, namely, whether frustration had a facilitative or inhibitory effect upon motor performance and if any change in these reactions related to aggressive fantasy. Temporal sequence and locus of frustration, proximity of frustration and the nature of the response class affected were important areas of investigation.

The response effects were studied in 108 middle class children. The children were divided evenly according to sex and into three age groupings ($7\frac{1}{2}$ to 8, 9 to $9\frac{1}{2}$, and $10\frac{1}{2}$ to 11). An experimental group of seventy-two children was subjected to early trial and extensive frustration conditions, and a control group of thirty-six children were subjected to late trial frustration conditions. Intentional (though non-arbitrary) interruption on a marble-board task constituted a frustration trial. Success conditions involved allowing task completion and giving of rewards. The experimental group was subjected to the following trial conditions: two success, six frustration, two success, three frustration, and two success. The control group was similar to the above, receiving six success trials instead of six frustration trials. After the six trials in question, both groups were asked to respond to a series of incomplete stories, intended to elicit aggressive fantasy. The response variables under consideration were speed of motor performance on the task, force of a gross motor response immediately following the task, and, degree of aggressive fantasy following

the series of frustration trials.

A major finding was that, with late trial frustration, and continued prior success, there was a clear-cut facilitative effect on performance speed, which was not uniformly noted with early trial frustration. This result was interpreted in line with reinforcement and expectancy principles. Another major result was that frustration effects were evident in consistent inhibition of the extra-task motor response. The inhibition of this response, together with facilitation of performance speed, indicate that specific effects of frustration depend on the response class being measured. It was suggested that, at least, certain examples of frustration may activate relevant, instrumental responses and at the same time, depress irrelevant, non-instrumental responses.

To ascertain the effects of frustration close to the task goal, proximity of frustration, both early and late trial speeds were compared. A slowing up of motor performance was found near the completion of the task. This effect, however, was independent of frustration conditions and appeared to reflect fatigue effects inherent in the task.

The effects of frustration upon motor performance were unrelated to aggressive fantasy under the present experimental procedures.

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By

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PROBLEM

The study of frustration has long been of active interest to those in the behavioral sciences. Though the many efforts in this field have not been rewarding in regard to consistent or general principles governing reactions to frustration, there has been an increasing appreciation of the extreme complexity of the problem.

Examination of both the consistency and complexity of various response classes following certain forms of frustration might appear, then, to be a fruitful approach to the problem. The present study is an attempt to determine the response effects of certain types and amounts of frustration in children. More specifically, the present study is concerned with examining whether certain conditions of frustration have a facilitative or inhibitory effect upon motor reactions, and if any change in these reactions relates to aggressive fantasy.

As a function of the amount and temporal sequence of frustration, the following reactions were studied: (a) speed of performance on a task, itself; (b) strength of gross overt response immediately after the task (amplitude); and, (c) aggressive fantasy following a series of trials on the task. The apparatus used in a recent study (McDonough, 1958) afforded a means of exploring the behavior in (a) and (b). As the McDonough investigation provided, also, a background for the present inquiry, her procedure and results are described briefly.

The sample consisted of 100 children of middle class background, evenly divided according to sex, and grouped into five age groups from $3\frac{1}{2}$- to $9\frac{1}{2}$-years of age. The marble-board apparatus used for the

task was a modification of that used in the Haner and Brown (1955) experiment and will be described in detail in the Method section. In the McDonough study, every child was given at least ten trials to fill the marble-board as quickly as he could. In the first two and last two trials, the child was allowed to complete the task. The intermediate trials were terminated just before the child filled the board by letting the marbles drop through the board. These were considered frustration trials. At the end of each trial, the child was instructed to hit a plunger, which was considered the amplitude measure. The recorded amplitude, together with the speed with which the child filled twenty of the 24-hole board, were considered to be measures of the child's reaction subsequent to frustration (noncompleted) and successful (completed) task conditions.

McDonough predicted a facilitative effect of frustration based on theories suggesting incremental drive properties of frustration (Amsel, 1958; Spence, 1956; Marx, 1956). However, her results were rather curious in that no such effect was noted in performance speed, while an inhibitory effect was noted in amplitude. The following analyses of her results have led to certain modifications in the experimental design:

(a) There was a little change in performance on task speed when frustration was introduced in an early trial. This could be accounted for because response patterns to one particular condition (success) were not sufficiently established for disruption of conditions to have any effect (Denny & Adelman, 1955; Tolman, 1932). The importance of establishment of response patterns was also inherent in Amsel's (1958) definition of frustration. He maintained that a prior condition of continuous

reward (success) was essential to any drive producing effect of frustration. To explore whether later introduction of frustration procedure effects performance, frustration conditions were introduced early in the task experience for one group of children (in replicating the previous research) and for another group of children, later in the practice period (after having continued successful task experience).

(b) McDonough had observed an inhibitory effect on performance speed close to the completion of the task on frustration trials, which was suggestive of an avoidance reaction close to the point of frustration. Some evidence (Denny & Adelman, 1955) has indicated that avoidance reactions are set up in temporal and spacial proximity to the frustration goal stimuli. In view of this, the measurement of performance speed close to the point of task completion was thought to be a more sensitive measure of inhibitory or facilitative effects of frustration than the overall trial speed.

(c) It was further thought that if no inhibitory or facilitative effect from frustration showed up, it might be revealed in some other measure. It was thought that aggressive fantasy might be a more sensitive measure of frustration. Some evidence has suggested that aggressive needs of middle class children are revealed to a greater extent in fantasy than in behavioral manifestations (Sanford et al, 1943). It should be recalled that the sample used in the McDonough study consisted of middle to upper-middle class children. As is often the case with such children, their training may discourage overt motor reactions to frustration, while encouraging verbal and symbolic means of expression. D. Miller and Swanson (1956) have suggested that middle class expression

of needs would be more in terms of indirect, symbolic means than by physical efforts. McNeil's study, cited in the same article, found that middle class children were more expressive with conceptual material than motor reactions; whereas, lower class children showed the opposite pattern. Bellak (1954) has also noted that aggressive needs were more likely to be prevented from overt expressions, though they may be strongly manifested in fantasy content. The questions arise, then, will this type of child be more expressive in verbal fantasy than in motor performance subsequent to frustration?

It should also be noted that the amplitude measure (from striking the plunger) may not be an apt measure of aggression, as Haner and Brown (1955) and McDonough have inferred. The use of aggressive fantasy might be a more appropriate measure.

With the introduction of aggressive fantasy as a variable, interest in the relationship between motor performance and aggressive fantasy evolved. According to N. Miller (1941), with continued frustration, aggressive responses are more likely to become manifest as other responses to the frustration situation become extinguished. Hence, if certain motor responses become less dominant, an aggressive response would be expected. If frustration does inhibit certain responses (as in the case of amplitude), it would be expected that as response strength diminished, there would be an increase in some form of aggression, possibly fantasy.

Some theorists might argue that both motor performance and fantasy reactions to frustration change consistently. Though not specific to fantasy productions as such, certain researchers (Sears, 1937; Zeller, 1951) have indicated that individuals inhibited on frustration tasks

also showed inhibitory performance on subsequent measures. From this was inferred a generalized "repressive" effect of frustration. In a broad sense, by assuming a trait theory or theory of generality in regard to personality (cf MacKinnon, 1944), one might expect any inhibitory or facilitative effect of frustration to operate consistently upon both the individual's aggressive and motor performance. Of course, that there should be a direct relation between overt behavior (such as motor performance) and fantasy has been contested (Lindzey, 1952; Kagan, 1958). Though not in agreement with other findings, Stone (1950), Lesser (1957), and Mussen & Naylor (1954) have presented evidence indicating a positive relationship between individual's overt aggression and aggressive fantasy.

In addition to enlarging upon the McDonough design, its replication, at least in part, was a major consideration of the present investigation. We also wanted to understand more of the nature and the stability of the measures used. An extension of the upper range of the age sample was made to ascertain if there was any continuation of developmental trends found in her study. Similar to the McDonough research, maturation factors and sex differences were an inherent part of this study. Because of the complex nature of the design, a number of important aspects of the design are enlarged upon in the discussion of the methods section.

In summary, this investigation was an effort to learn if facilitative or inhibitory effects of frustration exist with regard to certain responses of middle class children. The motor effects were examined with respect to the degree of aggressive fantasy. Variables of age, sex, amount of frustration, temporal sequence of frustration, and proximity of frustration were considered.

THEORETICAL POSITIONS WITH REGARD TO FRUSTRATION

Frustration terminology

Since the term "frustration" has been used to refer to a number of different types of conditions and events, it is necessary to be aware of the various usages and meanings of the term in psychology. Lewin (1944) has cautioned that a scientific concept of frustration should not include all the phenomena covered by the popular meaning of the term. Marx (1956) has outlined four different usages of the term. Frustration could be considered as: (1) an independent variable, the complete or partial prevention of attaining a goal; (2) an intervening construct, the hypothetical internal state or condition of the organism that is produced by thwarting or depriving an individual, sometimes considered irrelevant drive; (3) a dependent variable, which happens as a result of antecedent thwarting conditions, in essence, a response class; and (4) a phenomenon, a kind of experience of the organism.

Besides various usages ascribed to frustration, various authors have attached somewhat different meanings to the term. In some instances, emphasis has been on the thwarting of needs. Rosensweig (1944) has maintained that frustration occurs when a vital need is obstructed in its satisfaction. Maslow and Mittleman (1951) have characterized frustration as taking place when vital needs are blocked (deprivation), constituting a threat to the personality. Symond's (1946) definition suggested that need satisfaction is either blocked, interferred with, or not available. Sargent (1948) saw frustration as the thwarting of the individual's dominant motives. The same author distinguished frus-

tration from conflict, stating that the former is an objective, environmental thwarting, while conflict is the clash of incompatible motives.

The distinction between frustration and "stress" has not been made clear. Frustration shall be considered an objective, environmental blocking of a response sequence, without any particular assumptions concerning internal states. Stress usually refers to certain states within the organism. Selye (1956) called particular attention to the biological roots of stress in the following definition: "Stress is the state manifested by a specific syndrome which consists of all the nonspecifically induced changes within a biologic system." Shakow et al (1945) have emphasized the internal psychological state during stress, noting: "Stress consists essentially of a threat to the 'ego status' of the subject occasioned by increasing failure in his ability to achieve goals which he is told the general population fairly easily achieves."

Referring to frustration as a blocking of a response sequence springs from a behavioristic orientation. Dollard et al (1939) defined frustration as "that condition which exists when a goal-response suffers interference." Child and Waterhouse (1953) also find frustration as a "blocking of a goal-response." Adelman and Maatsch (1955) refered to a "stimulus complex interrupting a response sequence."

Amsel and Ward's (1954) interpretation was quite close to the extinction phenomenon. They defined frustration as a "state which results from non-reinforcement of an instrumental response which previously was consistently reinforced." Zander (1944) had attempted a rather comprehensive definition, emphasizing both individual needs and behavioral

components. He has stated that frustration is "that condition which exists when a response toward a goal believed important and attainable by a given person suffers interference, resulting in a change in behavior characteristics for that person and situation."

Frustration will be considered here as an interruption of a response sequence, operationally defined as the prevention of finishing a task near the point of completion. Frustration, then, is used as an independent variable, with reactions subsequent to frustration as dependent variables. In light of the previous discussion, frustration is viewed as a form of environmental manipulation. The purpose of interrupting an activity near the attainment of a goal (completion of a task) is to enable the subject to become sufficiently engaged in the task and its completion before the behavior sequence is terminated. Essentially, the procedural definition of frustration in this study is that the individual is prevented from attaining an expected goal. As will become evident in the methods section, the goal of task completion was accentuated by a reward procedure.

Predicted reactions to frustration

A. Aggression

The first prominent theory in regards to reactions to frustration was the well-known frustration-aggression hypothesis of Dollard et al (1939). They maintained that frustration always leads to some form of aggression. In view of obvious objections to this position, both N. Miller (1941) and Sears (1941) conceded that it is possible for frustration to lead to forms of behavior other than aggression. Initially, Freud (1920) felt that aggression was the "primordial reaction" to

frustration, but later (1922) asserted that aggression was a manifestation of the death instinct. Fenichel (1945) suggested that aggression may be a response to frustration; but can also arise spontaneously.

Because of the specificity inherent in the original hypothesis of Dollard etal, there were a number of violent disagreements to their position. Lewin (1944) asserted that it "would be scientifically meaningless to make the attempt . . . of linking the intensity of frustration lawfully with any specific effect (such as aggression); for one would have to know the type of frustration and the detailed setting in order to make any definitive derivations." Ichheiser (1950) stated that the original hypothesis neglects the role of misperception, self-perception and social perception. Symonds (1946) has noted anxiety or emotional tension as a common reaction to frustration.

B. Performance change

Some authors have suggested that frustration leads to a deterioration of performance. Barker et al (1941) emphasized the primitivation of performance as one of the outcomes of frustration. Along these lines, T. M. French (1941) suggested that frustration disorganizes goal-seeking into more elementary drives. In making the distinction between frustrated and motivated behavior, Maier (1949) viewed the former as a non-goal oriented, stereotyped, non-adaptive type of response. H. Schaffer (1954) suggested that with frustration, a form of stress, behavior was governed primarily by sub-cortical rather than cortical processes.

Others take note of the increased vigor or "restlessness" in performance following frustration. Amsel and Ward (1954) have pointed out

that frustration provides drive stimulation. Denny and Adelman (1955) also noted the motivational properties of frustration, stating that frustration (non-reward) has reinforcing properties.

A more recent attempt to reconcile possibly two different effects of frustration has been suggested by Lawson and Marx (1958). They maintained that frustration may be accompanied by "1. a momentary increase in motivation and/or 2. the occurrence of stimuli for responses which interfere with the response involved in a frustrating situation." They cautioned, however, that there were no ways to predict when one or the other effect will predominate. An example of the two factor theory was that of Child and Waterhouse (1953). They suggested that there are contrasting effects of interference and of increased drive resulting from frustration. Some authors have considered roughly two possibilities among frustration responses, namely, along adjustive and non-adjustive lines. Mowrer (1938), Lazarus, Deese and Osler (1952), and Rosensweig (1944) have labeled frustration reactions as: "habit progression" and "habit regression"; goal directed and less goal directed; and "need-persistive" and "ego-defensive" respectively.

C. Reactions contingent upon the frustrating situation and/or individual differences

A number of theorists feel that the nature of frustration situations and/or the personality or reaction tendencies of the organism should be of primary importance in understanding reactions to frustration.

Pastore (1950) asserted that the reasonableness or unreasonableness of the situation, as perceived by the individual, is an important factor

in the post-frustration behavior. Stopol (1954) suggested that certain types of frustration, distraction and failure, yield independent effects upon subsequent performance. Deese et al (1953) felt that there may be some type of interaction between types of frustration and individual differences. Lazarus, Deese and Osler (1952) noted that not all people react uniformly to a particular situation. Billingslea and Bloom (1950) felt strongly that reactions to frustration can best be studied in real life situations.

Sargent (1948) saw the individual's habit patterns, how he interpreted and reacted to the situation, as crucial to his behavior following frustration. Both Lindzey (1950) and Sargent pointed out that the same objective situation may not be experienced subjectively as equally frustrating by all individuals. In extensive reviews of frustration studies, both Zander (1944) and Lawson & Marx (1958) conclude that most important to the outcome of frustration are the types of frustration and individual reaction patterns.

RESEARCH WITH REGARD TO FRUSTRATION

In reviewing the literature of frustration studies, it becomes apparent that there has been a wide divergence of procedures designed to elicit frustration. Among the methods employed in such experiments have been manipulations, such as arbitrary failure, impossible time limits or solutions, false reports of failure to the subject, delay or denial of reward, verbal derision, withdrawal from pleasant surroundings, and many others. Along with the wide variety of procedures, theories have been tested on a variety of populations, with no consistent definition of frustration. It is small wonder, then, that the outcome of these investigations has not led to any consistent or coherent body of knowledge.

Though we may not have, at this time, an integrated body of information, research findings can be categorized according to the following reactions to frustration: A. an increase in the level of performance; B. a decrease in the level of performance; C. a change in the level of performance contingent upon the nature of frustration and/or individual differences.

Increase in performance

In examining various physiological reactions of stable and unstable children, Jost (1941) found an increase of sympathetic reactions following frustration. Though there was greater variability in the reactions of unstable children, he concluded that physiological measures were less variable, and therefore, better measures of post-frustration reactions than measures of overt behavior.

Thompson and Honnicutt (1944) found that children's achievement improved more with either praise or blame than without any external incentives. They pointed out that blame increased the work of the extraverts more than the introverts. In Hurlock's (1952) praise-reproof study with children, he found that reproof had an initially facilitative effect upon performance; but that continued reprimanding led to a deterioration in performance. Using a selective learning technique with rats, Amsel and Ward (1954) noted the increased drive properties with the introduction of frustrating stimuli. Crespi's (1944) experiment with varying incentives indicated an increased effect when no reward was present, when compared to a small unit of reward. Truax and Martin (1957) found all of their adult sample improved in their performance on a simple task following failure, with high anxious subjects doing somewhat better than low anxious subjects. With a complex task, there were no definitive performance changes.

Decrease in performance

In the classical study by Barker, Dembo and Lewin (1941), they found a "primitivation" in the level of performance of nursery school children following frustration. Along with regression in the constructiveness of play, they noted more group expression of aggression among the children. In a replication of the above experiment, Block and Martin (1955) also found post-frustration play to be less constructive. They observed that "over-controlled" children showed less decrement than "under-controlled" children.

With induced failure in a card sorting task, McClelland and Apicella (1947) found that subjects had more difficulty in subsequently

learning the task than those with prior success. Sears (1937) found that failure on a card sorting task related to a decrement in performance on another task of learning nonsense syllables. Zeller's (1951) work lent support to the theory that initial failure in one task seemed to have a generalized decremental effect upon later associated tasks. He found that prior experience of failure in a nonsense syllable task had a decremental effect on learning another form of nonsense syllables. If the subject had a prior experience of success, however, a subsequent failure experience did not have any effect on later performance. Marquart (1948), in using arbitrary shock and a no solution procedure in a card selection, found that this type of frustration seemed to interfere with the learning of new responses.

Postman and Bruner (1948) frustrated a group by presenting a set of pictures too quickly for adequate recognition. They found on subsequent trials, in describing another set of pictures, the frustrated group failed to benefit from practice. On the other hand, the control group evidenced learning with successive frustration trials.

In continued repititions of drawing a man, children progressively deteriorated in the quality of work, according to Seashore and Bavelas (1942). Resistance to the task was also evidenced by verbalized resentments from the children. When Barker (1942) confronted children with unpleasant alternatives, they took longer in making decisions and showed greater alternations between choices than when presented with neutral or pleasant choices. Barker suggested the unpleasant situation gave rise to conflicting tendencies within the children. H. Wright (1943) found that an obstruction to a goal can become so great that a

sudden cessation of effort and/or a withdrawal from the situation can be observed in young children.

Change in performance contingent upon nature of frustration situation and/or individual differences

In a number of experiments, emphasis has been given to the frustrating situation when variations in the quality, degree or nature of frustration are taken into account. Other studies seemed to underline various individual differences, such as personality factors, or reaction patterns, as crucial to the outcome of frustration. In a few instances, there has been a combination of the above variables in the design of the study.

With increasingly difficult problems, Cowen (1952) found increasing rigidity among his subjects. Also measuring problem solving, Mohsin (1954) discovered that increasing difficulty of the task seemed to have an inhibitory effect upon performance. He noted that there seemed to be a spread of the effect of frustration from the performance on one task to another. By training feeble-minded subjects with success interspersed with failure, Grosslight and Child (1947) found that these subjects persisted more in the face of subsequent failure than those who were trained on success only.

Osler (1954) examined the effects of two types of frustration, fear and failure, upon performance of high school students. She found that failure tended to depress performance on arithmetic problems, whereas, fear yielded no significant change in performance. She concluded that the effect of frustration on intellectual performance was not only a function of the type of stimulus situation, but the type of control

used for comparison. Stopol (1954) found that failure seemed to have an incremental effect upon digit symbol performance, while distraction had a decremental effect. He maintained that tolerance for these two types of frustration were independent.

Further, Pastore (1952) found that as modifications of an arbitrary set were made in the direction of non-arbitrariness, there was a marked reduction in the number of aggressive responses. Cohen (1955) also found less aggressive responses were made to non-arbitrary stimuli.

According to the Hullian goal gradient hypothesis (1938), responses closest to the goal are more strongly learned than those farther from the goal. Varying the distance from the goal at which frustration takes place has been attempted by a number of investigators in support of this hypothesis. Lambert and Solomon (1952) found that rats failing to receive an expected reinforcement close to the goal resisted extinction longer than those frustrated farther from the goal. They also noted a greater degree of excitement among the former group, as evidence of a "frustration-produced drive." Adelman and Rosenbaum (1954) found that the response of adults frustrated closer to the goal took longer to extinguish than responses of subjects frustrated farther from the goal. Children frustrated near the completion of a task showed more intense physical reaction than those frustrated near the beginning of a task, according to Haner and Brown (1955). They concluded that frustration produced near the goal showed a greater aggressive reaction than when frustration occured farther from the goal. Adelman and Maatsch (1955) attempted various means of extinguishing learning habits in rats. Their results suggested that reactions to extinction were a function

of the type of response encouraged during frustration, and the way this reaction interacted with the original learning. Where responses were incompatible with the original learning, the original habit extinguished quickly, suggesting an interference effect of frustration. If the responses were compatible, the original learning extinguished more slowly, suggesting a facilitative effect of frustration. Waterhouse and Child (1953) also concluded that frustration would decrease the quality of the performance to the extent that frustration evoked interfering responses. They found that adults reporting a high degree of task interference showed a small decrement in performance under failure when compared to successful conditions. Those subjects reporting low interference showed an increment during failure as compared to successful performance conditions.

Studies involving high and low anxiety groups have become somewhat popular in the last decade. Deese et al (1953) found that following frustration, the non-anxious subjects are more variable and poorer in their performance. Anxious subjects improved somewhat in their performance. Using somewhat similar learning conditions as the above study, Lazarus, Deese and Hamilton (1954) found no difference in the performance of high and low anxious groups, both showing a decrement in performance following frustration. Lucus (1952) found that, with increasing degrees of failure, fewer number of errors occured with the low anxiety group, and greater number of errors occured with the high anxious subjects. This author suggested that there is an interaction between anxiety and the amount of failure. Sarason et al (1952) found that two types of threatening instructions (task-relevant and non-task-

relevant) had opposite effects on high and low anxiety groups.

Adams (1940), using varying degrees of failure on stable and neurotic groups, found no difference between the two groups in efficiency on manual performance or in their susceptibility to varying degrees of frustration. Bennett and Jorden (1948) compared the picture-frustration scores of secure and insecure groups, finding the former to be more impunative, while the latter group was more extrapunative. On the other hand, Rosenswieg and Sarason's (1942) results suggested that impunative reactions to the Picture-Frustration Test were intimately related to such personality traits as preference for repressive defense measures and high suggestability. Exta-punative reactions appeared to be associated with nonrepressive defense measures and low suggestibility.

Zander (1944) found that children who were rated inferior on personality measures displayed regressive and/or inattentive behavior following frustration, whereas, those children with superior ratings showed more aggressive and/or attentive reactions. He found that considerable individual variation in post-frustration behavior was evident. He suggested that these differences in reaction may be the result of individualized habits of meeting frustration and the degrees to which the personality of each subject was threatened by the same situation. The author also found that boys showed more non-adjustive forms of behavior, while girls showed more cooperation following frustration. Marquis (1943) also noted the wide variations in individual reactions to frustration among infants. Lazarus and Eriksen (1952) found an increase in variability of performance in a high school group under failure when compared to a group under success conditions. They

also found that those students with a high grade point average improved under failure conditions, while students with a lower average did more poorly.

AGGRESSIVE RESPONSES AS THEY RELATE TO CHILDREN

Probably one of the most basic concerns of a culture is how to deal with and modify the aggressive responses of its offspring. On the other hand, a clear understanding of how and when in the child's development aggressive reactions come under some form of control is not in the offing. Research has suggested a few sign posts, but much remains in the realm of theory. Researchers have labeled as "aggression" any one of a number of reactions ranging from intense physical violence to fantasy. As enlarged upon in the following section, aggression shall be defined here as "an expression or action whose goal is injury to an organism."

Cultural considerations

In the acculturation process, Child (1954) maintains that there are twokinds of effects in the socialization of aggressive behavior: those that tend to strengthen the tendency to be aggressive, and those that lead to control or inhibition of this tendency.

Such facilitation or inhibition of aggressive tendencies have been related to class status and cultural variations. Davis (1952) noted that middleclass adolescents were punished for physical aggression, while lower class children were frequently rewarded in this area. The same author (1941) noted that the middle class, in general, most strongly controls areas of behavior such as aggression. In a cross cultural study, Whiting and Child (1953) concluded that the severity of inhibiting socialization of aggression in any particular culture was related to anxiety about aggression in that culture. With a comparison of middle class and lower class nursery school groups, Brody (1955) observed more verbal responses and some forms of verbal aggres-

sion in the former group. On the other hand, in another study by Sears, MacCoby and Levin (1957), there were no differences in aggression as related to socioeconomic status.

Parental punishment

Some experimenters have assumed that punativeness of the parent was a form of frustration to the child; and, in line with the frustration-aggression hypothesis, would precipitate some form of aggression on the part of the child. Research, however, attempting to relate punativeness or restrictiveness of the parent to aggression in their respective offspring has not led to any consistent or linear type of relationship (Levin and Sears, 1956; Sears, MacCoby, & Levin, 1957; Hollenberg & Sperry, 1951; Sears, Whiting, Nowlis, & Sears, 1953). Page (1941) offered an interesting alternative to the above hypothesis, concluding, "The occurence of aggression in childen apparently may be said to presuppose laxity or absence of control over the child more than . . . the presence of frustrating conditions . . ."

Developmental

There is also some meagre information about the course and modifications of aggressive responses as the child becomes older. Waters et al (1957) found that overt aggressive responses seem to increase from two to four years of age (cf Sears, 1951). Halpern's (1953) analysis of children's Rorschach responses suggested a prevalence of aggressive responses, without anxiety indices, at about six years; relatively mature records, with less manifestation of aggression, at about eight years; and tendencies towards exaggerated control (inhibition), at about ten years. Ames et al (1952) described a somewhat different pat-

tern of Rorschach responses. They suggested suppression of aggressive tendencies by the seven-year-olds, whereas, the eight- and nine-year-olds revealed considerable aggressivity toward the cards. With children at about ten years and over, Sanford et al (1943) came to a conclusion similar to Halpern's interpretation, concerning responses to the TAT. He found that there was considerable concern with guilt and guilt reduction in the stories of these children. Rosensweig (1948) found in responses to his Picture Frustration Test a progressive decrease in extrapunative responses, and an increasing tendency for intropunative and impunative responses to become evident with increasing age (from four to ten years).

Sex differences

Almost without exception, child studies have noted greater overt and fantasy aggression in boys than girls (Levin & Sears, 1956; Sears, Whiting, Nowlis, & Sears, 1953; Sanford et al, 1943). Sears, MacCoby, and Levin (1957) found no sex differences in aggressive fantasy.

Post-frustration aggressive fantasy

In measuring responses to TAT pictures, both Bellak (1942) and Shakow et al (1945) found an increase in aggressive themes following frustration. Crandall (1951) found no difference between frustrated and nonfrustrated subjects on formal aspects of TAT stories, but noted greater punishment expectancy in the frustrated group. Lindzey and Riecken (1951) demonstrated that, subsequent to social frustration, TAT stories reflected more of an increase in the number of aggressive acts carried out by "heroes" than those carried out by "other" figures. Rodnick and Klebanoff (1942) found that poorly adjusted subjects' TAT stories were shorter and contained more aggressive elements following frustration

while the adjusted subjects gave longer stories, yet did not show an increase in aggression following frustration. According to Yarrow (1948), children exhibited an increase in certain forms of aggression in projective play after frustration.

PRE-TEST PROCEDURE

Measurement of aggressive fantasy

Certain considerations led us to use responses to incomplete stories as a means of measuring aggressive fantasy. Standard projective techniques were not thought suitable for our purposes, as no one of these instruments had a sufficient number of stimuli that tend to elicit aggressive responses. The decision to use incomplete stories was based on Korner's (1949) success in using this method to tap young children's aggressive fantasy.

As previous studies did not contain enough incomplete stories that would meet the present research design, a number of original stories were devised. It was considered important to try out a series of these stories on a small sample of children of a similar population and age range as those of the investigation. A total of ten incomplete stories was used in the pre-test procedure (Appendix I). Three of these stories (nos. 2, 6 and 9) were taken in modified form from Korner's (1949) study with 4-, 5- and 6-year-olds. She found that these stories elicited the highest number of aggressive responses among her repetoire of stories. Two of the devised stories (nos. 1 and 4) were similar to those used in the Andersons' (1954) research.

In devising the stories, the following criteria were used: (1) All stories present children in somewhat frustrating situations which are likely to provoke full responses of an aggressive nature. (2) Questions regarding the completion of the story center upon the character who experiences some form of frustration. (3) Story content in-

volves not too ordinary, but realistic occurrences to counteract the stereotyping of answers. (4) The content of each story is assumed to have somewhat the same appeal for both sexes through the age range of 7to 11. (5) The content is believed to be comprehensible to a large majority, if not all, the children.

In addition, two neutral stories, whose content was of a more positive nature, were used as filler items. The purpose of the filler stories was to make it more difficult for the child to "catch on" to the experimental intent of the stories.

Criteria of aggressive fantasy

Aggressive fantasy, as used here, is a particular verbal response to theincomplete stories. A response which contains any expression or action whose goal is injury to an organism is considered aggressive. This general definition is essentially that of Dollard et al (1939). Such responses involving assault, destruction, anger, resistance, etc., could rightfully be included under such a definition. It is noted that some authors, as Murray (1938) and Jackson (1954), have included a common connotation relating to initiative, dominance, assertion under aggression. This meaning of the word is excluded from the present definition.

Interpertation of aggressive fantasy was in terms of its presence and intensity. Direction of aggression or punishment themes with regard to aggression was not considered in this investigation. It was assumed that certain forms of aggression were more intense than others. Overt acts were considered more intense, and nominal expression to passive forms of aggression were evaluated as less intense. According to the

following schema, judges were to tabulate the intensity of aggression in each story response:

Tally	Nature of aggression	
1.5	Active	-physical attack intentional destruction
1.o	Nominal expression	-expression of anger statements of revenge
0.5	Passive and inferred	-non-compliance accidental destruction

This means of tabulation was adapted from Korner's (1949) ratings of incomplete stories. Admittedly, the method of tallying aggressive responses is arbitrary, but use of a particular rating procedure was thought essential for consistency. Raters were especially instructed to score manifest content with a minimum of interpretation. There was no limit placed upon the number of aggressive tallies in each story, provided such tallies related to somewhat discrete happenings.

Selection of experimental stories

The sample used for the pre-testing of the incomplete stories comprised eleven college faculty children (6 girls and 5 boys). An attempt was made to select children at the oldest and the youngest agerange of the final sample. The order of presentation of the stories was reversed at random.

The E related each of the stories to the individual child, and wrote down verbatim his response. The children were instructed to be free in the use of imagination, much as in the standard administration of the TAT and Symonds' (1949) Picture Test.

The responses to each story were then coded for aggressive fantasy

by two raters with graduate training in psychology. Then, the scores of the two raters were averaged. In selecting final stories, the following requirements were considered: the story should (a) elicit a sufficient number of aggressive responses; (b) have a reasonable amount of variability among respondents in aggressive fantasy; and (c) have responses which can be reliably coded with regard to the degree of aggressive fantasy.

It was found that the mean ratings of aggressive fantasy for each child's story ranged from .18 (story no. 5) to 1.18 (story no. 3), with a mean of .55 for all stories. According to the above criteria, stories nos. 6, 7, 8 and 10 were satisfactory and so, were selected for use in the experiment proper. The mean ratings of these four stories were .42. Inter-rater reliability of the scores on the four stories was found to be .874. The stories selected and a filler story (no. 9a) were used in the main investigation in the following order: nos. 6, 9a, 7, 8 and 10.

STATEMENT OF INQUIRY

In the survey of frustration theory and research, there did not appear to be a substantial or consistent body of knowledge from which definitive hypotheses could be made in relation to this investigation. Therefore, instead of employing hypotheses, it seemed wise to summarize the major areas of concern as points of inquiry. As a minimum, the following points came under consideration:

1: a. With the initial introduction of frustration, is there an inhibitory[1] or facilitative effect upon motor performance (speed and amplitude) as compared with no introduction of frustration?

b. Does a series of frustration trials have an inhibitory or facilitative effect upon motor performance when compared with a series of non-frustration trials?

2: Are inhibitory or facilitative effects following frustration most pronounced near the point of frustration?

3: Does the introduction of success after frustration have an inhibiting or facilitating effect on motor performance?

4: After a series of trials, does changing from success to frustration have a facilitating or inhibiting effect on motor performance, and how do such effects compare with early trial frustration?

5: Are inhibitory or facilitative effects of frustration on amplitude of extra-task responses dependent upon the age of the child?

---

[1] Inhibition is defined as a decrement from expected or preceding performance, while facilitation is defined as an increment over expected or preceding performance.

6: Do children showing changes in motor performance under frustration, display corresponding changes in their aggressive fantasy?

7: Is there greater aggressive fantasy among children subjected to frustration than those subjected to success?

8: a. Is there a difference in boys' and girls' aggressive fantasy following frustration?

b. Is there a difference in boys' and girls' aggressive fantasy following success?

METHOD

Sample

The test sample was made up of 108 grammar school children selected from eight schools in central Michigan. To obtain a representative sample of middle class children, those children whose parents were in white collar occupations were selected. At random, seventy-two of these children were chosen as the experimental group and thirty-six as the control group. As will be described later, the former group were primarily subjected to frustration and the latter group, primarily success. Since the study was concerned with reactions to frustration rather than to success, larger sampling was considered among the experimental subjects. The subjects were divided according to the following age levels and conditions:

-Age-	-Experimental-		-Control-	
	boys	girls	boys	girls
$7\frac{1}{2}$ - 8	12	12	6	6
9 - $9\frac{1}{2}$	12	12	6	6
$10\frac{1}{2}$ - 11	12	12	6	6

The age groups of $7\frac{1}{2}$ to 8 and 9 to $9\frac{1}{2}$ were the same age groupings used in the McDonough study for the purpose of replication. Furthermore, the selection of these groups was based on the fact that prior experimentation showed that children were more consistently cooperative to the procedures used and the reaction measures most stable with this age group. Extension of the age range by including an older group of children was an attempt to trace developmentally performance reactions of the McDonough study, as well as age changes in aggressive fantasy.

By separating the boys and girls in the sample, the design took into account possible sex differences.

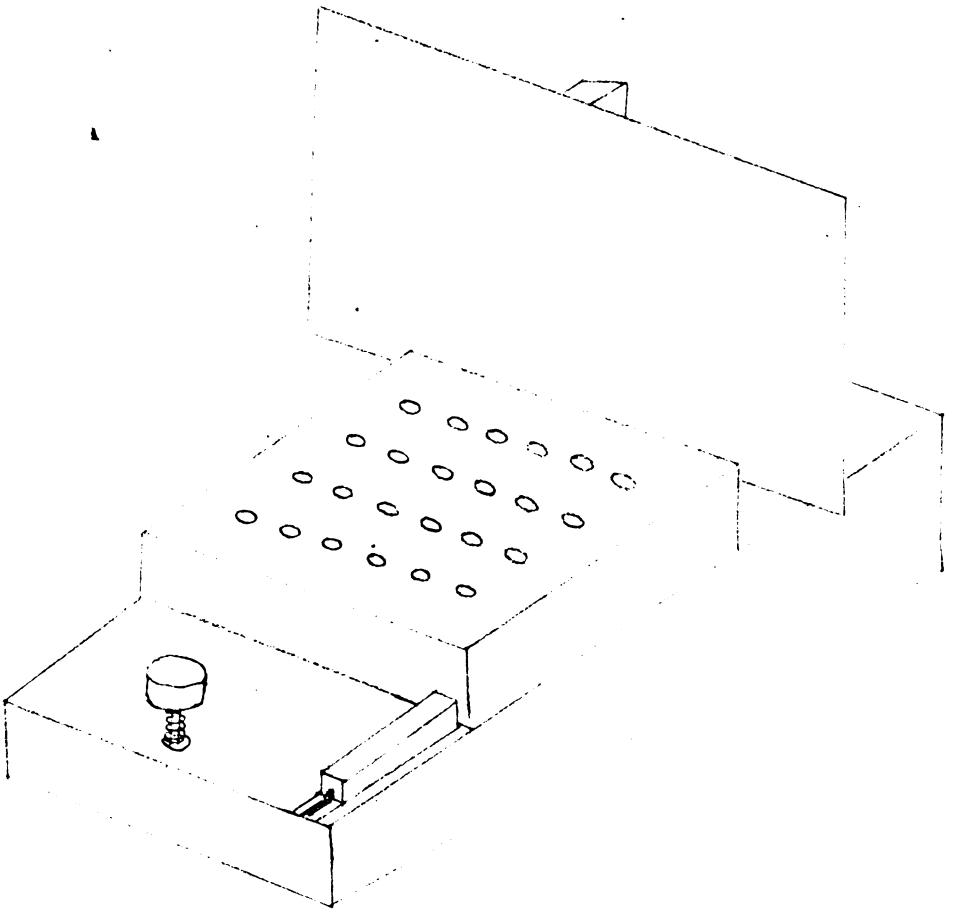
Apparatus

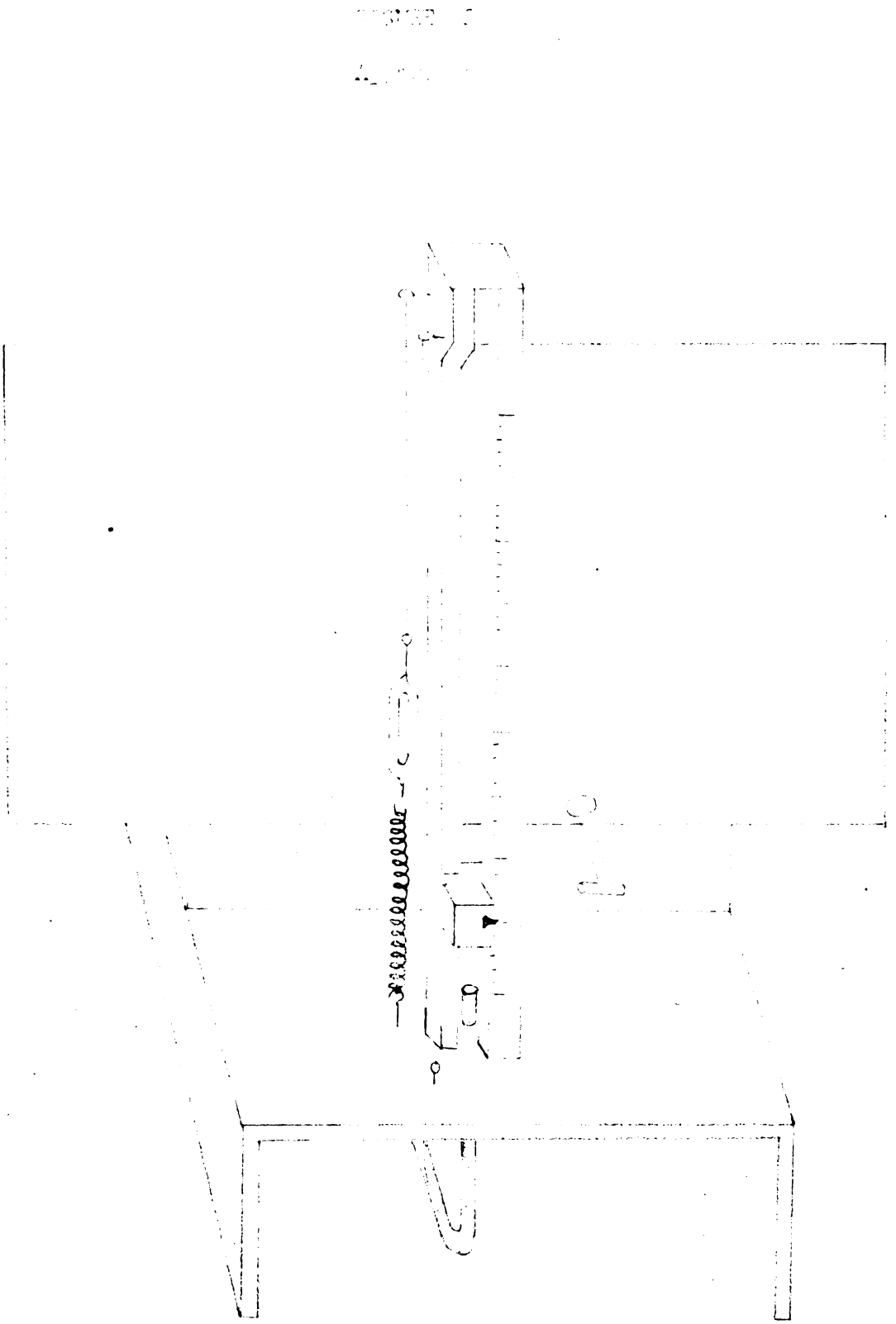
The same marble-board apparatus used in the McDonough study (adapted from Haner and Brown, 1955) served as the experimental task for the present investigation. Haner and Brown have pointed out the suitability of this type of apparatus in frustration procedures. The task and apparatus were considered a "game," which would engage the interest and cooperation of children. The task also provided for a continuous response, with a clear starting point and goal. Further, the task enabled E to thwart S at any point in the task, without allowing S to realize the arbitrary nature of the thwarting.

The apparatus is shown in Figures 1 and 2. Common to many children's toys, the apparatus was colored in bright yellow and blue, which was intended to increase the interest and game element of the task. The base box was 12x20x2½" in front, rising to a height of 4-3/4" in the back. The top box was perforated with four rows of six holes, slightly larger than ½" in diameter. The child was required to place different colored marbles in these holes. Inside the top box was a sliding frame attached to a handle which extended to the rear of the apparatus. When the frame handle was pulled by the E, the marbles in the holes fell into the box. The frame was then returned to its original position by E for the next trial. The floor of the marble box was slanted in a manner which caused the marbles to roll toward the right front corner where they entered a tunnel leading to a small tray, just large enough to contain a single marble. Only when S picked up a

FIGURE 1

Apparatus





marble did another become available by rolling into the tray.

In the center of the base box and 4-3/4" from the marble box was located a wooden plunger, 2-3/4" in diameter. Atop the wooden plunger was $1\frac{1}{4}$" of foam rubber covered with linen. The foam rubber provided cushioning when striking the plunger, in order to eliminate any noxious effects of contact. Beneath the plunger, there was a steel spring which provided resistance when the plunger was hit, and also recoiled the plunger to the initial position. On a lever principle, depression of the plunger activated a recording device.

The recording mechanism consisted of two wooden columns, $14\frac{1}{4}$" high, placed on either side of the hole from which the plunger lever emerged. Resting on the end of the lever was a wooden block, grooved on both sides so that it could ride up and down between the two columns. Each time S hit the plunger, the block was propelled upward by the push of the plunger. It was necessary for the purpose of recording the height of the block that it remain elevated after the S's blow. This was accomplished by creating tension between the two columns and the wooden block by means of a pulley-like arrangement of a thread in series with a turnbuckle screw and a light weight spring, as seen in Fig. 2. A shield attached to the apparatus obstructed S's view of the recording device and the marble-releasing mechanism.

Measurement of the force of the blow upon the plunger was read directly from a scale (measured in 10th of inches) on the face of one of the columns. A marker on the wooden block (riding between the two columns) indicated the force of the blow at the maximum height obtained. This apparatus was designed to measure the force of the S's initial im-

pact on the plunger rather than prolonged physical pressure, as initial impact was believed to be a better indicator of immediate reaction to the experimental conditions.

Important to the investigation was determining whether the amplitude deflections represented a linear measurement. This was attempted by ascertaining if proportional increases in known amounts of force upon the plunger would result in proportional increases in the marker deflection. This was accomplished by dropping various standard weights from a constant height onto the plunger and recording the marker deflections. Standard weights of .05, .1, .2, and .5 kgm. were dropped five times from a constant distance above the plunger. The means of the resulting deflections from these weights was found to be directly proportional to the amount of weight dropped. It was concluded that the amplitude deflections were essentially a linear measure of the force applied to the plunger.

Procedure

Children were seen individually in a vacant schoolroom, after being told they were going to play a game with E. During the examination, the child sat in front of the apparatus which was placed on a table of suitable height. The E sat behind the apparatus, manipulating the wooden frame, timing the trials and recording the marker elevation.

All the children were given the following instructions: "Look at this board with the holes in it. The idea is to take one of these marbles (E pointing to marble container), put it in a hole, then take another marble, put it in a hole. . . until you get the whole board filled with marbles. Every time you get the whole board filled with marbles, you get a little prize that you can take home with you. Any

time you don't get the board filled fast enough, within the time allowed, all the marbles will fall through the holes. Every time the marbles drop through the holes, you hit this (E pointing to the plunger)." E gestured with his fist over the plunger as if to hit and then told S to hit it once before starting, to see how it worked. E then added, "Whenever themarbles drop through the holes, whether you've filled the holes or did not finish filling the holes, you hit the plunger."

The task essentially required the child to fill a 24-hole marble-board as quickly as he could, then hit the plunger. As hitting the plunger was not a part of the response sequence of filling the board, it was considered an extra-task response. Since reward was contingent upon task completion, this incentive was used to exacerbate the goal of completion.

On successful trials, the marbles were released after filling the last hole and a toy was put in an envelope, which he was told he could take home after school. Toy rewards were similar to those which Bijou (1955) found had a universal appeal for children. Toy charms, as eraser figurines, whistles, cars, alligator snappers, were given to boys and girls alike; while rings and fans were given exclusively to girls and army trucks and soldiers were givenexclusively to boys.

On frustration or unsuccessful trials, the marbles were released before the completion of the task. On these trials, the E after the child had filled either the 20th, 21st, 22nd or 23rd hole, said, "Time is up," ostensibly looking at a stop watch upon releasingth e marbles. Calling attention to the time was intended to offset any perception of arbitrariness of failure.

Every child was given fifteen trials on the marble board, as well as asked to respond to five incomplete stories selected from the pre-testing procedure at the end of the eigth trial. The experimental or frustration group was given two initial successful trials, six unsuccessful trials, two successful trials, three unsuccessful trials, and two successful trials. The same procedure was followed for the control group, receiving six successful trials instead of six unsuccessful trials. Successful trials were considered those in which the child filled the board and was awarded a prize. Frustration trials were considered those in which the marbles drop before filling the board and no reward was given. The time between trials averaged 30 to 35 secs. Therefore, practice periods were essentially distributed.

Below is schematized the procedural order of conditions for the experimental and control groups:

Trial number	Experimental	Control
1 and 2	success	success
3 to 8	frustration	success
-	incomplete stories	incomplete stories
9 to 11	success	success
11 to 13	frustration	frustration
14 to 15	success	success

With the experimental group, the initial success was for purposes of engaging the cooperation of the child. In order to ascertain initial, as well as cumulative effects of frustration, six separate failure trials were then presented. Incomplete stories (as fantasyindicators) were introduced after these trials because it was assumed that the most

marked effect of frustration would be after a long series of unsuccessful trials. The stories were administered in the same manner as described in the pre-test procedure. Following these stories, all the Ss were given two successful trials. These trial conditions were of use in ascertaining the effects of success that had been preceded by frustration. Up to this point, order of conditions and number of success trials were identical to the McDonough study, with the exception of introducing a fantasy measure. In addition, three frustration and two concluding successful trials were given. These additional frustration trials made comparison possible between post-frustration reactions of children who underwent previous frustration and reactions of children who had only prior success.

The basic purpose ofthe control group was for direct comparison of reactions obtained under the experimental procedure. With this method, the effects of early and late introduction of frustration could be analyzed. Further, it was noted that McDonough's examination of reactions to differential trial conditions was restricted to sequential trial comparisons. The present design afforded a control group means of comparison, with variable conditions of frustration and success. The control group, also, offered an opportunity of studying performance on the apparatus with a series of continually reinforced (non-frustration) trials.

RESULTS

Measures used

There are three kinds of measures used in this study: performance speed, amplitude and aggressive fantasy. The mean scores of each measure for the experimental, age and sex groupings are presented in Appendix II.

Performance speed

Performance speed was the only measure of motor performance on the task itself. Performance speed was defined as the time to complete a trial or half-trial. A complete trial consisted of placing 20 marbles in the board; the first half-trial, of placing marbles 1 to 10; and the second half-trial of placing marbles 11 to 20. As discussed under "Problem," performance speed was separated into first half- and second-half-trial times since the second half-trial time was considered a more sensitive measure of inhibitory or facilitative effects. The rationale for considering the sensitivity of this measure was: (1) this time represented task performance close to the point of subsequent frustration (learned effects) and, (2) work (fatigue-like)[1] effects associated with the second half-trial meant performance was farther from a ceiling, hence allowing any facilitative effects to become manifest. Cumulative speed refers to the mean performance speed of trials 4 to 8, the trials which followed the frustration procedure and preceded administration of the incomplete stories.

A measure of reliability was obtained by comparing individual performance speeds between trials where experimental conditions were

[1] cf Inquiry 2 in "Results" section.

constant over a series of trials. During and prior to the 7th and 8th trials, conditions were constant for both the experimental and control groups. The correlation between performance speeds on these trials is .792. This result shows a high degree of consistency in the speed measure.

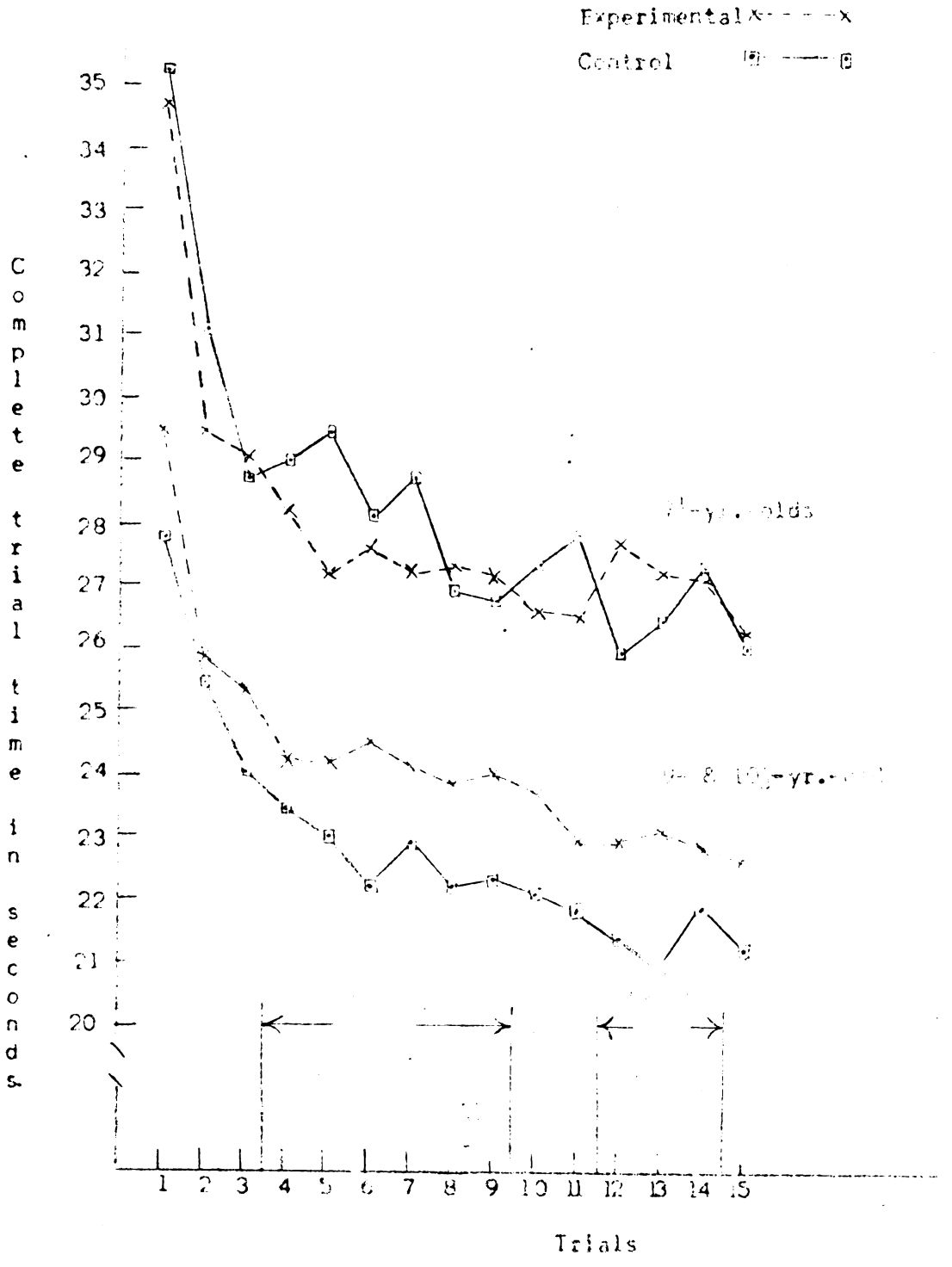
The mean performance speeds of ithe experimental and control groups of boys and girls appear in Fig. 3. The 9- and $10\frac{1}{2}$-year groups were combined for graphical clarity. Although learning was clearly evident, there seemed to be no appreciable sex differences, both in level of performance and rate of learning the marble-board task. However, as will become evident later, faster performance speeds were associated with increasing age.

Amplitude

Amplitude, also a motor response, measured the force of initial impact upon the plunger, subsequent to each trial. As noted in the "Procedure," amplitude was designated as an extra-task response. Cumulative amplitude refers to the mean scores of trials 3 to 8. These trials were selected since frustration procedures directly preceded plunger manipulation during this trial sequence and were followed by the incomplete stories. The amplitude measure was taken from the recorded deflection of the marker attached to the plunger. Due to the construction of the apparatus, it was necessary to make daily corrections of individual amplitude scores over the testing period. On each testing day, a .19 kgm. weight was dropped five times through a 24"-long tube onto the plunger. The mean of the resulting marker deflections for each day was recorded. (These means varied from 1.9" to 2.3", with

FIGURE 3

Mean time scores of 7½-yr.-olds and combined 9- and 10½-yr.-olds for experimental and control groups for all trials



a grand mean of 2.2" and probable error of ± .048".) The daily mean was then compared to a constant mean deflection of 2.2". The difference between the daily mean and the constant mean deflection was appropriately added to or subtracted from the amplitude scores obtained on that particular day. Thus, amplitude scores were corrected daily for variations in the apparatus.

A measure of reliability was obtained by comparing individual scores on those trials where conditions were constant over a series of trials. Comparison of scores from the 6th to the 7th and from the 7th to the 8th trials suited this purpose. The correlation between the amplitude scores on the 6th and 7th trials is .782, and between the 7th and 8th trials is .753. This finding indicates a high degree of consistency in the amplitude measure.

In Fig. 4, appears the mean amplitude of the experimental and control groups of boys and girls during the experimental trials. From the initial trial on, it is evident that the boys hit the plunger harder than girls. This difference appears to be consistent for all age groups[1] throughout the performance period. To ascertain the sex differences in the plunger scores, a t test was computed on the amplitude scores of the first trial (Table 1).

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[1] Median test of first trial amplitude scores with respect to age and a similar test with respect to sex show no significant age differences (χ^2 of 2.89, n.s. for df 2) and significant sex differences (χ^2 of 4.48, $p < .05$ for df 1).

FIGURE 4

Mean amplitude scores of experimental and control groups of boys and girls for all trials

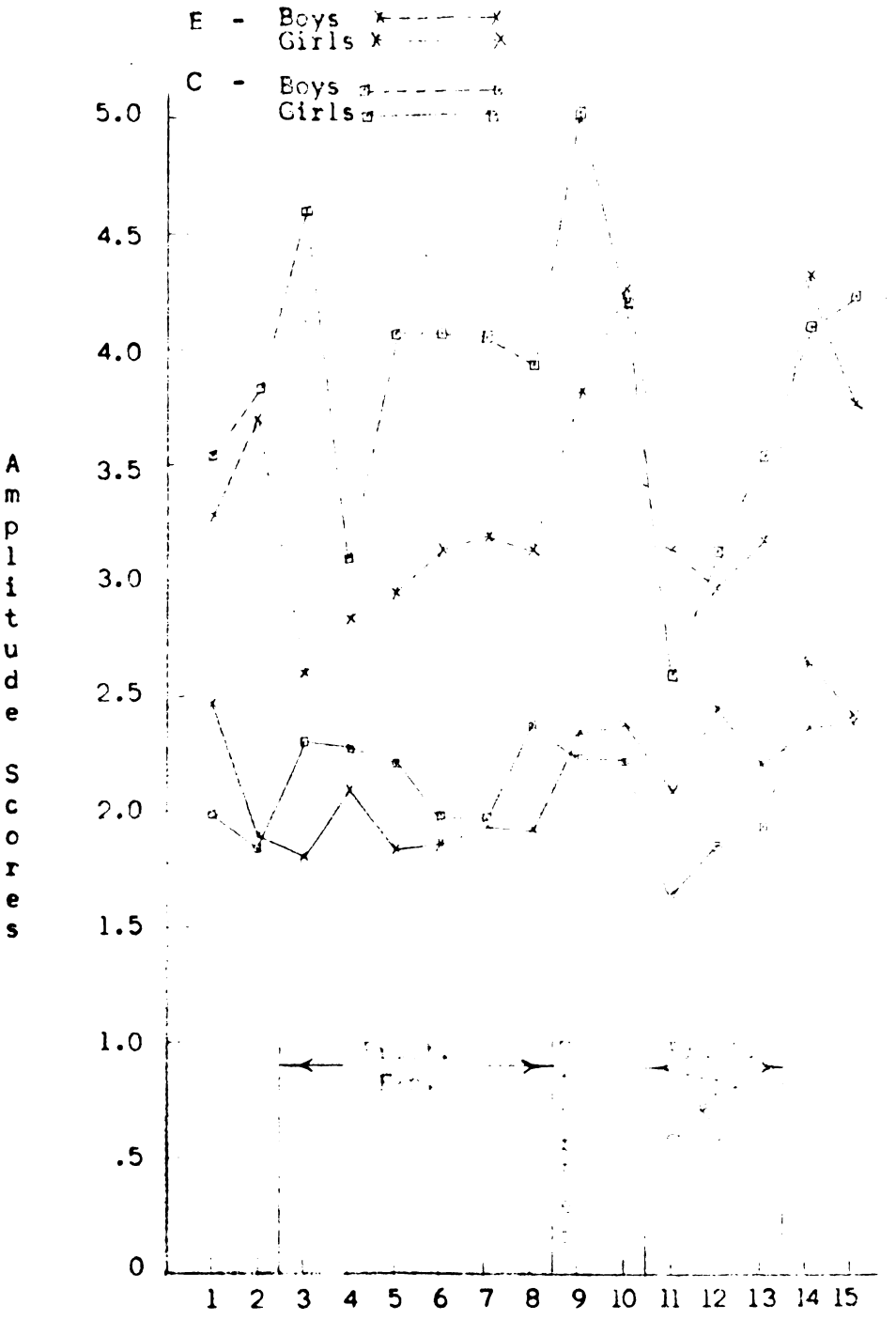


Table 1

t test of amplitude scores on trial 1

	Group	
	Boys	Girls
Mean	3.372	2.342
Variance	6.13	2 .71
n	54	54
t = 2.54	p < .02 for 2-tail test, df 106	

An *F* of 2.26 (p < .01 for *df* 53 & 53) for the variance ratios indicates non-homogeneity of variance. However, probability values of *t* are not substantially influenced by variance heterogeneity in the case of the 2-tail test. Hence, the resulting *t* can be considered significant, indicating a reliable difference between boys' and girls' initial amplitude scores.

Aggressive fantasy

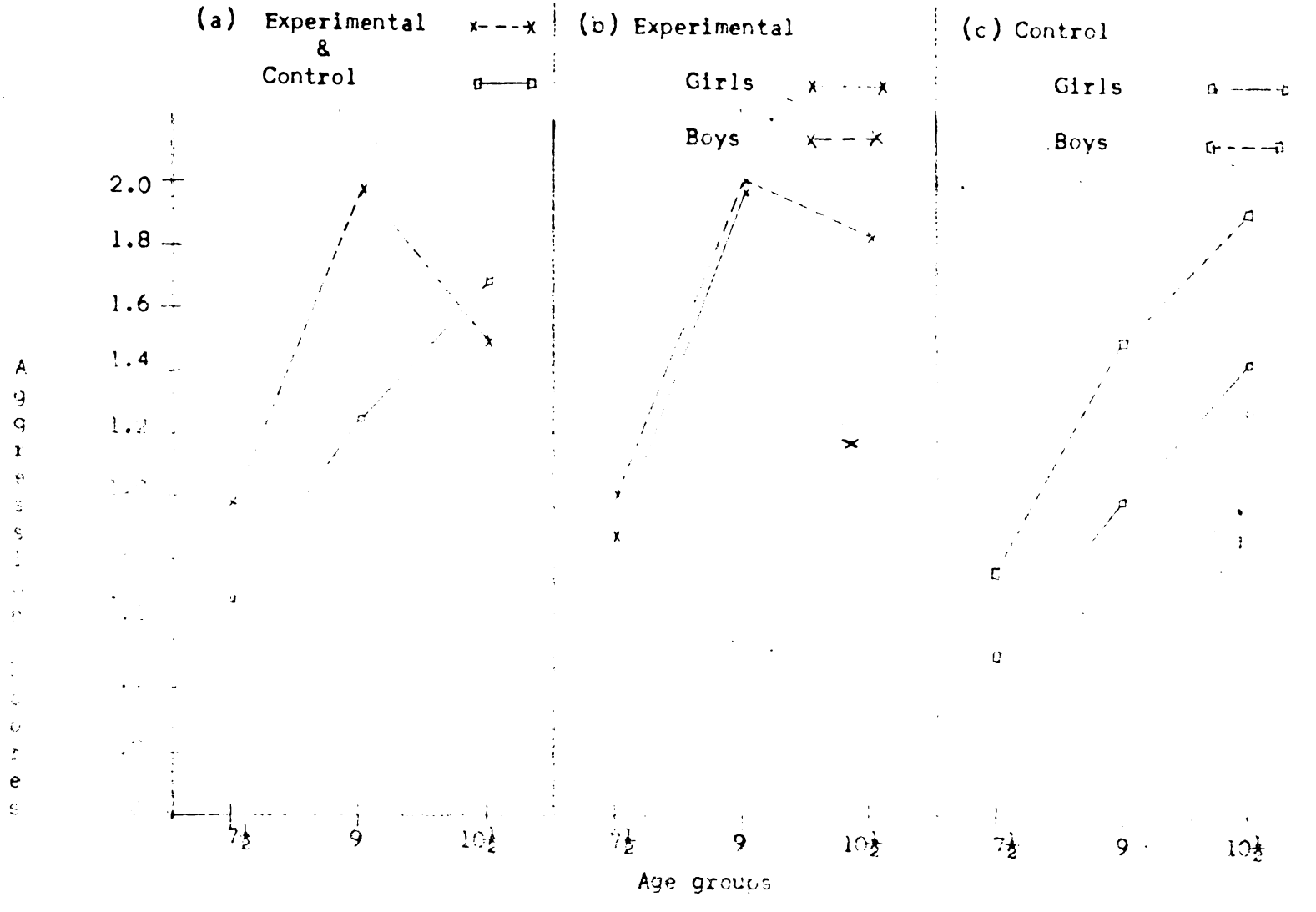
Responses to the incomplete stories were rated for aggressive fantasy in the same manner as responses to the pre-test stories. Two judges, with advanced degrees in psychology, independently rated the aggressive fantasy responses to the experimental stories. As the eventual fantasy measure was to be based on the individual scores totaled over four stories, the inter-rater reliability was computed from the total of the judges' ratings on these stories. An *r* of .891 indicates that the measure of aggressive fantasy was adequately rated by the judges. The average of the judges' ratings was used as the measure of aggressive fantasy.

The mean aggressive scores of the experimental and control groups

at each age level are illustrated in Figs. 5a, b and c. As will become evident later, analysis of the entire sample reveals that age groups differed significantly in their aggressive fantasy. The results, however, are not clear. For, though both experimental and control groups showed an increase in aggressive fantasy from the $7\frac{1}{2}$- to 9-year levels, the control group seemed to show a continued rise, while the experimental group declined in aggressive fantasy from the 9- to $10\frac{1}{2}$-year levels. It is reasonable to conclude that there was an increase in aggressive fantasy from the $7\frac{1}{2}$- to 9-year groups ($\underline{t} = 3.03$, $p < .01$ for $\underline{df}$ 70). On the other hand, any conclusions regarding the differences in aggressive fantasy between the two older age levels would seem inappropriate.

FIGURE 5

Mean aggression scores with respect to age



Inquiries

In taking up each inquiry, the results pertaining to motor performance were assayed in the following order: first, performance speed; then, amplitude.

Inquiry 1: a With initial introduction of frustration, is there an inhibitory or facilitative effect upon motor performance as compared with no introduction of frustration?

Performance speed

The initial effect of frustration upon performance speed was obtained by comparison of the experimental and control group's performance speed on trials 4 and 5. As a sensitive measure of performance speed, the second half-trial time was used. At each age level, the groups were found to have the same means on the previous trial (3rd) with respect to this measure. The mean scores on the 4th and 5th trials for the experimental and control groups according to age levels are presented in Fig. 6. Fig. 6 suggests that the introduction of frustration had a differential effect upon the age levels (facilitative for the youngest and inhibitory for the older). Thus, a 2x3 analysis of variance of conditions and age was made to test for interactions between age and conditions, as well as for main effects (Table 2). Hartley's test indicates variance homogeneity with an F_{max} of 2.79 (N.S. for df 23 and 6 groups). Significant age difference shows that faster performance was associated with increasing age. Although no significant difference was found between conditions, a significant interaction between age and conditions indicates that the presence or absence of initial frustration did have a differential effect on the various age groups of the sample with respect to speed of performance.

FIGURE 6

Initial post-frustration performance speed on second half-trials of experimental and control groups with respect to age

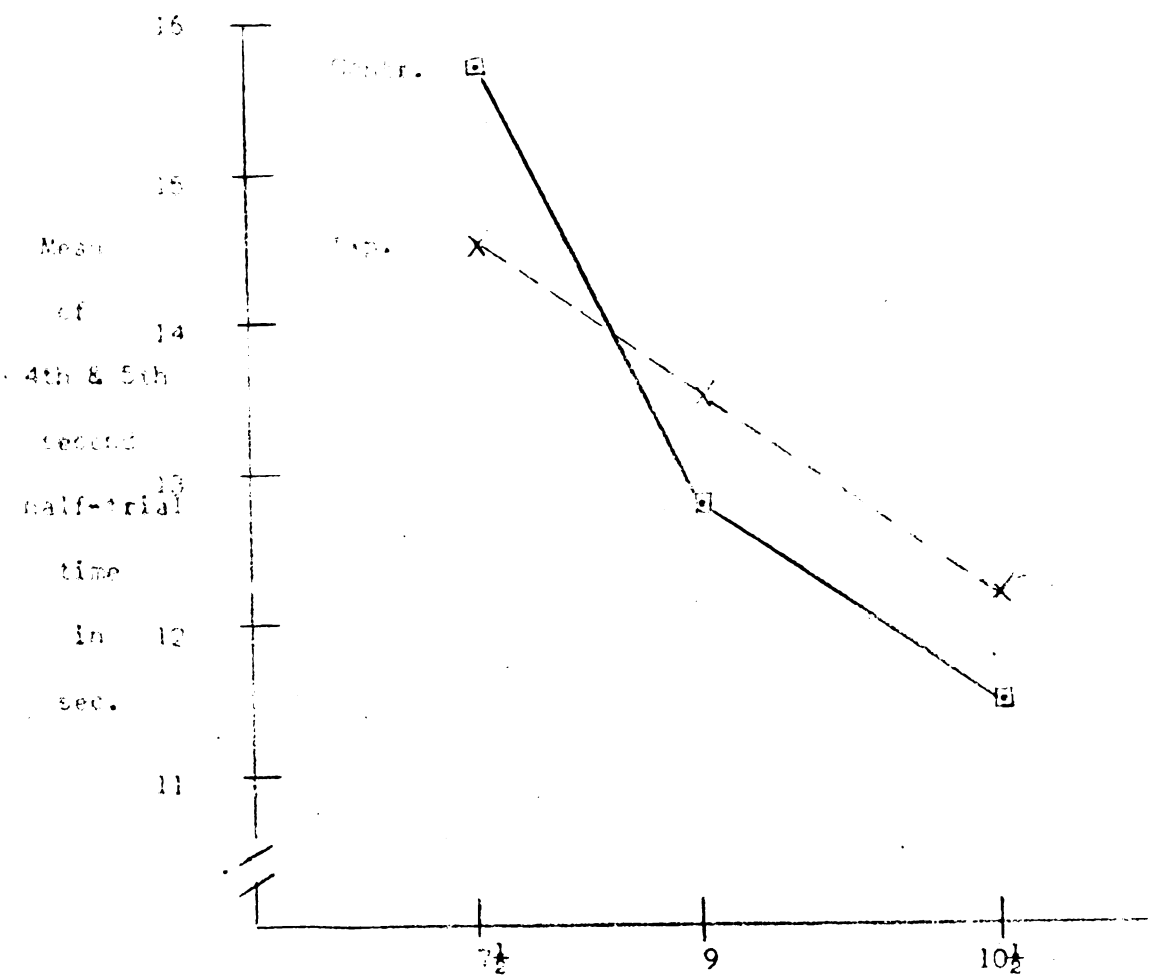


Table 2

Analysis of variance of the second half-trial time scores on the 4th & 5th trials

Source of variation	SS	df	MS	F	P
Between conditions	.56	1	.56	-	
Age	579.85	2	289.92	31.04	.01
CxA	67.35	2	33.68	3.61	.05
Within	952. 87	102			
Total	1600.63	107			

Amplitude

To ascertain the immediate effect of frustration on the amplitude of response, the initial amplitude change (amplitude on trial 2 less amplitude on trial 3) of the experimental group was compared with the control group. Table 3 reveals that a large proportion of the experimental group either decreased, or had similar amplitude of response; while the reverse trend was true of the control groups.

Table 3[1]

Initial amplitude change from trials 2 to 3

Group	Increase	Not increase	Totals
Experimental	20	52	72
Control	22	14	36
Totals	42	66	

$X^2 = 9.88$ $p < .01$

Note - - No change in 8 experimental and 3 control Ss.

[1] Since the amplitude scores as a rule did not lend themselves to parametric analysis, it was necessary to use nonparametrics. Throughout this study, parametrics were used whenever possible (e.g.- with homogeneity of variance).

The resulting $\underline{X}^2$ of 9.88 is significant at the 1% level, indicating that the difference of amplitude of the two groups appeared to be the result of the different experimental conditions. This suggests that the initial introduction of frustration had an inhibitory effect upon the amplitude or vigorousness of response.

In summary, it was found that the initial introduction of frustration has differential effects upon speed of performance (task response) among different age groups, and had a general inhibitory effect upon the vigor of an extra-task response.

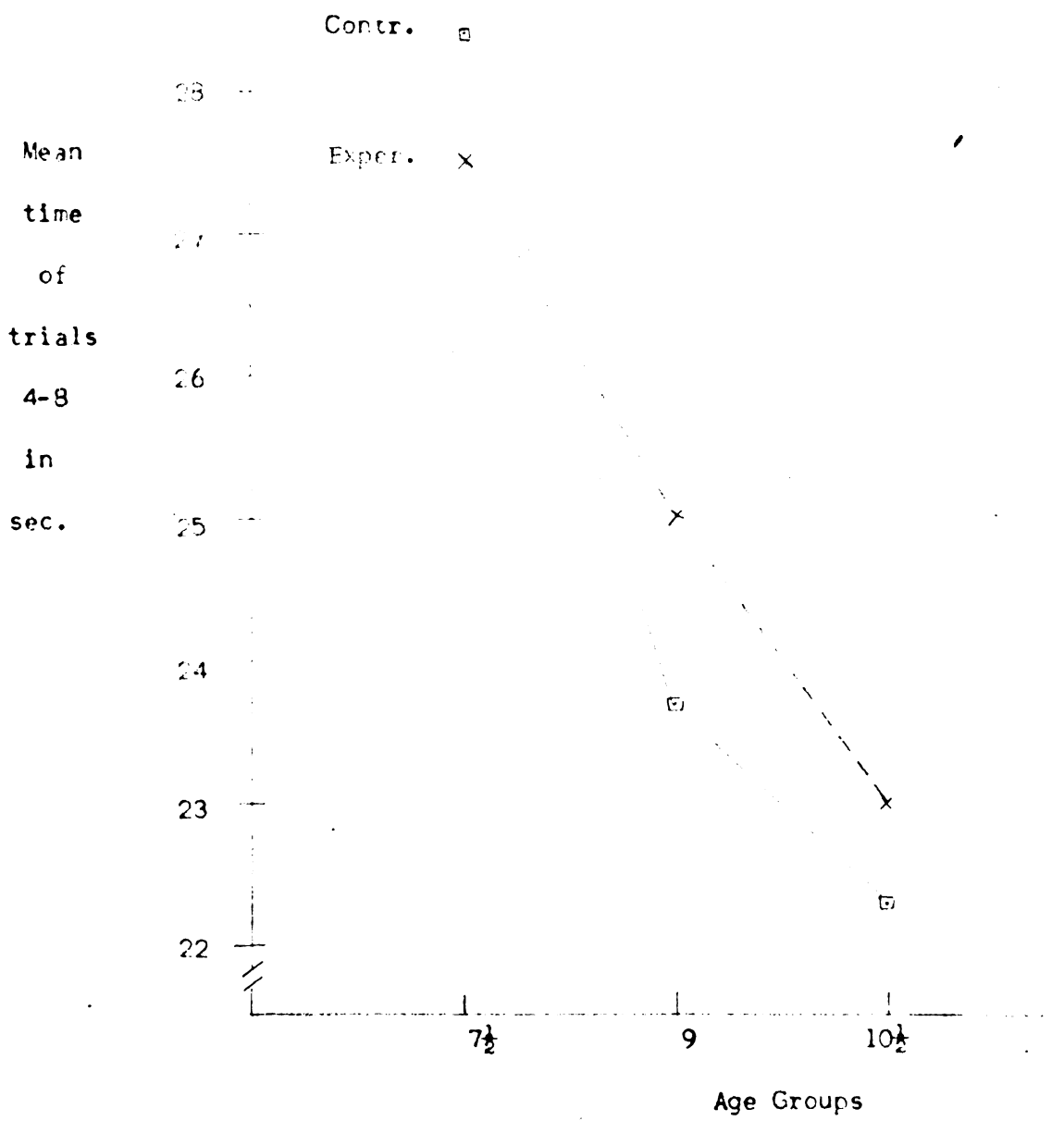
Inquiry 1: b Does a series of frustration trials have an inhibitory or facilitative effect upon motor performance when compared with a series of non-frustration trials?

Performance speed

In order to compare the cumulative speed of the experimental groups with their controls, it was necessary to take into account initial performance differences at certain age levels. Both the 9- and $10\frac{1}{2}$-year-old girls of the experimental group were slower than their controls on pre-frustration trial 3. The remaining groups were at equal levels of initial performance. The equating of all groups with their controls was accomplished by omitting two girls of each of the older experimental groups who were the slowest on trial 3, as well as the fastest girl from each of the older control groups, removing six in all from the sample. Figure 7 shows the mean cumulative speed, as corrected above for initial performance, of the experimental and control groups at each age level. Observation of the graph suggests that there was an inhibitory effect of frustration on the youngest group and a facilitative effect on the two older groups. In order to obtain a strong test of interaction between age and experimental conditions, the 9- and $10\frac{1}{2}$-year-old groups were combined in an analysis of variance. Table 4 represents a 2x2 analysis of variance of cumulative speed with respect to age and conditions. The variances of the groups are homogeneous, using Hartley's test, with a nonsignificant F_{max} of 1.97 (df 43 and 4 groups). Analysis reveals a highly significant differnce between age groups, but no significant difference between conditions and no significant interaction between conditions and age. An analysis of cumulative speed, using the second half-trials time means of the experimental and control

FIGURE 7

Corrected cumulative speed means of experimental and control groups with respect to age



groups on the three age groups was also attempted. The results are essentially similar to the complete trial time analysis: a highly significant difference in cumulative speed scores between ages, a nonsignificant difference between conditions, and nonsignificant interaction between conditions and age.

Table 4

Analysis of variance of cumulative speed, equated for initial performance

Source of variation	SS	df	MS	F	P
Between conditions	58.88	1	58.88	-	
Age	9,978.37	1	9,978.37	50.92	.01
CxA	463.65	1	463.65	2.36	n.s.
Within	19,205.83	98	195.97		
Total	29,706.73	101			

Amplitude

As described in the section on measurement, the boys' initial trial amplitude scores are significantly higher than the girls'. The mean difference in amplitude between the sex groups was 1.03. In order to combine the female and male groups with respect to amplitude, this mean difference was added to each girl's amplitude scores. From these corrected scores, the mean amplitude of the control and experimental groups was found for trials 3 to 8 (cumulative amplitude). The corrected scores of these two groups with respect to age are presented in Fig. 8. A 2x3 analysis of variance of these scores was then attempted with regard to conditions and age classification (table 5).

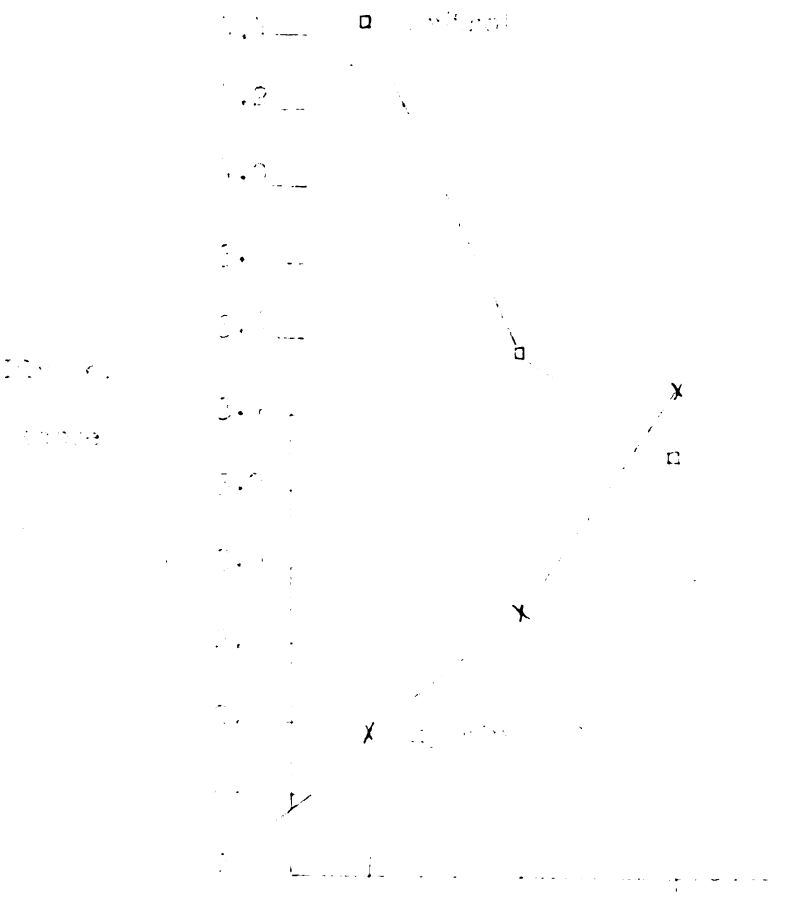


Table 5[1]

Analysis of variance of cumulative amplitude scores, with correction of girls' scores

Source of variation	SS	df	MS	F	P
Between conditions	544.99	1	544.99	5.42	.05
Age	63 .87	2	31.94	-	
CxA	611.17	2	305.59	3.04	n.s.
Within	10,247.54	102	100.47		
Total	11,467.57	107			

A Hartley test reveals a nonsignificant F_{max} of 2.72 (df of 23 and 6 groups), indicating homogeneity of variance. The results of this analysis show a significant difference in amplitude between experimental and control groups, but no significant difference with respect to age or age-condition interaction. The foregoing indicates the amplitude response was inhibited overa series of frustration trials.

[1] Sex groups were combined to make use of the largest possible sample. It should be noted that a comparable analysis of sex and conditions was not applicable in view of non-homogeneity of variance (F_{max} of 4.06, $p < .01$ for df of 17 and 4 groups).

Inquiry 2: Are inhibitory or facilitative effects following frustration most pronounced near the point of frustration?

In Fig. 9a are shown the means of the experimental group's speeds of performance on the first halves and the second halves of trials 4 to 8, broken down for each age group. Similar scores for the control group appear in Fig. 9b. Trials 4 to 8 were selected for this comparison because they encompass a difference in experimental conditions over a period of time.

To test for the presence of intra-trial inhibitory or facilitative effects, a difference score was obtained: for each individual, the mean time on the first halves of trials 4 to 8 were subtracted from the mean time on the second halves. In the experimental group, the mean difference score was 8.80 seconds, and its standard error, .676 sec. The *t* of 13.00 is significant at the 1% level (*df* 71), indicating that the experimental group was slower on the second halves of trials 4 to 8. For the controls, the mean difference was 9.06 seconds; its standard error, .843 sec. The *t* of 10.75 is significant at the 1% level (*df* 35), again indicating slower preformance in the later halves of these trials.

While both slowed in the second halves of trials 4 to 8, inhibition may have affected the groups differently. For this reason, difference scores of the two samples were compared in a *t* test. The data are shown in Table 6. The variances are homogeneous. There is no significant difference in intra-trial inhibition of performance speed between the experimental and control groups.

From these analyses, it appears that the inhibitory effects occurring near the completion of the task were not influenced by the frustration and reward conditions. Slower speed on the second half of the

FIGURE 9

Mean half-trial performance speeds for trials 4-8 with respect to age

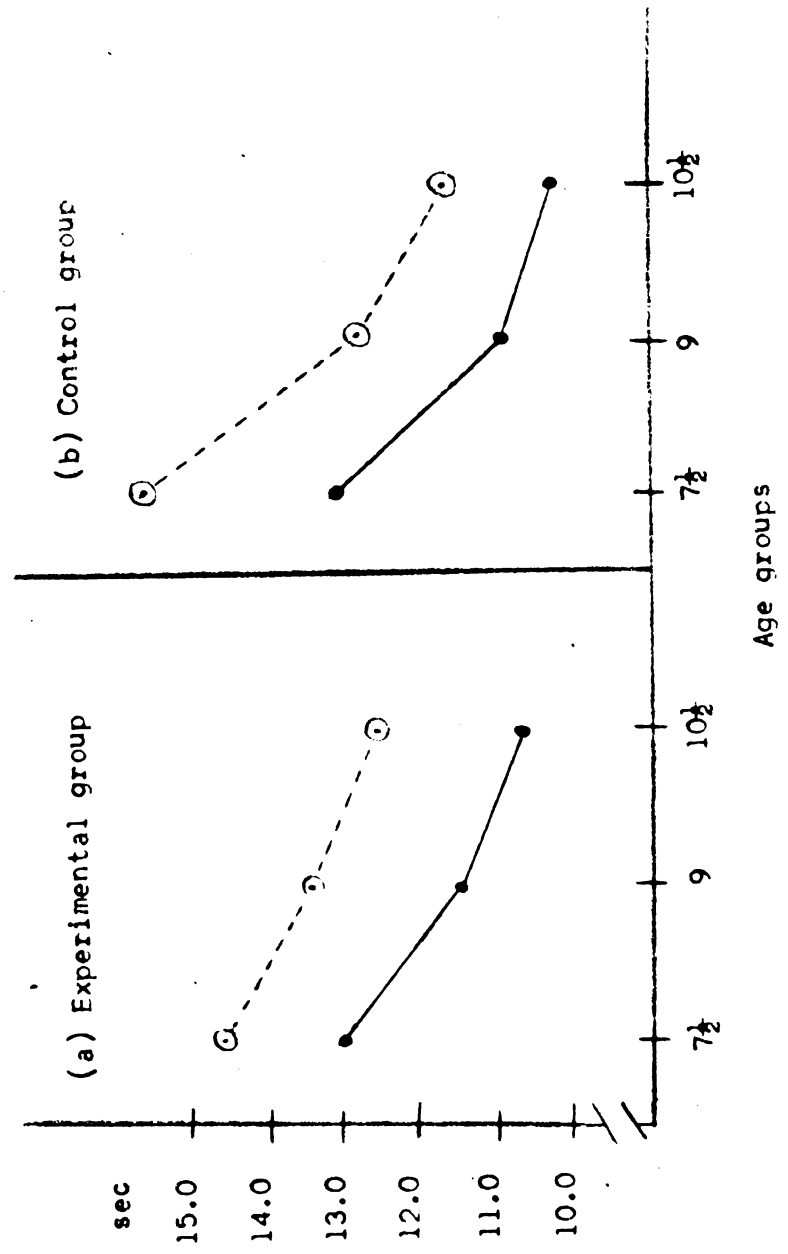


Table 6

t test of half-trial time differences of experimental and control groups

	Group	
	Experimental	Control
Mean	8.80	9.06
Variance	32.7	25.4
n	72	36
t = .24	n.s. for df 106	

trial appears to be a temporary form of inhibition, as trial periods were distributed.

Inquiry 3: Does the introduction of success after frustration have an inhibiting or facilitating effect on motor performance?

As success was introduced after frustration during the 9th trial for the experimental group and during the 14th trial for the control group, an analysis of motor performance was considered during each of these periods.

A. Success with extensive history of frustration

Performance speed

If success following a long history of frustration either inhibited or facilitated performance speed, we'd expect to find differences in going from trials 9 to 10. In Table 7 appears a tabular comparison of changes in performance speed for the experimental and control groups during these trials.

Table 7

Post-success speed changes from trials 9 to 10

Group	Increase	Not increase	Totals
Experimental	39	33	72
Control	18	18	36
Totals	57	51	
	X^2 = .042	n.s.	

Note - - No change in 4 experimental & 1 control Ss.

The resulting X^2 is not significant. Therefore, when conditions change from (extensive) frustration to success, performance speed does not appear to be reliably different from performance speed under continued success.

Amplitude

Inhibitory or facilitative effects of success upon amplitude would be anticipated by amplitude changes from trials 8 to 9. Tabulation of changes in amplitude during this period for the experimental and control groups is presented in Table 8.

Table 8

Post-success amplitude changes from trials 8 to 9

Group	Increase	Not increase	Totals
Experimental	42	30	72
Control	16	20	36
Totals	58	50	

X^2 = 1.41 n.s.

Note - - No change in 8 experimental & 5 control Ss.

The resulting X^2 is not significant, indicating that with the introduction of success after (extensive) frustration, there was no reliable change in amplitude scores from those given success all along.

B. Success with extensive history of success

Performance speed

If success following frustration and an extended period of success either inhibited or facilitated performance speed, we'd expect to find differences in going from trial 14 to 15 among the controls. To test such effect, difference scores were obtained by subtracting each individual's performance speed on trial 15 from his speed on trial 14. The mean difference score was .823 seconds; its standard error, .367 sec. The t of 2.30 is significant at the 5% level (df 35), indicating performance speed on trial 15 was reliably faster.

Amplitude

Changes in amplitude from trials 13 to 14 would reveal facilitation or inhibition effects of success after frustration among the controls. Individual changes in amplitude during these trials were recorded in a sign test analysis. A z of 2.33 is significant at the 5% level, indicating a greater than chance number of subjects increased in amplitude after success. Hence, amplitude scores were reliably facilitated.

In summary, the introduction of success subsequent to frustration had no demonstrable effect on motor performance after a considerable degree of frustration, but after a long history of success (and a limited amount of frustration), had a facilitative effect on motor performance.

Inquiry 4: After a series of trials, does changing from success to frustration have a facilitating or inhibiting effect on motor performance and how do such effects compare with early trial frustration?

Both the experimental and control groups had changed from success to frustration conditions between the 10th and 11th trials, with the former group having been subjected to prior furstration and the latter having no history of experimental frustration.

Performance speed

A. Late trial frustration

Any inhibitory or facilitative effects of frustration upon performance speed would be expected in speed changes subsequent to the 11th trial. To measure individual changes in performance speed from success to frustration conditions, the mean time[1] on trials 12 and 13 were subtracted from the mean of trials 10 and 11. A positive difference was interpreted as a facilitative effect on performance speed.

For the experimental group, the mean time difference (trials 11 and 12 less 10 and 11) was $\neq$ .053 seconds; its standard error, .379 sec. The resulting t of .139 is not significant (df-71). Thus, in changing from success to frustration among children with a prior history of frustration, there was no demonstrable change in performance speed.

For the control group, the mean time difference was $\neq$ 1.708 seconds; its standard error, .516 sec. The resultant t of 3.31 is highly significant at the 1% level (df 35). Since there is a reliable improvement in speed scores, the introduction of failure after a

[1] Throughout this inquiry, time chosen was that of the second half-trial in view of the sensitivity of the measure.

sizeable history of success had a facilitative effect upon performance speed. However, when frustration was re-introduced after a series of frustration trials, and a minimum of success, there seemed to be no noticeable effect on performance speed.

B. Early and late trial frustration

The results of Inquiry 1a imply that early trial frustration had an immediate facilitative effect upon performance speed of the $7\frac{1}{2}$-year-olds in contrast with an inhibiting effect on the older group. In this connection, concern arose whether the initial effects of early trial frustration were similar to late trial frustration for these age groupings. For example, among the $7\frac{1}{2}$-year-olds, is the improvement in performance speed noted in early trial frustration the same magnitude as for late trial frustration, independent of the history of frustration? Any comparison of early and later frustration effects involves comparing performance speed during early practice periods and late practice periods where different learning effects may be present. In order to cancel out differential learning effects, performance just prior to frustration was compared with performance just after frustration. Thus, it was possible to determine approximately the degree to which performance varied with frustration without contamination from learning effects. Such performance changes found in early trial frustration were then compared with those found in later trial frustration.

The change in performance in the early trials was obtained by subtracting the average performance of the two trials immediately following frustration (trials 3 to 4 and 4 to 5) from the performance on the pre-frustration trial (2 to 3). Change in performance during the late

trials was obtained by using similar computations in comparing post-frustration period (trials 11 to 12 and 12 to 13) with the pre-frustration period (trial 10 to 11). A positive score implied inhibition of performance; a negative score was indicative of a facilitative change (acceleration). Admittedly, this method might not be the most direct means of comparing early and late trial frustration effects; however, it appeared to be the best means available with the present design.

With the $7\frac{1}{2}$-year-olds, a *t* test was made between the mean changes in early trial period and changes found in the late trial period (Table 9). A *t* of 1.16 suggests that a facilitative effect with late furstration trials is not significantly greater than with early trial frustration among $7\frac{1}{2}$-year-olds.

Table 9

t test between early and late trial mean changes in learning rate of $7\frac{1}{2}$-yr.-olds with initial frustration

	Group	
	Experimental Early trial change	Control Late trial change
Mean	-.433	-1.667
Variance	5.239	10.928
n	24	12
t = 1.16	n.s. for *df* 34	

Similarly, with the combined 9- and $10\frac{1}{2}$-year-old groups, early and late trial changes were compared in a *t* test (Table 10).

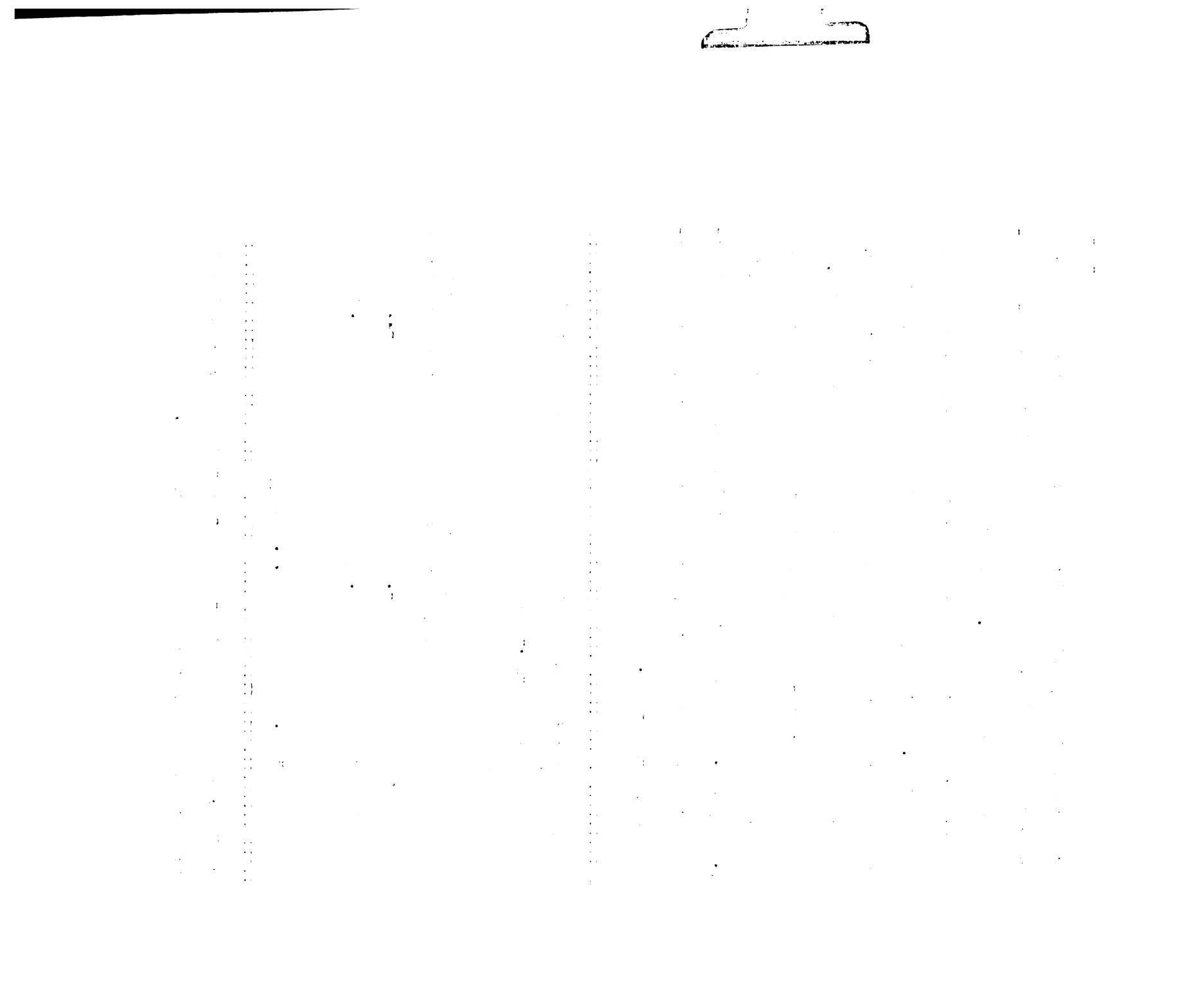


Table 10

t test between early and late trial mean changes in learning rate of 9- and $10\frac{1}{2}$-yr.-olds with initial frustration

	Group	
	Experimental Early trial change	Control Late trial change
Mean	+ .363	- .533
Variance	2.272	2.604
n	48	24
$t = 2.27$	$p < .05$ for df 70	

The t is significant, indicating a reliable improvement in performance from early to late trial frustration periods among the older children. Thus, when the older children had a more extensive history of success, frustration resulted in facilitation of performance speed, as was evident in the $7\frac{1}{2}$-year-old group, both for early and late frustration.

Amplitude

Facilitative or inhibitory effects of later period frustration upon amplitude would be evident in changes in amplitude scores from the 10th to 11th trials.

To test the frustration effects in the experimental group, the changes in amplitude scores between these trials were tabulated. A sign test reveals a reliable decrease in amplitude scores between these trials ($z = 2.95$, $p < .01$). The same procedure was followed for the controls. There is also a reliable decrease in the amplitude scores of the control group which was also frustrated at this point ($z = 2.50$, $p < .02$).

Although both groups show a decrement in amplitude, frustration may have affected the groups differently. Therefore, the change in amplitude of the experimental group was compared with the change of the controls in a $\underline{X}^2$ analysis (Table 11).

Table 11

Amplitude change from trials 10 to 11

Group	Increase	Not increase	Totals
Experimental	18	54	72
Control	7	29	36
Totals	25	83	

$X^2_{Yates} = .021$ n.s.

Note - - No change in 10 experimental and 2 control Ss.

The resulting analysis indicates inhibitory effects upon amplitude are not significantly different between the experimental and control groups.

The foregoing computations reveal inhibitory effects on the amplitude of the extra-task response when conditions changed from success to frustration; however, the inhibitory effects appear to be relatively independent of prior history of frustration or success.

Inquiry 5: Are inhibitory or facilitative effects of frustration on the amplitude of extra-task responses dependent upon the age of the child?

As the McDonough investigation suggested inhibitory effects of frustration on amplitude increased from the $7\frac{1}{2}$- to 9-year-old groups, this inquiry is directed at examination of the amplitude reaction among the same age children and older. Similar to the procedure of the McDonough study, sequential trial comparisons of pre- and post-frustration behavior were considered.

Initial frustration effect

To test for possible age variations with initial introduction of frustration, amplitude scores on trial 2 were compared with amplitude scores on trial 3, for each age group ($7\frac{1}{2}$, 9, and $10\frac{1}{2}$) of the experimental sample. The Ss who increased and those who decreased or had the same amplitude scores during these trials were tabulated and broken down into age groupings for a $\underline{X}^2$ analysis. The data appear in Table 12.

Table 12

Initial amplitude change from trials 2 to 3 according to age groupings

	Age $7\frac{1}{2}$	9	$10\frac{1}{2}$	Totals
Increase	5	8	7	20
Not increase	19	16	17	52
Totals	24	24	24	

$X^2 = .43$ n.s. (df 2)

There is no significant relationship between age groups and (facilita-

tive or inhibitory) changes in amplitude with initial frustration.

Cumulative frustration effects

To test age as a variable under a series of frustation trials, the mean of the Ss' amplitude scores on trials 1 and 2 was compared with the mean scores over trials 3 to 8 for each age grouping. Those Ss who increased and those who decreased or had the same mean amplitude scores during the trials in question were tabulated at each age level in a X^2 analysis. The data are presented in Table 13.

Table 13

Cumulative amplitude change from trials 1-2 to 3-8 according to age groupings

	Age $7\frac{1}{2}$	9	$10\frac{1}{2}$	Totals
Increase	9	12	8	29
Not increase	15	12	16	43
Totals	24	24	24	

$X^2 = 1.50$ n.s. (df 2)

There is no significant difference between the age levels regarding (facilitative or inhibitory) changes in amplitude with cumulative frustration.

From these analyses, it appears that facilitative or inhibitory effects of frustration, initial or cumulative, on amplitude were not influenced by the age variables under consideration.

Inquiry 6: Do children showing changes in motor performance under frustration, display corresponding changes in their aggressive fantasy?

The first step in analyzing this inquiry was a comparison of the degree of aggressive fantasy with performance measures of amplitude, and speed among the experimental Ss during frustration trials. The cumulative performance speed of each individual was correlated with aggressive fantasy scores, resulting in an r of .01. Using the cumulative amplitude scores, the correlation of these measures is .01. Thus, there appears to be little relationship between aggressive fantasy and inhibiting or facilitating effects on motor performance during frustration.

Aggressive fantasy was also related to inter-trial amplitude changes with frustration. Amplitude change scores were obtained by subtracting the mean of the individual's cumulative ampltiude score (trials 3 to 8) from the mean of pre-frustration trials 1 and 2: the higher the score, the greater the inhibition. These scores were then correlated with aggressive fantasy. An r of -.221 (n.s. for df 70) was obtained, suggesting only a mild negative relation between individual inhibition in amplitude and intensity of aggressive fantasy.

To further explore the relationship between aggressive fantasy and motor performance, a comparison of these variables during success conditions was attempted. First, the control group's motor performance was computed for successful trials 3 to 8, the resulting scores essentially measuring cumulative speed and cumulative amplitude. These scores were then correlated with aggressive fantasy. An r of -.208 (n.s. for df 34) between cumulative speed and aggressive fantasy was obtained; and between cumulative amplitude and aggressive fantasy, an r of .213. Though not significant, there is a slight tendency for

faster performance speed and greater amplitude to be associated with greater aggressive fantasy among successful children.

In conclusion, no demonstrable relationship was found between inhibition or facilitation of motor performance of children subjected to frustration and their aggressive fantasy under the present experimental procedures.

Inquiry 7: Is there greater aggressive fantasy among children subjected to frustration than those subjected to success?

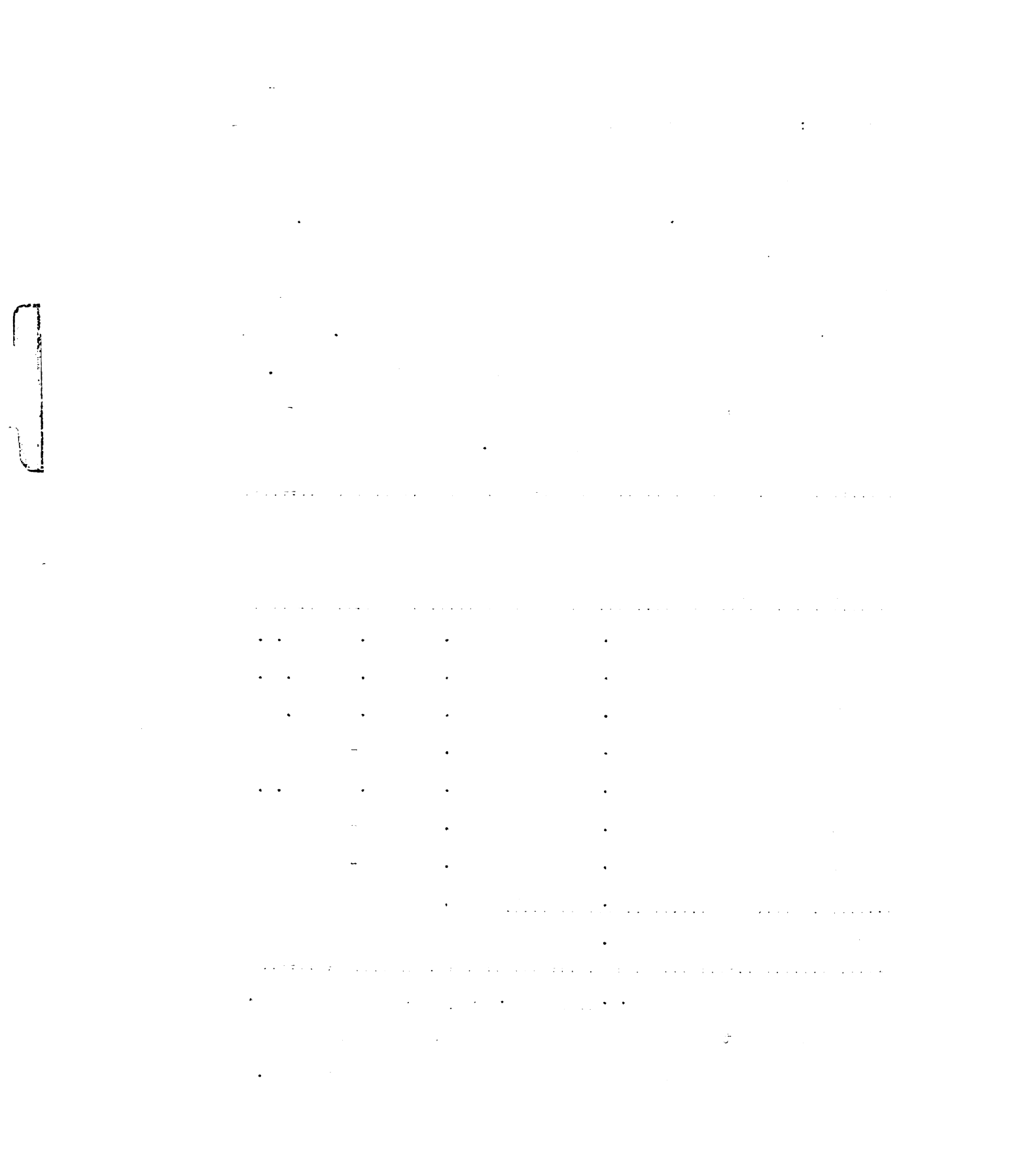
A comparison of the mean aggression scores of the experimental and control groups (Fig. 5a) reveals a somewhat complex picture. There does appear to be an interaction effect between conditions and age (younger experimental children showing greater aggressive fantasy, whereas, the oldest group showing less than their controls). However, the data were not suitable for direct analysis of such interaction. On the other hand, a 2x2x3 analysis of variance with conditions-sex-age classification was possible (Table 14).

Table 14

Analysis of variance of aggression scores with respect to conditions, sex & age classification

Source of variation	SS	df	MS	F	P
Between conditions	1.90	1	1.90	1.21	n.s.
Sex	3.08	1	3.08	1.97	n. s.
Age	14.51	2	7.26	4.63	.05
SxC	.04	1	.04	-	
AxC	3.52	2	1.76	1.12	n.s.
AxS	1.02	2	.51	-	
AxSxC	.52	4	.13	-	
Within	147.30	94	1.567		
Total	171.89	107			

Variances are homogeneous (n.s. F_{max} of 8.34, df 11, with 12 groups). As the main conditions effect is not significant, aggressive fantasy between the experimental and control groups did not differ reliably.



Interaction between conditions and age is also not significant. Therefore, we could not conclude the presence or absence of frustration had a differential effect on the various age groups with respect to aggressive fantasy.

In general, our results did not show substantially greater aggressive fantasy in children having frustration from those having success. None the less, differences in aggressive fantasy between various age groups were evident.

Inquiry 8: a Is there a difference in boys' and girls' aggressive fantasy following frustration?

Observation of the mean aggression scores of the experimental groups of boys and girls with respect to age (Fig. 5b) suggests a greater degree of aggressive fantasy among the boys. A 2x3 analysis of variance (n.s. F_{max} of 3.94, df 11 with 6 groups) of aggression with respect to age and sex classification was computed to test sex differences (Table 15).

Table 15

Analysis of variance of experimental group's aggression scores with respect to sex & age

Source of variation	SS	df	MS	F	P
Between sex	1.76	1	1.76	1.09	n.s.
Age	12.00	2	6.00	3.71	.05
SxA	1.39	2	.70	-	
Within	106.78	66	1. 62		
Total	121.93	71			

No significant difference between male and female children was found, yet aggression scores seemed to vary significantly between age groups. Although boys tended to show more aggression than girls, there were no conclusive sex differences in aggressive fantasy among children under frustration conditions.

Inquiry 8: b Is there a difference in boys' and girls' aggressive fantasy following success?

Observation of the mean aggression scores of the control groups of boys and girls with respect to age (Fig. 5c) again intimates greater aggressive fantasy in boys. A 2x3 analysis of variance of the control group's aggression scores with respect to sex and age was attempted (Table 16).

Table 16

Analysis of variance of control group's aggression scores with respect to sex & age

Source of variation	SS	df	MS	F	P
Between sex	1.36	1	1.36	1.01	n.s.
Age	6.03	2	3.02	2.24	n.s.
SxA	.15	2	.08	-	
Within	40.52	30	1.35		
Total	48.06	35			

Variances are homogeneous (n.s. F_{max} of 8.23, df 5, with6groups). No significant difference was found between sexes, indicating no definitive sex differences in aggressive fantasy among children having just success conditions. Further, as was found in the aforementioned 2x2x3 analysis of variance, no reliable sex differences in aggressive fantasy exists over the entire sample (Table 14).

DISCUSSION

The present investigation was designed to examine response patterns of middle class children subjected to task frustration. Specific frustration effects were evident in consistent inhibition of the amplitude of the extra-task response and in either increased or decreased performance speed, depending upon the locus and sequence of frustration and the age of the child. Little or no frustration effect was evident in aggressive fantasy. Changes in the experimental conditions (frustration and success) and the sex of the child were also related to the amplitude of the extra-task response.

An important finding of this study seemed to be that the effect of frustration on performance speed was dependent upon whether frustration was introduced early or late in training (i.e. after two successes or after ten successes). There was a clear-cut facilitative effect following frustration after ten success, including the older children (9 and $10\frac{1}{2}$ years), who, if anything, were inhibited after only two successes. Apparently, it is necessary to establish habit patterns to the task or expectations of success (via continued reinforcement) before a change to frustration conditions yields a facilitating effect on task performance. That under late trial frustration an incremental effect was found on task performance appears to be in accord with research suggesting energizing effects of frustration (Marx, 1956; Spence, 1956; Amsel, 1958). On the other hand, as will be pointed out later, the assumption of a generalized drive effect of frustration, as energizing all response classes (Spence, 1956), was not supported by the data.

The importance of expectancy patterns was also evident in Abel's (1936) study. In an investigation of sensori-motor learning of children, she found that the absence or presence of rewards, from the initial trial on, had no differential effect on the rate of learning. However, when a new incentive was introduced after a series of learning trials, better learning was evident. In comparison with present findings, it appears then, that whenever a new condition (reward in the Abel study, frustration in the present study) is introduced for the first time after a series of trials, a facilitative effect is present in children's performance. From the above findings and interpretations, the effectiveness of late trial frustration appears to have important implications for procedures in future research.

A provocative finding was that frustration had an inhibiting effect on the amplitude of the extra-task response. The same findings were obtained in the forerunner of the present study by McDonough (1958), using similar procedures, the same apparatus, and children the same age and younger. Thus, the effect appears stable. This inhibitory effect led to the examination of the nature of the extra-task response. Temporally, the extra-task response is not within, but outside, the start and end phases of the instrumental response sequence of placing the marbles. Further, this response is only minimally related to such instrumental behavior via instructions. Therefore, one might conclude that the energizing effects of frustration occur only to the instrumental response sequence. Although frustration had an energizing effect on the extra-task response in the Haner and Brown (1955) study, it is possible to infer that their plunger response was more integral to the

instrumental chain or, at least, had a more instrumental quality. In their study, pushing the plunger turned off a (possibly noxious) buzzer, which had signalled the dropping of the marbles. Stating the above more simply, one could say that in the present study, the "unnecessary" plunger response is partially by-passed, after failure on the preceding trial, in the child's eagerness to fill the board on the next chance. This particular finding and interpretation are clearly contradictory to Spence's (1956) position in maintaining that all response classes are activated by frustration. To check on the above, one could use the following research design: Instead of having the plunger response outside the instrumental response sequence, embed it directly into the response chain, by having S hit the plunger each time a row of six marbles is completed. Under these conditions, it is likely that amplitude would be facilitated by frustration.

The amplitude measure also showed that boys hit the plunger harder than girls for all age groups studied. Although Methany (1941) and Meredith (1935), who measured manual strength directly, have pointed out greater physical strength in boys, this would appear to be too simple an explanation. An indication that amplitude is not a direct measure of physical strength is that, with increasing age, there was no noticeable increase in amplitude. Older children, due to maturation, are stronger (Methany, 1941; Jokl & Cluver, 1941) and could hit harder if strength were an important variable. The fact that physical expression is probably discouraged for girls more aptly accounts for the less vigorous amplitude response among the girls.

It was found that the initial effects of frustration facilitated

performance speed in younger children ($7\frac{1}{2}$ years) and inhibited performance speed of the older children (9 and $10\frac{1}{2}$ years); this differential effect was not as apparent after a series of frustration trials. Here an adequate explanation is not obvious. The older children may be more aware of the ramifications of not succeeding than younger children are and, thereby, may have become discouraged by their performance. Some evidence that failure may be more meaningful for the older child was revealed in Sanford's (1946) research on the recall of completed and uncompleted tasks. He found that younger children (under 10) tended to remember successful tasks, whereas there was an increasing tendency for older children to remember failures. Further, the effects found in the present study were most noticeable immediately after the introduction of frustration, reflecting the momentary effects of frustration (Lawson & Marx, 1958). It appears that some form of adaptations takes place after a series of frustration trials.

If inhibitory or facilitative effects of frustration upon motor responses are related to the intensity of aggressive fantasy, it was not evident with the procedures used in this study. It may be that frustration procedures were too mild, or as discussed earlier, were introduced too early in the task experience to have any noticeable effect upon aggressive fantasy. Since it was observed in the success group that the speed of performance and vigor of the amplitude response were minimally and positively associated with the intensity of aggressive fantasy, one might explore further how individual response patterns or motivational states may influence the above response measures.

Although aggressive fantasy was to some extent more pronounced among

children under frustration conditions than among those under success conditions as found by Bellak (1954), Shakow et al (1945), Yarrow (1948), failure to find sizeable differences between these groups may also be related to the experimental procedure or possibly to the nature of the measure itself.

Although an increase in aggressive fantasy was found from the $7\frac{1}{2}$ to 9 year groups, the implications of this result are not clear. The finding seems to agree with Ames et al (1952), in their account of increasing aggression to Rorschach stimuli from the 7 to 9 year level. On the other hand, Halpern (1953) noted the opposite pattern in studying Rorschach responses and Rosensweig (1948) found a decrease in extrapunative responses during these ages. It seems feasible that the above findings are obscured by different methods of measuring aggressive fantasy. It also is possible that different forms of aggression, as suggested in Rosensweig's research, do not show similar changes with increasing age.

SUMMARY

The present study was an attempt to determine certain response effects of frustration in children, namely, whether frustration had a facilitative or inhibitory effect upon motor performance and if any change in these reactions related to aggressive fantasy. Temporal sequence and locus of frustration, proximity of frustration, and the nature of the response class affected were important areas of investigation.

The response effects were studied in 108 middle class children. The children were divided evenly according to sex and into three age groupings ($7\frac{1}{2}$ to 8, 9 to $9\frac{1}{2}$, and $10\frac{1}{2}$ to 11). An experimental group of seventy-two children was subjected to early trial and extensive frustration conditions, and a control group of thirty-six children were subjected to late trial frustration conditions. Intentional (though non-arbitrary) interruption on a marble-board task constituted a frustration trial. Success conditions involved allowing task completion and the giving of rewards. The experimental group was subjected to the following trial conditions: two success, six frustration, two success, three frustration, and two success. The control group was similar to the above, receiving six success trials instead of six frustration trials. After the six trials in question, both groups were asked to respond to a series of incomplete stories, intended to elicit aggressive fantasy. The response variables under consideration were speed of motor performance on the task, force of a gross motor response immediately following the task, and, degree of aggressive fantasy following the series of frustra-

tion trials.

A major finding was that, with late-trial frustration, and continued prior success, there was a clear-cut facilitative effect on performance speed, which was not uniformly noted with early trial frustration. This result was interpreted in line with reinforcement and expectancy principles. Another major result was that frustration effects were evident in consistent inhibition of the extra-task response. The inhibition of this response, together with facilitation of performance speed, indicate that specific effects of frustration depend on the response class being measured. It was suggested that, at least, certain examples of frustration may activate relevant, instrumental responses and at the same time depress irrelevant, non-instrumental responses.

To ascertain the effects of frustration close to the task goal, proximity of frustration, both early and late trial speeds were compared. A slowing up of motor performance was found near the completion of the task. This effect, however, was independent of frustration conditions and appeared to reflect fatigue effects inherent in the task.

The effects of frustration upon motor performance were unrelated to aggressive fantasy under the present experimental procedures.

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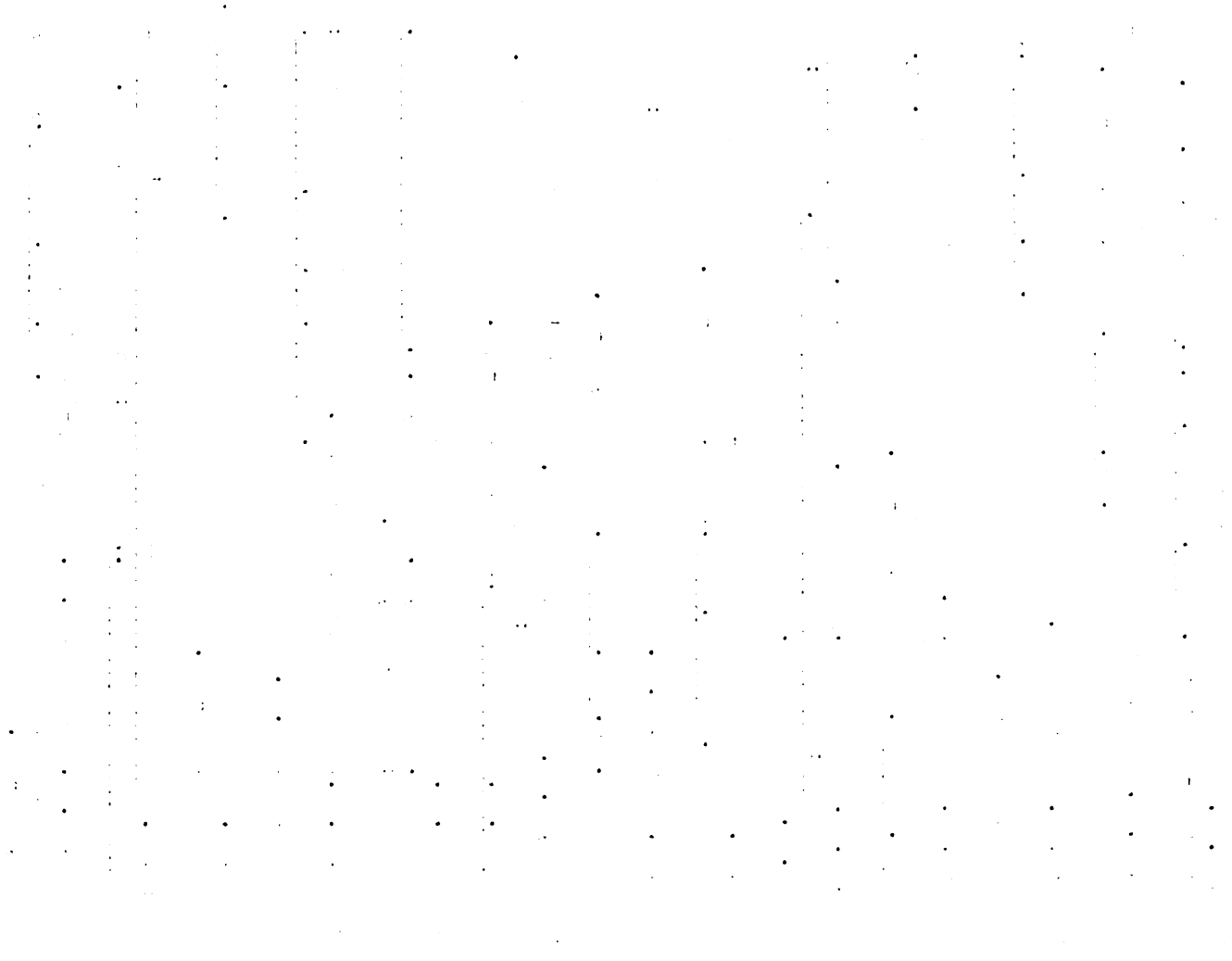

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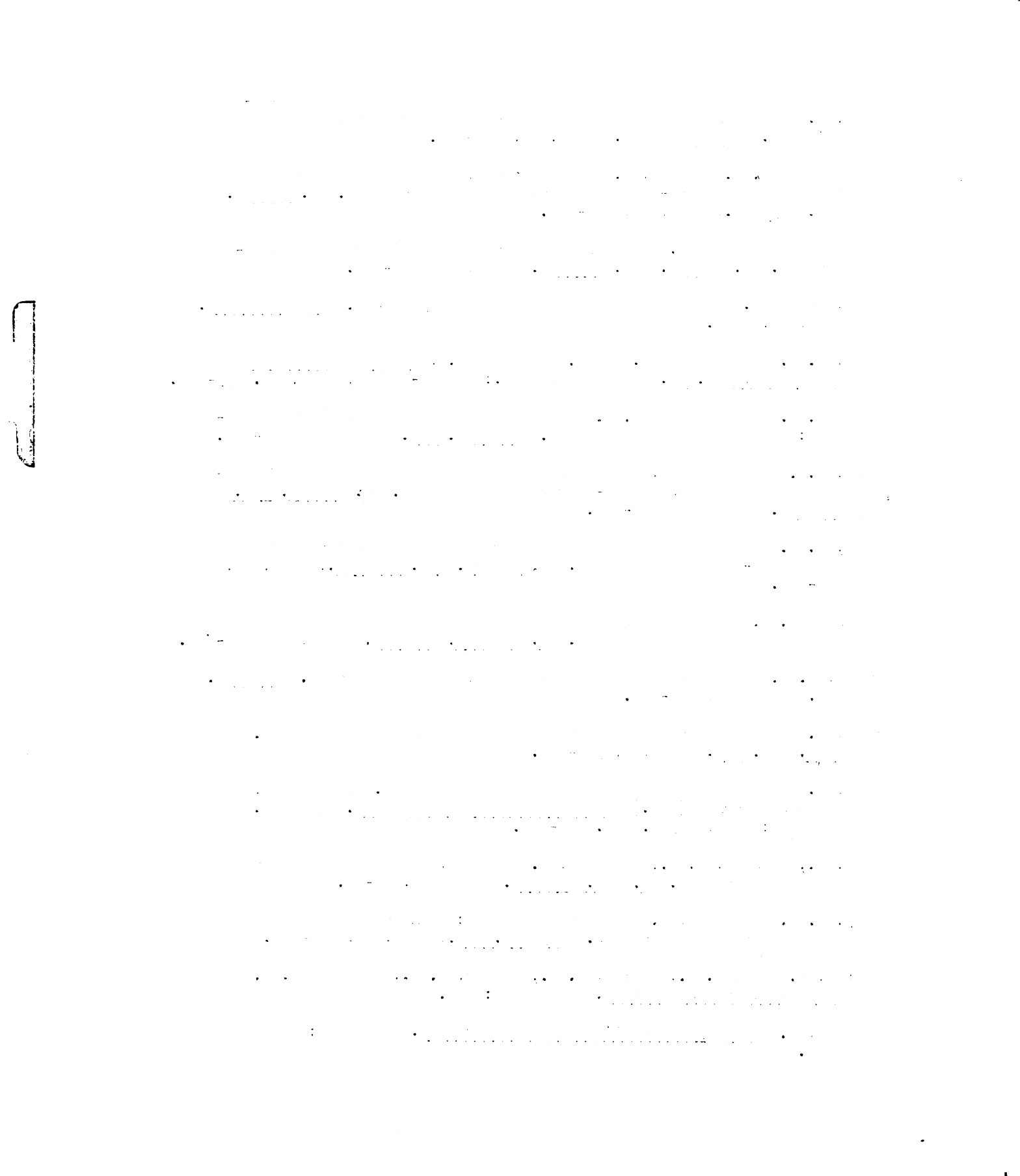

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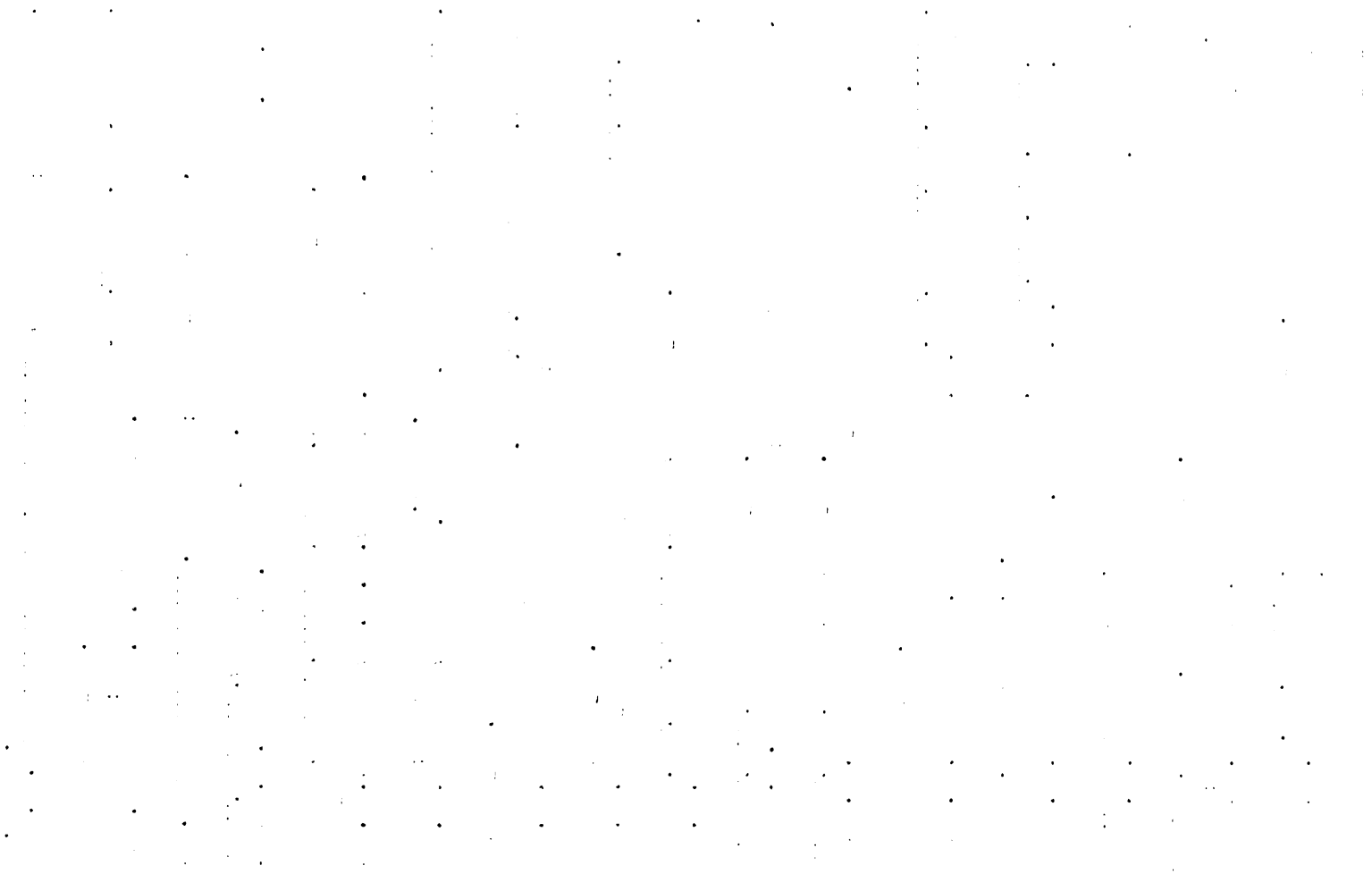

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APPENDIX I

Incomplete stories

1. Jim and Bill (Joan and Dorothy) were at a picnic by a lake. All of a sudden, Jim (Joan) took Bill's (Dorothy's) ball and threw it into the lake. What does Bill (Dorothy) feel like doing when his (her) ball is thrown into the lake?

2. A boy (girl) likes to go and play with his (her) friends in the street. His (her) mother says, "Put on your rubbers (boots) before you go out. It is wet outside." It is too much bother for the boy (girl) to put on rubbers (boots). He (she) does not like to do it at all. What does the boy (girl) feel like when his (her) mother tells him (her) he (she) must put them on?

3. A boy (girl) was having a good time putting together a puzzle. Just as he (she) was about to finish it, another child steps on it, and messes the puzzle up. What does the boy (girl) feel like doing when his (her) puzzle was ruined?

4. Some money was missing from the teacher's desk. The teacher asked a boy (girl) about the missing money. The teacher then told him (her) that she believed that he (she) took the money. But the boy (girl) knows that he (she) did not take the money. What does the boy (girl) feel like doing about the teacher saying he (she) did?

5. Larry and Joe (Joyce and Sandy) had permission to go together to the zoo. They had looked forward to going for a long time. On the day that they were supposed to go, Larry (Joyce) became sick and Joe (Sandy) could not go alone. What does Joe (Sandy) feel like doing about not going to the zoo?

6. A boy (girl) had a lot of fun making a mess in the living room. Mother tells him (her) to clean up before father comes home. But he (she) had so much fun making a mess. What does he (she) feel like doing when told to clean up?

7. A boy (girl) was reading a story in a comic book. Just as he (she) was at the end of the story, he (she) found that the last page was torn out of the book. What does the boy (girl) feel like doing when he (she) discovers that the page is missing?

8. A boy (girl) became angry with his (her) friend. His (her) mother and father think that the friend is right and scold him (her) for being so mean to his (her) friend. What does the boy (girl) feel like doing when his (her) mother and father do that?

9. One day, a boy (girl) did something naughty. His (her) friend saw him (her) and told so that he (she) was punished. How does the boy (girl) feel about his (her) friend for tattling on him (her)?

10. A boy (girl) was told that he (she) could not play with his (her) new hoop in the house. One rainy day, he (she) wanted to play very much with the hoop, but his (her) mother would not let him (her) as long as he (she) was in the house. What does the boy (girl) feel like doing now?

Filler stories

1a. A boy (girl) went out to a party with a friend and received a lot of prsents. As he (she) was looking over his (her) belongings, he (she) found that he (she) had a lot more than his (her) friend. What does he (she) feel like doing now?

9a. A boy (girl) was getting a special present for doing something for his parents. He (she) wondered what he (she) was going to get. When he (she) got the present, what does he (she) feel like doing?

APPENDIX II

Mean performance speed scores (in sec.)

Group	Trial 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7½yr.															
Exp.															
Girls	34.8	30.0	29.3	28.1	27.4	27.2	26.5	26.8	25.5.	25.6	25.8	26.1	25.7	26.4	25.7
Boys	34.4	28.8	28.8	28.4	26.9	28.1	27.8	27.9	28.8	27.7	27.3	29.3	28.7	27.9	26.8
Contr.															
Girls	33.5	30.2	28.7	28.9	28.5	27.8	27.6	27.4	27.9	28.2	28.0	27.6	27.0	26.2	25.0
Boys	36.9	31.9	28.7	29.0	29.9	28.5	29.9	26.4	25.5	26.5	27.7	24.2	25.8	28.5	27.1
9 yr.															
Exp.															
Girls	30.6	27.2	27.2	26.2	25.5	25.6	24.0	24.7	25.3	24.0	23.8	24.1	23.9	23.9	23.7
Boyd	28.4	26.5	25.4	25.3	24.2	25.5	25.1	24.0	24.3	23.1	23.5	22.9	23.8	22.0	22.5
Contr.															
Girls	28.5	24.8	23.8	23.6	25.0	23.3	24.7	23.0	23.2	22.3	22.8	23.1	22.4	23.4	23.2
Boys	28.5	27.4	25.3	24.1	23.3	22.3	23.6	22.6	22.9	22.7	21.6	21.3	21.4	21.1	20.6
10½yr.															
Exp.															
Girls	29.4	25.9	25.1	23.3	24.6	23.7	23.9	24.1	23.4	23.2	22.9	22.3	22.8	23.3	22.4
Boys	29.4	23.9	23.6	22.2	22.6	23.3	23.4	22.4	23.0	24.1	21.5	22.2	22.0	21.9	21.6
Contr.															
Girls	25.6	23.9	23.0	23.0	22.2	21.9	21.9	21.6	21.0	21.4	20.9	20.8	20.4	21.3	21.1
Boys	28.6	25.9	24.0	22.8	21.6	21.3	21.5	21.6	22.3	22.1	21.9	20.0	19.4	21.8	20.2

APPENDIX II

Mean amplitude scores

Group	Trial 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7½yr.															
Exp.															
Girls	1.72	1.62	1.32	1.40	1.41	1.23	1.31	1.20	1.58	1.57	1.71	2.29	1.50	1.90	1.63
Boys	2.66	3.67	1.95	2.54	3.37	3.23	2.73	2.99	3.62	4.10	2.74	2.93	2.77	4.03	3.35
Contr.															
Girls	1.62	1.32	1.78	2.45	2.38	2.33	2.03	3.00	2.20	1.75	1.47	1.70	1.95	2.78	2.52
Boys	3.62	5.13	6.18	5.75	5.00	5.18	6.02	4.88	5.57	4.42	2.75	3.06	4.58	5.77	5.02
9 yr.															
Exp.															
Girls	2.35	1.55	2.07	2.39	2.01	2.02	1.89	1.98	2.87	2.34	1.83	2.41	2.51	2.45	2.92
Boys	3.19	3.37	2.53	2.66	2.32	2.85	2.88	2.42	3.62	3.58	2.68	2.75	2.60	3.82	3.46
Contr.															
Girls	2.51	2.53	2.87	2.68	3.20	2.67	3.08	1.92	2.73	2.87	1.83	2.15	1.93	2.88	2.67
Boys	3.98	3.17	3.33	3.18	3.62	3.60	3.00	3.33	5.25	4.02	2.62	2.97	3.23	4.00	3.52
10½yr.															
Exp.															
Girls	3.41	2.53	2.05	2.51	2.11	2.34	2.60	2.54	2.56	3.21	2.74	2.69	2.53	2.78	2.66
Boys	4.00	4.08	3.33	3.32	3.17	3.33	3.99	3.99	4.23	5.13	4.01	3.25	4.13	5.07	4.54
Contr.															
Girls	1.67	1.65	2.27	1.72	1.04	0.87	0.79	2.25	1.73	2.00	1.53	1.67	1.90	2.33	2.03
Boys	3.06	3.20	4.28	3.33	3.60	3.43	3.20	3.58	4.23	4.32	2.40	3.32	2.87	2.83	4.13

APPENDIX II

Mean aggressive fantasy scores

	Age		
	7½	9	10½
Experimental group			
Girls	.88	1.98	1.15
Boys	1.10	2.00	1.83
Control group			
Girls	.58	1.00	1.46
Boys	.79	1.50	1.92