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THE EFFECTS OF LOCUS OF CONTROL, DEFENSIVENESS, AND LEVEL  
OF INSTIGATION ON AGGRESSIVE BEHAVIOR

By

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B.A., Montana State University, 1969

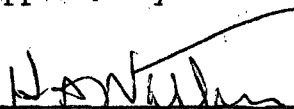
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Master of Arts

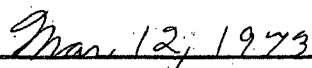
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## CHAPTER I

### INTRODUCTION

The present study considered the variables of locus of control of reinforcement (internal vs. external), level of defensiveness (defensive vs. non-defensive), and potency of instigation to aggression (personal frustration vs. attack). The effects of these three variables upon instrumental and non-instrumental aggression was investigated via the use of a Prisoner's Dilemma game. Before considering the particular emphasis of the proposed study, it would be useful to examine current research in the study of aggressive behavior.

Aggression has long been an important topic in personality research, and recently is becoming of even greater interest. Aggression leading to violence is currently a national problem which cannot be ignored, and an increasing number of researchers are putting their efforts together to study this problem. Two recent reviewers (Adelson, 1969; Sarason & Smith, 1971), have summarized the current research in this area. Sarason and Smith state:

One way of characterizing research on aggression is in terms of the effects of three classes of variables: 1. those resulting in increases in aggressive behavior; 2. those serving to inhibit aggression, and 3. individual difference variables as they effect aggressive behavior. (page 421)

Up to the present time the major thrust of research in aggression has focused on the first two approaches, i.e., studies exploring increases in aggressive behavior and studies examining inhibition of aggressive

responses. Relatively little research is being done on the third class -- that of individual difference variables. Adelson is critical of this omission:

There was a great deal of research on this topic in several genres. Much of the work is experimental, aggression lends itself well to experimental manipulation. The citing of so many studies in the laboratory may have produced a certain bias in the research, in that situational factors become, because of their manipulability, the center of interest. One would like to see more research on differences in disposition to aggression and the interactions between disposition and ambiance. . . (page 239).

The present tendency, then, clearly seems to be to study many of the environmental factors which appear to elicit or inhibit aggression, while ignoring the more stable individual difference variables, such as personality variables that may affect aggressive behavior. This study attempted to fill this void somewhat by examining the effects of one personality variable on aggressive behavior. The personality variable to be studied is Rotter's Internal-External Locus of Control construct (Rotter, 1966).

Since the major focus of the present research is on the effect of a personality variable on aggressive behavior, situational variables did not receive direct attention. Situational variables increasing or decreasing aggressive behavior will be reviewed later insofar as they affect the relationship between the locus of control variable and aggression (see Problem Focus for this treatment). The interested reader may wish to examine the following sources for a more extensive treatment of these situational variables: Baron and Liebert (1971); Goranson (1970).

At this point, a review of the research that has focused on dispositional variables affecting aggressive behavior will provide a background from which to evaluate the locus of control variable and aggression.

#### PERSONALITY VARIABLES AND AGGRESSIVE BEHAVIOR

There are numerous personality inventories available which are reported to measure the trait of hostility and aggression. That is, they attempt to assess the relative frequency of aggressive behaviors or hostile attitudes that are present in an individual. Some of the major ones are the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957), Overcontrolled and Undercontrolled Hostility (OC-UC) (Megargee, Cook, & Mendelson, 1967), and the Foulds-Caine Hostility Battery on Intropunitiveness and Extropunitiveness (Foulds, Caine, & Creasy, 1960).

The Buss-Durkee Hostility Inventory (BDHI) is comprised of eight subscales: assault, indirect irritability, negativism, resentment, suspicion, verbal and guilt. Using these subscales the authors attempt to measure various possible types of hostility and aggression. In the test construction each question was designed to load on one and only one subscale. The questions relate to specific behaviors and attitudes with the stimulus situations that arouse them being nearly universal; for example: "It makes my blood boil to have people make fun of me". The questions also assume that certain socially undesirable states exist and ask how these may be expressed; for example: "When I get mad, I say nasty things." A justification is also provided in the questions for the hostile behavior, with the intention of minimizing social desirability

response set. In general, the test covers a broad sampling of types of aggressive and hostile behavior. From the subscale totals a total hostility score may be obtained. Bendig (1962) has shown that a factor analysis of the subscales produces two general factors of hostility, which he identified as overt and covert hostility. The BDHI most typically is used as a dependent variable when a measure of hostility or aggression is needed. Very little experimental work, however, has been done relating scores on this test to overt aggressive behavior. Knott (1970) did find that high scorers significantly differed from low scorers on the number and intensity of shocks given to a stooge when the former had been angered. These results do suggest then, that high scorers on the BDHI will engage in aggressive behaviors more often than low scorers when frustrated.

Megargee (1966) demonstrated that two types of violent offenders could be differentiated as overcontrollers (OC) and undercontrollers (UC) of hostility. The OC is characterized as having rigid inhibitions against the overt expression of aggressive or hostile behavior. He typically has let his hostile feelings build up until they have reached murderous intensity. The UC, on the other hand is described as being impulsive, quick to anger and generally very aggressive. Megargee felt that he had demonstrated the validity of this OC-UC distinction when he obtained support for 22 of 28 hypotheses with 14 of these reaching some type of statistical significance (p values varying from .08 to .003). This evidence suggested that a substantial number of individuals who had committed violently assaultive crimes (including murder) were the OC type.

Those individuals who had committed moderately assaultive crimes were predominantly the UC type. Taylor (1967) found that UC's were significantly more aggressive than OC's when provoked by an aggressive opponent, at all levels of provocation. The OC's produced a negatively accelerated curve and the UC's produced a positively accelerated curve of aggression as a function of provocation. Comparing basal conductance rates, a measure of emotional tension, for the OC's and UC's and the control group (made up of subjects scoring low on both the UC and OC scale) produced interesting and unexpected results. The highest tension level was demonstrated by the control group, with UC's coming next and then OC's. The author concluded that this result was due to the high initial defensiveness of the control group. One wonders about the social desirability response set as a variable in this test. It appears that the control group subjects were hesitant to admit the symptoms described. The research with the OC and UC personality types seems to suggest that at least two very different types of people under different conditions will commit violent acts. There also seems to be evidence for the detrimental effect of chronically inhibiting aggressive expression, as well as undercontrolling aggressive impulses. More will be mentioned on this issue later in relation to the present study.

The Foulds, Caine Hostility Battery of Intropunitiveness and Extropunitiveness attempts to measure the extent an individual tends to express his hostility to himself as opposed to others. This test was found to correlate highly with the BDHI scale in a psychiatric population (Clark, 1970). Clark found  $r_a$  and  $r_b$  correlations of .84 ( $p < .001$ ) and

respectively. He concluded that the total score for these two tests can be usefully compared.

Blackburn (1972) seems to have conducted the most definitive study to date with regard to personality inventories of hostility and aggression. His findings were the result of a factor analysis on 17 scales of hostility and aggression. All of the scales mentioned above (the BDHI, the Caine-Foulds, and the OC-UC) were represented. He found two broad dimensions of aggressive response tendency which accounted for over 50% of the total variance. These factors were labeled Aggression and Hostility. Aggression was described as the tendency to be aroused to, and engage in behaviors injurious to others. This tendency was characterized by high positive loadings on assaultiveness, the urge to "act out", the tendency to be readily aroused to anger, impulsiveness, and by negative loadings on the denial of undesirable impulses and over-control or inhibition of aggressiveness. On the other hand, the factor of Hostility appeared to be characterized by negative attitudes toward the self or others. The high loadings centered around those scales which reflect negative evaluation of others and self, or the attribution of hostility to others (projected hostility). Contrary to prediction, Eysenck's introversion-extroversion dimension was not related to these two factors. It constituted a third factor. Introverts, it would seem, are as likely as extroverts to engage in aggressive behavior. This result is encouraging to the usefulness of these personality factors in view of the fact that neuroticism and introversion-extroversion account for a major portion of the variance in most omnibus personality inventories (Eysenck, 1960; Peterson, 1965). Foulds intropunitiveness-

extropunitiveness variable was found to be related to Bendig's Covert Hostility, and Eysenck's Neuroticism, but was not related to the general Aggression Factor. Blackburn concludes that concepts of hostility, neuroticism, and punitiveness appear to have identical referents, with the concept of punitiveness taking on meaning only in terms of the objects, self or other, that elicit hostile evaluations. In summary, the value of this study lies in its consistency with previous results that postulate two broad dimensions of hostility and aggression (Buss, Fisher & Simmons, 1962; Bendig, 1962). It may be concluded from this research that those who are characterized by negative hostile attitudes toward themselves and others do not necessarily engage in aggressive behavior. Conversely, those who have a tendency to injure others, or are overly concerned with inhibiting their aggression, do not necessarily have hostile attitudes toward others. Blackburn concluded his article with a comment on high loading ( $r = -.79$ ) of the MMPI Lie Scale on the Aggression factor. This high negative loading suggests that individuals with the tendency to deny unfavorable attributes in themselves will not behave aggressively. He connects this finding with that of Conn and Crowne (1964), who found that high need for approval subjects had difficulty in the recognition and overt expression of hostility. Assuming that high scorers on the lie scale are also highly approval motivated, a similar prediction may be made for low scorers on the Aggression dimension. This would be consistent with the notion that this dimension is concerned with aggressiveness versus overcontrol of inhibition of aggressiveness responses. Evidence for this assumption, however, is not given.

The Conn and Crowne study is representative of a different type of approach in studying personality in relation to aggression. It suggests that an independent personality variable (the approval motive) is related to the tendency to express aggressive or hostile behavior. In contrast, the studies mentioned above attempted to establish aggressiveness as a personality trait in itself.

The approval motive is conceptualized as a tendency to seek or need the approval of others to maintain a shaky self-concept (Crown and Marlowe, 1964). It is measured by the Marlow-Crown Social Desirability Scale (MCSD) Crown and Marlowe, 1964), a 33 item true and false test. Social desirability can be studied as a response set or as a personality variable measuring need for approval or defensiveness.

The proposed study will utilize the MCSD scale as a control for defensive scoring on the I-E scale.

The Conn and Crowne study mentioned above has shown evidence that high need for approval individuals will defend against hostility arousal by utilizing avoidant, repressive defenses. Low need for approval individuals are more able to express their anger. Schachter and Singer (1962) view all emotions as one state of physiological arousal which acquires its specific label through a cognitive evaluation of the situation in which the arousal has occurred. Utilizing this conception of emotion, they propose that the effect of defenses is to block in an individual the cognition which defines a threatening state of emotions. Therefore, the defense against hostility affects the verbal and symbolic cues available to the person, blocking the labeling of anger, yet leaving the individual in a state of arousal. With this defense operating, the individual feels



stirred up or anxious but is unable to explain why. Conn and Crowne found support for this conceptualization when high need for approval subjects became significantly more euphoric than either control or low need for approval subjects, after an anger manipulation. Low need for approval subjects were able to recognize and express their feelings of anger whereas high need for approval subjects were not able to express anger and jumped at the opportunity to give vent to their aroused state via euphoric behaviors. This study lends credence to the possible potential of using the MCSD as a measure of defensiveness inhibiting the expression of anger or hostility. Further supportive evidence was demonstrated by Taylor (1970) in a reaction time experiment. Under conditions of increasing attack, the low need for approval subject retaliated with significantly higher aggressive responses (shock intensity to the attacker) than either the control or high need for approval subject. This difference was not found at the highest levels of attack. Stuart concluded that low need for approval subjects were inappropriately aggressive at the lower levels of attack, but that this could be attributed to the low need for approval subject's efforts to "make the game interesting".

Schill, Thomas and Block (1969) made an attempt to relate Byrne's Repression-Sensitization Scale to the tendency to make an aggressive response. They found that the repression-sensitization variable was related to punitiveness (intropunitive-extropunitive) only when the MCSD scale was used to differentiate between defensive and nondefensive scorers. A previous study by Schill and Althoff (1969) had shown the MCSD scale to be effective in differentiating the "true repressor" from

the nondefensive subjects who score low because they really lack the pathology implied in the test. They concluded that since the need for approval measure of defensiveness accounted for most of the differences found, it was a better measure of the predisposition to approach or avoid making an aggressive response than was the repression-sensitization variable. A similar approach has proven to be effective in increasing the discriminating power of the Taylor Manifest Anxiety Scale on a digit symbol performance task (Boor and Schill, 1967). The predicted difference in performance was obtained only after defensive low anxious subjects were discarded. It would appear, then, that the MCSD scale is an effective device in detecting defensive scoring on personality inventories. This control for defensive scoring was used in the present study in an effort to increase the validity of the scores on the Internal-External Locus of Control scale and at the same time enhance its discriminating power.

This control seems necessary in view of recent studies pointing to the I-E scale's possible susceptibility to the social desirability response set. Rotter (1966) reported results which indicated that this scale was free of items loaded highly on social desirability. Strickland (1965) and Taylor and Jalowiec (1968) also found non-significant correlations between the I-E scale and the MCSD scale. However, Feather (1967) and Altrocchi, Palmer, Hellman and Davis (1968) found a significant relationship between I-E scores and the MCSD scale scores ( $r = -.42, p < .01$ , and  $r = -.34, p < .05$  respectively). A similar result was obtained by Joe (1972b) using a different technique. He had subjects rate the 23 internal and external forced choice items on their relative social

desirability. Using a chi-square technique, he found that 13 of the internal statements were judged as significantly more socially desirable than their corresponding external statements. This result was consistent with the Hjelle (1971) study which used a very similar rating system and found 15 of the 23 internal statements rated more socially desirable than the corresponding external items, with 11 of the items being significant at the .05 level of confidence. There is also some supportive evidence that an external attitude could be a defensive maneuver to avoid taking responsibility for one's failures. Davis (1971), for example, found that individuals who scored as externals could be usefully divided into congruent and incongruent categories by virtue of their behavior on an action-taking questionnaire. Those individuals who behaved as one would expect internals to behave were labeled incongruent (defensive), and those who behaved as one would expect externals to behave were labeled congruent. Davis found that defensive externals placed a significantly higher value on academic recognition than did congruent externals. Defensive externals also showed significant evidence of a greater discrepancy between actual academic achievement and expectancy for achievement than did the congruent externals.

Taken as a whole, the above research seems to indicate that the I-E control scale is not entirely free of the social desirability response set or other types of defensive test scoring, and therefore should benefit from the utilization of a control for defensiveness. For this reason, the present study used high and low scorers on the MCSD scale as a measure of defensive and non-defensive scoring on the I-E scale.

Thus far, the reader has surveyed the research on personality variables in relation to aggression. The one personality variable yet to be reviewed in relation to aggression is the internal-external control of reinforcement. The next section will introduce this construct and review the previous research that has been done relating this variable to aggressive behavior.

#### THE LOCUS OF CONTROL CONSTRUCT

Rotter (1966) has postulated that the acquisition and performance of certain behaviors are differentially affected by the manner in which an individual perceives the reinforcements that are shaping his behavior. When an individual perceives a reinforcement following a behavior as not entirely contingent upon that behavior, then, in our culture, he usually attributes the reinforcement to chance, luck or fate. Rotter has labeled this event the belief in external control (E). If the person perceives that the reinforcement is contingent upon his behavior then he is considered to have a belief in internal control (I). Drawing from his social learning theory (Rotter, 1954), Rotter further predicts that generalized expectancies will be formed about the nature of causal relationships between one's behavior and its outcomes. These generalized expectancies, in turn, should affect a broad spectrum of behavioral choices. In other words, a person with an expectancy that his behavior, in most situations, will be instrumental in controlling the reinforcements he receives, will behave very differently from a person who generally believes that reinforcements are out of his hands.

Studies in complex learning have provided support for the notion that individuals build up generalized expectancies for internal-external control. For instance, Phares (1957) found that there were significantly greater increments and decrements in certain behaviors following success and failure under skill instructions than under chance instructions. In other words, when subjects felt the task involved skill, reinforcements had a greater effect on raising or lowering expectancies for future reinforcements.

In another study James and Rotter (1958) looked at the extinction rate of verbal expectancies. Using an extrasensory perception type of task, James and Rotter instructed two groups that the task was entirely a matter of luck, while two additional groups were instructed that some people were very skilled at the task. 100% and 50% reinforcements were given during the training trials. The results showed interesting differences in extinction rates for the skill condition versus the chance condition. In the chance condition, the 50% reinforcement group took significantly longer to extinguish, but in the skill condition the 100% reinforcement group took significantly more trials to extinction than the 50% reinforcement group. These results were interpreted to indicate that under chance conditions, the subjects perceived the extinction trials as a change in situation for the 100% reinforcement group, but not for the 50% reinforcement group. When the percent of reinforcements were the highest in the skill condition, the subjects were the most resistant to accepting the fact that they no longer were able to do the task. This same result was replicated by Rotter, Liverant and Crowe (1961) in a more complicated study using 25, 50, 75 and 100% reinforcement. Bennion (1961)

found that he could replicate the results of the above Phares study by varying the variability of the reported scores to the subject. Variability of performance on a task, then, can be seen as the result of the subject's defining one of the possible conditions necessary for the perception of a task as being skill determined.

Through the development of scales measuring individual differences in expectancy for internal versus external control, a new personality variable was established utilizing a 26 item Likert type scale (Phares, 1957). Phares attempted to replicate the results he obtained with the skill and chance manipulations, by substituting subjects who scored high on external or internal control expectancies. Instead of having a skill and chance condition, he used subjects scoring high versus low on the I-E scale. As predicted, those who scored in the external direction behaved very similarly to those subjects who had received chance or luck instruction. That is, they tended to show a significantly wider range of shifts in expectancy for reinforcement, smaller increments and decrements in performance following success and failure and a lower frequency of shifts in expectancy for reinforcement than subjects who scored as internals. James (1957) followed with a revision of the Phares test and found low but significant correlations between internal-external test scores and behavior in the task situation, External subjects had significantly smaller increments and decrements of expectancy for reinforcement following success and failure, their behavior generalized significantly less from one task to another and they recovered significantly less following a period of extinction than did the internals. One may conclude from

this research that the construct of internal and external locus of control has some discriminant validity.

A great deal of research has been conducted relating this personality variable to its expected correlates. Consequently, much information on construct validity is available. For instance, it would seem a logical extension of the internal-external control notion that high achievement striving individuals would score more internal. Rotter (1966) states, however, that this relationship is somewhat limited by the fact that many achievement striving individuals will score as defensive externals. That is, they strive to achieve but take an external belief stance as a defense against failure. Despite this limitation, McGhee and Crandall (1968) reported that internals consistently attained higher course grades and achievement test scores than externals. His test results also indicated that a boy's belief that he is responsible for his own academic-intellectual failure may be a greater motivation for increased or continued academic effort than the positive anticipation of doing well. Coleman, Campbell, Hobson, McPartland, Mood, Wernfield and York (1966) reported that children of minority groups who showed a sense of control of their environment, had higher achievement motivated scores than those who did not have this sense of control. Furthermore, internal control was reported to be related to achievement for all minority groups except Oriental. Some relation, therefore, does seem to exist between I-E control and achievement motivation.

Internals seem to differ from externals in their attempts to control the environment. Seeman and Evans (1962) studied the attempts of people

to better their present life conditions; i.e., control their environment in important life situations. From this point of view, Seeman and Evans felt that the I-E scale measured the psychological equivalent to the sociological concept of alienation or powerlessness. He found that internals in a tuberculosis hospital know significantly more about their condition, questioned the doctors and nurses significantly more, and expressed significantly less satisfaction about the amount of feedback they were getting about their condition than did externals.

Seeman (1963) studied reformatory inmates for memory of different kinds of information. He found that, independent of intelligence, a significant correlation existed between internality-externality and the amount of information remembered about how long the reformatory was run, parole, and long range economic facts or information that might affect them after they left the reformatory.

Straits and Sechnest (1963) found that non-smokers were significantly more internal than smokers. He also reported that those who quit smoking after the Surgeon General's report and didn't return to smoking in a specified period were more internal than those who read the report and did not stop. This result seems to also indicate that the internal individual has more control over his own behavior than does the external.

Davis and Phares (1967) noted that internals made significantly more active attempts to seek information relevant to influencing the attitude of another person on the war in Vietnam. Phares (1965) found that internals were also significantly better at changing the initial attitudes of the other person than the externals. No attitude changes relative to a



control group were demonstrated in those individuals who had been influenced by external subjects.

Generally, then, we may describe the internal person as being more achievement oriented, more active in controlling his environment and influencing others and more able to control his own impulses. A more comprehensive review of the research bearing on the general construct validity of the I-E control variable may be found in Joe (1971), Rotter (1966), and Lefcourt (1966).

#### LOCUS OF CONTROL AND AGGRESSION

Recent research suggests that a possible relationship exists between the I-E control variable and aggressiveness or aggressive behavior. Williams and Vantress (1969) provide a rationale for E subjects being more hostile and aggressive than I subjects. Since frustration is considered by some theorists to be the cause of aggression (Buss, 1961; Dollard, Doob, Miller, Mowrer, & Sears, 1939), a person who experiences more frustration is more apt to be aggressive than a person who has experienced less frustration in the past. Minton's (1967) study relating E to the feeling of powerlessness and Talor and Janowiecs' (1968) study which indicated that E subjects perceive their mothers as manifesting authoritarian control and hostile rejecting tendencies are both offered as evidence that E subjects have experienced a lot of frustration in the past. Also, Rotter, Seeman and Liverant (1962) have shown a relationship between authoritarianism and E Control. Since authoritarianism and hostility have also been shown to be related (Siegel, 1956) it follows that E subjects should also be more hostile. Williams and Vantress offered partial

support for their argument by obtaining a small but significant correlation between the Buss-Durkee Hostility Inventory and the I-E scale ( $r = .27, p < .05$ ), with 5 of the 8 subscales demonstrating significant correlations. The highest loadings were on the resentment, suspicion, indirect, and irritability subscales; which seems to suggest that most of the hostility is covert or what Blackburn (1972) has termed the Hostility factor. Aarons (1969) lent further support to this relationship when he obtained a positive correlation between E and covert hostility, but no relationship between E and overt hostilities. He interpreted the lack of a positive correlation with overt hostility as the result of a greater tendency on the part of E subjects to inhibit the direct expression of hostility. Suggestive as these results might be, the correlations obtained are not large, and further support is needed from studies using behavioral measures of aggression.

There have been some studies using I-E control of reinforcement and behavioral measures of aggression. Davis and Mettee (1971) used a compliant measure of aggression in which the subjects were asked to set a level of aversive noise to themselves or to others subsequent to the experimental manipulations. They hypothesized that since I subjects believe they are responsible for their own outcomes, they should regard themselves as the appropriate target for aggression instigated by outcomes. Conversely, since E subjects believe external sources control their outcomes, they should view others as the appropriate target for aggression instigated by outcomes. Davis and Mettee further reasoned that since their individual aggressive tendencies would meet negative evaluations and social pressures from significant others, I subjects

would learn to inhibit aggression toward others. Outcome feedback information on a competitive reaction time task was conceived as a social cue which inhibits these natural tendencies to aggress. Should that feedback be removed or absent, the aggressive tendencies would be released. In accordance with their predictions Davis and Mettee found that under conditions of no success or failure feedback both I subjects and E subjects were significantly more aggressive to their appropriate targets; "self" for I subjects and "other" for E subjects. There were no significant differences found in levels of aggression for inappropriate targets or when outcome feedback was available. When success and failure outcome information was available, appropriate targets received a moderated level of aggression as compared to inappropriate targets when outcome information was available. Post-experimental levels of anger were found to be least for E subjects who had just aggressed to "other" in the no outcome information condition. Generally, those who set low noise levels were the most angry. This study would suggest that I subjects are more intropunitive and E subjects are more extropunitive, at least when aggression is elicited through compliance and in the absence of outcome information. One, however, may legitimately question the generalizability of results obtained from such a unique methodology. There also seems to be a theoretical difficulty in explaining the instigation to aggression in the no information condition. Davis and Mettee's basic assumption is that the aggression is instigated by the outcome of the performance task. But the no information condition expressly prevents the subjects from getting this outcome information. One

One seems to be hard pressed to explain how aggression to an appropriate target will occur when the procedure devised to release inhibitions also removes the stimulus to aggress.

Considering these difficulties, it is not surprising that somewhat contradictory results were found by Butterfield (1964) on a pencil and paper test of intro-punitive, extropunitive and constructive reactions to frustration. No correlation was found between I-E control of reinforcement and extropunitiveness ( $r = .14$ ,  $p < .20$ ). However, high correlations were found between E and intro-punitiveness ( $r = +.57$ ,  $p < .01$ ) and I and constructive solutions ( $r = -.86$ ,  $p < .01$ ). This result suggests that I subjects react to frustration with constructive responses and E subjects with intro-punitive responses. It seems difficult to reconcile the differences between these two studies without further research being done controlling for the methodological differences.

Skeel (1969) has also studied the I-E control variable in relationship to a behavioral measure of aggression. She used the Buss (1961) paradigm which utilizes an "Aggression Machine". The "Aggression Machine" is an apparatus devised by Buss (1961), with ten buttons supposedly representing increasing levels of shock. The subject is told that he is participating in an experiment on the effects of punishment on learning. In this study, Skeel instigated the aggression by having a confederate insult the subject before the learning experiment and shocks were given. This study was conceptualized as an attempt to resolve the contradiction found in studies relating persuasibility to aggression. Couch and Keniston (1960) had found a positive correlation ( $r = .43$ ,  $p < .01$ ) between the tendency to express overt aggression and the degree of acquiescence.

Roland (1963), on the other hand, found a negative relationship between persuasibility and overt aggression. Low persuasive subjects were significantly more aggressive than high persuasive subjects (mean difference = 2.77,  $p < .01$ ). Since Rotter (1966) had found I subjects more resistant to environmental control and E subjects more receptive to environmental control and easily influenced, Skeel felt that E subjects could also be considered more acquiescent and susceptible to persuasion than I subjects. Offering no rationale, Skeel predicted that E subjects would behave more aggressively than I subjects as measured by shock intensity, after being insulted by the recipient of the shock. Her results showed no significant differences between the two groups, with the obtained F values being less than 1. No explanation was offered for these findings other than that future studies might increase the intensity of the insult manipulation. Since her methodology wasn't stated explicitly nor any checks made of the effectiveness of the insult manipulation, one must question the adequacy of her procedure in instigating aggressive behavior.

Some indirect evidence points toward I subjects being more aggressive. Schill, Thomas and Block (1969), mentioned above, have found nondefensive repressors to be equal to sensitizers in aggressiveness as measured by high scores on extropunitiveness in a Rosensweig Picture Frustration Study. Altrocchi, Palmer, Hellmann, and Davis (1968) have demonstrated a significant positive correlation between I-E scores and the repressor-sensitizer variable ( $r = -.37$ ,  $p < .05$  for males;  $r = +.47$ ,  $p < .05$  for females). This suggests that I subjects have a tendency to be repressors. Since the

repressor variable relates to aggressiveness and I subjects score as repressors, than it seems to follow that the same nondefensive scorers on the I-E scale may also be more extropunitive.

In summary, the past research on the I-E control variable and aggression suggests a general relationship, but the area is fraught with inconsistent results and methodological weaknesses. Externalizers seem to be more hostile, at least covertly, than internalizers. Some evidence was found to suggest that the externalizers are more extropunitive and internalizers more intropunitive. However, there are some directly contradictory results and this research can be criticized for theoretical and methodological weaknesses. Another study found no relationship between I-E control and aggressiveness. Finally some indirect evidence may suggest internalizers are more aggressive.

The research up to date leaves the reader confused, and strongly suggests a need for a more systematic approach to this area of study. In response to this need, the next section re-examines the problem conceptually and theoretically in an attempt to reduce this confusion.

#### PROBLEM FOCUS

##### HOSTILE VS. INSTRUMENTAL AGGRESSION

It seems necessary at this juncture to consider the nature and function of aggressive behavior. As was mentioned earlier, most of the current research has focused on the variables inhibiting and eliciting aggression. The implication of this focus seems to be that aggression is always a negative undesirable behavior which must be controlled or

eliminated. Thus Berkowitz (1970) is led to comment about the hostility catharsis issue:

We are often told that people should express their hostile ideas and feelings; telling someone we hate him will supposedly purge pent up aggressive inclinations and will "clear the air" -- whatever this last cliché seems to mean. (page 5)

He is reflecting his findings that observed appropriate aggression is reinforcing and gratifying to an angry individual but also acts as a stimulus to further aggression. In other words, aggression, rather than being tension-reducing, acts as a reinforcement for additional aggressive behavior. It would appear that he does not recognize the possible maladaptive consequences of not expressing anger (Megargee, 1966). Very few researchers made distinction between appropriate versus inappropriate, or adaptive versus maladaptive aggression. Holt (1970) has taken researchers in aggression to task for avoiding this issue. The need for this distinction seems apparent. Ample evidence was stated above for the detrimental consequences of both undercontrolling and overcontrolling one's hostile and aggressive impulses.

Holt, utilizing mainly suggestions from clinical observations, has defined constructive and destructive aggression. Constructive aggression is described in the following manner:

An important underlying assumption and wish to the constructively angry person is to establish, restore or maintain a positive relationship with the other. He acts and speaks in a way as to give direct and genuine expression to his own feelings, while maintaining enough control so that their intensity is no greater than what is necessary to convey their true quality . . . (page 8-9)

Destructive expressions of anger on the other hand, are manifested when:

. . . the interpersonal situation is implicitly conceived of as a zero-sum game, which the angry person wants to win at any cost to the pre-existing or possible relationship. There seem to be more ways to express anger destructively than constructively: the enraged one may express himself in an entirely or primarily nonverbal way. For example: by physical attack . . . ; or with such overwhelming emphasis on the expression rather than the semantic use of words that the other hears primarily the screamed, sobbed hostility and misperceives the content . . . (page 9)

A close study of the above description suggests a distinction between the two modes of anger expression that is relevant to this study. Those displaying constructive anger seem to be able to behave when angered in a manner which is effective in making positive changes with regard to the source of their anger.

On the other hand, those displaying destructive aggression do not seem to have the consequences of aggression in mind, but rather focus on the desire to express a harmful or hostile emotion.

Taking less of a clinical point of view, Feshbach (1964) has made a similar distinction. In relation to intentional aggression, he distinguishes two different functions of aggressive acts: 1: Instrumental aggression, 2: Hostile aggression. Even though their behavioral expression may be identical, the goals of these two functions are quite different. Instrumental aggression is primarily directed toward the achievement of non-aggressive goals. Hostile aggression has as its primary goal the injury to an object or person or the "desire to hurt". When an individual is frustrated, attacked or otherwise instigated to anger, these functional differences are displayed in the intentionality of the aggressive acts and later in the catharsis of aggression. When angered, the hostile individual displays the intention to harm as his



principle goal. The hostile individual is therefore, rewarded when he gets the feedback of harm or pain from his victim. An individual who engages in instrumental aggression may harm an individual, but his primary motive is to attain the removal of the frustration or some other non-aggressive goal. This individual, therefore, is reinforced by the non-aggressive consequences of the action, not the victim's pain cues. If this distinction is valid, the observation mentioned above by Berkowitz that pain cues act as a stimulus for further aggression, should only hold for individuals predisposed to Hostile aggression. The individual engaging in instrumental aggression, on the other hand, should experience a catharsis of his anger after he has aggressed.

It seems conceptually reasonable to equate Feshback's Instrumental and Hostile aggression with Holt's Constructive and Destructive aggression. The only apparent qualification that needs to be made on this equality is that it is assumed that the non-aggressive goals intended by the instrumental aggressor are not inherently harmful to his victim. This dual function conception of aggression seems to offer the rationale needed to resolve the confusion currently found in I-E control and aggression literature.

One would predict that the internal person's generalized expectancy that his behavior will be instrumental in obtaining reinforcements would predispose him to engage more in instrumental or constructive aggression. Since he expects to be able to control a situation, and does engage in behaviors enabling him to gain control of his environment, he should be more apt to engage in instrumental types of aggression. Since he is able

to handle himself and others, anger should not manifest itself in hostile aggression. When frustrated or angered by someone, his expectancy to be in control of his reinforcements should enable him to choose a behavior which will alter that person's behavior.

The external person, on the other hand, has quite different expectancies and behaviors when frustrated. He feels powerless and helpless to control what happens to him. He expects that his reinforcements will be controlled by external sources like luck, fate, chance, etc. Not expecting to be able to control his environment, he is helpless and victimized when thwarted or frustrated. He does not expect to be in control of a situation but rather he expects that his reinforcements will come from some external source. He does not expect to handle a situation but rather expects to be handled by a situation. The externalizer, then, would be expected to be incapable of dealing with many of his frustrations constructively. Just as was predicted in some of the studies mentioned above, one would expect that the external person would have many unresolved frustrations in his past and have built up a lot of hostile attitudes toward others. Since his parents were hostile toward him and commanded authoritarian control, he was the object of much punishment as a child. This type of individual, then, should have a greater tendency to engage in hostile types of aggressions. Feshback (1964) lends even further support to this prediction with his contention that the motivation to injure others or engage in hostile aggression is caused directly by the degree of punishment a child has received, especially for the expression of aggression (Bandura and Walters, 1959; Sears, Macoby and Levin, 1957). Since hostile aggression is mediated by a desire to hurt,

the tendency to express this form of aggression will normally be inhibited in our culture. Our society evaluates this type of aggression very negatively and administers strong moral sanctions against its expression. Some evidence seems to support this contention. Buss (1963) received a low but significant effect on physical aggression induced by frustration. He hypothesized that this low level of aggression was not instrumental in the removal of the frustration. Buss (1967) in a later study showed that a higher degree of aggression was displayed when it was of instrumental value in removing the frustration. Since the present study hypothesized that internals will expect their behavior to be instrumental and therefore perceive their aggression as instrumental, internal subjects were predicted to aggress more when frustrated in a situation where aggression could have instrumental value than will external subjects. A more potent instigator to aggression than frustration is personal attack. Dispositional variables that seem to inhibit or increase aggression under lower levels of provocation (i.e., frustration) seem to wash out at higher levels of attack (Brown, 1972; Dengerink, 1971; Taylor, 1970). Therefore, in a situation of personal attack no differences in aggression would be expected between internals and externals when the opportunity to aggress could be perceived as instrumental.

If the situation in which a subject is given the opportunity to aggress prevents that aggression from having any instrumental value, then the subjects resulting behavior could only be a demonstration of hostile aggression. This seems to be an important consideration in view of the current methodologies used in the study of aggression. The most common

methodology is the paradigm devised by Buss (1961) which utilizes the "Aggression Machine". This paradigm, unless explicitly modified, takes its measures of aggression in a situation which could have no possible instrumental value in changing the frustrating stimulus. This observation seems to be a reasonable explanation for Berkowitz's (1970) findings that aggression does not provide cathartic release but rather acts as a further stimulus to aggression. Non-instrumental aggression may even be conceived of as a measure of the cathartic release that has occurred as the result of previous instrumental behavior. More will be stated on this issue in the next section on catharsis. At any rate, external subjects should engage more in non-instrumental aggression than internal subjects. This prediction seems justified since internal subjects should not have any rewards present in this situation for aggressive behavior. Again, the dispositional differences in the subjects should affect their aggressive behavior in the frustration condition only. Under a condition of personal attack there should be no differences in aggression between external and internal subjects.

In summary, then, this study made the following predictions with regard to locus of control and aggressive behavior: Internal subjects will behave more aggressively than external subjects when frustrated in a situation where that aggression could be perceived as instrumental; external subjects will behave more aggressively than internal subjects in a situation where that aggression cannot be perceived as instrumental; these predictions will not hold for the personal attack condition.

### CATHARSIS

Instrumental and Hostile aggression should also produce differences in cathartic release which will provide additional predicted differences between internals and externals.

Aggression perceived as being instrumental (by the aggressor) in the modifying or removing of the frustration, will produce a reduction in the anger or hostility felt toward the frustrating agent. This relationship was very adequately shown in a well designed study by Rothaus and Worchel (1964). This study tested three theories' predictions on how ego-support, catharsis and hostile communication will affect hostility. Horwitz's power theory (Horwitz, 1958) was strongly supported in this study. Horwitz has argued that frustration is a necessary but not sufficient condition for aggression. For hostility to be induced the frustration must be perceived as "arbitrary" or "willful". This perception arises when the frustrator gives more than legitimate weight to his own needs when in conflict with others. This reduces the victim's expected power over decision making. Out of a reaction to this power reduction, hostility is aroused. Horwitz feels that if an aggressive action restores power, hostility will be reduced. A key factor in his theory is that hostility will not be reduced merely by the removal of frustration, but only when a hostile communication or aggressive action is seen as instrumental in removing the frustration. In the Rothaus and Worchel experiment, instrumental hostile communication was found to be the only variable which reduced hostility. Cathartic release of hostile feelings, and ego-support were ineffective.

We may conclude then, that individuals who aggress and perceive their aggression as instrumental in removing the source of frustration, should be less angry toward the frustrator. For the purposes of this study a finding of less anger after aggressing for internal subjects would be evidence that they engage more in instrumental or constructive types of aggression.

Typically, as mentioned above, in paradigms studying aggression, the measure of aggression is taken after the frustration or attack manipulation in a situation where aggression is non-instrumental. The present study also took a measure of non-instrumental aggression but in this case after the victim (simulated opponent) had made a behavioral change which indicates cooperativeness on his part and removes the source of frustration to the subject. According to the findings of the previously mentioned Rothaus and Worchel study, those individuals who engage in an aggressive communication which leads to the removal of a frustration should feel less hostile. If, as hypothesized, internal subjects do engage more in instrumental aggression, they should perceive their aggressive behavior as instrumental in causing the victim's behavior change and therefore be less hostile and aggressive in the non-instrumental aggression situation. The external subjects, however, would not be expected to perceive the instrumentality of their behavior (aggressive in this case) in the subsequent change of the victim's behavior. Therefore, they should not meet the conditions set by Horwitz for the reduction of hostility and will be more aggressive than internalizers in the non-instrumental aggression situation.

SUMMARY

In summary, the reader is first reminded of the previously described problems of defensive scoring on the I-E scale. It was, therefore, decided that a control for defensiveness be included in the present study in the form of high and low scorers on the Marlow-Crowne Social Desirability Scale. In turn, the following predictions were made for non-defensive subjects about the relationship between the internal-external control of reinforcement variable and aggression.

HYPOTHESIS I - Internals will behave more aggressively than externals in a situation where aggression can be perceived as instrumental to the removal of a frustrating stimulus.

HYPOTHESIS II - Internals will be less angry and hostile than externals after aggressing in a situation where aggression can be perceived as instrumental to the removal of a frustrating stimulus.

HYPOTHESIS III - Internals will be less aggressive than externals, after a constructive (more cooperative) behavior change on the part of the victim, where aggression cannot be perceived as instrumental to the removal of the frustrating stimulus.

The above predictions were made for the non-defensive internal and external subjects only. It also may be noted that under the personal attack conditions no differences were expected between internals and externals.

## CHAPTER II

### METHOD

#### SUBJECTS

Volunteer male subjects were obtained from Psychology 110 classes. Ninety-nine subjects were obtained in insure a minimum of 10 subjects per cell. Male subjects only were used due to the fact that sex has been found to be a significant variable affecting both the amount of expressed aggression (Buss, 1963) and the predictability of the I-E scale (Joe, 1971).

Subjects were assigned into the defensive and non-defensive categories on the basis of their scores on the Marlow-Crowne Social Desirability Scale (MCSD, Crowne and Marlow, 1964). Scores of 12 and below constituted the non-defensive group, and scores of 13 and above constituted the defensive group. The assignment of the subjects into internalizers and externalizers was accomplished by making a median split of scores on the modified I-E scale (Rotter, 1966; Joe, 1972; Stern, 1972).

These divisions provided the following four categories: non-defensive internals, non-defensive externals, defensive internals, and defensive externals. From the original 99 subjects 97 subjects were run and the data of 80 of these subjects was analyzed. The subjects in each of the four cells were randomly assigned to one of the two experimental conditions; frustration or personal attack. Table 1 provides a description of the resulting eight cells.



TABLE 1

	INTERNAL		EXTERNAL
DEFENSIVE	FRUSTRATION	PERSONAL ATTACK	FRUSTRATION PERSONAL ATTACK
NON- DEFENSIVE	FRUSTRATION	PERSONAL ATTACK	FRUSTRATION PERSONAL ATTACK

APPARATUS

The apparatus used in this study was designed by Brown (1972) It is his modification of a paradigm utilized by Berger and Tedeschi (1969) for the study of aggression. The latter authors have characterized their modification of the Prisoner's Dilemma Game (PDG) as a research paradigm which can be effectively used with both children and adults. It also uses a behavioral response that can be unambiguously interpreted as harm intending aggression toward another person. The PDG is typically a conflict situation in which each of two players must select one of two strategies. The four possible outcomes associated with the joint choices of the two players are so ordered that a partial conflict of interests occurs. For example, consider the following matrix utilized by Berger and Tedeschi:

		Player B	
		1, 1	-10, 10
Player A	10, -10	-1, -1	
		1	2

In this conflict situation each player has the choice of two alternatives. Depending on the opponent's strategy, each choice has associated with it either (a small gain or a big loss) or (a big gain or small loss). The assumption Berger and Tedeschi have made is that playing this game with an opponent will induce sufficient frustration to cause aggressive behavior. By including a "zap option" or aggression option in the game

an objective measure of aggression was obtained. The aggression option consisted of an opportunity to take points (money) away from the opponent, with the subject accruing a fixed cost for this privilege. For example, after every seven trials in the game the subject was allowed to take ten dollars away from the opponent at a cost of 2, 5, 8 or \$11 to himself, depending on his cell assignment. The frequency with which he utilized this option was the measure of aggression. Berger and Tedeschi found results which indicated that this paradigm provided an effective manipulation of aggression. This effectiveness, however, was shown only when the analysis focused on the trial prior to the opportunity for the aggression option. In other words, the subjects reacted only to the last trial of the sequence when aggressing and not to the strategy of the opponent as a whole.

Brown's paradigm seems to have captured the advantages of the Berger and Tedeschi paradigm while overcoming the shortcomings. His design allows the subject to react to the entire strategy of his opponent instead of just one trial. He uses a 3 x 3 non zero sum matrix with outcome choices being such that a manipulation for personal frustration and personal attack can be made. The matrix is built into a visually pleasing console which allows each of the nine cells to be differentially lit. A control panel has nine switches that correspond to the nine cells of the major matrix. When the subject presses a particular button and verbalizes his choice, and when the E receives the response (simulated) by telephone from the simulated player, then the switch controlling the appropriate outcome can be lit. The secondary matrix can also be lit up

by the experimenter when the subject selects one of the four alternatives. Feedback is also available to the subject of his cumulative gains and losses.

Table 2 provides a picture of the display panel in front of which the subject was seated. In addition to the Brown Apparatus a shocking device was present near the panel, capable of giving a moderate electric shock.

#### DEPENDENT VARIABLES

There were two types of measures of aggression; shock intensity and number of Loss-Cost Options (L-C Options). These measures were taken at different junctures during the game. A game was constituted by three blocks, each containing four trials. After each block the subject was given an opportunity to utilize the secondary matrix. After the second and third blocks, the subject also had an opportunity to give his game partner a moderate electric shock. Three measures of instrumental aggression were taken. The first and second measures were the number of L-C Options chosen after the first and second trial blocks. The higher the number chosen the greater the aggression. The third measure was the intensity of the first shock given to the simulated subject. This will take place after the second block. The shock intensity and the number of the third L-C Option chosen after the third block will constitute the measures of non-instrumental aggression. A hostility measure was taken after the third shock had been given. This measure was a questionnaire regarding the subjects present feelings toward his playing partner. See Appendix C.

TABLE 2

Total Points

Your Points

Player 2

		Player 2		
		#1	#2	#3
YOUR CHOICE	#1	you gain 6 he gains 6	you gain 0 he gains 4	you gain 2 he gains 0
	#2	you gain 4 he gains 0	you lose 4 he loses 4	you gain 0 he loses 1
	#3	you gain 0 he gains 2	you lose 1 he gains 0	you gain 0 he gains 0

SECONDARY MATRIX

green light

	I	II	III	IV
you lose 0	you lose 4	you lose 8	you lose 12	
he loses 0	he loses 10	he loses 12	he loses 14	

PROCEDURE

Subjects were first given the Marlow-Crowne Social Desirability Scale (Appendix C) and the modified Rotter Internal-External Scale (Appendix D) in a group session. The subject had been told that there would be two parts to the experiment which would total to less than two hours. At the end of the first group session each subject signed up for the second hour. After this first session the tests were coded and scored. The eight groups were then formed in the manner previously described. During the second half, or game part, of the experiment the only information the experimenter (E) was given in regard to each subject was which condition, frustrated or personal attack, he was assigned.

When each subject arrived he was met by the E and two stooges. The first stooge was introduced as Linda Sargent, the E's assistant during the experiment. Miss Sargent was the assistant for all of the subjects. The second stooge played the part of another volunteer subject. He was a volunteer from the Psychology 230 class and had previously been instructed as to his role in the experiment. This second stooge and the real subject were introduced as playing partners in the game to be played upstairs. This interaction took place in the reception of the Clinical Psychology Center. After introductions the E said the following:

In a few minutes both of you will be participating in a game in which you will have an opportunity to earn a small amount of money. During the game you both will be separated into two different rooms. In order to determine which of the two rooms you will be in we will now draw for what is called the "Game Advantage Room." To do this you both will pick a number between 1 and 10. The one who picks the number closest to the one I have in my pocket will be in the "Game Advantage Room."

After this statement the subject (S) and the stooge stated their choices out loud. Through a pre-arranged strategy the real S always won the game advantage room. The stooge was then told to follow Miss Sargent upstairs and the real S was told to follow the E. Room 6 of the Clinical Psychology Center was labeled "Game Advantage Room" and Room 8 was labeled "Room No. 2." E's assistant and the second stooge then entered "Room No. 2" and the E and real S entered the "Game Advantage Room." The "Game Advantage Room" was situated as Appendix N depicts. E first asked the S to sit down in front of the console and then stated that the tape would explain the game and any questions would be answered afterward. The tape (Appendix A) was then played. Afterwards any question the S had were briefly answered. Also, four questions were asked to insure the S understood the game: 1) How many points will the total counter increase each time? 2) What was the object of the game? 3) When are the Loss-Cost Options utilized? 4) What does your opponent's console look like? The E then ran two practice trials showing the S how the choices would be relayed to the next room by phone, and the appropriate cells lit up. After the S stated he completely understood the game, E said that "We begin the game in a few seconds after I see if they're ready in the next room." E then left the room for a few seconds and then returned saying that the game could begin. Then simulating contact by phone with the next room E announced trial 1, block 1 was starting. E then flashed the green light on the console to signal that the S was to make his choice. When the S pressed a button this choice was relayed over the phone to the assistant, and

the second player's choice received (or so the S thought). Then the appropriate cell was lit. This particular simulation allowed the frustration and personal attack manipulations. For the frustration subjects the E simulated the pressing of number 3 by the opponent. For the personal attack condition E simulated the pressing of number 2 by the opponent. This strategy remained unchanged for the first two blocks or 8 trials. That is, the S thought that his opponent was always pressing 3 if he was in the frustration condition and always pressing number 2 if he was in the personal attack condition. Each trial consisted of the S making his choice, the simulated relaying of the S's choice and receiving of the opponent's choice and the lighting of the appropriate matrix-cell. After the first four trials the S was told to make a choice on the L-C Option. Again after the next four trials he made his second choice on the L-C Option. Then the S was told by the E that this (the tape) would explain the game advantage:

Prior research with this interpersonal game has shown that the player with the opportunity to give an electric shock to his playing partner in many cases has an advantage in gaining more game points. The apparatus at your right will administer the shock to the subject in the other room. The lever on the right hand side of the apparatus will administer the shock as long as it is depressed. You first will be given a sample of a mild shock by the experimenter from the apparatus. With this shock as a gauge, set the black knob to the intensity you wish your opponent to receive. The knob is labeled low, medium, and high. The experimenter will now give you a sample of a mild shock.

The E then gave each subject a 100 milliamp shock with a C.A. Applegate shock source. The S was then told that the black knob was set at the level he received and would be please set the level he wanted his opponent



to receive. The E then went to the phone and asked if they (the assistant and opponent) were ready for this part of the experiment. Then the E told the S to depress the lever until the needle on the shock device reached a peak or no longer rose. This enabled E to get a shock intensity measure (shock #1) from the shock apparatus. The S was then told that the third trial block would begin. Four more trials of the game were then run in which the opponent pressed number 1 (Cooperative strategy). This occurred for all S's. After this change to a cooperative strategy, the S made their final and 3rd L-C Option choice. Then the E announced that this would be the last part of the experiment and played the following recorded message:

The game is over and the final points are about to be tabulated. At this point you will be given a second chance to use the shock option. Your opponent has been instructed to perceive this shock as your evaluation and feelings about his performance during the game. He in turn will be evaluating your performance through a questionnaire only. Again, set the black knob to the level that best describes your feelings about his performance during the game.

The S then set the intensity he wished and depressed the lever delivering the shock (apparently) to the opponent in the next room. The E next gave the S the questionnaire (Appendix B) asking him to fill it out while the final points were tabulated. When the S was finished with the questionnaire he was thanked for participating in the experiment and given the final point totals. If warranted he was given the money he had earned. The S was also asked to please not speak to anyone who might be in the experiment in the future.

## CHAPTER III

### RESULTS

Eleven 2 x 2 x 2 factorial, fixed factor anovas were run on the five behavioral measures of aggression. In addition numerous t-tests were run on the mean difference between the two cells of interest -- internal, non-defensive, frustrated ( $A_1B_2C_1$ ) and external, non-defensive, frustrated ( $A_1B_2C_2$ ). Throughout this section the Instigation to Aggression variable will be labeled A with level  $A_1$  signifying the frustration condition and level  $A_2$  signifying the Personal Attack Condition. The Defensiveness variable will be labeled B with level  $B_1$  signifying the Defensive classification and level  $B_2$  signifying the Non-defensive classification. Lastly the Locus of Control of Reinforcement variable will be labeled C with level  $C_1$  signifying Internal Control and level  $C_2$  signifying External Control.

Hypothesis I was tested with four different measures. These results are reported in Appendices E, F, G, and H. The first L-C Option (Appendix E) showed no significant results. The second L-C Option (Appendix F) and the sum of the first and second L-C Option (Appendix G) showed significant A main effects ( $F = 7.85, p < .01$  and  $F = 7.04, p < .01$  respectively). Looking specifically at cells  $A_1B_2C_1$  and  $A_1B_2C_2$  for these three measures, a t-test of mean differences found  $t = 1.41, p < .10$  for the first L-C Option,  $t < 1$  for the second L-C Option and  $t = .97, p > .10$  for the sum of the first and second L-C Options. The first shock in-

tensity measure (Appendix H) showed no significant differences though an AB interaction of  $F = 3.06$ ,  $p < .10$  was found.

To test Hypothesis III two different behavioral measures were taken. Table 3 shows the eight-cell Means and Analysis of Variance Summary Table for the Third L-C Option. Here a significant BC and ABC interaction was found ( $F = 4.80$ ,  $p < .05$  and  $F = 4.80$ ,  $p < .05$  respectively). Figure 1 shows graphically the source of these interactions. A Newman-Keuls test of ordered means for this ABC interaction does not indicate any significant differences between any of the 8 group means. A t-test between the cell means of the  $A_1B_2C_1$  and  $A_1B_2C_2$  groups produce a difference with  $t = 1.63$ ,  $p < .07$ , in the predicted direction. The second shock intensity data (Appendix I) showed no significant results. A t-test between the  $A_1B_2C_1$  and  $A_1B_2C_2$  groups yielded a  $t = 1.41$ ,  $p < .10$  a difference in the opposite of the predicted direction.

Utilizing difference score data between the instrumental and hostile measures additional differences were found pertaining to Hypothesis I and III. Appendix J shows the results for the first minus the third L-C Option. No significant results were found with only the C main effect having an F greater than 1 ( $F = 2.57$ ,  $p < .15$ ). Looking at the second L-C Option minus the third L-C Option some significant differences were found. Table 4 presents these findings. The BC and ABC interactions were statistically significant with  $F = 4.53$ ,  $p < .05$  and  $F = 7.27$ ,  $p < .01$  respectively. Figure 2 graphically presents the cell means that are causing the interactions. A t-test between the cell means of interest  $A_1B_2C_1$  and  $A_1B_2C_2$  were also significant at  $t = 1.75$ ,  $p < .05$ . This difference was in the predicted direction. Appendix K illustrates the

results of the average of the first and second L-C Option minus the third L-C Option. This analysis did not yield any significant differences. However, the BC and ABC interaction are approaching significance at  $F = 3.66$ ,  $p < .08$  and  $F = 3.66$ ,  $p < .08$  respectively and show the same basic relationships that were found in the second minus the third L-C Option analysis (compare Figure 2 with Figure 3). Lastly, the difference scores between the first and second shock were analyzed. As Table 5 shows, the AC and BC interactions were significant with  $F = 6.64$ ,  $p < .03$  and  $F = 4.84$ ,  $p < .05$  respectively. Figure 4 graphically presents the relationship between the cell means causing these interactions. A Newman-Keuls run on the ordered means of the four cells in the AC interaction found cell  $A_1C_1$  was significantly less instrumentally aggressive in relation to hostile aggression than cell  $A_1C_2$  (mean difference = 9.80,  $r = 3$ ,  $p < .05$ ). A Newman-Keuls on the BC ordered means found a significant difference between cells  $C_1B_1$  and  $C_1B_2$  with the former groups being the more instrumentally aggressive (mean difference = 9.4,  $r = 3$ ,  $p < .05$ ). A t-test comparing groups  $A_1B_2C_1$  and  $A_1B_2C_2$  also reached statistical significance ( $t = 1.85$ ,  $p < .05$ ) with group  $A_1B_2C_2$  being the most instrumentally aggressive in relation to hostile aggression.

To test Hypothesis II an after game pencil and paper measure of anger was analyzed. As Appendix L shows, no significant differences were found with only the A main effect ( $F = 3.30$ ,  $p < .10$ ) approaching significance. A t-test between the  $A_1B_2C_1$  and  $A_1B_2C_2$  cells means was not significant ( $t = .67$ ,  $p < .10$ ) though in this predicted direction. Using a difference score measure of the during game anger minus the after game anger also

showed no significant differences (see Appendix M). Looking at cells  $A_1B_2C_1$  and  $A_1B_2C_2$  a difference, though non-significant ( $t = 1.58$ ,  $p < .08$ ), was found in the predicted direction.

TABLE 3

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## ANALYSIS OF VARIANCE SUMMARY TABLE ON THE THIRD L-C OPTION

SOURCE	SS	df	MS	F
SS <sub>A</sub>	.31	1	.31	
SS <sub>B</sub>	.01	1	.01	
SS <sub>C</sub>	1.01	1	1.01	2.30
SS <sub>AB</sub>	.01	1	.01	
SS <sub>AC</sub>	.01	1	.01	
SS <sub>BC</sub>	2.11	1	2.11	4.80 *
SS <sub>ABC</sub>	2.11	1	2.11	4.80 *
WITHIN	31.90	72	.44	
TOTAL	37.49	79		

\* Significant  $p < .05$ 

## EIGHT-CELL MEANS

C<sub>1</sub>C<sub>2</sub>

	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	2.1	1.5	1.2	1.9
A <sub>2</sub>	1.9	1.9	1.7	1.7

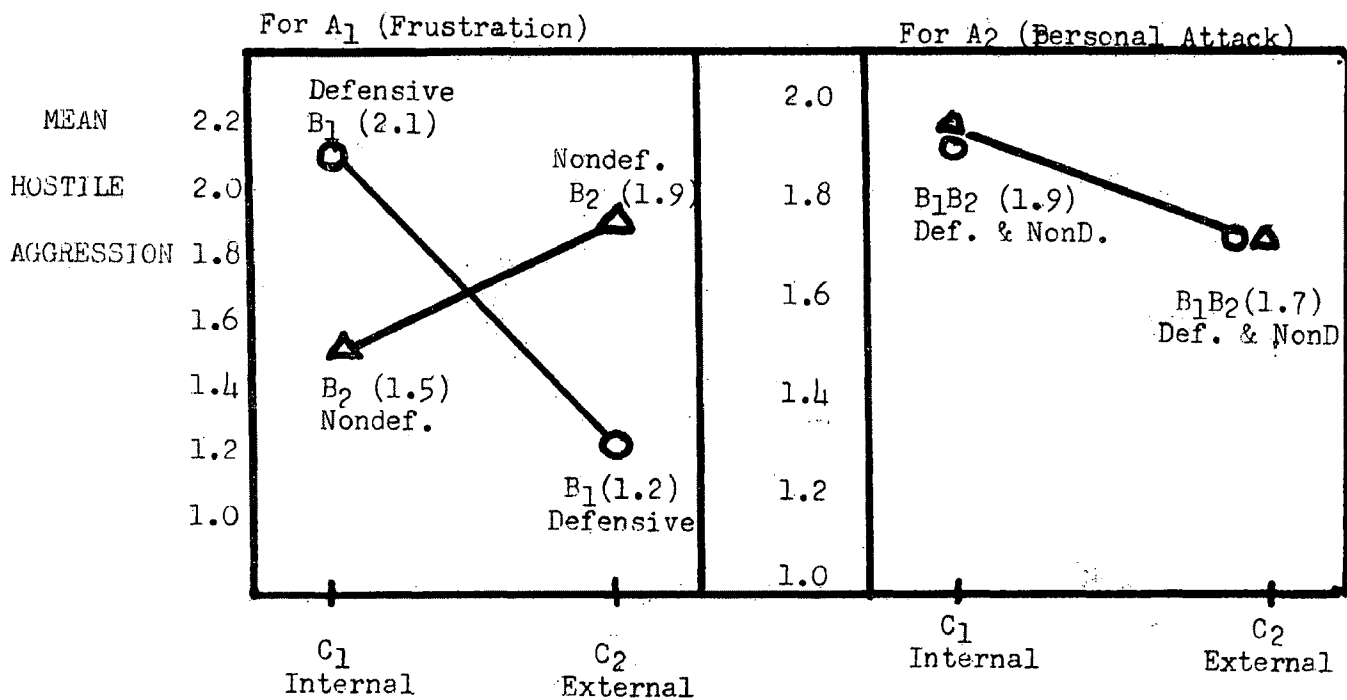
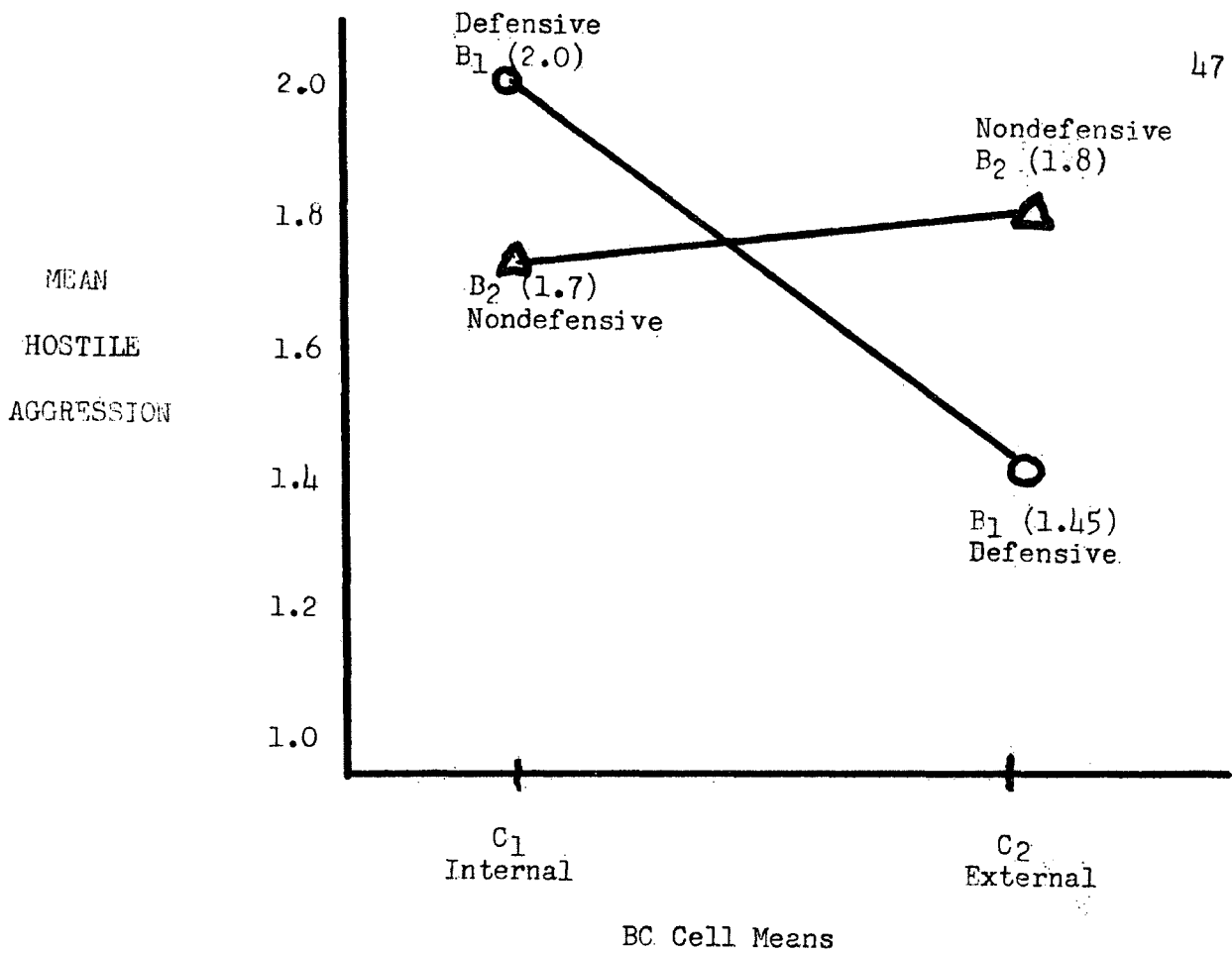


Figure 1. Graph of the interactions for the third L-C Option

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE SECOND MINUS THE THIRD L-C OPTION \*\*\*

SOURCE	SS	df	MS	F
SS <sub>A</sub>	2.11	1	2.11	3.40
SS <sub>B</sub>	.31	1	.31	
SS <sub>C</sub>	.31	1	.31	
SS <sub>AB</sub>	.01	1	.01	
SS <sub>AC</sub>	1.01	1	1.01	1.62
SS <sub>BC</sub>	2.81	1	2.81	4.53 *
SS <sub>ABC</sub>	4.51	1	4.51	7.27 **
WITHIN	44.9	72	.62	
TOTAL	56	79		

\* Significant  $p < .05$ \*\* Significant  $p < .01$ 

\*\*\* Each difference score was added by 3.

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	2.2	2.9	3.4	2.4
A <sub>2</sub>	3.2	3.0	3.0	3.0



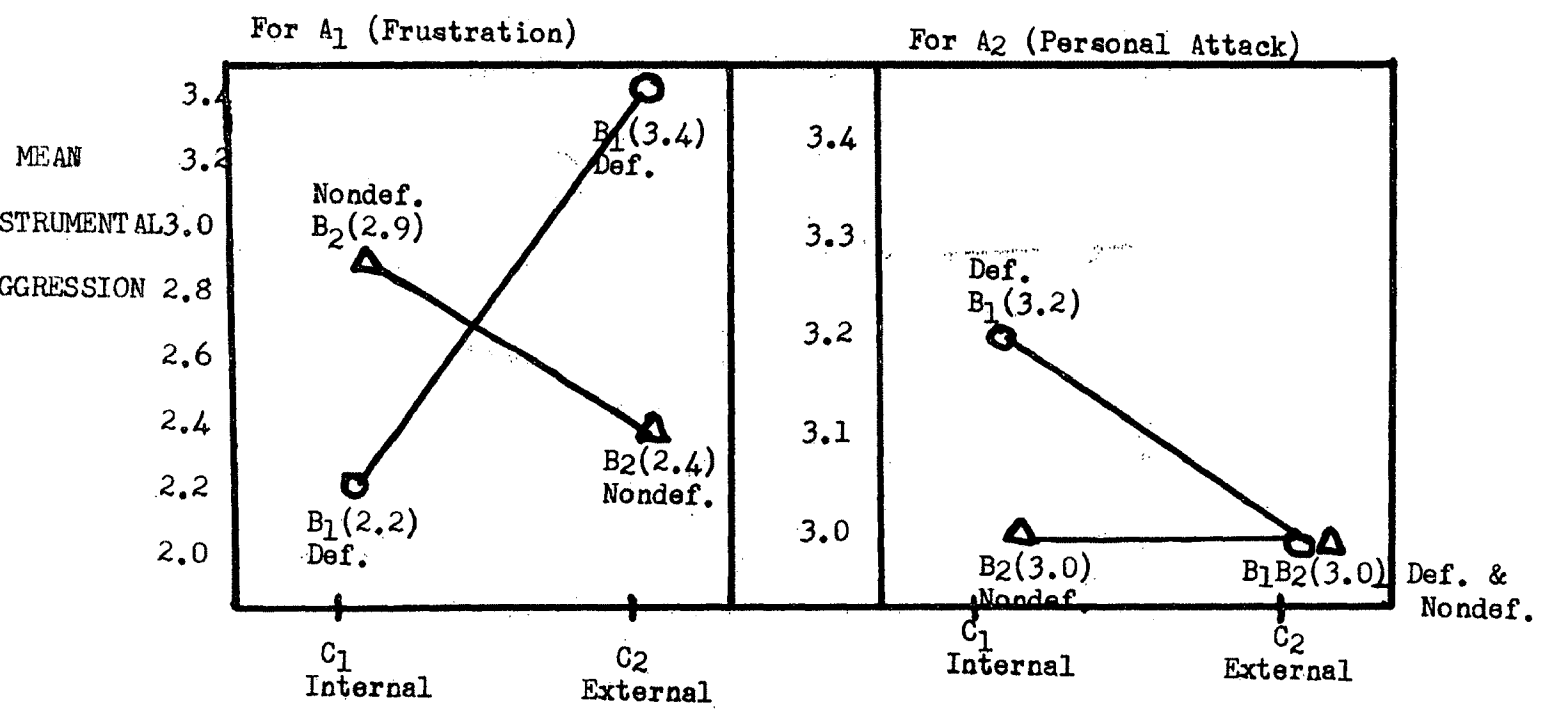
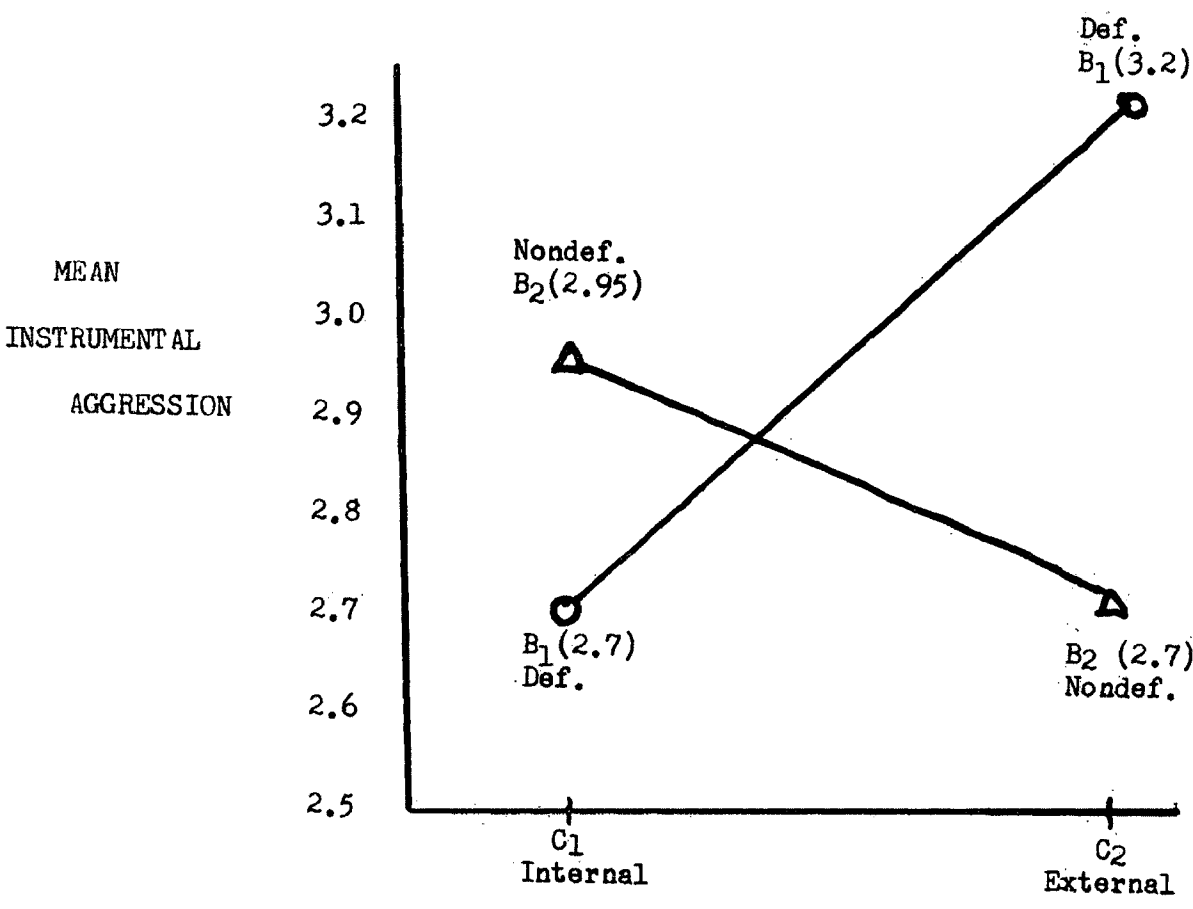


Figure 2. Graphs of the interactions for the second L-C Option minus the third L-C Option.

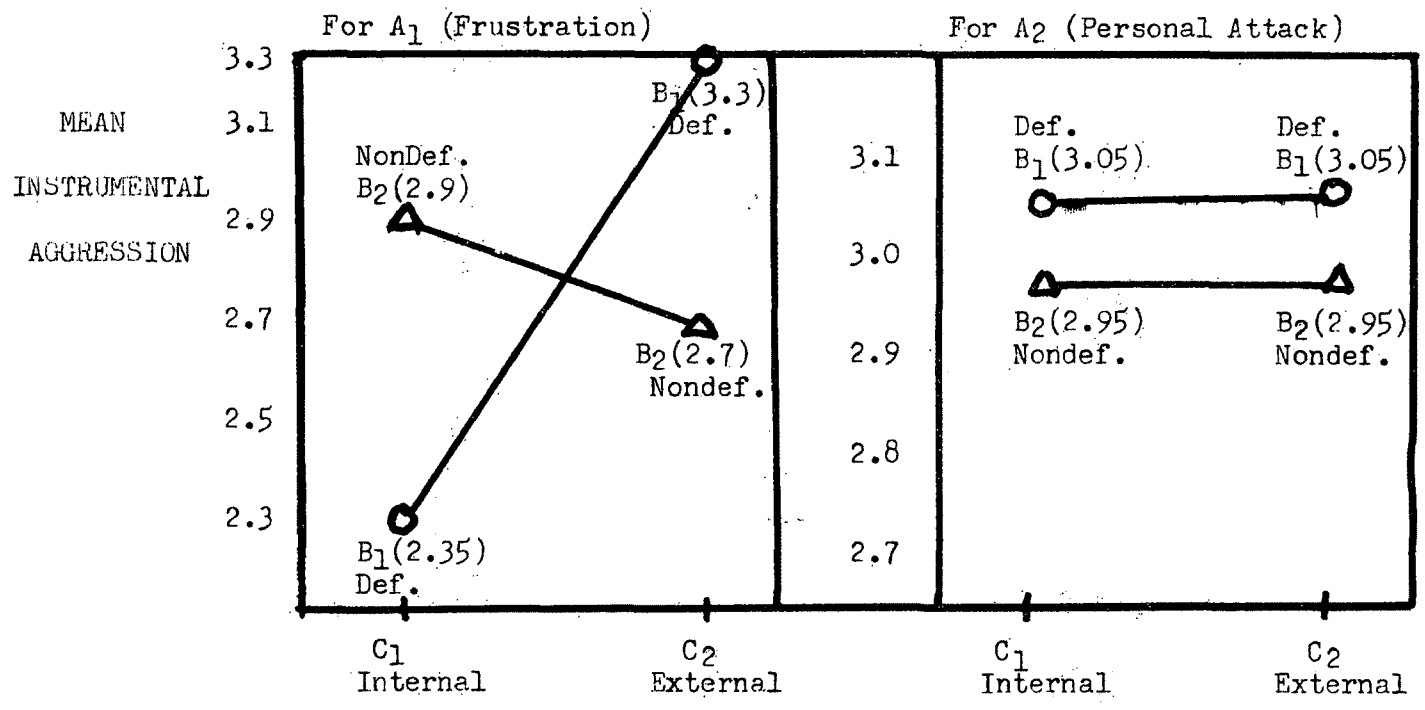
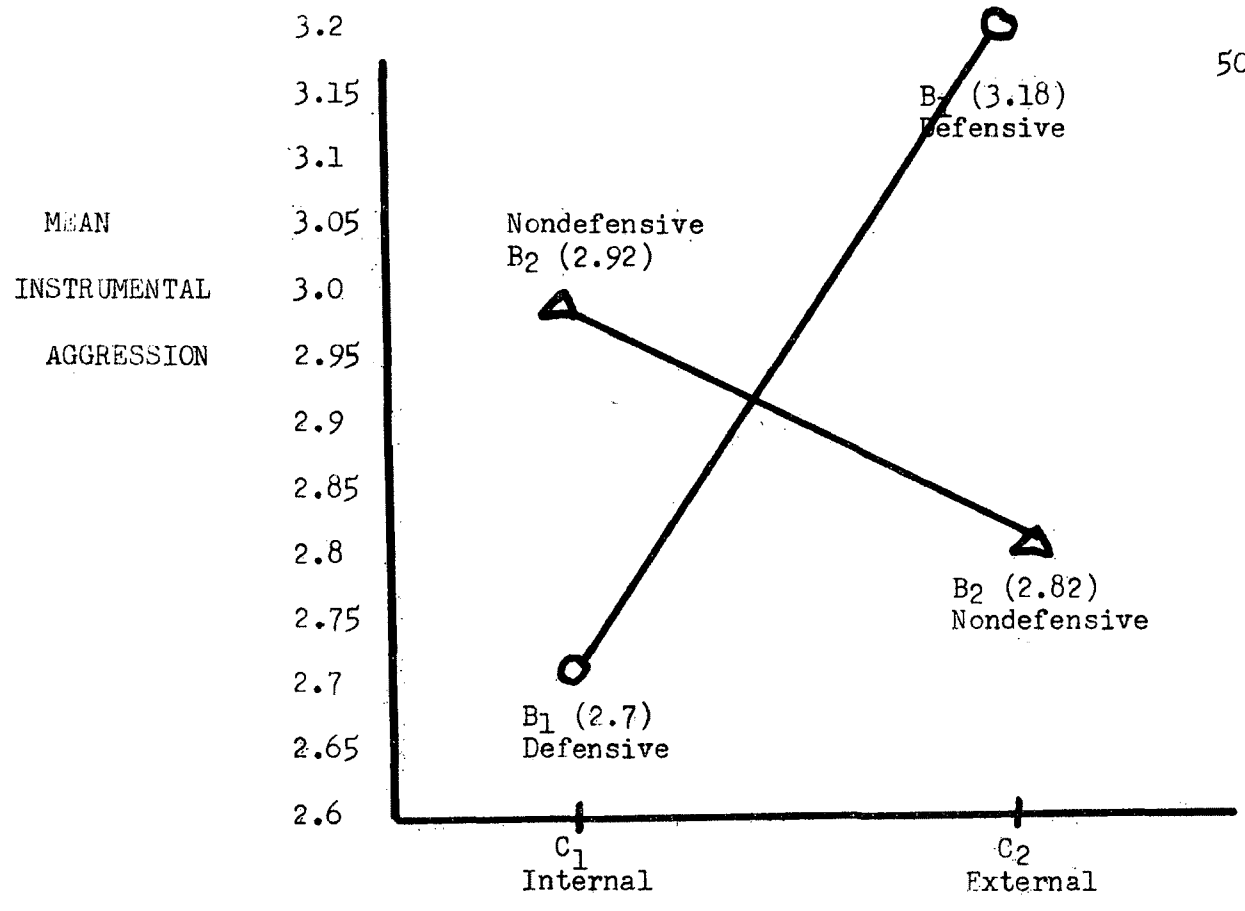


Figure 3. Graphs of the interactions for the average of the first and second L-C Options minus the third L-C Option.

## ANALYSIS OF VARIANCE SUMMARY TABLE FOR SHOCK #1 MINUS SHOCK #2 \*\*\*

SOURCE	SS	df	MS	F
SS <sub>A</sub>	270.11	1	270.11	1.74
SS <sub>B</sub>	214.51	1	214.51	1.38
SS <sub>C</sub>	137.81	1	137.81	
SS <sub>AB</sub>	70.31	1	70.31	
SS <sub>AC</sub>	1029.61	1	1029.61	6.64 **
SS <sub>BC</sub>	750.31	1	750.31	4.84 *
SS <sub>ABC</sub>	159.61	1	159.61	1.03
WITHIN	11,149.9	72	154.85	
TOTAL	13,782.19	79		

\* Significant p .05

\*\* Significant p .01

\*\*\* Difference scores each were added by 30

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	30.1	25.4	36.6	38.5
A <sub>2</sub>	38.3	24.2	24.8	28.6

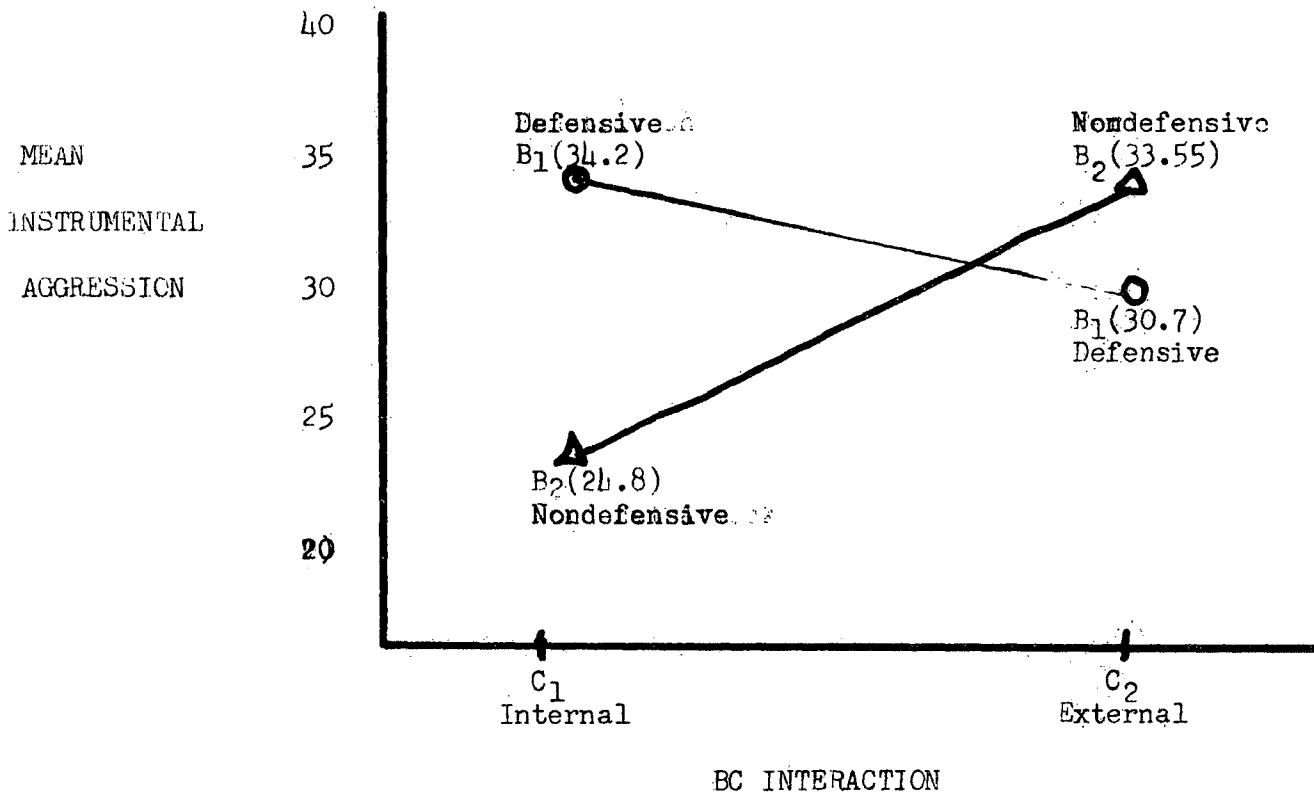
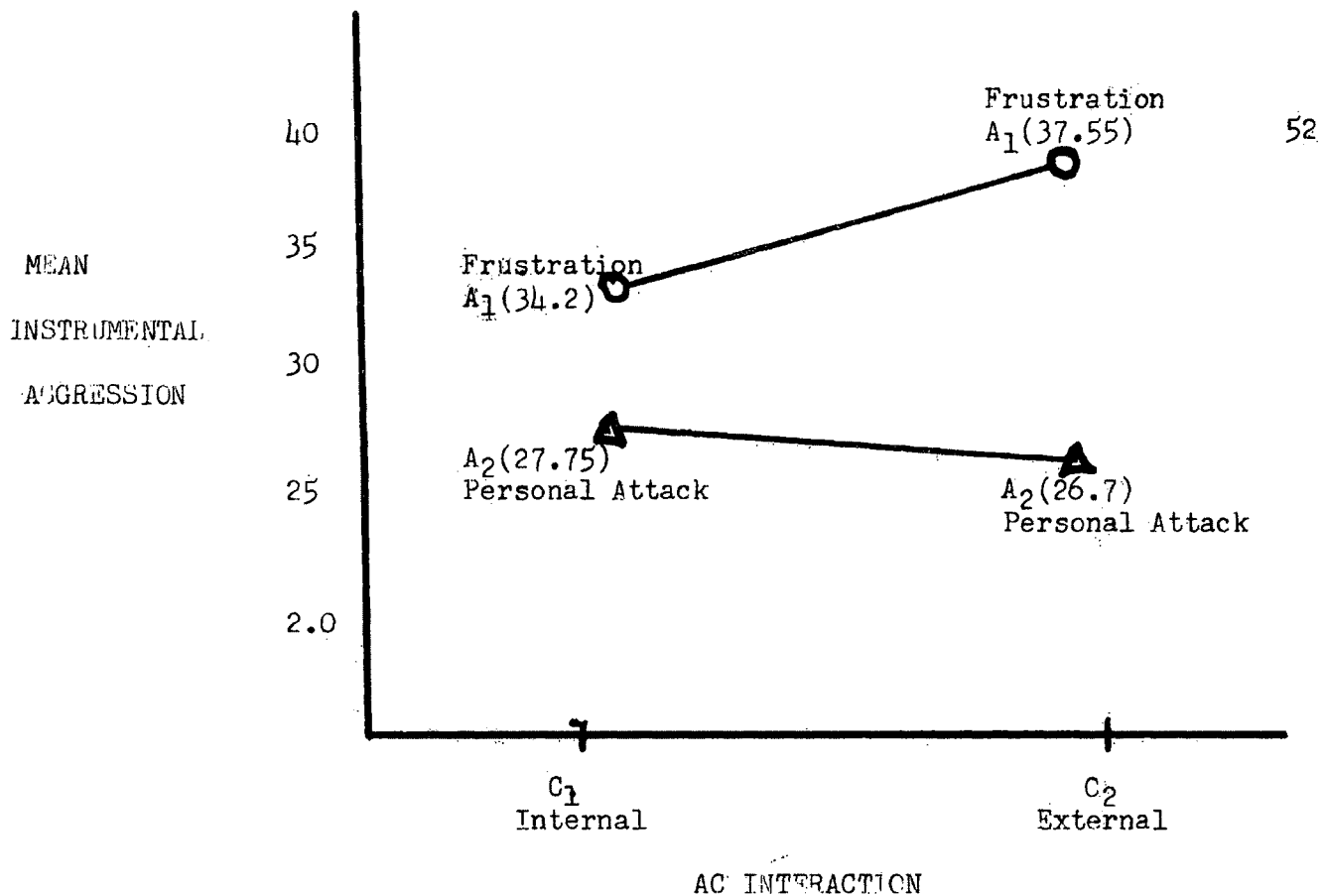


Figure 4. Graph of the interactions for shock #1 minus shock #2.

## CHAPTER IV

### DISCUSSION

To insure clarity for the reader the results will first be interpreted as they relate to the three predictions of this study. Care will be taken to first specify the relevant data and then make the appropriate conclusions from this data. The second section will discuss these conclusions in relationship to the theory presented in this paper.

#### INTERPRETATION OF RESULTS

The relationship predicted in Hypothesis I was tested with four separate measures: 1) the number of the button pressed in the first Loss-Cost (L-C) Option, 2) the number of the button pressed in the second L-C Option, 3) the total of the numbers pressed on the first and second L-C Option, and 4) the intensity of the first shock. Appendices E, F, and G show the Analysis of Variance Summary Tables and the Eight-Cell Means for three of the L-C Option measures. The second L-C Option and the sum of the first and second L-C Options show significant A main effects ( $F = 7.85$ ,  $p < .01$  and  $F = 7.04$ ,  $p < .01$  respectively). This result concurs with Brown's (1972) findings that the Personal Attack manipulation will elicit more aggression as measured by the L-C Options. No other significant differences were found on these measures. Looking specifically at the two cells  $A_1B_2C_1$  or internal non-defensive frustrated (INDF) and  $A_1B_2C_2$  or external non-defensive frustrated (ENDF) for these three respective

measures we find means of 1.4 (INDF) and 1.9 (ENDF) ( $t = 1.41$ ,  $p = .10$ ) for the first L-C Option, means of 1.4 (INDF) and 1.3 (ENDF) ( $t = 1$ ) for the second L-C Option, and means of 2.8 and 3.2 ( $t = .97$ ,  $p < .05$ ) for the sum of the first and second L-C Options. These results unanimously disconfirm Hypothesis I with the first L-C Option approaching significance in the opposite direction. The first shock intensity measure also produced no significant results. Appendix H presents the Analysis of Variance Summary Table and Eight-Cell Means for this measure. Worthy of noting, however, is the non-significant trend shown in the AB interaction ( $F = 3.06$ ,  $p < .10$ ). This result indicates that non-defensive subjects display less shock intensity under the Personal Attack condition compared to the Frustration condition while defensive subjects were more aggressive under the Personal Attack condition than under the Frustration condition. Even though this difference is non-significant it does show a high inconsistency between the L-C Option measures and the shock intensity measure in the effectiveness of the instigation to aggression manipulation. More will be stated on this issue in the Discussion section. Looking specifically at cells INDF and ENDF means of 20.9 and 25.2 ( $t = .53$ ,  $p < .05$ ) respectively were obtained for the first shock intensity data. This result again rejects Hypothesis I and shows a slight (non-significant) difference in the opposite direction.

In order to test Hypothesis III, two different behavioral measures were taken: 1) the number of the button pressed on the third L-C Option, and 2) the intensity of the second shock. Table 3 shows the Eight-Cell Means and Analysis of Variance Summary Table for the third L-C Option. A significant BC and ABC interaction was found ( $F = 4.80$ ,  $p < .05$  and

$F = 4.80, p < .05$  respectively). Figure 1 depicts graphically the source of these interactions. A visual inspection of this graph makes it apparent that the ABC interaction is caused primarily by the differences between  $B_2C_1$  (INDF) and  $B_2C_2$  (ENDF) for  $A_1$  and the differences between  $B_1C_1$  (IDF) and  $B_1C_2$  (EDF) for  $A_1$ . A Newman-Keuls test of ordered means for this ABC interaction does not produce any significant differences between any of the 8 group means. Individual t-tests do find more significant differences. The cell means for these respective groups are 1.5 (INDF) and 1.9 (ENDF) ( $t = 1.63, p < .07$ ) and 2.1 (IDF) and 1.2 (EDF) ( $t = 4.02, p < .001$ ). Therefore, most of the variance is accounted for by the difference between defensive frustrated internals and defensive frustrated externals. The two cells of interest, INDF and ENDF, seem to display a difference in the predicted direction though not significantly so. The shock intensity data for the second shock, however displayed no significant results. Appendix I shows the Eight-cell Means and Analysis of Variance Summary Table for this data. Cells INDF and ENDF obtained means of 25.5 and 16.7 respectively with this difference not reaching significance ( $t = 1.41, p < .10$ ). This result is approaching significance in the opposite direction of what Hypothesis III would predict. Also in examining the summary table (Appendix I) one notices the same though non-significant AB interaction ( $F = 1.33, p < .26$ ) that was found in the analysis of the first shock measure. By examining the individual cell means one can readily see that this effect is due to the lower shock intensity administered by the INDPA group as compared to the INDF group. Taken together these AB interactions on the two shock measures suggest that non-defensive subjects have a tendency, in this

study, though non-significant, of inhibiting aggression as measured by shock intensity when the manipulation to aggression is more potent. On the other hand, defensive subjects seem to increase their aggression with the higher potency instigation to aggression. More will be stated in way of interpretation about this finding in the Discussion section.

In summary, the above data seems to reject both Hypothesis I and Hypothesis III. The results of the data pertaining to Hypothesis I seem to be clearly contrary to prediction while the results pertaining to Hypothesis III are contradictory (though non-significant) using the two behavioral measures.

In order to make the above prediction about groups INDF and ENDF for the two types of measures (Instrumental versus Hostile), an assumption was necessary regarding the performance of each subject in these groups. The assumption behind Hypothesis I and Hypothesis III was that during the instrumental measures each subject in the INDF group would be more aggressive than he would during the hostile measures. Also it was assumed that the ENDF subjects each would engage in more hostile aggression in relation to instrumental aggression. With this result occurring within each of the subjects the predicted differences should occur. It would seem, however, that a more straightforward approach to testing Hypothesis I and III would be to look at the difference scores between the various instrumental and hostile measures of aggression. The following difference score combinations were analyzed: 1) first L-C Option minus third L-C Option, 2) second L-C Option minus third L-C Option, 3) average of first and second L-C Options minus third L-C Option, and 4) shock #1 minus shock #2.



Appendix J displays the Eight-cell Means and Analysis of Variance Summary Table for the first L-C Option minus third L-C Option. No significant differences were found on this measure. The C main effect, however, approached significance ( $F = 2.57, p < .15$ ) and indicated that when this measure is used that Externals engaged in more Instrumental than Hostile aggression. Cell INDF obtained a mean of 2.9 and cell ENDF a mean of 3.0 ( $t = <1$ ). Groups IDF and EDF, however, obtained means of 2.5 and 3.2 which is a statistically significant difference ( $t = 3.2, p < .005$ ). Using the second L-C Option minus third L-C Option as a test of Hypothesis I and III provides a very different result. Table 4 presents the Eight-cell Means and Analysis of Variance Summary Table for this data. The BC and ABC interactions were statistically significant ( $F = 4.53, p < .05$  and  $F = 7.27, p < .01$  respectively). Figure 2 depicts the relationships between cell means which are causing these significant differences. The BC interaction suggests that defensive internal subjects engage in the most hostile types of aggression and that defensive externals engage in the most instrumental aggression. On the other hand, non-defensive internals are more instrumentally aggressive than non-defensive externals. This same relationship is maintained in the ABC interaction and seems to be directly attributable to the differences between the INDF and ENDF cells as well as the differences between the IDF and EDF groups. The respective means for these groups are INDF = 2.9 and ENDF = 2.4 ( $t = 1.75, p < .05$ ) and IDF = 2.2 and EDF = 3.4 ( $t = 3.6, p < .005$ ). This data, therefore, can be considered evidence in support of the relationship sought in Hypothesis I and III. The A main effect in this analysis is also very

close to statistical significance ( $F = 3.40, p < .07$ ). This result suggests a tendency, though non-significant, for subjects in the personal attack condition to engage in more instrumental aggression in relation to hostile aggression. Appendix K illustrates the Eight-cell Means and Analysis of Variance Summary Table for the average of the first and second L-C Options minus the third L-C Option. This analysis did not yield any significant differences. However, the BC and ABC interactions are approaching significance ( $F = 3.66, p < .08$  and  $F = 3.66, p < .08$  respectively) and show the same relationships that were found in the previous analysis (see Figure 2 and compare with Figure 3). Finally, the difference scores between Shock #1 and Shock #2 provide additional evidence for the relationship found in the other shock analysis. As Table 5 shows, the AC and BC interactions are significant ( $F = 6.64, p < .03$  and  $F = 4.84, p < .05$  respectively). Figure 4 presents the cell means visually so that the source of the interactions may be observed. A Newman-Keuls run on the ordered means of the four cells of the AB interaction found that frustrated internals are significantly less instrumentally aggressive in relation to hostile aggression than are the frustrated externals (mean difference = 9.80,  $r = 3, p < .05$ ). A Newman-Keuls run on the BC ordered means found a significant difference between  $C_1B_1$  and  $C_1B_2$  or between defensive internals and non-defensive internals with the former being the more instrumentally aggressive. This result would suggest just the opposite relationship than was found using the L-C Option measures (compare Figure 2 with Figure 4). Non-defensive internals were also found to be less instrumentally aggressive in relation to hostile

aggression than were non-defensive externals though this difference doesn't quite reach statistical significance with the Newman-Keuls procedure. A t-test comparing the INDF subjects with the ENDF subjects does reach significance ( $t = 1.85, p < .05$ ) indicating that INDF subjects are significantly less instrumentally aggressive or engage in more hostile aggression than the ENDF subjects for this measure. These results are significant in the opposite direction than was predicted by Hypothesis I and III.

In order to test the differences predicted in Hypothesis II, two pencil and paper measures of anger were taken: 1) anger toward the opponent during the game, 2) anger toward the opponent after the game. The most direct test of this hypothesis is the reported anger after the game. An analysis of variance on this measure showed no significant differences (see Appendix L) with only the A main effect ( $F = 3.30, p < .10$ ) approaching significance. Looking at the individual cell means it was observed that group INDF scored a mean of 15.1 while the ENDF groups mean was 21.0. Though this difference is in the predicted direction a t-test of mean difference between these two cells is non-significant ( $t = .67, p < .10$ ). Another test of Hypothesis II would be the difference score between the during game anger rating and after game anger rating. Since this study predicts that internals will reduce anger and externals will not, a higher magnitude difference score would provide support for this prediction. An analysis of variance on these difference scores showed no significant differences. Appendix M provides the Eight-cell Means and the Analysis of Variance Summary Table for this data. Looking specifically at the group

INDF and ENDF the individual cell means are 66.1 and 48.4 respectively. This difference is in the predicted direction but does not reach statistical significance ( $t = 1.58, p < .08$ ). The results on the anger data therefore reject Hypothesis II.

#### FINAL DISCUSSION

The analysis of the data for this study was purposefully designed to provide maximum information about the variables involved. However, for reasons of clarity the results will first be discussed as they pertain directly to the main hypotheses of this study. The additional information about the remaining groups will provide a perspective with which to evaluate the merit of the present study's predictions.

In way of review, the two groups of primary interest are internal non-defensive frustrated subjects (INDF) and external non-defensive frustrated subjects (ENDF).

Hypothesis I. Internals will behave more aggressively than externals in a situation where aggression can be perceived as instrumental to the removal of a frustrating stimulus.

This prediction was designed to test whether INDF subjects were more instrumentally aggressive than ENDF subjects. The implicit assumption behind this prediction was that internals should more readily perceive the instrumentality of the opportunity to aggress in this situation. For the instrumental measures (L-C Options 1 and 2 and Shock #1) no significant differences were found between the INDF and ENDF groups. This result was consistent across all these three measures. It must be concluded then, that Hypothesis I is rejected. This study found no

significant differences between INDF subjects and ENDF subjects for the magnitude of instrumental aggression. This conclusion will later, however, be qualified in view of the difference score data to follow in the next section.

Hypothesis III. Internals will be less aggressive than externals after a constructive (more cooperative) behavior change on the part of the victim, where aggression cannot be perceived as instrumental to the removal of the frustrating stimulus.

This prediction tests the second half of the theory of aggression presented in this study. The position is that if INDF subjects engage in more instrumental types of aggression they should experience more catharsis of aggression after a constructive behavior change on the part of the frustrator and therefore will engage in less non-instrumental or hostile aggression. The results indicate that for the third L-C Option a difference was found in the predicted direction but that this difference did not quite reach statistical significance. The shock measures also found no significant differences. Hypothesis III, therefore, must also be rejected. INDF subjects and ENDF subjects do not significantly differ on the measures of hostile aggression. In sum, it must be concluded that both Hypothesis I and Hypothesis III have been rejected.

One may, however, return to the basic theory behind these two hypotheses and derive a more direct test. Both of these hypotheses are based upon the assumption that each member of group INDF will engage in more aggression on the instrumental measures in relation to the hostile measures of aggression. The ENDF group, on the other hand, was expected to engage in less instrumental in relation to hostile aggression. It would

seem, therefore, that difference scores between these two types of measures (instrumental versus hostile) would provide a more direct test of these relationships. Using difference scores, a significant difference was found between the INDF and the ENDF groups in the predicted direction for the L-C Option measures. This seems to be evidence to confirm the relationship Hypothesis I and III are attempting to detect. These findings suggest that the INDF group does use relatively more aggressive behavior, when it is instrumental rather than when it is hostile, than does the ENDF group. This conclusion, though, is quite different than what would be concluded if Hypothesis I and III were confirmed as stated. The total magnitude of instrumental aggression need not differ between the INDF and ENDF groups per se for a significant difference to be found between their difference scores.

If difference scores are analyzed for the shock measures significant differences are found in the opposite direction than was found for the L-C Option measures. That is, the ENDF group shows significantly more instrumental aggression in relation to the hostile aggression. One seems totally overwhelmed when attempting to explain this contradiction until he looks at the results of the other groups (see Table 3). The highly significant AC interaction suggests that under the more potent Personal Attack condition, internals are more instrumentally aggressive in relation to hostile aggression. It also suggests that externals under the frustration condition are more instrumentally aggressive in relation to hostile aggression than are internals. The significant BC interaction further suggests that non-defensive externals engage more in instrumental aggression in relation to hostile aggression than do non-defensive internals.

It also indicates that defensive internals engage more in instrumental aggression in relation to hostile aggression than do defensive externals. By comparing Table 4 with Table 2, and Figure 2 with Figure 4 it will become apparent that the exact opposite results, both significant, were obtained using the different measures of aggression. Evidently these measures cannot, in any sense, be equated. It would seem unreasonable to assume that these two different types of aggression are measuring the same response tendency. At the same time any explanation of these mirror results can be at best only speculative with the burden of proof lying in further empirical studies. Whatever the cause, it would appear that this finding is systematic rather than due to random variations. These mirror results could be operating under a single motivation. That is, whatever motivates an individual group to score high on one measure also motivates that group to score low on the other measure. The key, then, seems to lie in the motivations behind the strategies of each group in using the L-C Option and Shock. Some evidence tends to indicate, though not quite significantly, that for Shock #1, non-defensive subjects were more aggressive in the frustration condition than they were under the personal attack condition (see the cell means of Appendix D). Defensive subjects, however, were more aggressive under the personal attack condition than the frustration condition. This finding contradicts previous research with this defensiveness scale as well as the research on the magnitude of manipulation to aggression (Davis, 1971; Brown, 1972; Conn and Crowne, 1964). These studies found non-defensive subjects always to be more aggressive and open with their anger. Brown (1972) also found aggression

to increase as the potency of the manipulation to aggression increased. The present findings with the shock measures have just the opposite results. It seems fair to conclude that the shock measure does not in fact measure aggression but rather a response rather antithetical to aggression. Perhaps what is operating here is similar to what Blackburn (1972) described as part of his "Aggression" factor; the denial of undesirable impulses and overcontrol or inhibition of aggressiveness. In other words, rather than the shock intensity being a measure of the tendency to aggress, it may be a measure of the tendency to deny aggressive intent (at least overtly) or to control aggressive desire. The effect would be a counterbalancing or neutralization of each subject's response tendency; on the one hand (the L-C Option measures) the subjects are being clearly aggressive, while on the other hand (Shock measures) they are trying to deny or undo that response. This interpretation could be criticized as an effort to rationalize highly contradictory results in favor of the main predictions made in this study. This criticism may be justified but one is still faced with the burden of explaining remarkably consistent contradictory results. One is naturally allured by an explanation which unites polarities.

In summary it appears that there is some evidence in support of Hypothesis I and III. Though other evidence seems to point to the rejection of these hypotheses as stated initially. Enough significant and interesting results, however, seem to have been found to warrant further study of these variables in relation to aggressive behavior.



Hypothesis II. Internals will be less angry and hostile than externals after aggressing in a situation where aggression can be perceived as instrumental to the removal of a frustrating stimulus.

This hypothesis is an additional test of the catharsis which was predicted for the INDF group after having instrumentally aggressed. The differences found in the "during game" and "after game" measures of anger were in the predicted direction but did not quite reach significance at the .05 level. Hypothesis II is therefore rejected. However, the obtained high significance ( $p < .08$ ) in the predicted direction does seem to lend positive evidence in favor of Hypothesis II. Internal non-defensive frustrated subjects did seem to be less angry after the game in relation to their "during game" anger than were the external non-defensive frustrated subjects. The INDF group, therefore, experienced a greater catharsis of anger following the cooperation of their opponent than did the ENDF group. This result combined with the positive results on the L-C Option difference score data for Hypothesis I and III seem to lend some support to the model of aggression predicted in this study for Internal and External Control of Reinforcement subjects.

#### ADDITIONAL FINDINGS

The most statistically significant difference found in this study was between internal defensive frustrated subjects (IDF) and external defensive frustrated subjects (EDF) in the L-C Option measures. This difference was found in the third L-C Option and in all the difference score data. The EDF group was found to engage in significantly more instrumental aggression in relation to hostile aggression than the IDF group. The IDF group engaged in the most hostile aggression, as measured by the third

L-C Option, found in this study. These two groups (EDF and IDF) also differed in the opposite direction from the INDF and ENDF groups. In other words, the EDF and INDF groups engaged in significantly more instrumental aggression in relation to hostile aggression than did their counterpart groups IDF and ENDF. Since no predictions were made about the IDF and EDF any interpretation of these differences is speculative and subject to future empirical verification. An explanation, though, may lie in Rotter's (1966) suggestion that certain individuals who score as externals and who behave as one would expect an internal to behave, may be scoring external as a defense against fear of failure. Having an external belief system may reduce the dissonance caused by expecting to be in control and at the same time fearing failure or inadequacy. The defensive external then may actually be internal in his behavior. The defensive internal, on the other hand, does not behave as one would expect an internal to because his internal scoring is motivated only by the approval motive. It is more socially desirable to have an internal belief system. Since this group consciously holds at least lip service to internal beliefs, they are more vulnerable to experience fears of failure or inadequacy. This emotional state probably hinders performance and may cause the IDF group to behave like the ENDF group. This explanation would suggest therefore, that external defensive subjects are behaviorally equivalent with internal non-defensive subjects and internal defensive subjects are behaviorally equivalent with external non-defensive subjects. Even this interpretation would be unable to explain why the IDF and EDF subjects were found to have such wide differences in their aggressive responding.

Despite the absence of definitive results this study seems to have justified using a control of defensiveness with the internal-external variable when studying aggression. This conclusion is based on the fact that there were no significant C main effects while numerous AB, BC and ABC interactions were found. Without the defensiveness variable, therefore, the differences found in this study would have been masked.

An additional consideration in evaluating this experiment is its possible methodological shortcomings. For instance, in the instructions for the playing of the game the experimenter purposely left ambiguous whether the subject should be cooperative or competitive. Assuming a subject conceived his game goal to be a competitive one, he may not be frustrated or motivated at all to change his opponent's strategy because he (the subject) is winning with it. This inherent uncontrolled feature in the experiment could be effecting the instrumental aggression in some way. Future studies should be aware of this problem in using the Prisoner Dilemma paradigm. To overcome this possible methodological difficulty a paradigm is needed which would focus the subjects attention upon the frustration manipulation and demand a more immediate response. One methodology that may meet these requirements would be a psycho-dramatic approach utilizing role playing. A confederate could provide the aggression eliciting stimulus to which the subject must immediately respond to dramatically. Trained judges could be used to rate the subjects responses and label as hostile aggression or instrumental aggression.

In conclusion, the results of this study can be viewed as supporting the model of aggression theorized here. The L-C Option results supported

the Rothaus and Worchel (1964) findings in regard to catharsis of anger. The distortion between hostile and instrumental (Feshbach, 1964) aggression seemed to be a useful one when studying the personality variable of Locus of Control of Reinforcement. The additional findings seem to confuse the issue somewhat and are very difficult to interpret. However, since this study made no predictions about these groups the burden of explanation will lie in additional empirical studies.

## CHAPTER V

### SUMMARY

Eighty introductory psychology students served as subjects in a study designed to test the relationships between the Internal-External Locus of Control variable and aggressive behavior. This study utilized a 2 x 2 x 2 fixed factor factorial design. Locus of Control, Defensive-ness, and Potency of Instigation to Aggression were the three variables used in the design.

Subjects were initially assigned to the Internal and External as well as Defensive and Non-Defensive groups on the basis of their test scores on scales which are sensitive to these categories. The resulting four groups each were divided into two randomly assigned conditions: Personal Attack and Frustration. This division resulted in the following eight groups: 1) internal, defensive frustrated S's; 2) internal, non-defensive frustrated S's; 3) internal, defensive, personal attack S's; 4) internal, non-defensive personal attack S's; 5) external, defensive frustrated S's; 6) external, non-defensive frustrated S's; 7) external, defensive, personal attack S's; 8) external, non-defensive personal attack S's.

The two groups of specific interest were internal, non-defensive frustrated S's (INDF) and external, non-defensive frustrated S's (ENDF). The INDF group was not found to engage in any more instrumental aggression than the ENDF group. However, the INDF group was found to engage

in significantly more instrumental aggression in relation to hostile aggression than did the ENDF group. The ENDF group engaged in more hostile aggression, though not quite significantly more. The INDF group also was less angry after the game in relation to their "during game" anger than were the ENDF group. These results taken separately from the remainder of the studies' findings lend support to the predictions of this study. However, the greatest differences were found between the internal, defensive frustrated S's (IDF) and the external, defensive frustrated S's (EDF). These differences showed the EDF group to be the most instrumentally aggressive in relation to hostile aggression of any of the groups. Also, the IDF group was the least instrumentally aggressive in relation to hostile aggression of any of the groups. The above differences were all found using the Loss-Cost Option measures of aggression. The findings using the shock measures of aggression seemed to mirror or to be the exact opposite of the Loss-Cost Option results.

It was concluded that some support was found for the predictions made in this study but that this support must be qualified by inconsistencies and numerous surprising and difficult-to-explain findings.

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The purpose of this experiment is to explore interpersonal behavior in a game situation like the one you see before you. You are playing with an individual located in another room in this building, who is also receiving similar instructions via a tape recorder. The fact that each player is isolated from one another is a deliberate feature of the experiment. One of the purposes of this study is to explore interpersonal behavior when the individuals involved have minimal social contact. Therefore, at no time during this experiment will you be able to see or hear your playing partner. Now let me explain to you how the game is played.

Notice the three buttons along the left hand side of this 9-square matrix. The buttons are numbered 1, 2, and 3. During the major part of the game you will be pressing these buttons in order to indicate your choices or moves in the game. Your opponent is seated at a very similar console with the exception that his three numbered buttons are located across the top row of the 9-square matrix rather than along the side as yours are. The purpose and function of this minor difference will shortly become apparent. Let us say that on a particular trial of the game you chose button number 1 and your opponent also chooses button number 1. The outcome for such a joint choice is: your gain 6 and your opponent also gains 6 (Experimenter illuminates appropriate cell). The way in which the choice or move buttons are arranged on both your and your opponents consoles should allow you to immediately determine what button your opponent has pressed when the square is illuminated. Consider that your buttons control rows of the 9-square matrix: Button number 1 controls row 1; Button number 2 controls row 2; Button number 3 controls row 3. So, for any choice that you make and for any choice that your opponent makes there will be an intersect-

tion of one of your rows with one of his columns ( E illuminates row 2 and column 2). The square that is the intersection of your row and your opponents column is the outcome for that trial of the game. ( E demonstrates this by leaving only the center square illuminated)

Let me now explain the function of the three counters that are located across the top of your console. First you will notice that the counters are all set on 25 points at the present time. This means that I have given you 25 points as an initial stake with which to play the game. Any points that you accumulate over the 25 points given as an initial stake can be exchanged at the end of the experiment for money. The rate of exchange is 5 cents per extra point. The first counter on your extreme left and labeled "Total" will record the maximal or highest possible gain that you could get on any trial of the game. As you look across the 9-square matrix, you will discover that 6 is the most that you could gain on any trial of the game. So let us say that on the first trial of the game you chose button number 1 and that your opponent chose button number 3. The unique outcome for such a joint choice would be: you gain 2 and your opponent would gain 0. In this case counter one, the total counter, will go up six points ( E then activates counter 6 units). Of course it will always be possible to gain 6 points, so counter one will always go up 6 points on every trial of the game no matter what the actual outcome of that trial is. As you can see, on the first trial of the game I have been describing, you would have gained something less than the maximal amount of points that you could have gained. You would have gained only 2 points. Counter two, in the middle, will keep track of your actual gains ( E activates counter two). Counter three will keep track of your opponents actual gains. In the above example, however, your opponent would have gained nothing so his actual gain counter would not be activated. You will notice that events like this ( E illuminates a coil

which contains a loss figure) can also occur in the game. The counters across the top of your console will not cycle backwards so you will have to keep track of any losses that occur during the game yourself. The easiest way to do this is with the paper and pencil that is provided in front of you. Now I will explain the function and operation of the 4-square matrix at the bottom of your console. Another purpose of the game is to explore interpersonal behavior when the individuals playing this game have different game options at their disposal. At the end of that part of the game that uses the choices and the pay-offs that are depicted in the 9-cell matrix both you and your opponent will be given an opportunity to exercise one of these options. In general this procedure allows you to take away a certain number of points from your opponent at a certain cost to yourself. You may of course choose not to exercise one of these loss-cost options by choosing button number 1 (cell 1 illuminated by E) over the first cell of this 4-square matrix. In the case where you do choose to exercise one of these options that involves a cost to you and a loss to your opponent (E illuminates cells 2, 3, and 4), the point totals that are registered on the counters will change negatively. You will be keeping track of this loss separately. In the case where you choose button number 1 over the first cell of the matrix, the point totals will remain the same. Your opponent will make use of this same option. Since you have received the game advantage your opponent will receive the consolation of hearing your choice in the loss-cost option. You, however, will not know his loss-cost until the experiment is completed.

My assistant and I will be receiving each of your 9-square matrix moves and loss-cost options via room extension phones.

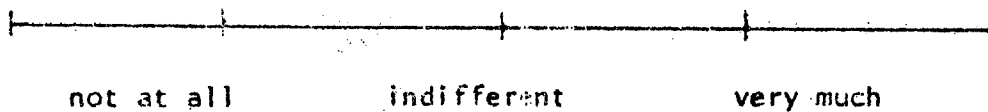
Finally, I will explain the game format. The game will consist of three trial blocks. Each trial block will be composed of four moves on the 9-cell matrix and one opportunity to use the loss-cost option. After the second block you will also have the opportunity to put the game advantage to effect. This advantage will be explained after the second trial block. (These instructions were adapted from Brown's apparatus instructions, Brown, 1972)



## GAME EVALUATION FORM

In evaluating the interpersonal interactions in this game it is very important to us to know your personal reactions during the game.

1. Did you enjoy playing the game? (mark an appropriate area on the scale below)



2. What were your most characteristic feelings during the game? Rate the following in order: 1= most characteristic

5= least characteristic

\_\_\_ Anger

\_\_\_ Challenged

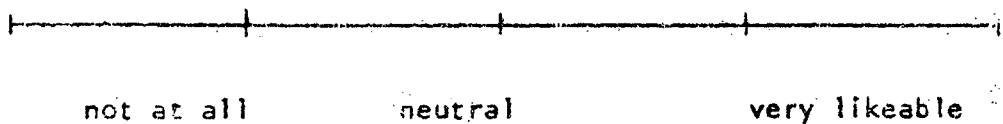
\_\_\_ Competitive

\_\_\_ Frustrated

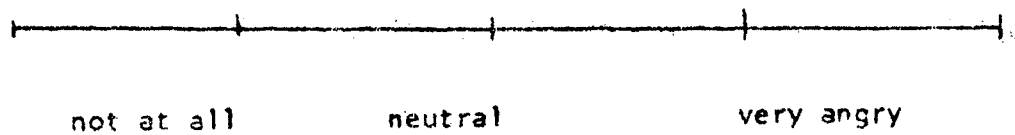
\_\_\_ Neutral (no noticeable reaction)

Feelings you hold toward playing partner:

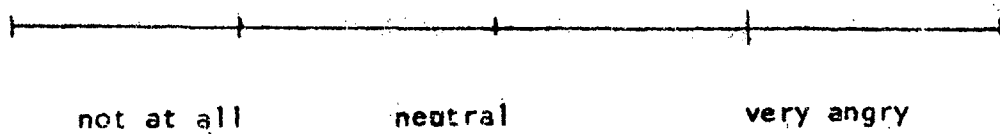
6. How likeable would you say he is?



7. During the game, did he make you angry?\_\_If yes, how much?



8. Do you presently feel angry toward him?\_\_If yes, how much?



## SOCIAL REACTION INVENTORY

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded on a separate answer sheet. Print your name and any other information requested by the examiner on the answer sheet, then finish reading these directions. Do not open the booklet until you are told to do so.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Find the number of the item on the answer sheet and circle either alternative a or b, which ever you choose as the statement most true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

## REMEMBER

Select the alternative which you personally believe to be more true.

I more strongly believe that:

1. a. In my case getting what I want has little or nothing to do with luck.  
b. Many times we might as well decide what to do by flipping a coin.
2. a. What happens to me is my own doing.  
b. Sometimes I feel that I don't have enough control over the direction my life is taking.
3. a. Many times I feel that I have little influence over the things that happen to me.  
b. It is impossible for me to believe that chance or luck plays an important role in my life.
4. a. In the case of a well prepared student there is rarely if ever such a thing as an unfair test.  
b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
5. a. Without the right breaks, one cannot be an effective leader.  
b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
6. a. Without the right breaks one cannot be an effective leader.  
b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. Becoming a success is a matter of hard work; luck has little or nothing to do with it.  
b. Getting a good job depends mainly on being at the right place at the right time.
8. a. Voting must be a pragmatic rather than moral decision.  
b. Real participatory democracy should be the basis for a new society.
9. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.  
b. Who gets to be the boss depends on who has the skill and ability; luck has little or nothing to do with it.
10. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.  
b. By taking an active part in political and social affairs the people can control world events.

I more strongly believe that:

11. a. The average citizen can have an influence in government decisions.  
 b. This world is run by the few people in power, and there is not much the little guy can do about it.
12. a. With enough effort we can wipe out political corruption.  
 b. It is difficult for people to have much control over the things politicians do in office.
13. a. In the long run people get the respect they deserve in this world.  
 b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
14. a. More and more I feel helpless in the face of what's happening in the world today.  
 b. I sometimes feel personally to blame for the ineffective affairs in our government.
15. a. Leadership positions tend to go to capable people who deserve being chosen.  
 b. It's hard to know why some people get leadership positions and others don't; ability doesn't seem to be the important factor.
16. a. Knowing the right people is important in deciding whether a person will get ahead.  
 b. People will get ahead in life if they have the goods and do a good job knowing the right people has nothing to do with it.
17. a. Even though I may feel a law is unjust, I do my best to obey it because I believe those who make and enforce the laws must know what they are doing.  
 b. I refuse to obey a law I believe to be immoral because I believe my conscience is the best judge.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.  
 b. There really is no such thing as "luck."
19. a. When I make plans, I am almost certain that I can make them work.  
 b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

I more strongly believe that:

20. a. Although I hope for a life of happiness, I know I'm bound to get my share of hardships someday.
- b. Although everyone has some bad luck, most misfortunes can be avoided by leading a well-planned and careful life.
21. a. I have always felt pretty sure my life would work out the way I wanted it to.
- b. There's not much use planning too far ahead because something usually comes up that makes me change my plans.
22. a. Because I usually see my problems from so many points of view, I find it hard to make up my mind one way or the other.
- b. I can usually make up my mind and stick to it.
23. a. Children get into trouble because their parents punish them too much.
- b. The trouble with most children nowadays is that their parents are too easy with them.
24. a. Many of the unhappy things in people's lives are partly due to bad luck.
- b. People's misfortunes result from the mistakes they make.
25. a. One of the major reasons why we have wars is that people don't take enough interest in politics.
- b. There will always be wars, no matter how hard people try to prevent them.
26. a. The idea that teachers are unfair to students is nonsense.
- b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
27. a. No matter how hard you try some people just won't like you.
- b. People who can't get others to like them don't understand how to get along with others.
28. a. Heredity plays the major role in determining one's personality.
- b. It is one's experiences in life which determine what one is like.
29. a. I have often found that what is going to happen will happen.
- b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

I more strongly believe that:

30. a. There are certain people who are just no good.  
b. There is some good in everybody.
31. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.  
b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
32. a. One should always be willing to admit his mistakes.  
b. It is usually best to cover up one's mistakes.
33. a. It is hard to know whether or not a person really likes you.  
b. How many friends you have depends on how nice a person you are.
34. a. In the long run the bad things that happen to us are balanced by the good ones.  
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
35. a. Sometimes I can't understand how teachers arrive at the grades they give.  
b. There is a direct connection between how hard I study and the grades I get.
36. a. A good leader expects people to decide for themselves what they should do.  
b. A good leader makes it clear to everybody what their jobs are.
37. a. People are lonely because they don't try to be friendly.  
b. There's not much use in trying too hard to please people, if they like you, they like you.
38. a. There is too much emphasis on athletics in high school.  
b. Team sports are an excellent way to build character.
39. a. Most of the time I can't understand why politicians behave the way they do.  
b. In the long run the people are responsible for bad government on a national as well as a local level.

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally. Circle T or F.

- T F 1. Before voting I thoroughly investigate the qualifications of all the candidates.
- T F 2. I never hesitate to go out of my way to help someone in trouble.
- T F 3. It is sometimes hard for me to go on with my work if I am not encouraged.
- T F 4. I have never intensely disliked anyone.
- T F 5. On occasion I have had doubts about my ability to succeed in life.
- T F 6. I sometimes feel resentful when I don't get my way.
- T F 7. I am always careful about my manner of dress.
- T F 8. My table manners at home are as good as when I eat out in a restaurant.
- T F 9. If I could get into a movie without paying and be sure I was not seen, I would probably do it.
- T F 10. On a few occasions, I have given up doing something because I thought too little of my ability.
- T F 11. I like to gossip at times.
- T F 12. There have been times when I felt like rebelling against people in authority even though I knew they were right.
- T F 13. No matter who I'm talking to, I'm always a good listener.
- T F 14. I can remember "playing sick" to get out of something.
- T F 15. There have been occasions when I took advantage of someone.
- T F 16. I'm always willing to admit it when I make a mistake.
- T F 17. I always try to practice what I preach.
- T F 18. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.
- T F 19. I sometimes try to get even, rather than forgive and forget.
- T F 20. When I don't know something I don't at all mind admitting it.
- T F 21. I am always courteous, even to people who are disagreeable.
- T F 22. At times I have really insisted on having things my own way.
- T F 23. There have been occasions when I felt like smashing things.



- T F 24. I would never think of letting someone else be punished for my wrongdoings.
- T F 25. I never resent being asked to return a favor.
- T F 26. I have never been irked when people expressed ideas very different from my own.
- T F 27. I never make a long trip without checking the safety of my car.
- T F 28. There have been times when I was quite jealous of the good fortune of others.
- T F 29. I have almost never felt the urge to tell someone off.
- T F 30. I am sometimes irritated by people who ask favors of me.
- T F 31. I have never felt that I was punished without cause.
- T F 32. I sometimes think when people have a misfortune they only got what they deserved.
- T F 33. I have never deliberately said something that hurt someone's feelings.

## ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE FIRST L-C OPTION

SOURCE	SS	df	MS	F
SS <sub>A</sub>	1.25		1.25	2.40
SS <sub>B</sub>	.20		.20	
SS <sub>C</sub>	.20		.20	
SS <sub>AB</sub>	.05		.05	
SS <sub>AC</sub>	.05		.05	
SS <sub>BC</sub>	.8		.8	1.54
SS <sub>ABC</sub>	.45	1	.45	
WITHIN	37.80	72	.52	
TOTAL	40.8	79		

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	1.6	1.4	1.4	1.9
A <sub>2</sub>	1.8	1.8	1.8	1.9

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE SECOND L-C OPTION

SOURCE	SS	df	MS	F
SS <sub>A</sub>	3.61		3.61	7.85 **
SS <sub>B</sub>	.31		.31	
SS <sub>C</sub>	.31		.31	
SS <sub>AB</sub>	.01		.01	
SS <sub>AC</sub>	1.01		1.01	2.20
SS <sub>BC</sub>	.11		.11	
SS <sub>ABC</sub>	.31	1	.31	
WITHIN	33.30	72	.46	
TOTAL	38.99	79		

\*\* Significant t p < .01

EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	1.3	1.4	1.6	1.3
A <sub>2</sub>	2.1	1.9	1.7	1.6

APPENDIX G

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE FIRST PLUS THE SECOND L-C OPTION

SOURCE	SS	df	MS	F
SS <sub>A</sub>	7.81	1	7.81	7.04 **
SS <sub>B</sub>	.11	1	.11	
SS <sub>C</sub>	.11	1	.11	
SS <sub>AB</sub>	.31	1	.31	
SS <sub>AC</sub>	2.11	1	2.11	1.90
SS <sub>BC</sub>	.11	1	.11	
SS <sub>ABC</sub>	.11	1	.11	
WITHIN	79.7	72	1.11	
TOTAL	90.39	79		

\*\* Significant p < .01

EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	2.9	2.8	3.0	3.2
A <sub>2</sub>	3.9	3.7	3.5	3.3

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SHOCK #1

SOURCE	SS	df	MS	F
SS <sub>A</sub>	54.45	1	54.45	
SS <sub>B</sub>	204.8	1	204.8	
SS <sub>C</sub>	48.05	1	48.05	
SS <sub>AB</sub>	744.2	1	744.2	3.06
SS <sub>AC</sub>	266.45	1	266.45	1.1
SS <sub>BC</sub>	180.0	1	180.0	
SS <sub>ABC</sub>	304.2	1	304.2	1.25
WITHIN	17495.8	72	242.99	
TOTAL	19,297.95	79		

EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	17.1	20.9	23.2	25.2
A <sub>2</sub>	29.1	12.9	20.1	17.7

## ANALYSIS OF VARIANCE SUMMARY TABLE FOR SHOCK #1

SOURCE	SS	df	MS	F
SS <sub>A</sub>	80	1	80	
SS <sub>B</sub>	.05	1	.05	
SS <sub>C</sub>	24.2	1	24.2	
SS <sub>AB</sub>	361.25	1	361.25	1.33
SS <sub>AC</sub>	245	1	245	
SS <sub>BC</sub>	198.45	1	198.45	
SS <sub>ABC</sub>	22.05	1	22.05	
WITHIN	19,422.8	72	269.76	
TOTAL	20,353.8	79		

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	17.0	25.5	16.6	16.7
A <sub>2</sub>	20.8	18.7	25.3	19.0

APPENDIX J

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE FIRST MINUS THE THIRD L-C OPTION\*

SOURCE	SS	df	MS	F
SS <sub>A</sub>	.05	1	.05	
SS <sub>B</sub>	.05	1	.05	
SS <sub>C</sub>	1.80	1	1.80	2.57
SS <sub>AB</sub>	.05	1	.05	
SS <sub>AC</sub>	.2	1	.2	
SS <sub>BC</sub>	.80	1	.80	1.14
SS <sub>ABC</sub>	.2	1	.2	
WITHIN	50.40	72	.70	
TOTAL	53.40	79		

\* Each difference score had 3 added to it.

EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	2.5	2.9	3.2	3.0
A <sub>2</sub>	2.8	2.9	3.1	3.0

ANALYSIS OF VARIANCE SUMMARY TABLE FOR THE AVERAGE OF L-C OPTIONS 1 & 2 MINUS

L-C OPTION 3

SOURCE	SS	df	MS	F
SS <sub>A</sub>	.70	1	.70	1.55
SS <sub>B</sub>	.07	1	.07	
SS <sub>C</sub>	.70	1	.70	1.55
SS <sub>AB</sub>	.02	1	.02	
SS <sub>AC</sub>	.70	1	.70	1.55
SS <sub>BC</sub>	1.65	1	1.65	3.66
SS <sub>ABC</sub>	1.65	1	1.65	3.66
WITHIN	32.53	72	.45	
TOTAL	38.05	72		

EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	2.35	2.9	3.3	2.7
A <sub>2</sub>	3.05	2.95	3.05	2.95



## ANALYSIS OF VARIANCE SUMMARY TABLE FOR AFTER GAME ANGER

SOURCE	SS	df	MS	F
SS <sub>A</sub>	2050.31	1	2050.31	3.30
SS <sub>B</sub>	103.51	1	103.51	
SS <sub>C</sub>	324.01	1	324.01	
SS <sub>AB</sub>	63.01	1	63.01	
SS <sub>AC</sub>	248.51	1	248.51	
SS <sub>BC</sub>	409.51	1	409.51	
SS <sub>ABC</sub>	70.31	1	70.31	
WITHIN	44,688.30	72	620.66	
TOTAL	47,957.49	79		

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	21.0	15.1	14.1	21.0
A <sub>2</sub>	31.0	32.4	20.8	27.5

## ANALYSIS OF VARIANCE SUMMARY TABLE FOR DURING GAME ANGER MINUS AFTER GAME ANGER

SOURCE	SS	df	MS	F
SS <sub>A</sub>	2040.2	1	2040.2	2.96
SS <sub>B</sub>	224.45	1	224.45	
SS <sub>C</sub>	61.25	1	61.25	
SS <sub>AB</sub>	561.80	1	561.80	
SS <sub>AC</sub>	952.2	1	952.2	1.38
SS <sub>BC</sub>	1602.05	1	1602.05	2.32
SS <sub>ABC</sub>	259.2	1	259.2	
WITHIN	49,544.8	72	688.12	
TOTAL	55,245.95	79		

## EIGHT-CELL MEANS

	C <sub>1</sub>		C <sub>2</sub>	
	B <sub>1</sub>	B <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	44.9	66.1	52.3	48.4
A <sub>2</sub>	57.0	60.4	71.0	63.7

