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**LA THÈSE A ÉTÉ  
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LOCUS OF CONTROL, AGE, SEX AND INTERPERSONAL  
BARGAINING IN CHILDREN

by Jack H. Papazian

Thesis presented to the School of  
Graduate Studies in partial ful-  
fillment of the requirements for  
the degree of Ph.D. in Child  
Clinical Psychology

University of Ottawa

Ottawa, Canada, 1977

(C) J.H. Papazian, Ottawa, Canada, 1978

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## CURRICULUM STUDIORUM

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## INTRODUCTION

Within the last decade, the construct of internal versus external control of reinforcement has emerged as a variable of considerable significance in understanding and predicting a broad range of behaviours. One can only speculate on the surprising popularity of this concept as a subject of psychological investigations. Research in this area has produced some important and well-replicated findings. The bulk of research has been conducted with adults, but almost since the work of identifying and describing locus of control began, researchers have been interested in investigating this variable in relation to children's development of academic and social-interpersonal skills; however, this latter aspect has been left relatively unexplored. Part of the reason is the fact that research with children naturally poses a formidable problem in terms of assessment across ages and several attempts to measure locus of control in children have been carried out with only moderate success. Consequently, inconsistent findings are often reported in the literature, with shortcomings and limitations relating to reliability, format, administration, lack of intercorrelation among the various children's I-E scales, and problems of 'impurity' and multi-dimensionality of these scales. Thus, questions have been raised concerning

the reliability and validity of these measurements and concerning the general efficiency of the scale or questionnaire approach to children's personality measurement. Due partly to these factors and also to many others, the field of personality research has experienced something of a belated behaviouristic revolt, leading to a situation of controlled laboratory studies intended to supply the unambiguous answers that scales, paper and pencil tests or questionnaires often failed to provide.

In contrast to locus of control research, a review of the gaming literature makes it clear that researchers, in trying to elicit co-operations from subjects, have put more emphasis on situational determinants of behaviour, rather than on individual differences. Here, too, results on adult co-operative or competitive behaviour have shown moderate co-operation, but the degree of adults' co-operation or competition has been found to be influenced by such situational variables as incentive value, possibility for communication, availability of information and possibility for use of threat. In short, the demand characteristics of the situation in experimental studies have not been the same for all participants in the game. Thus, it has often been observed by research workers that subjects seem to superimpose their personal motives and attitudes upon the game structure, in spite of the fact that the task is described as a choice

task rather than a game, and even though any reference to an opponent or winning is scrupulously avoided.

Emphasis on personality factors in experimental games is clearly warranted. In children's gaming literature, those laboratory investigations which have focussed upon subject differences in co-operative or competitive behaviours have emphasized the effects of social class, race, culture on co-operative or competitive behaviour, but the effects of developmental characteristics of personality on these behaviours have been left virtually unexplored. Age and sex variables have also not been explored systematically, thus, it would seem that there is a clear need to study personality, age and sex in experimental research.

An overview of both I-E and gaming literature, especially that dealing with cognitive and motivational aspects and their theoretical and practical implications, appears to suggest the fruitfulness of these methods applied to the study of individual differences in personality in children's interpersonal gaming behaviour. The experimental game proposed for the present study seems viable with children of different attitudes, ages and sexes, in view of its simplicity and the natural appeal that games in general have for children, and the relative ease with which the social environment could be brought under the control of the experimental situation. Consequently, after reviewing both

the I-E locus of control and the gaming literatures, the writer became convinced that a developmental study would be possible and could lead to fruitful insights into some of the limitations both of the predictive power of the I-E concept and of the questionnaire used for measuring I-E individual differences, if one were to investigate the relationship of the I-E locus of control variable to children's interpersonal behaviours, through a gaming approach. Rotter's conceptualization of I-E locus of control involves both cognitive and motivational aspects, and game theory lends itself to both approaches, since a solution of the game requires different levels of cognitive abilities and motivational states to be translated into overt behaviour; consequently, a gaming situation is utilized to determine whether this relationship does in fact exist.

The thesis is divided into four chapters. The review of the literature begins with a brief theoretical description of the I-E locus of control concept, followed by works leading to the construction of scales, with an up-to-date coverage of relevant research on both I-E locus of control and experimental games. The second chapter presents a description of the sample, the measuring tools, procedures and techniques for data collection and analysis. The quantitative results are presented in the third chapter. Finally, an interpretation of the behavioural patterns of children with different I-E

## INTRODUCTION

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attitudes, ages and sexes is offered. Conclusions are followed by suggestions for future research.

## CHAPTER I

### REVIEW OF THE LITERATURE

#### 1. Rotter's Concept of Internal-External Control.

The growing interest among psychologists in the subjective aspects of human behaviour is reflected in research dealing with individual differences. One very important construct considered is the internal-external control of reinforcement.

The notion of generalized expectancies for internal or external control of reinforcement and the rationale underlying the measurement of these expectancies derives from the social learning theory of Rotter (1954).<sup>1</sup>

Social learning theory (SLT) states that human learning is not just a process in which behaviours are "stamped in" by subsequent reinforcements. Whether behaviour is learned (i.e. whether the probability of its emission increases) depends in part on whether the individual believes his behaviour to be instrumental in obtaining the reinforcement. If no such causal link is perceived, the human subject sees no "reason" to repeat the behaviour.

The effect which reinforcement has is to establish, increase or maintain an expectancy that the behaviour which

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<sup>1</sup> J. B. Rotter, Social Learning and Clinical Psychology, Englewood Cliffs, N.J., Prentice-Hall, 1954.

preceded the reinforcement will be followed by reinforcement in the future. If the reinforcement is determined by factors external to the individual, (e.g. chance, luck, powerful others), the expectation will be reinforced to a lesser degree. The presence of reinforcement can be expected to lead to an increase in expectancy if the behaviour is perceived as related to the reinforcement; if no such relation is perceived, the presence of reinforcement would have a lesser effect.

Rotter (1966)<sup>2</sup> further argues that such expectancies can be expected to generalize to situations perceived as similar. Thus, generalized expectancies develop relating to sets of similar situations often encountered by the individual. Of particular concern here are expectancies associated with causal relations between behaviour and reinforcement. Given the difference in experience, it would be expected that individual variations in such expectancies would appear. In addition, within given cultural contexts, it would be expected that certain situations would be perceived by all (or nearly all) members of the culture as skill-determined or as determined by forces beyond individual control, such as chance or fate. In situations where such cultural definitions are

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<sup>2</sup> Idem, "Generalized Expectancies for Internal Versus External Control of Reinforcement", Psychological Monographs, Vol. 80, No. 1, 1966 (whole no. 609), p. 1-28.

clear, little individual variation would be expected; where cultural definitions are ambiguous, major individual differences would be expected, reflecting each individual's generalized expectancy for control.

The original work dealing with the effects on behaviour of the perceived locus of control involved behavioural tasks defined as chance- or skill-determined. Tasks which require skill on the part of the subject (or which S is led to believe require skill) establish the locus of control as internal, i.e., receiving reinforcement depends on S's own behaviour, skills or internal characteristics) rather than on external forces. Chance-determined tasks, however, establish the locus of control as external, i.e., reinforcement depends on forces beyond the individual's control, such as chance, luck, powerful others, various forces of a physical or social nature, or experimenter manipulation. The two alternatives or extremes of the dimension are defined as internal and external-perceived locus of control.

Consistent evidence regarding the effects of such manipulation of the perceived locus of control have been obtained with such tasks (Rotter, 1966).<sup>3</sup>

In subsequent works, scales were developed which measure a general orientation or "generalized expectancy" for

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<sup>3</sup> Ibid.

internal or external control of reinforcement (I-E). Scores on these scales are assumed to reflect a learned personality trait relating to the individual's characteristic perception of the locus of control in a number of real-life situations. It seems feasible to provide a brief review of the construction and development of the I-E scale along with a summary of the research resulting from this scale.

## 2. The Measurements of Individual Differences in Locus of Control Beliefs.

The earliest attempt to measure individual differences in internal-external locus of control was initiated by Phares (1955).<sup>4</sup> The original scale was modified by James (1957)<sup>5</sup> and finally, after several other revisions, put into a forced-choice format by Liverant, Rotter and Crown (1966).<sup>6</sup>

This last test, referred to as the I-E scale, was designed primarily for college and adult populations, and is composed of 29 items. Six of these are filler items inserted to conceal the nature of the test. The other twenty-three items deal with whether an individual believes that his

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4 E. J. Phares, Changes in expectancy in skill and Chance Situations, Unpublished doctoral dissertation, Ohio State University, 1955.

5 W. H. James, Interval vs. External Control of Reinforcement as a Basic Variable in Learning Theory, Unpublished doctoral dissertation, Ohio State University, 1957.

6 Rotter, Op. Cit., 1966, p. 1-28.

behaviour is effective in getting rewards or punishments or whether rewards or punishments are controlled by fate or powerful others' thus, "... the test is considered to be a measure of generalized expectancy" (Rotter, 1966). Each item consists of two alternatives, one expresses an "external" expectancy and the other suggests either a "neutral" or "internal" expectancy. The subject is forced to choose between the two and the score received on the scale is the total number of "external" responses chosen. Thus, the subject's score may range from 0 to 23 (filler items are not scored); the higher the score, the more "external" the person is said to be. A number of alternative scales purporting to measure I-E locus of control have recently been developed and a list of them is presented in an article by Throop and MacDonald (1971).<sup>7</sup> Most of the reliability and validity data on the I-E scale have been gathered and reported by Rotter (1966).<sup>8</sup> He indicates that the test-retest reliability range, based on a variety of samples and intervening time periods of from one to two months, is .48 to .86. Hersch and Scheibe (1967)<sup>9</sup>

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7 W. F. Throop and A. P. MacDonald, "Internal-external Locus of Control, a Bibliography", Psychological Reports, Vol. 28, 1971, p. 175-190.

8 Rotter, Op. Cit., 1966, p. 1-28.

9 P. D. Hersch and K. E. Scheibe, "Reliability and Validity of Internal-external Control as a Personality Dimension", Journal of Consulting Psychology, Vol. 31, 1967, p. 609-613.

likewise found test-retest reliability coefficients that ranged from .48 to .84, for a seven-week period. Harrow and Ferrante (1969),<sup>10</sup> using a psychiatric population, found a test-retest coefficient of .75 for a six-week period; this compares favourably with normal samples. Internal consistency correlational findings reported by Rotter (1966)<sup>11</sup> ranged from .65 to .79; most were in the .70's, which he took as an indication that the scale is a relatively reliable one. Good discriminant validity for the I-E scale, demonstrated by its high correlation with projective interview and Likert measures of the I-E dimension, and by its low correlation with measures of intelligence, political affiliation and social desirability, has been reported (Rotter, 1966).<sup>12</sup> Along the same lines, Hersch and Scheibe (1967)<sup>13</sup> found no relationship between I-E scores and three different measures of intelligence. However, Gold (1968)<sup>14</sup> reported a low but significant correlation between intelligence and I-E scores

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10 M. Harrow and A. Ferrante, "Locus of Control in Psychiatric Patients", Journal of Consulting and Clinical Psychology, Vol. 33, 1969, p. 582-589.

11 Rotter, Op. Cit., 1966, p. 1-28.

12 Ibid.

13 Hersch and Scheibe, Op. Cit., p. 609-613.

14 D. Gold, "Some Correlation Coefficients: Relationships among I-E Scores and other Personality Variables", Psychological Reports, Vol. 22, 1968, p. 983-984.

for a mixed sample of 283 university students. Gold does not report the correlation coefficients, but it is possible that a statistically significant relationship may have been obtained due to the larger sample size. Minton (1967)<sup>15</sup> reported that the I-E scores for a group of 69 males were unrelated to a seven-point scale measuring political liberalism-conservatism. This is in accord with the findings of Rotter (1966).<sup>16</sup> However, for a group of 67 females, he found, using this same scale, a low but significant correlation between external control and conservatism ( $r=.26$ ;  $p<.05$ ).

The relationship between I-E scores and social desirability has been studied a great deal in recent years with contradictory findings. Strickland (1965),<sup>17</sup> Tolor (1967)<sup>18</sup> and Tolor and Jalowiec (1968),<sup>19</sup> found no relationship.

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15 H. L. Minton, "Power as a Personality Construct", in B. A. Maher (Ed.), Progress in Experimental Personality Research, New York, Academic Press, Vol. 4, 1967, p. 229-267.

16 Roter, Op. Cit., 1966, p. 1-28.

17 B. R. Strickland, "The Prediction of Social Action from a Dimension of Internal-external Control", Journal of Social Psychology, Vol. 66, p. 353-358.

18 A. Tolor, "An Evaluation of the Maryland Parent Attitude Survey", Journal of Psychiatry, Vol. 67, 1967, p. 69-74.

19 Idem and J. E. Jalowiec, "Body-boundary, Parental Attitudes and Internal-external Expectancy", Journal of Consulting and Clinical Psychology, Vol. 32, 1968, p. 206-209.

between I-E scores and the Marlowe-Crowne Social Desirability Scale. However, Altrocchi, Palmer, Hellmann and Davis (1968)<sup>20</sup> reported a significant negative relationship between externalism and the Marlowe-Crowne Social Desirability Scale ( $r = -.34$ ;  $N = 53$ ;  $p < .01$ ); and Berzins, Ross and Cohen (1970)<sup>21</sup> found a significant negative correlation of  $-.23$  ( $N = 97$ ;  $p < .05$ ) between externalism and the Edward's Social Desirability Scale. These latter findings suggest that the I-E scale is not completely free of the social desirability set as claimed by Rotter (1966).<sup>22</sup> In spite of the fact that Rotter, in his presentation of normative data, reported no differences in mean scores on the I-E scale for males and females, the results of a few subsequent experiments on the behavioural correlate studies by Hamsher, Geller and Rotter (1968)<sup>23</sup> and Wareheime and Foulds (1971)<sup>24</sup> suggest that the postulated relationships

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20 J. Altrocchi, J. Palmer, R. Hellmann and H. Davis, "The Marlowe-Crowne, Repressor-Sensitizer and Internal-External Scales and Attributes of Unconscious Hostile Intent", Psychological Reports, Vol. 23, 1968, p. 1229-1230.

21 J. I. Berzins, W. F. Ross and D. I. Cohen, "Skill vs. Chance Activity Preferences as Alternative Measures of Locus of Control: An Attempted Validation", Journal of Consulting and Clinical Psychology, Vol. 9, 1968, p. 28-36.

22 Rotter, Op. Cit., 1966, p. 1-28.

23 J. H. Hamsher, J. D. Geller and J. B. Rotter, "Interpersonal Trust, Internal-external Control and the Warren Commission Report", Journal of Personality and Social Psychology, Vol. 9, 1968, p. 210-215.

24 R. G. Wareheime and M. L. Foulds, "Perceived Locus of Control and Personal Adjustment", Journal of Consulting and Clinical Psychology, Vol. 37, 1971, p. 350-352.

between internals and externals do not hold for males and females.

Other studies on sex differences on the I-E scale, conducted at the University of England by Feather (1967, 1968)<sup>25,26</sup> showed females obtaining significantly higher external scores than males. Rotter (1966)<sup>27</sup> has suggested that sex differences may be related to geographical differences as well as sex-role identification. However, more recently, Nowicki (1973)<sup>28</sup> has pointed out that the relative lack of consistent findings concerning the relationship between achievement and locus of control for females, in prior studies utilizing Rotter's I-E scale, may have been due to the failure to obtain groups of "pure" internal and external females. He suggests the effects of two mediational variables, that of "social desirability" and of "motive to avoid success" may confound the achievement-locus of control relationship for females..

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25 N. T. Feather, "Some Personality correlates of External Control", Australian Journal of Personality, Vol. 19, 1967, p. 253-260.

26 Idem, "Change in Confidence Following Success or Failure as a Predictor of Subsequent Performance", Journal of Personality and Social Psychology, Vol. 9, 1968, p. 38-46.

27 Rotter, Op. Cit., 1966, p. 1-28.

28 S. Nowicki, Predicting Academic Achievement of Females from a Locus of Control Orientation. Some Problems and Some Solutions, (mimeographed), Paper presented at the American Psychological Association Meeting, Montreal, Canada, 1973.

Several recent studies in the cognitive area (Lefcourt 1972)<sup>29</sup> have shown that the I-E itself explains only a limited percentage of the variance in cognitive tasks and the power of prediction of cognitive activity is often greatly increased when I-E and a measure of psychological differentiation (Witkin's Field Independence-Dependence) are used in concert.

More recently, other research investigators have presented theoretical and empirical evidence to show that Rotter's I-E scale has certain limitations and weaknesses. Mirels (1970)<sup>30</sup> explored the tenability of the assumption that the I-E scale measures a unidimensional trait. He performed a factor analysis of the I-E responses given by 159 college males and 157 college females. Two factors were identified; one concerned a belief in felt mastery over the course of one's life and the other concerned the extent to which the individual citizen perceives himself as capable of exerting an impact on political institutions. A subsequent

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29 H. B. Lefcourt, "Recent Developments in the Study of Locus of Control", in B. A. Maher (Ed.), Progress in Experimental Personality Research, New York, Academic Press, Vol. 6, 1972, p. 1-39.

30 H. L. Mirels, "Dimensions of Internal vs. External Control", Journal of Consulting and Clinical Psychology, Vol. 34, 1970, p. 226-228.

study by Abrahamson, Schulderman and Schulderman (1973)<sup>31</sup> closely matched Mirels' findings. Schneider and Parsons (1970),<sup>32</sup> reanalyzing data from an earlier study, suggested that five categories can be reliably established from I-E scale scores. These are generally luck or fate, respect, politics, academics and leadership and success. They report small positive intercorrelations among these five scales, which they interpret to indicate the multidimensionality of the I-E scale. Gurin, Gurin, Lao and Beattie (1969)<sup>33</sup> factor-analyzed the responses of black students and found evidence for two separate factors. The first factor (items phrased in the first person) relates to personal control--the control that one can exert in his own life; the second factor (third-person items) seems more akin to ideological or general beliefs--beliefs about how much control most people in our society possess. Collins (1974)<sup>34</sup> administered the

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31 D. Abrahamson, S. Schulderman and E. Schulderman, "Replication of Dimensions of Locus of Control", Journal of Consulting and Clinical Psychology, Vol. 41, 1973, p. 320.

32 J. M. Schneider and O. A. Parsons, "Categories on the Locus of Control Scale and Cross-cultural Comparisons in Denmark and the United States", Journal of Cross-cultural Psychology, Vol. 1, 1970, p. 131-138.

33 P. Gurin, G. Gurin, R. C. Lao and M. Beattie, "Internal-external Control in the Motivational Dynamics of Negro Youth", Journal of Social Issues, Vol. 25, 1969, p. 29-53.

34 B. E. Collins, "Four Separate Components of the Rotter I-E Scale: Belief in a Difficult World, a Just World, a Predictable World and a Politically Responsible World", Journal of Personality and Social Psychology, Vol. 29, 1974, p. 381-391.

I-E scale in a Likert agree-disagree format. This resulted in forty-six alternatives. He also constructed forty-two new items, to provide an "it depends on the situation" alternative. This entire 88-item scale was administered to three hundred undergraduates. Rotation of four factors resulted in four distinguishable and relatively orthogonal scales. Collins concluded that an individual may achieve an external score on the I-E scale by subscribing to any of four views: (1) The world is difficult, (2) the world is unjust, (3) the world is governed by luck, or (4) the world is politically unresponsive.

In conclusion, then, the foregoing findings demonstrate that the dimension of internal-external locus of control has generated an enormous amount of research over the last decade. Theoretically, its implication lies in the suggestion that expectancies can play a major role in determining the effects of reinforcement. There are, however, a number of difficulties associated with the use of the I-E scale: (a) the association with social desirability, (b) the weak predictive power resulting from low correlations, and finally, (c) the factorial "impurity" of the I-E scale. A further problem is the fact that results of some of the research findings tend to be very inconsistent: some studies show internality to be related to a particular variable, other studies show externality to be related to the same variable,

and still others show no relationship at all. Many of these problems may result from the use of the total I-E score in research investigations. Although there are some important differences between them, many of the factor analytic studies previously cited point to the existence of several main locus of control factors. Separate examination of the effects of many of these largely independent factors may well sharpen up the predictive utility of the I-E scale, but more complete research is necessary in order to demonstrate this.

Considering the extensive body of research with adults, it has seemed appropriate to extend this research on the locus of control variable to children. Valid data in this area are evidently dependent on reliable and valid measures and there have been a number of attempts to measure the locus of control of reinforcement dimension in children.

The first paper and pencil I-E measure for children consisting of twenty-three items answered yes or no was introduced by Bialer (1961).<sup>35</sup> Battle and Rotter (1963)<sup>36</sup> constructed a projective device called the Children's Picture Test of Internal-External Control. Research with these

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35 I. Bialer, "Conceptualization of Success and Failure in Mentally Retarded and Normal Children", Journal of Personality, Vol. 29, 1961, p. 303-320.

36 E. S. Battle and J. B. Rotter, "Children's Feelings of Personal Control as Related to Social Class and Ethnic Group", Journal of Personality, Vol. 3, 1963, p. 482-490.

measures suggested that locus of control becomes more internal with age and that internality is associated with higher social class and white culture placement as opposed to Negro and lower socio-economic status. Later, Crandall, Katkovsky and Crandall (1965)<sup>37</sup> developed a more specific measure aimed at assessing children's beliefs in reinforcement in intellectual-academic achievement situations. The Intellectual Achievement Responsibility Questionnaire (IAR) was so constructed that, in addition to total  $I_{tot}$  (internal or self) responsibility scores, separate subscores could be obtained for beliefs in internal responsibility for successes ( $I+$  scores) and for failures ( $I-$  scores). With the IAR scale, Crandall et al. found internal beliefs to be moderately related to intelligence, ordinal position and size of family, but inconsistently related to social class. The scale was predictive of younger girls' and older boys' achievement scores.

Each of these scales, however, have fallen short in one way or another. Bialer's scale suffers from reliability and format shortcomings. In a study Schaffer, Strickland and

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37 V. J. Crandall, W. Katkovsky and V. C. Crandall, "Children's Belief in their Own Control of Reinforcement in Intellectual-academic Situations", Child Development, Vol. 36, 1965, p. 91-109.

Uhl (1969),<sup>38</sup> a split-half reliability of  $r = .49$  was obtained. Furthermore, the basic format of this scale has almost half of the items consecutively keyed in one direction: an open invitation for response style to significantly affect scores. Battle and Rotter's measure is difficult to administer to large groups and there is incomplete reliability information available. The Crandall et al. scale is specifically constructed for the academic rather than the general situation and its forced choice format may be difficult for younger and less bright subjects.

Consequently, there has been a clearer need to construct a reliable instrument for use in research on the effects of a generalized locus of control orientation of children's behaviour. In addition, the developmental determinants and behavioural consequences of I-E have never been clearly defined, since none of these scales were appropriate for use with preschool-age children in the sense of enabling investigators to study early developmental phenomena associated with I-E control.

In order to aid researchers in assessing antecedent relations of locus of control in young children, five

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38 S. Schaffer, B. Strickland and N. Uhl, The Relationship of Individual Difference Measures to Socio-economic Level and to Discrimination Learning, (Mimeographed), Paper read at the Southeastern Psychological Association Meeting, 1969.

additional scales have been recently constructed.

The first is that of Stephens and Delys (1973),<sup>39</sup> "A Locus of Control Measure for Preschool Children", a 40-item paper and pencil test. An initial study has shown a rater reliability of .98, and a correlation between parallel forms given two weeks apart of .69. Subsequent studies have supported internal consistency, retest reliability and construct validity as manifest in behavioural correlates, age and socio-economic differences. The second is Nowicki and Duke's (1973)<sup>40</sup> "A Pre-school and Primary Internal-External Control Scale" (PPNS-IE). This scale presents items in a cartoon-type format. One form for males and another for females. Preliminary evidence on six hundred children ranging in age from four to nine has been reported to be satisfactory. Test-retest reliability after four weeks has been found to be  $r = .82$ ; internal consistency estimates ranged from  $r = .66$  to  $r = .79$ . The scale has also shown a highly significant relationship ( $r = .88$ ) with another prepared for school-age children: "The Locus of Control Scale for Children".

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39 M. W. Stephens and P. Delys, "A Locus of Control Measure for Preschool Children", Developmental Psychology, Vol. 9, No. 1, 1973, p. 55-65.

40 S. Nowicki and M. P. Duke, "A Preschool and Primary Internal-External Control Scale", Developmental Psychology, Vol. 10, No. 6, 1973, p. 874-880.

Nowicki and Strickland (1973)<sup>41</sup> constructed this "Locus of Control Scale for Children" (CNS-IE), a forty-item yes-no instrument with questions designed to be readable at fifth grade level and understandable even for younger children. Reliability and validity data were gathered on more than one thousand school children in grades three through twelve. Estimates of internal consistency ranged from .63 to .81, at different grade levels and were considered to be satisfactory. Test-retest reliability for different grade levels ranged from .63 to .71 over a six-week period. The scale was found not to be related to social desirability as measured by the Children's Social Desirability Scale (Crandall et al., 1965),<sup>42</sup> but was generally related to school achievement for males.

Gruen (1970)<sup>43</sup> reported the development of an internal-external control scale. This test utilized pictorial stimuli

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41 S. Nowicki and B. R. Strickland, "A Locus of Control Scale for Children", Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-155.

42 V. C. Crandall, V. J. Crandall and W. Matkovsky, "A Children's Social Desirability Questionnaire", Journal of Consulting Psychology, Vol. 29, 1965, p. 27-36.

43 G. E. Gruen, "The Development of an Internal-External Control Scale", in J. W. Asher, J. F. Feldhusen, G. E. Gruen, R. B. Kane, E. McDaniel, M. I. Stephens, J. Towler and G. H. Wheatley (Eds.), The Development of New Measures of Cognitive Variables in Elementary School Children (Phase II), Washington, D.C., U.S. Office of Education, 1971.

representing the response alternative to supplement the oral presentation of response alternatives and thereby reducing its demands on the child's cognitive ability and on his ability to remember the first-read response. This scale was designed for children no younger than second grade and was specific to the school setting.

More recently, Gruen et al. (1974)<sup>44</sup> have reported the construction of a "Group Measure of Locus of Control" for children. This new measure was given to eleven hundred black, white and Spanish, moderately disadvantaged children from grades two, four and six. Internal consistency and test-retest reliability estimates are reported to be moderately high. Older children were found to be more internal than younger children and the affluent children to be more internal than the disadvantaged. Scores on this scale were found to be significantly related to grade point averages but not significantly related to measures of IQ or social desirability.

As indicated earlier, various authors have found the Rotter Adult Locus of Control Scale to be multidimensional, thus implying that the original definition of locus of control as a unidimensional variable must be modified.

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44 G. E. Gruen, J. R. Korts, and J. F. Baum, "Group Measure of Locus of Control", Developmental Psychology, Vol. 10, No. 5, 1974, p. 683-686.

Similar arguments have also been raised with regard to several children's scales. Thus, in two recent subsequent studies, one with second graders and another with third graders, Stephens (1973)<sup>45</sup> has intercorrelated scores on four different locus of control scales for children: namely, those of Stephens and Delys (1973),<sup>46</sup> Nowicki and Strickland (1973),<sup>47</sup> Gruen (1970)<sup>48</sup> and Crandall et al.(1965).<sup>49</sup> These studies have found (a) generally quite low correlations among all four of the tests at these ages, (b) sex differences in regard to the pattern of intercorrelations among tests, and (c) the Gruen test showing generally the highest intercorrelations with other tests (although still seldom higher than the .30's and often lower), with the Stephens-Delys being next highest.

An important implication of these data, according to Stephens (1973)<sup>50</sup> is that the four tests reflect different

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45 Stephens and Delys, Op. Cit., p. 55-65.

46 Ibid.

47 Nowicki and Strickland, Op. Cit., p. 148-155.

48 Gruen, Op. Cit.

49 Crandall, Crandall and Katkovsky, Op. Cit., p. 27-36.

50 M. W. Stephens, Parental Behavioural Antecedents, Cognitive Correlates and Multidimensionality of Locus of Control in Young Children, (Mimeographed), Paper read at Symposium on Recent Developments in Research on Locus of Control in Children and Young Adults, American Psychological Association Convention, Montreal, 1973.

variables, even though each variable might justifiably be called locus of control. Inspection of the items, format and reported correlates of these tests as discussed by Stephens supports the conclusion that the tests reflect different variables (albeit with many shared properties and correlates), which represent different connotative meanings the term locus of control has assumed in the literature. These findings raise questions of the definition of "locus of control" and the extent to which the measurement technique is consistent with that definition.

The fact is, according to Stephens,<sup>51</sup> that several I-E research workers have been trying to talk about several different variables and phenomena under the same label. They look the same, they often are functionally similar, but they are different and importantly so. It appears that I-E is not a variable but a set of variables.

Crandall (1971)<sup>52</sup> has pointed out that the Nowicki-Strickland Scale (and aspects of other tests, including Rotter's as well) tends to confound internal control expectancy with expectancy of success; few items represent internal control expectancies of negative reinforcing events. This variable

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51 Ibid.

52 V. C. Crandall, Discussant's Comments at the Symposium on Methods and Prospects, (Mimeographed), American Psychological Association Convention, Washington, D.C., 1971.

would seem, from its format and content, to represent what might be called expectancy of competence, and is implied strongly in Rotter's original definition. This is one aspect of I-E which substantially overlaps freedom of movement.

Crandall's as well as Gruen's scales balance the positive and negative reinforcement items so that expectancies of success and failure (or positive-negative reinforcements) are independent of locus of control expectancies; it, thereby, does not represent specifically a competence-expectancy type of locus of control variable. However, as the title indicates, the Crandall test represents operationally whether the child does or does not publicly (verbally) accept responsibility for his successes and failures. Public responsibility-taking behaviour is subject to direct reinforcement and easily subject to conscious monitoring so this test operation may well reflect most directly the child's reinforcement history regarding public responsibility-taking behaviour. This is another implicit definition of locus of control in much of the literature. The Stephens-Delys technique appears operationally to represent something more analogous to a perceptual-cognitive style aspect of locus of control: whether the child perceives (or thinks) the events of reinforcing significance to him in the context of what he does to influence their probability of occurrence or in the context of other conditions on which these events are

contingent.

Each of these tests represents a set of operations designed to elicit responses from which to draw inferences regarding a mediating variable--the subject's I-E expectancies. As Stephens suggests, in their attempt to find different measurement strategies for operationalizing I-E, the research workers may unwittingly have laid bare the anatomy of the variable we have been talking and thinking about.

Locus of control literature has implied that all of these types of variables and others, as well, coalesce under the single rubric "locus of control" and are highly intercorrelated. It is apparent now that they are, in fact, empirically separate variables. Each of these four scales now has a substantial research literature surrounding it and it is striking how parallel the tests are in terms of antecedents (socio-economic status, age, parent-behaviour) and their functional properties (impact on competence behaviour, achievement, etc.) but they are not correlated!

In sum, I-E in the thinking of different research workers, has been a conglomerate of some fairly humanistic, Adlerian phenomena (e.g. "competence" expectancies) and some probability phenomena (e.g. contingencies for reinforcement), among others. The lack of correlation among these scales, or variables, does not then simply indicate a "lack of convergent validity". It means rather that subsequent research will have

to be more analytic than it has been, separating various individual variables and phenomena that so far have been dealt with only grossly and collectively. Such research must also examine separately the effects of the various individual variables identified as children's I-E scales, in order to sharpen up the predictive validity of each of these scales.

In subsequent pages, research on I-E control will be reviewed, to serve as a background summary leading to the formulation of an experimental hypothesis.

### 3. The Locus of Control Variable and Attempts to Control and Master the Environment.

A major focus of a group of studies has been to test the general hypothesis that internally-oriented as opposed to externally-oriented individuals are less passive and more frequently and actively engaged in behaviour designed to control, master or influence their environment. Thus, Seeman and Evans (1962)<sup>53</sup> conducted a study relating I-E expectancy as measured by an abbreviated version of the I-E scale, to T.B. patients' knowledge of their own condition. The sample consisted of pairs of patients matched for race, occupation,

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<sup>53</sup> M. Seeman and J. W. Evans, "Alienation and Learning in a Hospital Setting", American Sociological Review, Vol. 27, 1962, p. 772-783.

education and hospital experience. The results indicated that subjects with more internal expectancy of control of reinforcements had more objective knowledge of T.B. In a similar study, Seeman (1963)<sup>54</sup> investigated the relationship between scores on a forty-item version of the I-E scale and learning of three kinds of information by reformatory inmates. He found that the score on the scale was significantly related to the degree of attention to and acquisition of information concerning people. Differences in learning the two other kinds of material which were of less immediate value to the inmates were not significantly related to the I-E scores. These differences in learning could not be attributed to age, intelligence or criminal history. In a related study, Seeman (1966)<sup>55</sup> obtained results among Swedish factory workers indicating that internals were more likely to be members of a union, to participate in union activities and to possess more general knowledge regarding political affairs than externals. More recent studies have supported and complemented the foregoing findings. Davis and Phares

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54 M. Seeman, "Alienation and Social Learning in a Reformatory", American Journal of Sociology, Vol. 69, 1963, p. 270-284.

55 Idem, "Alienation, Membership and Political Knowledge: A Comparative Study", Public Opinion Quarterly, Vol. 30, 1966, p. 359-367.

(1967),<sup>56</sup> testing the general hypothesis that internals differ from externals in seeking information important to the acquisition of personal goals, found that internally-oriented persons made significantly more active attempts to seek information relevant to influencing the attitude of another person concerning the war in Vietnam. Phares (1968)<sup>57</sup> controlled for the acquisition and retention of material and found that individuals with an internal expectancy were more effective than externals in using previously learned information to solve a computer simulation task. The author interpreted these results as indicating that internals believe efforts pay off; hence, they are more likely to exert effort to solve a problem. The foregoing studies suggest that internals and externals differ not only in attentiveness to and recall of material that is immediately present in the environment, but also in terms of how actively they seek and utilize additional relevant information.

The internal seems to be eager to seek out cues and to manipulate the situation to be better able to achieve certain outcomes. Thus, in a series of studies on the

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56 W. L. Davis and E. J. Phares, "Internal-external Control as a Determinant of Information-seeking in a Social Influence Situation", Journal of Personality, Vol. 35, 1967, p. 547-561.

57 E. J. Phares, "Differential Utilization of Information as a Function of Internal-external Control", Journal of Personality, Vol. 36, 1968, p. 649-662.

relationship of cognitive activities and I-E control, Lefcourt (1967)<sup>58</sup> hypothesized that the more effective functioning of the internal, as opposed to the external, was due to the internal's greater ability to utilize cues in a situation to determine what reinforcement is available to him. Results obtained supported this hypothesis. Indeed, when the external was made more aware of the reinforcement available to him, his performance on a level of aspiration task was not significantly different from that of the internal. Lefcourt speculated that externals do not adequately search for reinforcement properties or that they fail to maintain the kind of cognitive awareness that might facilitate cognitive categorizing of the situation so as to better attain valued reinforcements. In a more recent study, Lefcourt and Wine (1969)<sup>59</sup> had subjects interview other persons, one that avoided eye contact with the subject and one that behaved in a more typical social fashion. Results indicated that the internals looked at the person who avoided eye contact more often than did external subjects. Likewise,

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58 H. M. Lefcourt, "Effects of Cue Explication upon Persons Maintaining External Control Expectancies", Journal of Personality and Social Psychology, Vol. 5, 1967, p. 372-378.

59 Idem, and J. Wine, "Internal versus External Control of Reinforcement and the Deployment of Attention in Experimental Situations", Canadian Journal of Behavioural Science, Vol. 1, 1969, p. 167-181.

internals made more observations of both persons than did externals. The authors concluded that, when there are uncertainties in the situation, internals are more likely to pay attention to potentially relevant cues than externals.

In keeping with the foregoing studies on adult subjects, suggesting that internals are more perceptually and cognitively alert than externals, Ludwigsen (1972)<sup>60</sup> administered concept formation tasks to eleven and twelve year-old children under reinforcement, verbalization and control conditions. Results indicated that overall conditions with IQ-controlled internals, as measured by the CNS-IE scale, had significantly higher rates of concept problem solution and appeared to go about gathering information about task solution more efficiently than externals. Walters (1972),<sup>61</sup> after collecting Nowicki-Strickland I-E and Wechsler Block Design scores, and a brief IQ measure, individually examined fourth and fifth grade children on a difficult wooden puzzle which they were asked to assemble. Half of the subjects received skill instructions while the other half received

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60 K. Ludwigsen, Concept-solution Efficiency as a Function of Locus of Control, Verbalization and Reinforcement, Unpublished doctoral dissertation, Emory University, 1972.

61 D. Waters, Differential Effects of Skill and Chance Instructions on Persistence Time and Attention Breaks as a Function of Locus of Control in Elementary School Children, Unpublished doctoral dissertation, Emory University, 1972.

chance instructions. Subjects' responses were analyzed across two dependent measures: persistence time and attention breaks. Results indicated that Block Design and IQ scores were not related to locus of control or to the dependent measures. However, as hypothesized, male internal subjects persisted longer at the task under skill instructions and male externals under chance instructions. External female subjects gave a significantly greater incidence of attention breaks than did any of the other groups. Parker (1971)<sup>62</sup> found that scores on Stephens-Delys LOC scale, for a group of day-care centre boys, was directly related to performance on a mirror-tracing learning task. Utilizing the same Stephens-Delys LOC scale, Waite (1971)<sup>63</sup> found suggestive evidence, among nursery school children, of a relationship between internal locus of control and reflectivity, on a reflectivity-impulsivity test. A subsequent study by Stephens (1972)<sup>64</sup> confirmed the relationship of locus of control to both mirror-tracing scores and the reflectivity

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62 L. Parker, Locus of Control Expectancies and the Effects of Aggression on Performance on a Learning Task, Unpublished Master's thesis, Purdue University, 1971.

63 D. Waité, The Relationship between Locus of Control Expectancies and Cognitive-reflectivity-impulsivity, Unpublished Master's thesis, Purdue University, 1971.

64 M. W. Stephens, "Dimensions of Locus of Control: Impact of Early Educational Experiences", Proceedings of the 80th Annual Convention of the American Psychological Association, Vol. 7, 1972, p. 137-138. (A summary)

test. In addition, internal scores were also found to be directly related to performance on a discrimination learning task. The foregoing studies indicate that internals are superior in cognitive processing to externals. If this is true, then their higher cognitive functioning should enhance their personal effectiveness more than is the case with externals; several studies have addressed themselves to this issue.

Gore and Rotter (1963),<sup>65</sup> in their study on the relationship between I-E scores and subjects' behaviour in regard to social reform, found that I-E scale predicted type and degree of commitment to social action. The subjects were Southern Negroes in a college population that had been involved with civil rights activities. Commitment was measured by a subject's willingness to sign up to participate in various social protest activities such as going to civil rights rallies and joining the Freedom Riders group. They concluded that internals were more willing to commit themselves to personal and social action than were externals. In a similar study, Strickland (1965),<sup>66</sup> using a more direct measure of social action, confirmed the findings of Gore and

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65 P. M. Gore and J. B. Rotter, "A Personality Correlate of Social Action", Journal of Personality, Vol. 31, 1963, p. 58-64.

66 Strickland, Op. Cit., p. 353-358.

Rotter (1963).<sup>67</sup> She used two groups of Southern Negroes: one group was made up of active civil rights workers and the other group consisted of students not known to participate actively in civil rights movements. Her results indicated that members of the more active group were significantly more internal as measured by the I-E scale. In another study, using I-E control as the determinant of the amount of social influence exerted, Phares (1965)<sup>68</sup> found that the internal males were able to induce significantly greater changes in expressed attitudes on current college topics in a group of females than were external males. The external males did not induce any more change than occurred in a control group of females. In a later study, Phares, Ritchie and Davis (1968),<sup>69</sup> using a five-step questionnaire measuring personal commitment to take action to remedy personal problems, found that internals were more willing to take overt action to alleviate presumed personal shortcomings than externals. Consequently, internals seem to be more disposed toward behaviour that will enhance their

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67 Gore and Rotter, Op. Cit., p. 58-64.

68 E. J. Phares, "Internal-external Control as a Determinant of Amount of Social Influence Exerted", Journal of Personality and Social Psychology, Vol. 2, 1965, p. 642-647.

69 Idem, D. E. Ritchie and W. L. Davis, "Internal-external Control and Reaction to Threat", Journal of Personality and Social Psychology, Vol. 10, 1968, p. 402-405.

personal efficiency (rectifying personal inadequacies) than externals. Hersch and Scheibe (1967)<sup>70</sup> correlated the I-E scale with the California Psychological Inventory and the Adjective Check List. On the CPI, they found that internal scores, as compared to external scores, were higher on Dominance, Tolerance, Good Impression, Sociability, Intellectual Efficiency, Achievement via Conformance and Well-being scales. On the Adjective Check List, the internal scorer described himself as assertive, achieving, powerful, independent, effective and industrious. The converse of these held true for external scorers, who checked fewer favourable and more unfavourable self-descriptive adjectives than did internals. In a later study, Tseng (1970),<sup>71</sup> utilizing a sample of vocational rehabilitation clients, found that internal clients, as a group, showed significantly higher instructor's ratings of job proficiency and personal qualities than did external subjects. In a more recent study, Brown and Strickland (1972)<sup>72</sup> selected internal and external

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70 Hersch and Scheibe, Op. Cit., p. 609-613.

71 M. S. Tseng, "Locus of Control as a Determinant of Job Proficiency, Employability and Training Satisfaction of Vocational Rehabilitation Clients", Journal of Counseling Psychology, Vol. 17, 1970, p. 487-491.

72 J. C. Brown and B. R. Strickland, "Belief in Internal-external Control of Reinforcement and Participation in College Activities", Journal of Consulting and Clinical Psychology, Vol. 87, 1972, p. 152-158.

college students from a college year book with activity summaries. With intelligence controlled, they found that internal males turned out to be significantly more often office holders on the campus and also had significantly higher grade-point averages than externals. No comparable findings were obtained for female students. In yet another study on the relationship between locus of control and commitment to social action, Ryckman, Martens, Rodda and Sherman (1972)<sup>73</sup> reported an interesting reversal of the preceding study. Their results demonstrated that internal college women expressed a greater commitment to Women's Liberation activities than did external college women. However, no significant relationship was found for men. It seems most likely that males in this study valued these liberation activities less than did females. Moving toward children's competence behaviour, Martin (1972),<sup>74</sup> in a research project at county schools, found that external children were significantly more likely to be identified by teachers as behaviour problems than were internals.

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73 R. M. Ryckman, J. L. Martens, W. C. Rodda and M. F. Sherman, "Locus of Control and Attitudes Towards Women's Liberation in a College Population", Journal of Social Psychology, Vol. 87, 1972, p. 157-158.

74 F. Martin, The Creative Organization of Positive Experiences, (Mimeographed), Research Project, Gwinnett County Schools, Lawrenceville, Georgia, 1972.

In two different studies (Strickland 1972;<sup>75</sup> 1972<sup>76</sup>), one with third, fourth and fifth grade children, and the other with ninth graders, Strickland found a relationship between internality and the choosing of a delayed, more valuable reward as opposed to immediate rewards. In a large-scale study with ninth grade children, Williams (reported by Strickland, 1972)<sup>77</sup> found that a belief in external control was related to greater smoking for females. In addition, seat belt use, as well as preventive dental care, that is, check-ups even if teeth or gums were not painful, were also related to internal control.

With a view to a better understanding of expectancy and competence behaviour in children, attempts have been made to relate Nowicki-Strickland I-E and aspiration estimates of children following their success and failure.

Drawing from a sample of white, middle-class sixth grade male subjects, Strickland (1972)<sup>78</sup> found a belief in

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75 B. R. Strickland, "Delay of Gratification as a Function of Race of the Experimenter", Journal of Personality and Social Psychology, Vol. 22, 1972, p. 108-112.

76 Idem, Delay of Gratification and Internal Locus of Control in Children, Unpublished research, Emory University, 1972.

77 Idem, Locus of Control and Competence in Children, (Mimeographed), Paper presented at the American Psychological Association meetings, Honolulu, 1972.

78 Idem, Level of Aspiration and Locus of Control Among White Sixth Grade Males, Unpublished research, Emory University, 1972.

internal control to be related to adaptive, realistic estimates of future success following performance on a perceived skill task. Strickland (1972)<sup>79</sup> replicated this finding with a group of nine to twelve-year-old males of varied and mixed ethnic backgrounds from low-income housing families. It was found that across each of these groups, external males were more likely to give unusual and erratic estimates of immediate future success even with the knowledge of their immediate performance before them. Externals more often than internals raise their estimates after failure or lower them following success. The results are taken to mean that male children with an external locus of control orientation are utilizing immediate past information about their performance in a different way from internal males who may be more likely to perceive behaviour-reinforcement contingencies as causally related.

Another aspect of behaviour with special relevance to the present study is that of helping behaviour. From the foregoing studies, it can be concluded that, in general, internals are more competent and manifest greater commitment to social action. Midlarsky (1971)<sup>80</sup> has also suggested that

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<sup>79</sup> Idem, Competence Behaviours among Children of Lower Class Status, Unpublished research, Emory University, 1972.

<sup>80</sup> E. Midlarsky, "Aiding under Stress: the Effects of Competence, Dependency, Visibility and Fatalism", Journal of Personality, Vol. 39, 1971, p. 132-149.

an individual's general sense of personal control over events, together with his specific competencies, (i.e. skill, previous achievements, abilities), might make helping a dependent victim a desirable outcome. In her study, subjects were put in a situation where they could help a confederate finish a sorting task. Each item that the subject lifted would generate a shock from a grid upon which the items had been placed. Further, each time a subject helped the partner, he received a shock. Midlarsky also used a sixteen-item true-false measure of fatalism, a measure presumably similar to the I-E scale. Results indicated that subjects low in fatalism (internals) were more likely to help their confederate in spite of receiving a shock, than were subjects high in fatalism (externals). In a similar recent study, Midlarsky and Midlarsky (1973)<sup>81</sup> also found that scores low on fatalism (internal control) were associated with helping behaviour. In yet another study, Staub (1968)<sup>82</sup> found that fourth-grade children who scored high on internal control shared more often after an experience of success and less often after a neutral experience or experience of failure than those low on

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<sup>81</sup> Idem, and M. Midlarsky, "Some Determinants of Aiding under Experimentally Induced Stress", Journal of Personality, Vol. 41, 1973, p. 305-327.

<sup>82</sup> E. Staub, The Effects of Success and Failure on Children's Sharing Behaviour, (Mimeographed), Paper presented at the 40th Annual Meeting of the Eastern Psychological Association, Washington, D.C., April 1968.

internal control (externals).

Taken in aggregate, not only do the foregoing studies seem to suggest that internality leads to behaviour designed to achieve greater control over one's environment but they indirectly seem to bear out the Social Learning Theory notion that locus of control is commonly mediated by need value and expectancy for success variables. That is, the individual's behaviour is determined not just by the expectancy that it will achieve a certain outcome, but also by the value of that outcome (goal) toward which the behaviour is oriented. Indeed, the possibility that the locus of control variable might have motivational properties, in addition to being a generalized expectancy, has been explored by Rotter and Mulry (1965).<sup>83</sup> In their study, decision-time was the key dependent variable, with internal subjects taking a longer time to make a decision on a difficult angle-matching task. when they were instructed that performance (correct matching) was a function of skill.. Although externals performed very similarly under skill and chance conditions, they tended to take longer under chance expectancy conditions.

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83 J. B. Rotter and R. C. Mulry, "Internal vs. External Control of Reinforcement and Decision-time", Journal of Personality and Social Psychology, Vol. 2, 1965, p. 598-604.

In another study, Lefcourt, Lewis and Silverman (1968),<sup>84</sup> using a level of aspiration task, found differences in decision-time between internals and externals, with internals taking more time to decide upon their subsequent expectancy statement on trials when they perceived the task as determined by their own skill. Externals, on the other hand, extended their decision-time when they perceived the task as chance-determined. In addition, internals who perceived the task as skill-determined were more attentive and reported having engaged in more task-relevant and less task-irrelevant thoughts than did externals who believed the task was more chance-determined. These results appear to be consistent with the Rotter and Mulry data. Watson and Baumal (1967),<sup>85</sup> utilizing a different methodological approach, demonstrated that skill and chance tasks have different meanings for internals and externals. They found that internals tended to make a greater number of errors during a practice period prior to performing on a task that was structured as chance-determined. Externals, on the other hand, were more

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84 H. M. Lefcourt, L. Lewis and I. W. Silverman, "Internal vs External Control of Reinforcement and Attention in a Decision-making Task", Journal of Personality, Vol. 36, 1968, p. 663-682.

85 D. Watson and E. Baumal, "Effects of Locus of Control and Expectation of Future Control upon Present Performance", Journal of Personality and Social Psychology, Vol. 6, 1967, p. 212-215.

error-prone when practicing for a task that apparently involved skill. The authors proposed an incongruence hypothesis, suggesting that in skill situations, internals perform better, and in chance situations, externals perform better, because when internals perceive the situation as uncontrollable (chance-determined), this increases their anxiety. They can neither control the reinforcements nor be in control of the situation. Externals, on the other hand, when confronted with skill situations, feel anxious, since they feel that a skill situation is beyond their control. In two subsequent experiments, Julian and Katz (1968)<sup>86</sup> investigated their general hypothesis that internals value self-determined rewards more than externals under skill conditions, while the converse is true for externals under chance-determined conditions. Subjects were put into game situations where they could earn rewards (points) for themselves or rely on a more competent other to earn points for them. Results of the first study indicated that internals preferred to rely more on themselves when making a decision between pairs of words which increased in difficulty, than externals. Consequently, as the difficulty of decision-making increased, internals required longer decision-times, while externals showed

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<sup>86</sup> J. W. Julian and S. B. Katz, "Internal vs. External Control and the Value of Reinforcement", Journal of Personality and Social Psychology, Vol. 8, 1968, p. 89-94.

no significant difference in time taken between easy and difficult choices. In the second study, in which groups receiving chance instructions were added, internals and externals employed similar choice strategies under both skill and chance conditions. While the failure of the second study to show skill-chance differences, as in the Rotter and Mulry study (1965),<sup>87</sup> raises some questions regarding the interaction between skill-chance and internal-external locus of control; the evidence suggests that there are probably motivational differences between internals and externals. At the least, it is possible that expressed preference for internal control implies a need or desire to predict and control outcomes and to rely upon oneself. This finding of a tendency toward self-reliance among internal subjects and deference toward others among external subjects supports an earlier report by Crowne and Liverant (1963),<sup>88</sup> who found that external subjects had less confidence in their own judgment abilities in an Asch-type task, wagering less money than internals on their potential success in task trials, when they had to make independent decisions in contrast to trials in which they would yield to others' decisions. In two other

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87 Rotter and Mulry, Op. Cit., p. 598-604.

88 D. P. Crowne and S. Liverant, "Conformity under Varying Conditions of Personal Commitment", Journal of Abnormal and Social Psychology, Vol. 66, 1963, p. 547-555.

studies (Ryckman, Stone and Elam, 1971; Ryckman, Rodda and Stone, 1971),<sup>89,90</sup> groups of internals and externals were strongly criticized by two experimenters while participating in a dart-throwing task. In general, internals showed greater concern (anxiety) than externals under skill conditions; while externals exhibited greater concern under chance conditions. Being concerned (made anxious) by the criticism was taken to signify motivation. A different aspect of self-reliance is the autonomy allowed during one's performance. In a study by Cromwell, Rosenthal, Shakow and Zahn (1960),<sup>91</sup> internal subjects were found to improve their performance in a reaction-time experiment when the onset and choice of preparatory intervals were under their own control. External subjects, on the other hand, performed better with experimenter- than with self-determined conditions. In addition to the behavioural findings, internal and external groups differed in their expressed preference for each condition,

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89 R. M. Ryckman, W. F. Stone and R. R. Elam, "Emotional Arousal as a Function of Perceived Locus of Control and Task Requirements", Journal of Social Psychology, Vol. 83, 1971, p. 185-191.

90 R. M. Ryckman, W. C. Rodda and W. F. Stone, "Performance Time as a Function of Sex, Locus of Control and Task Requirements", Journal of Social Psychology, Vol. 85, 1971, p. 299-305.

91 R. L. Cromwell, D. Rosenthal, D. Shakow and R. P. Zahn, "Reaction-time, Locus of Control, Choice Behaviour and Description of Parental Behaviour in Schizophrenic and Normal Subjects", Journal of Personality, Vol. 29, 1961, p. 363-379.

internals preferring self- and externals preferring experimenter-determined conditions. These findings are of interest, since reaction-time performance has been said to reflect the degree of attention that a person can maintain and the preceding research on the relationship of cognitive processes and the internal-external dimension has indicated that internal subjects may be more cognitively alert and attentive than external subjects (Lefcourt, 1967;<sup>92</sup> Lefcourt and Wine, 1969;<sup>93</sup> Davis and Phares, 1967<sup>94</sup>). That internal subjects should become more active when granted autonomy, and external subjects less so, suggests, in conjunction with the decision-making results noted above, that internal subjects become cognitively more activated by opportunities to exercise control than external subjects. In summary, then, the research so far reviewed in this section seems to reflect some characteristic differences in the performance of internals and externals. Internals exhibit better learning and acquisition of material, they more actively seek information, they show a superior utilization of information acquired, they are more attentive and more alert than externals. In addition, internals are more highly motivated to perform

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92 Lefcourt, Op. Cit., p. 372-378.

93 Idem, and Wine, Op. Cit., p. 167-181.

94 Davis and Phares, Op. Cit., p. 547-561.

well in situations that allow them to exercise control, self-reliance or skill. Consequently, combining the cognitive and motivational aspects of locus of control, it could be expected that internals will be in a superior position to exert control and power over their environment than externals.

#### 4. The Locus of Control Variable and Resistance to Social Influence.

The studies reported in the preceding section offered evidence that internals are more actively involved in their attempts to control or otherwise deal effectively with their own environment. Their behaviour appeared to be mediated by their belief in the efficiency of their own efforts and by a desire or need to remain in control. It would seem, therefore, that internals are more likely to resist the efforts by others who would attempt to influence, coerce, manipulate or otherwise control them since to be controlled by others would run counter to their expectations of being in control of their environment. Externals, on the other hand, would conform to external pressure since their expectations involve a view of events as being due to sources outside their own control. Parting from this general hypothesis, several investigators

have attempted to relate internal-external locus of control to various forms of social influence. Some of the important findings relevant to the present study will be reported in the ensuing pages.

The earliest confirmation of this hypothesis was reported by Odell (1959)<sup>95</sup> who, using an earlier version of the I-E scale, found a significant relationship between locus of control and Barron's Independence of Judgement Scale (a questionnaire which discriminates conformers from non-conformers in Asch-type conformity situations) with externals significantly more conforming than internals. The study by Crowne and Liverant (1963)<sup>96</sup> also indicated that externals are more conforming than internals under overt influence situations.

Gore (1962)<sup>97</sup> used an experimenter influence paradigm, establishing overt influence, subtle influence and no influence conditions and presented TAT cards to subjects, leading them to believe that the purpose was to determine which card produced longer stories. In the overt influence

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95 M. Odell, Personality Correlates of Independence and Conformity, Unpublished Master's thesis, Ohio State University, 1959.

96 Crowne and Liverant, Op. Cit., p. 547-555.

97 P. M. Gore, Individual Differences in the Prediction of Subject Compliance to Experimenter Bias, Unpublished doctoral dissertation, Ohio State University, 1962.

situation, she specified which card she thought was the best. In the subtle influence situation, she presented the card, saying to the subjects, smiling "Now let's see what you can do with this one". In the last condition, no influence was attempted at all. Gore found that only in the covert influence condition did internals produce significantly shorter stories than externals. There were no differences between internals and externals in the remaining conditions. Internals did tend to produce shorter stories than externals in the overt condition but the difference was not statistically significant. Thus, in the face of such subtle pressure attempts, internals were less likely than externals to succumb. Biando and MacDonald (1971)<sup>98</sup> studied the reactions of students toward some proposed changes in university grading practices. They found that internals showed no great resistance to low-influence messages, but that they did, however, react to high-influence attempts by moving in the opposite direction. Externals, on the other hand, were more receptive to either high or low levels of influence. While this study demonstrates externals' rather conforming attitude, it does not give evidence of a particular effect of high vs. low influence.

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98 J. Biando and A. P. MacDonald, "Internal-external Locus of Control and Response to Influence Attempts", Journal of Personality, Vol. 39, 1971, p. 407-419.

Several studies have yielded similar results when the situation involves verbal conditioning. Such a conditioning situation can be viewed as one wherein the experimenter tries to influence the subject's production of particular verbalizations by offering subtle or covert rewards (smiles, a nod of the head, etc.).

Getter (1966),<sup>99</sup> using a verbal conditioning paradigm, found that the most external subjects were the easiest to condition. However, when he examined extinction trials (after the experimenter had stopped giving reinforcing responses), a number of subjects gave a significantly more conditioned response than during acquisition trials. These subjects were found to be significantly more internal than those who did not show such increases and those who conditioned during training. In a later study, using a verbal conditioning paradigm, Strickland (1970)<sup>100</sup> found no verbal difference between internals and externals during conditioning. However, on the basis of post-experimental interviews, Strickland found that internals who were aware of the reinforcement contingency showed significantly less conditioning than did either the internals who were not aware or the

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99 H. Getter, "A Personality Determinant of Verbal Conditioning", Journal of Personality, Vol. 34, 1966, p. 397-405.

100 B. R. Strickland, "Individual Differences in Verbal Conditioning, Extinction and Awareness", Journal of Personality, Vol. 36, 1970, p. 364-378.

externals. Strickland's (1970)<sup>101</sup> findings appear to be consistent, not only with the findings reported in the preceding studies that suggest internals resist subtle influence but also agree with Getter's (1966)<sup>102</sup> findings concerning "latent conditioners". It might be noted that Baron (1966)<sup>103</sup> found no difference in awareness between internals and externals following trials in a verbal conditioning experiment. Likewise, Lichtenstein and Craine (1969)<sup>104</sup> could find no support for either Getter's or Strickland's results in a rather different study that included success-praise and failure-criticism manipulations prior to the verbal conditioning procedures. In a later study, Doctor (1971)<sup>105</sup> found that externally-oriented subjects, as hypothesized, when selectively reinforced in a sentence construction task, showed significantly greater performance gains (emission of

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101 Ibid.

102 Getter, Op. Cit., p. 397-405.

103 R. A. Baron, "The Effects of Intertrial Activity and Locus of Control Orientation on Verbal Operant Conditioning", Psychonomic Science, Vol. 15, 1969, p. 69-70.

104 E. Lichtenstein and W. H. Craine, "The Importance of Subjective Evaluation of Reinforcement in Verbal Conditioning", Journal of Experimental Research in Personality, Vol. 3, 1969, p. 214-220.

105 R. M. Doctor, "Locus of Control of Reinforcement and Responsiveness to Social Influence", Journal of Personality, Vol. 39, 1971, p. 542-551.

I-We pronouns) over their base rate than did similarly treated internally-controlled subjects. When reports of awareness were used to further subdivide the subjects as to their awareness of what was going on in the experiment, it was found that aware externals accounted for the conditioning effect, while aware internals, unaware subjects and controls were essentially similar and showed no changes in their performance. The author interpreted these results as a function of the internal's greater resistance to a subtle form of social influence and the external's greater compliance, cooperation and responsiveness. The foregoing studies on verbal conditioning, taken as a whole, seem to suggest that internals are less easily influenced when attempts are made to induce changes in their verbal or related responses whereas externals are more easily influenced by such attempts. Although no direct evidence exists to indicate that internals perceive verbal conditioning or other techniques as subtle or covert, the fact remains, however, that when faced with what experimenters regard as relatively covert or subtle influence, internals seem to resist more than externals what the experimenter appears to want them to do.

A number of workers have taken a departure from the foregoing conformity and subtle-influence situations and have, instead, studied the differential persuasibility of externals and internals as reflected in some specific areas

of attitude change. Ritchie and Phares (1969)<sup>106</sup> found that when the same communications on government budgeting from high or low prestige sources were presented to internals and externals, external subjects changed more in response to a high-prestige source than to a low-prestige source. Internals, on the other hand, did not differ in attitudes toward communications from high and low-prestige sources. Ritchie and Phares concluded that externals are not equally subject to influence attempts in all situations but are markedly influenced by the prestige of the source. In addition, internals seemed more responsive to the content of the communication in the light of their previously held opinions than to the prestige of the source. In a later study, Ryckman, Rodda and Sherman (1972)<sup>107</sup> found that external subjects tended to accept influence from a high-prestige source regardless of its relevance or irrelevance. Internals, on the other hand, did not submit more to a source with relevant as opposed to irrelevant expertise. In yet another different approach,

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106 E. Ritchie and E. J. Phares, "Attitude Change as a Function of Internal-external Control and Communicator Status", Journal of Personality, Vol. 37, 1969, p. 429-443.

107 R. M. Ryckman, W. C. Rodda and M. F. Sherman, "Locus of Control and Expertise Relevance as Determinants of Change in Opinion about Student Activism", Journal of Social Psychology, Vol. 88, 1972, p. 107-114.

Johnson, Ackerman, Frank and Fionda (1968)<sup>108</sup> investigated resistance to temptation as part of a project dealing with moral development and personal adjustment. They asked undergraduate subjects to complete stories in which the "hero" of each story either had to make a decision or else had already yielded to pressure and now had to live with his decision. The results indicated that among males, the more internal the subject, the more likely he was to present a story ending in which the hero resisted pressure. In addition, when the transgression had already occurred, internals were more likely to have the hero feel guilty about having yielded to pressure than were externals. Johnson et al.'s study suggests that locus of control may directly influence a person's moral judgement and that, among externals, moral standards are less important than the need for affiliation and dependence. More recently, Sherman (1973)<sup>109</sup> studied the effects of inducing subjects to behave in a fashion at odds with their beliefs and then observed the effects of such discrepant behaviour on their beliefs. He had subjects either read a

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108 R. C. Johnson, J. M. Ackerman, H. Frank and A. J. Fionda, "Resistance to Temptation and Guilt Following Yielding and Psychotherapy", Journal of Consulting and Clinical Psychology, Vol. 32, 1968, p. 169-175.

109 S. J. Sherman, "Internal-external Control and the Relationship to Attitude Change under Different Social Influence Techniques", Journal of Personality and Social Psychology, Vol. 23, 1973, p. 23-29.

persuasive message about lowering the voting age or write an essay that was opposed to their stated views on the voting issue. Results indicated that internals showed greater attitude change following their act of writing counter-attitudinal messages while externals showed the greatest attitude change after reading the persuasive message. An argument which could account for these results would be that internals generally take greater responsibility for their own behaviour (especially for negative outcomes). Since they were induced to behave in a manner that could have produced negative results, (others might be influenced to support raising the voting age), they should feel greater responsibility for their behaviour and thus exhibit greater attitude change (perhaps as a way of reducing cognitive dissonance). Externals, however, attribute a greater role to outside forces when negative consequences follow their behaviour' therefore, little dissonance and little consequent attitude change should occur - their behaviour was induced by forces outside themselves.

In an attempt to study the effects of social influence on subjects' behaviour, several investigators have used a slightly different methodology from those already reported. They have tried to examine factors that underlie differential acceptance of information by internals and externals. Thus,

in a study by James, Woodruff and Werner (1965),<sup>110</sup> it was found that following the Surgeon General's report on the dangers of smoking, smokers who were convinced by the evidence in the report were more internal than smokers who were not convinced and internal males were more likely than externals to quit smoking. These results seem to be consistent with the previous attitude change data in suggesting that internals will change attitudes but that neither the prestige nor the expertise of the source is as influential as the content of the message. Such manoeuvring would seem more useful if one is to maintain control over one's life. In a later study, Jones and Shrauger (1968)<sup>111</sup> placed either an internal or an external subject in a group test with two peers during which they exchanged evaluations of each other's answers. Each subject received mostly negative evaluations from one peer and mostly positive evaluations from the other peer. Half of the subjects were informed that the test measured personal opinion and that there was no right or wrong answer while the other half was told that the test measured an ability. The results showed that externals reciprocated

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110 W. H. James, A. B. Woodruff and W. Werner, "Effects of Internal and External Control upon Changes in Smoking Behaviour", Journal of Consulting Psychology, Vol. 29, 1965, p. 184-186.

111 S. C. Jones and J. S. Shrauger, "Locus of Control and Interpersonal Evaluations", Journal of Consulting and Clinical Psychology, Vol. 32, 1968, p. 664-668.

negative and positive evaluations more frequently in the opinion condition than did internals. These results could be interpreted as demonstrating both the willingness of the external to be controlled and the activity of the internal in attempting to control social outcomes. In a more recent study, Snyder and Larson (1972)<sup>112</sup> asked subjects to take personality tests following which identical interpretations were given to all about their general personality features and all were asked to rate the degree to which they felt the interpretations described their personalities. Results indicated that a higher external locus of control was associated with greater acceptance of the interpretations. Some recent studies by Lefcourt (1972),<sup>113</sup> while not directly designed to study the differential responsiveness of internals and externals to social influence, appear nevertheless relevant to the issue. In one study, Lefcourt (1967)<sup>114</sup> found that externals, in a level of aspiration task, performed in accordance with experimental instructions, while internals did not. Lefcourt concluded that externals were highly

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112 C. R. Snyder and G. R. Larson, "A Further Look at Student Acceptance of General Personality Interpretations", Journal of Consulting and Clinical Psychology, Vol. 38, 1972, p. 384-388.

113 Lefcourt, Op. Cit., 1972, p. 1-39.

114 Lefcourt, Op. Cit., 1967, p. 372-378.

responsive to external definitions of the task while internals tended more to follow their own insights, paying little heed to the experimental suggestions. Likewise, Lefcourt, Lewis and Silverman (1968)<sup>115</sup> found that internals less often than externals accepted directions that stressed chance determination of the level of aspiration task and more often accepted the skill directions. Finally, a study by Pine and Julian (1972)<sup>116</sup> predicted that internals would be more influenced by the informational requirements of the task whereas externals would be more affected by the demands of the social situation (evaluation of the experimenter). As hypothesized, results demonstrated that internal college girls were more attuned to the task difficulty and the consequent pressure it exerted for information-processing while externals were more affected by the social demand characteristics of the situation. Consequently, it would seem that internals and externals adopt different strategies in their pursuit of valued goals; internals pay more careful attention to the nature of the experimental task and externals rely upon behaviours oriented toward the social agent in the situation.

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115 Lefcourt, Lewis and Silverman, Op. Cit., p. 663-682.

116 H. A. Pine and J. W. Julian, "Effects of Task and Social Demands on Locus of Control Differences in Information-processing", Journal of Personality, Vol. 40, 1972, p. 407-416.

In conclusion, the research reported in this section seems to suggest that internals exhibit greater resistance to social influence which emanates from persuasive outside agents while they appear circumspect when the influence is subtle and attempts to induce them to behave contrary to their beliefs; however, they respond to reasoned arguments regardless of the status of the source and readily respond to prescriptions that are in agreement with their own perceptions. Externals, on the other hand, appear suggestible and conform to what they believe is expected of them by others and accept readily information or other sources of influence. If these considerations are accurate, it would follow that persons differing in their belief in their own personal control over important events in their lives will not only be expected to differ in their dependence upon their inner resources in formulating independent judgements in a situation of interpersonal conflict but also to differ in their willingness to take the initiative to resolve conflict and commit resources through well-calculated strategies to retaliatory action which will prevent further exploitation by the other party.

##### 5. Problems and Issues in Personality Research.

The studies thus far reviewed have clearly demonstrated that the I-E scale predicts moderately well in a wide range of situations especially those involving personal mastery or coping behaviour. However, it is being discovered that its

success is variable in several other situations (particularly socio-political), depending upon a number of factors, such as age, sex or the nature of the situation which are just beginning to be identified.

Initially, Rotter (1966)<sup>117</sup> described the I-E scale as an additive scale. That is, the items represent an attempt to sample I-E beliefs across a range of situations such as school, work, politics and interpersonal situations. Thus, such a scale, by its nature, is multidimensional and since it samples beliefs in a variety of areas, the scale can more nearly lay claim to being a measure of generalized expectancy. However, like any other behavioural variable, I-E does not possess complete generality, that is, its effects on behaviour have not been uniform and invariant across all situations. It has affected some behaviour more than others and different individuals have manifested differing patterns of effects. Individuals may show a series of specific or circumscribed beliefs about locus of control, each of which applies more to certain situations than to others. Thus, taken together, these locus of control beliefs may average out to a high level of internal control over many situations. It should be pointed out, however, that the wider the range of situations, the less predictive the concept will be. Consequently,

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117 Rotter, Op. Cit., 1966, p. 1-28.

I-E may be a good predictor of individuals' behaviour in general; but rather a poor predictor in any specific situation. In a similar vein, just because individuals show a high mean level of internality does not mean one can infer that they are high in internality in every situation. Ultimately, what seems to be required for successful prediction with the I-E personality disposition to social behaviour is experimental investigation which can differentiate between conditions in which I-E relates to a specific type of behaviour and those in which it does not relate or others in which reverse relations may be found.

If one examines the body of literature on a given personality dimension relating to overt behavioural reactions of persons, it is found that the vast majority of findings can be subsumed within two categories: those in which scores on the personality measure have been correlated with paper-and-pencil measures of other characteristics of the person (e.g. attitudes, values, intelligence) and those in which scores on the personality dimension have been correlated with the behavioural reactions of subjects to constant stimulus conditions. Of course, both these approaches yield a substantial amount of data with minimum investment of time and resources; however, the results of such procedures alone may be very misleading. The weaknesses of studies attempting to correlate internal characteristics and processes are of

course widely known. For many of these studies, all the relevant measures are of the paper-and-pencil variety and for such endeavours, the spector of response set (test-taking attitudes) looms interminably in the wings. Such studies are predominantly of the correlational variety and the question of causality remains omnipresent. It is also evident that investigators remain ambivalent about discovering that a pet scale correlates highly with other aspects of the person. For example, the finding that a given personality dimension correlates significantly with intelligence may well be the death knell for the personality dimension; this is in spite of the fact that the search for such correlates is an essential step in scale validation (Campbell and Fiske, 1959).<sup>118</sup> Investigators are often loath to find that their measure is a weak substitute for an intelligence test. It is also clear that, although establishing interrelations among various psychological properties may serve a useful purpose in determining the meaning of a given personality dimension, such studies however are no substitute for empirical demonstrations of the relationship of personality to everyday social interaction. It is, for example, erroneous to think, because persons who are high in internality may be

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118 D. T. Campbell and D. W. Fiske, "Convergent and Discriminant Validation by the Multitrait-multimethod Matrix", Psychological Bulletin, Vol. 56, 1959, p. 81-105.

less susceptible to social influence in one situation, that such non-susceptibility is general across diverse influence situations. The need, then, is for a taxonomy of situations such as to enable one to specify, for various kinds of personalities (or for various cognitive and motivational states), the concerns most likely to be aroused by specific situational cues.

Some recent studies of personality have shown that many so-called "stable" dispositions are subject to gross changes as the person moves from one social group to another, or self-ratings and descriptions are highly susceptible to at least temporary modifications. More specifically, studies by Jones, Gergen and Davis (1962);<sup>119</sup> Jones, Gergen and Jones (1963),<sup>120</sup> and Gergen (1965),<sup>121</sup> have demonstrated that the way a person defines himself is greatly influenced by his motivation in a given situation. Consequently, the fact that people with high externality are very conforming may reflect

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119 E. E. Jones, K. J. Gergen and K. E. Davis, "Some Determinants of Reactions to Being Approved or Disapproved as a Person", Psychological Monographs, Vol. 76, No. 2, 1962, (whole no. 521).

120 E. E. Jones, K. J. Gergen and R. C. Jones, "Tactics of Ingratiation among Leaders and Subordinates in a Status Hierarchy", Psychological Monographs, Vol. 77, No. 3, (whole no. 566).

121 K. J. Gergen, "The Effects of Interaction Goals and Personalistic Feedback on the Presentation of Self", Journal of Personality and Social Psychology, Vol. 1, 1965, p. 413-424.

nothing more than a simple attempt on their part to "fit in" and thereby enhance their self-image or alternatively, the process linking I-E to social persuasion may prove to be somewhat more complicated when one considers the role of situational cues in determining the direction of behaviour (Lefcourt, 1967).<sup>122</sup> Rotter (1955)<sup>123</sup> has been the most articulate and consistent representative of this point of view, namely, that little progress is apt to be made in predicting the directionality of human behaviour until the "psychological situation" is systematically differentiated. On the basis of the studies reviewed, it can be concluded that no simple or highly general relationship holds true for I-E control and for example, social influence. In order to specify the existing relationship and whether the relationship will be positive, negative, linear or curvilinear, it will be necessary to consider such factors as the age and sex of the subjects, the ambiguity of the stimuli, the format and content of the I-E measure and the degree of instrumentality of the social susceptibility act for the subjects.

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<sup>122</sup> Lefcourt, Op. Cit., 1967, p. 372-378.

<sup>123</sup> J. B. Rotter, "The Role of the Psychological Situation in Determining the Direction of Human Behaviour", in M. J. Jones (Ed.), Nebraska Symposium on Motivation, Lincoln, University of Nebraska Press, 1955, p. 245-268.

Clearly, a study is required in which two major approaches, individual dispositions and the situational states, are combined within a single research design. This will, on the one hand, require an assessment of the way in which I-E dispositions imported into a situation modify one's perception of the situation and one's response tendencies, and on the other, an understanding of the way in which situational manipulations affect personal dispositions and the individual's subsequent responses. Consequently, it is necessary to find a procedure stringent enough to put this hypothesis to the test.

This approach has a specific importance for the study of young children's I-E personality dispositions, for although a sound theoretical grounding and a large number of research efforts have shown that I-E personality dispositions are well established and play an important role in social adjustment, as well as in the academic achievement of a child in his initial school years, however, controlled laboratory research bearing on these subjects and, in particular, on the children's interpersonal behaviour, are either lacking or scarce and available results either insufficient or inconsistent. In addition, most research reported in the area of children's I-E control has been generally correlational in nature, using such traditional measurement methods as paper-and-pencil tests, rating scales and questionnaires. The intention here

is not to present a detailed review of the difficulties inherent in the use of these techniques. Much has already been written about the insufficiency of such tools. Suffice it to say that the problems of recall of diverse information by children or their parents and of definition, distortions, the desire to present a favourable image and defensive attitudes have all been commonly observed. Thus, given the previously noted inconsistencies and often reported conflicting findings, the shortcomings and limitations regarding the reliability, format, administration and the combination of some global and some specific items in many of the children's I-E scales, the lack of intercorrelations among the various existing children's I-E scales, the psychometric and multi-dimensionality problems, it is natural that concerns about the reliability and validity of the scales, as well as of some research findings have been raised, as has the question of the general efficiency of the scale approach to the measurement of children's personality dispositions. It has been argued that several of these children's I-E scales are cognitively too demanding for young children; that is, children may have difficulty in understanding or grasping the meaning and subtleties of some of the items and they may randomly respond to these questions, leading consequently to reduced reliability of the scale and its effect on the validity of the construct measured.

Thus, due to these factors and many others, the field of personality research has experienced something of a belated behaviouristic revolt, leading to a state of laboratory studies that are intended to supply the unambiguous answer that scales, paper-and-pencil tests or questionnaires failed to provide. The recent popularity of gaming has provided a natural way of studying children's behaviour and has given validation to the theoretical construct under study. This experimental method seems viable with children in view of the natural appeal and simplicity which games have for them, the relative ease with which the social environment could be under the control of the experimenter and the high extrinsic validity which behavioural measures of covert human beliefs and motives afford. Finally, since Rotter's conceptualization of I-E locus of control involves implicit "expectancies", "reinforcement values" and the "psychological situation", the decision theory of gaming lends itself to these trends. In other words, cognitive abilities of the organism are presented as subjective probabilities or expectancies. Motivational characteristics are described by means of utilities or reinforcement values. The psychological situation is seen as defining realistic options for behaviour. Finally, the organism is assumed to be a maximizer - always choosing the option that offers the best hope or the highest payoff, maximum behaviour potential

or maximum expectancy value. Therefore, the next section will deal with a description of the use of gaming techniques.

#### 6. Research on Gaming Behaviour.

As members of a society, individuals are constantly into or find themselves in interpersonal interactions in which their goals, needs or wants are in opposition to those of others. Often, in such conflict situations, each party can achieve some of what he desires through mutual co-operation although the temptation to achieve even more through exploitation is omnipresent.

Schelling (1960)<sup>124</sup> has termed such a conflict as one revealing mixed motives: that is, each party is placed in the position where he is tempted to seek his own personal gain by competing, but if both players compete they both lose, whereas if both co-operate, they both profit. Thus, the task for both parties concerned is one of how to divide the pie between them and each party usually finds himself in the position of having to exercise some form of influence to determine his share.

In most laboratory studies of bargaining, one of the most often utilized techniques has been the two-person

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124 C. T. Schelling, The Strategy of Conflict, Cambridge, Harvard University Press, 1960.

mixed-motive games, and of these, by far the most popular has been the Prisoner's Dilemma (PD), described in detail by Luce and Raiffa (1957).<sup>125</sup> The reason for its popularity is that its structure contains the essence of many real-life conflict situations in which achieving individual goals is incompatible with achieving mutual or group goals. As the laboratory analogue to situations of social choice and the consequences, the PD game has been modified in various ways and widely used by social scientists to study co-operative behaviour, conflict resolution and strategies employed to maximize outcomes.

The principal aim of game theory is to develop criteria for rational behaviour in situations where two or more individuals in a total or partial conflict are required to make choices among the possible alternatives under the rules of a specific game. The theory rests on two major assumptions known as rationality postulates. The first of these is the individual rationality which states that the person acts to maximize his own expected gain or utility. The second is the mutually expected rationality which states that each player acts on the expectation that the other player will also try to maximize his own expected utility. These postulates essentially delineate the interaction of

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<sup>125</sup> R. D. Luce and H. Raiffa, Games and Decisions, New York, Wiley, 1957.

two or more individuals in terms of behaviours which can be defined as the rational pursuit of their own self-interests. Contemporary game research, utilizing the PD game, has tried to measure this behaviour. Consequently, some of the attempts at a possible rationale have tried to clarify PD findings in terms of personality variables, including sex and age of the players, strategies employed by these players, as well as a variety of other situational determinants.

The studies attempting to relate individual differences in personality to choice behaviour in PD games have tended to be both fewer in number and more diverse in focus. These studies, as a rule, have followed the common experimental design of separating subjects on the basis of their high and low scores on some personality dimension and then either matched subjects with respect to some pole of the predetermined continuum or paired them in terms of polar opposites.<sup>126</sup>

Thus, a great many apparently different personality variables have been selected for study within the last decade. Only a few, however, have reported consistent results and few of these have been the object of repeated, intensive exploration or have been used to study choice behaviour in PD games

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<sup>126</sup> K. W. Terhune, "The effects of Personality in Cooperation and Conflict", in P. G. Swingle (Ed.), The Structure of Conflict, New York, Academic Press, 1970, p. 193-234.

with children. A relevant study is that of Bobbitt (1967),<sup>127</sup> who administered Rotter's scale to a group of subjects who then played a PD game against an experimentally manipulated strategy. During a consistently competitive strategy of the other, internals were found to behave less competitively than externals; however, in the face of a predominantly co-operative strategy of the other, internals were less co-operative than externals. Thus, internals seemed to be less sensitive and reactive to variations in the other's behaviour than were externals. That is, they maximized their own gains by choosing competitively (exploitatively) when the other consistently co-operated; however, they initiated co-operative behaviour (risk-taking) in the presence of a partner who was competitive, but presumably might be induced to choose co-operatively. Externals, on the other hand, seem less concerned with maximization of their own gain and more concerned with interpersonal cues, making co-operative choices in direct proportion to the frequency of the competitiveness of the other. In contrast to the foregoing results, Condry (1967)<sup>128</sup> found no relationship between locus of control and behaviour

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127 R. A. Bobbitt, "Internal-external Control and Bargaining Behaviour in a Prisoner's Dilemma Game", Dissertation Abstracts, Vol. 27, 1967, p. 3266-3267-B.

128 J. C. Condry, "The Effects of Situational Power and Personality upon the Decision to Negotiate or not in a Two-person Bargaining Situation", Dissertation Abstracts, Vol. 27, 1967, p. 2612-A.

in a two-person negotiation game.

Research concerned with variations in bargainer's background (i.e. age, sex) has generally examined a limited number of parameters, giving some of these (i.e. sex variable) considerable attention. Thus, with respect to age, for example, although a great many researchers have studied bargaining processes in college-age student populations, while others have looked at bargaining in children, only a handful of these experiments have been truly developmental in nature, in the sense of systematically examining age as a critical independent variable.

In an earlier study by Fry (1967),<sup>129</sup> pairs of fourth-graders, eighth-graders and college students were placed in a multi-trial co-ordination game. On each trial, the subjects were given an identical set of three objects (a door key, a pencil and a bottle top) and were asked to pick up one of the three objects so as to match the object picked up by their unseen partner. A point was given on every trial in which a correct match occurred; on mismatch trials, both subjects lost a point. The game continued until one hundred trials had been completed or until the pairs reached a solution and matched on ten consecutive trials.

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129 C. L. Fry, "A Developmental Examination of Performance in a Tacit Co-ordination Game Situation", Journal of Personality and Social Psychology, Vol. 5, 1967, p. 277-287.

It was found that college students out-performed eighth graders and eighth-graders out-performed fourth-graders on this task. The college students seemed best able to take the role of the other, using knowledge of the other's previous choice behaviour to anticipate successfully his choice on a given problem. In contrast, the fourth-graders had great difficulty converging on a solution to the co-ordination task, largely, it would seem, because they were incapable of (or uninterested in) standing in the other's shoes to "see the world as he saw it".

Several experimental studies have found an interaction between age and the sex variable. Vinacke and Gullickson (1964)<sup>130</sup> ran male and female triads of seven- to eight-year-olds, fourteen- to sixteen-year-olds, and undergraduates in the Parchesi Coalition game. They found no difference as a function of age in the behaviour of the female triads (all the subjects behaved co-operatively). Among the males, however, the youngest triads were found to behave like the females, while the two older triads were far more competitive. In another study, Shears and Behrens (1969),<sup>131</sup> using a

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130 W. E. Winacke and G. R. Gullickson, "Age and Sex Differences in the Formation of Coalitions", Child Development, Vol. 35, 1964, p. 1217-1231.

131 I. M. Shears and M. G. Behrens, "Age and Sex Differences in Payoff Demands During Tetrad Game Negotiations", Child Development, Vol. 40, 1969, p. 559-568.

four-person Coalition game, found that male and female third-graders behaved similarly and were generally more co-operative than fourth-graders, with the lesser co-operation among fourth-graders being largely attributed to the behaviour of the male tetrads. In contrast to the foregoing studies, Sampson and Mardush (1965),<sup>132</sup> in a PD game in which the variables of age (7-8 years vs. 9-11 years), sex, class and race were all varied, found that the younger male and female dyads behaved similarly. Only in the older groups did they observe increasing co-operation among males and increasing competition among females.

Despite the fact that two of these studies conclude that males behave more competitively as they grow older, while the conclusion of the third is that they behave more co-operatively, they each point to the same general inference, namely, that bargaining behaviour becomes increasingly distinctive and diverse as a function of age. While college students and older children are likely to bargain differently, depending on their gender, younger children tend to behave in similar fashion regardless of whether they are boys or girls.

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<sup>132</sup> E. E. Sampson and M. Kardush, "Age, Sex, Class and Race Differences in Response to a Two-person Non-zero-sum Game", Journal of Conflict Resolution, Vol. 9, 1965, p. 212-220.

Several other cross-cultural investigations are pertinent to the present study. McClintock and Nuttin (1969)<sup>133</sup> placed all-male pairs of second, fourth and sixth-grade Americans and Belgians in a "maximizing differences" variant of the PD game. Results indicated that subjects behaved in an increasingly more competitive fashion with age. In addition, older children appeared to have adopted a competitive strategy, that is, maximizing the differences between the players which they employed with consistency throughout the game. The younger children, on the other hand, displayed a far more shifting and erratic behavioural pattern, one which appeared to be largely unrelated to their opponent's behaviour in any kind of meaningful way. In contrast with older subjects, for example, second-graders were far more likely to behave cooperatively following their own prior competitive choice (probability of .74) than following a prior co-operative one (probability of .34). This suggests that they were either unable or unwilling to develop a meaningful strategy - one in which they could anticipate, for example, the likelihood of the other player's responding to their competitive or exploitative behaviour with competitive or retaliatory behaviour of his own.

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133 C. G. McClintock and J. M. Nuttin, "Development of Competitive Game Behaviour in Children Across Two Cultures", Journal of Experimental Social Psychology, Vol. 5, 1969, p. 203-218.

In another cross-cultural study of Anglo-American and Mexican children, Kagan and Madsen (1972)<sup>134</sup> found that the older eight- to ten-year-old children were significantly more rivalrous than the younger five- to six-year-old children. Similarly, in groups of same-sex and presumably same-age Mexican children, four- to five-year-old children were more co-operative in a "tug-of-war" game than seven to eight-year-olds or ten- to eleven-year-olds (Madsen 1971).<sup>135</sup> Kagan and Madsen (1971)<sup>136</sup> found that the four- to five-year-old children were more co-operative in a "circle matrix" game than were seven- to nine-year-old children.

Investigating the relationship of intelligence to co-operation, Madsen and Conner (1973)<sup>137</sup> found that six- to seven-year-old retarded children in a "tug-of-war" game were more co-operative than eleven- to twelve-year old retardates. Both groups of retarded children co-operated more than normal children of the same chronological age. Of interest was the

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134 S. Kagan and M. C. Madsen, "Rivalry in Anglo-American and Mexican Children of Two Ages", Journal of Personality and Social Psychology, Vol. 24, 1972, p. 214-220.

135 M. C. Madsen, "Developmental and Cross-cultural Differences in the Cooperative and Competitive Behavior of Young Children", Journal of Cross-Cultural Psychology, Vol. 2, 1971, p. 365-371.

136 S. Kagan and M. C. Madsen, "Cooperation and Competition of Mexican, Mexican-American and Anglo-American Children of Two Ages under Four Instructional Sets", Developmental Psychology, Vol. 5, 1971, p. 32-39.

137 M. C. Madsen and C. Conner, "Cooperative and Competitive Behavior of Retarded and Non-retarded Children at Two Ages", Child Development, Vol. 44, 1973, p. 175-178.

authors' observation that "... several retarded subjects expressed concern about what was the right thing to do, while the non-retarded subjects more often expressed concern about winning". In a similar vein, McClintock (1974)<sup>138</sup> reported that Anglo-American and Mexican-American children became increasingly competitive with age. Bearing some resemblance to the foregoing results is a study by Tedeschi, Hiester and Gahagan (1969),<sup>139</sup> in which third and fourth-grade males and females were placed in a PD game modified for use with children. It was found that children were far less responsive to variations in the other's behaviour than were college students, whose responses were reported in an earlier comparable study by Rapoport and Chammah (1965).<sup>140</sup>

In summary, then, the most general and important finding which emerges from these studies relating bargaining to age is that, all other factors remaining constant, young children tend to behave more co-operatively, becoming, however,

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138 C. G. McClintock, "Development of Social Motives in Anglo-American and Mexican-American Children", Journal of Personality and Social Psychology, Vol. 29, 1974, p. 348-354.

139 J. T. Tedeschi, D. Hiester and J. P. Gahagan, "Matrix Values and the Behavior of Children in the Prisoner's Dilemma Game", Child Development, Vol. 40, 1969, p. 517-527.

140 A. Rapoport and A. M. Chammah, "Sex Differences in Factors Contributing to the Level of Cooperation in the Prisoner's Dilemma Game", Journal of Personality and Social Psychology, Vol. 2, 1965, p. 831-838.

increasingly more competitive as they grow older. Bargaining behaviour seems more complex when sex is taken into consideration. In spite of some contradictory results, the bulk of studies seem to point to the same general inference, that bargaining behaviour becomes increasingly distinctive and diverse as a function of age: while younger children tend to behave in similar fashion (co-operatively) regardless of whether they are boys or girls, older children are likely to bargain differently depending on their gender. More specifically, the younger boys and girls are less adept at problem-solving, less skilful and competent in competitive tasks, show more shifting and erratic behavioural patterns, perhaps because they are unable and unwilling to develop a meaningful strategy to compete with the other. The older ten- to twelve-year-old boys and girls, in contrast, bargain differently. Boys, in general, are more competitive and more competent or skilful in problem-solving tasks than girls. They are thus able and willing to develop strategies that will not only allow them to anticipate the other's behaviour but also help them to best compete with the opponent. Older girls, on the other hand, tend to be generally more co-operative. Their co-operation is particularly evident when rewards associated with the game are relatively great or small. They behave competitively when rewards or losses are intermediate in magnitude.

These findings may be related to Piaget's (1965)<sup>141</sup> suggestion that children between the ages of seven and twelve experience cognitive (egocentric) difficulty with tasks requiring them to take the role of the other, because these tasks necessitate reasoning of a relative and formal kind. These findings may also be related to Rotter's (1966)<sup>142</sup> concept of an internal versus external locus of control variable. Typically, internal locus of control increases with the age of the child (Penk, 1969).<sup>143</sup> Young children are relatively helpless and can effect little control over their own lives. They can be picked up, punished, hauled around and generally controlled by all-powerful adults in their lives. As they become older, locus of control is increasingly internalized. However, it is not age alone that increases the strength of their internal beliefs, but also the accompanying growth in capacity to care for themselves, the growth in cognitive and behavioural competencies, independence and real ability to influence their surroundings. Consequently, the fact that the older children in the foregoing studies were found to be more competent, more skilful

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141 J. Piaget, The Moral Judgement of the Child, New York, The Free Press, 1965 (originally published 1932).

142 Rotter, Op. Cit., 1966, p. 1-28.

143 W. E. Penk, "Age Changes and Correlates of Internal-external Locus of Control Scales", Psychological Reports, Vol. 25, 1969, p. 856.

or more adept at competitive problem-solving tasks and better able to develop strategies to compete and maximize their outcomes than the younger children, and in view of the fact that internal children were seen to be more competent, more active, more self-assertive, more achievement-oriented, with greater problem-solving skills ~~control~~ and master the environment than the externals, the possibility that age may be an important variable mediating I-E personality attitudes in mixed motive game situations becomes tenable.

In contrast to the limited number of experimental studies of individual personality differences and age variables in the PD game is an enormous array of bargaining research concerned with the relationship between sex and various aspects of bargaining behaviour. Among this enormous volume of studies on the sex variable are a number which found no relationship between sex and bargaining and a number that failed to report data concerning this relationship and numerous other experiments where the conclusions appear to be diametrically opposed.

Vinacke (1969),<sup>144</sup> in his review of the effect of personality variables in experimental games, under which he included sex differences in bargaining, pointed out that

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<sup>144</sup> E. W. Vinacke, "Variables in Experimental Games", Psychological Bulletin, Vol. 71, No. 4, 1969, p. 293-318.

research in this area has been unsystematic, in spite of a large number of studies, and the findings often appear contradictory. He cited several dyad experiments that reported a high level of co-operation for females and in direct opposition to this finding, he cited several others that reported a high level of co-operation for males. In Vinacke's own experiments involving triads, he has found females to be consistently accommodative (co-operative), discussing each problem with one another and forming alliances that lead to an equitable division of the game's rewards. Males, on the other hand, tended to behave exploitatively, seeking and demanding an inequitable division of the rewards. Terhune (1970),<sup>145</sup> in his survey of the literature on the effects of personality in experimental games, also noted this intriguing paradox regarding sexes. He summarized sex differences found in bargaining by stating that females tend to react in a more extreme fashion to both the demands of the situation and the behaviour of the other party. In general, females adopt an either-or approach to bargaining. If the adversary cooperates, females will co-operate more than would male bargainers but if the adversary competes, uses threats or aggressively administers punishment, females will react vindictively, outcompeting their male counterparts. He

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145 Terhune, Op. Cit., p. 193-234.

reconciled these different findings by considering the females as more affiliative and dependent with males being more dominant and aggressive. Terhune concluded that females were more co-operative in studies which used bargaining situations where co-operation could be achieved through concession and acquiescence whereas males were more co-operative in studies where strategic co-ordination between parties was needed.

In this situation, the dominant and aggressive motivation of males provided them with the necessary skills to lead, direct and co-ordinate their behaviour in a more co-operative way.

In a similar vein, Lindskold and Tedeschi (1971)<sup>146</sup> have argued that females are generally more concerned about presentation of self than are males. Females take cues from both the situation and the behaviour of other people to draw inferences about what conduct would look best in the eyes of others. To co-operate and seek accommodation is generally perceived as worthy conduct. Given the opportunities, females will behave in a co-operative and accommodative (good) manner. If others seek competition or advantage, females are concerned (more than males) with saving face and, hence, react in such situations in a volatile and extremely aggressive manner.

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146 S. Lindskold and J. T. Tedeschi, "Reward Power and Attraction in Interpersonal Conflict", Psychonomic Science, Vol. 22, 1971, p. 211-213.

In two recent experiments, Kahn et al. (1971)<sup>147</sup> desired to test the hypothesis that males are motivated to win (a problem-solving approach) in game situations whereas females are motivated by the "interpersonal nature" of the situation. Subjects of both sexes played a prisoner's dilemma game in which false feedback about the other person's choices was provided. In experiment 1, subjects either were faced with a pre-programmed strategy that was non-reactive to their own strategies or were presented with an adversary who played a tit-for-tat contingent strategy. In a tit-for-tat condition, subjects would maximize their own winnings by co-operating since this action would produce mutual rewards and avoid mutual punishments. In the random strategy conditions, competitive behaviour would maximize winnings since it avoids the possibility of exploitation when the random strategy calls for a co-operative choice. It was found that males played in a manner that demonstrated both their problem-solving ability and their desire to maximize gains. They co-operated more on the tit-for-tat condition and competed more in the random strategy condition. Females behaved in a similar manner in both conditions indicating that they either

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147 A. Kahn, J. Hottes and W. L. Davis, "Co-operation and Optimal Responding in the Prisoner's Dilemma Game: Effects of Sex and Physical Attractiveness", Journal of Personality and Social Psychology, Vol. 17, 1971, p. 267-279.

could not discriminate or would not react to the differences in strategies.

Experiment 2 varied both the strategies of the adversaries and their attractiveness. Males reacted to strategies and females reacted to the attractiveness of their adversary. Reaffirming the males' problem-solving orientation and maximizing rule, the result showed that males were unresponsive to their opponent's attractiveness but co-operated more when they gained more by doing so (tit-for-tat condition) and competed more when they could gain more by doing so (random strategy condition). Females acted in concert with their concern for interpersonal relationships by generally co-operating more when the other person was attractive and competing more when the other person was unattractive. They were unresponsive to the changes in strategy.

Sex role, as learned in the socialization process, at least in the United States, seems to dispose the two sexes to develop different styles in interacting with others. Differences in behaviours between the sexes have shown several rather discernable patterns. Females are more influenceable, more dependent on others, less aggressive and less adept at problem-solving skills than are males (Janis et al.;<sup>148</sup>

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148 I. L. Janis, G. F. Mahl, J. Kagan and R. R. Holt, Personality: Dynamics, Development and Assessment, New York, Harcourt, Brace and World, 1969.

McGuire, 1969;<sup>149</sup> Mischel, 1976<sup>150</sup>).

In summary, then, the literature seems to suggest, not that males and females differ in their inherent propensity to bargain co-operatively with another, but rather they are sensitive to different cues. Women are highly sensitive and reactive to the interpersonal aspects of their relationship with the other; males, on the other hand, orient themselves not to the other but to the impersonal task of maximizing their own earnings. When earnings can best be maximized through the use of a competitive strategy, males tend to compete whereas when a co-operative strategy seems more likely to achieve this end, males co-operate.

The foregoing findings suggest that males are more dominant, aggressive and competitive, with more problem-solving skills to maximize gains through either co-operation or competition. They orient themselves to the impersonal task rather than to the "other". Females, on the other hand, appear more influenceable, dependent and less aggressive and less adept at problem-solving. They also appear highly sensitive and reactive to interpersonal aspects of their relationships with the "other". Similarly, previous findings

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<sup>149</sup> W. J. McGuire, "The Nature of Attitudes and Attitude Change", in G. Lindzey and E. Aronson (Eds.), Handbook of Social Psychology, Reading, Mass., Addison-Wesley, Vol. 3, (2nd ed.), 1969, p. 136-314.

<sup>150</sup> W. Mischel, Introduction to Personality, New York, Holt, Rinehart and Winston, (2nd ed.), 1976.

indicate that internals are more active, self-assertive, less influenceable, less conforming, with greater problem-solving skills, and orient themselves to the informational requirements of the task (gathering and processing as much information as possible) to control and master their environment, whereas externals are more passive, submissive, palatable and more sensitive and responsive to social requirements, with less problem-solving skills to control their own environment. Thus, the possibility that sex is an important variable mediating the personality dispositions indicated by the I-E control variable, particularly as applied to a mixed motive game situation, becomes tenable.

Another area of recent interest in bargaining research has been the situational variable of pre-training (Sermat, 1967; <sup>151</sup> Sermat, 1967; <sup>152</sup> Swingle, 1968), <sup>153</sup> which has been shown to be effective not only in influencing choice behaviour in PD games but also in exemplifying motives or

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151 V. Sermat, "The Effect of an Initial Co-operative or Competitive Treatment upon a Subject's Response to Conditioned Co-operation", Behavioural Science, Vol. 12, 1967, p. 301-313.

152 Idem, "Possibility of Influencing the Other's Behaviour and Co-operation: Chicken vs. Prisoner's Dilemma", Canadian Journal of Psychology, Vol. 21, 1967, p. 204-219.

153 P. G. Swingle, "Effects of Prior Exposure to Co-operative or Competitive Treatment upon Subject's Responding in the Prisoner's Dilemma", Journal of Personality and Social Psychology, Vol. 10, 1968, p. 44-52.

behavioural dispositions of players in the PD games. It is clear from a consideration of these studies that a person's choice behaviour is very much affected in a new situation by the extent to which the other player has responded in a previous one. Thus, personality differences, age, sex, strategy variations, as well as a multitude of other factors, have been utilized in PD studies. As a standardized procedure in these studies, the experimenter has defined the situation to the subjects in terms of rules, behavioural options and pay-offs and has even instructed them as to what their goals should be. Often, however, post-experimental interviews have revealed that the "game" actually played by the subjects was not as the experimenter defined it, but rather, subjects had set their own goals to "beat" the partner. Indeed, a major characteristic of conflict situations that makes them highly susceptible to idiosyncratic influences of the players is the fact that the intention underlying a particular act is seldom obvious. For example, subjects could interpret partner's unconditional co-operation as an attempt to maximize his own gains, as well as the subjects' gains; they may believe that he is playing in such a fashion out of regard for them or conversely, to deceive them or that perhaps, in an attempt to convey good intentions, he is actually setting them up in order to exploit them. Given such ambiguity, it is more likely that the interpretation of one person's actions

by another will be a joint function of the latter's predispositions or his "expectancy of success" in the game, reflecting tendencies such as confidence, trust or suspicion, and of the objective characteristics of the situation. Consequently, in an experimental design utilizing different levels of pretraining, various motives change over the sequence of the game and remain uncontrolled. Unfortunately, the effect which this previous conditioning would have on later iterations of the PD game remains unclear. However, considering a sequence of interaction plays with a definite beginning, one might speculate that the initial actions of each party are likely to be determined to a large degree by each player's predispositions. They initiate a sequence of action, or counteraction, where each individual's behaviour is influenced not only by his own proclivities, but also by the actions of the other, a situation in which one subject starts out by playing co-operatively, or competitively (due to short-term interest), while the other is reciprocating that choice. The participants, therefore, end up with a steady state of either co-operative or competitive deadlock. The stable state that obtains will in a large measure be the resultant of behaviours early in the interaction sequence. This observation implies that subjects are not governed by a single motive to maximize their gains. If they were, even if the other individual started out by playing competitively,

the two individuals would, in the long run, come to a joint co-operative play. However, the initial competitive choice might induce mistrust, a desire to save face and the urge for revenge, all of which would negate the possibility of finding the joint solution to maximize gain. Thus, the PD game structure, a seemingly simple situation, has frequently masked otherwise significant behavioural differences. However, this problem could be circumvented by utilizing a simple experimental game where the initial two phases would serve as a pretraining period, during which the subject is introduced to a one hundred per cent co-operative play of the other. It is expected that this short period would allow the behavioural predispositions of the players to be exemplified. Following this brief period and before behaviours become stabilized, the subjects could be exposed to another phase of sixty per cent competitive play by the other, where the motives are more obvious and a final phase which would allow behavioural dispositions of the player to be exemplified as he counterreacts to the previous competitive treatment by the other.

An experimental design of this kind could further elucidate the effect of pretraining treatment and other situational variables of the individual's motives in the game situation.

### 7. Summary of Relevant Literature.

Internals, as contrasted to externals, seem to display much more initiative and effort in attempts to control and influence the environment to gain desired ends.

They exhibit better learning and acquisition of materials; they more actively seek information; they show superior utilization of information once it is acquired; they are more attentive, alert and perceptive than are externals and they seem to be more concerned with the informational demands of situations than with any presumed social demands. Due to the internal's better ability to utilize cues in a situation to determine available reinforcements, he would be expected to be more responsive to variations in the strategies of a simulated player in a mixed-motive situation and to maximize outcomes accordingly. The external, on the other hand, lacking the personality attributes of the internal, tends to exhibit failure-avoidant behaviour. When faced with a difficult situation, he can be expected to exhibit passive, uninvolved behaviour, in an effort to avoid failure.

Internal control expectancies are also associated with resistance to social influence, coercion or control from others, and it is assumed that cognitive differences between internals and externals might account for differential

response to such pressures. Since internals have been found to be more perceptive to and ready to learn about their surroundings, and more inquisitive, curious and efficient processors of information than are externals, they are expected more than externals to question or judge the legitimacy of the other's demands. Perceiving themselves as responsible actors rather than externally controlled pawns, they would resist the demands of or influence attempts by the simulated other, whose aim might be to by-pass their own sense of justice, and will only respond to those appeals that address themselves to their own beliefs and values. Externals, in contrast, lacking the very cognitive processes of internals and being more susceptible to external social influence, are expected to be unable to examine and evaluate choices and decisions or to scrutinize their own responses, so that they would yield to external demands of the other.

There is some evidence to suggest that internals as compared to externals are more motivated to perform well in situations that allow them to exercise skill, control, autonomy or self-reliance. Combining the cognitive and motivational aspects of locus of control, it would be expected that internals should be in a better position than externals to exert control and power, through better, well-calculated counter-strategies over the game situation.

The relationship of personality characteristics of internals and externals to cultural roles for ages and sexes, as well as evidence for age, sex differences in performance in social-influence and mixed-motive settings, seem to raise the question of whether the predicted functioning of internals and externals can be generalized without regard to the age and sex of the persons.

## CHAPTER II

### EXPERIMENTAL DESIGN

The purpose of the present chapter is to offer a description of subject selection, the method employed, the definition of the dependent variables and, finally, the hypotheses.

#### 1. The Sample.

A total of eighty children, comprising an equal number of boys and girls of two age levels, served as participants. They were obtained from four different elementary schools of the Greater Montreal Protestant School Board. The children were selected on the basis of their scores on the Nowicki-Strickland Locus of Control Scale for Children. Only middle-class, Anglo-American, Protestant children with no learning problems and with at least average intellectual ability were selected.

Since these children were not exposed to a battery of psychological tests as a policy of the school board, the intellectual as well as the reading and comprehension level of these children were determined on the basis of the home-room teacher's knowledge and evaluation of the individual child's overall ability and skills of the past and current grade levels. The data were collected during the mid-year

from December 5, 1974 through February 15, 1975. The teachers' knowledge of their students' overall performance, as well as the examination of previous years' records, offered a fairly accurate, gross estimate of their intellectual ability and learning skills.

## 2. The Apparatus.

The apparatus used consisted of a standard 21 x 32 inch table model relay rack with a solid steel face panel.

The panel was placed on a 2-1/2 x 2-1/2 foot table, at which a child was seated. At eye level, on the face panel, were three different coloured stimulus lights: a yellow light in the middle of the panel and beneath it a red and a blue light with two response buttons (one under the red and one under the blue light). The yellow light was a "go" signal, whereas the red and the blue lights were indicators; the response buttons, which the subject had to press, were recorded on a point counter situated to the lower right side of the panel. An enclosed speaker on the upper right side of the panel gave the game instructions to the subjects. A sketch of the experimental apparatus is presented in Appendix 1.

The control of stimulus lights, registration of points on the counter and recording of the data, were all automatically programmed by the computerized "Behavioural Laboratory",

manufactured by Lehigh Electronics, Fogelsville, Pennsylvania.

The entire experiment was conducted in a large room, acoustically isolated from the programming and recording apparatus. Observation of the participants during the course of the experiment was made possible through a small window between the two rooms and the verbal interaction was obtained through a concealed tape recorder.

### 3. Description of the Scale.

The Nowicki-Strickland Locus of Control Scale for Children was designed as a measure of generalized expectancies for internal vs. external control of reinforcement among children, as defined by Rotter (1966).<sup>1</sup> This scale is a forty-item paper-and-pencil measure which answered either "yes" or "no" by placing a mark next to the question. The test was developed from an item pool of 102 items; an item analysis reduced the measure to its final forty-item format.<sup>2</sup> (A copy of Nowicki-Strickland Locus of Control Scales for Children is presented in Appendix 2.)

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<sup>1</sup> S. Nowicki and B. R. Strickland, "A Locus of Control for Children", Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-155.

<sup>2</sup> Ibid.

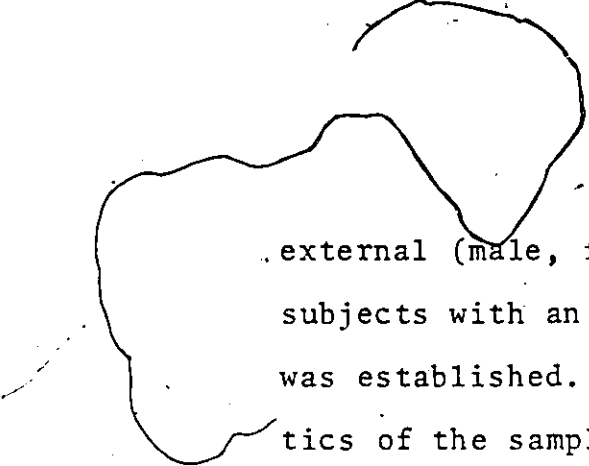
#### 4. Administration of Locus of Control Scale.

The scale was administered to a total of four hundred boys and girls of two age levels, seven years and twelve years.

Since the seven year-old group of the present study was relatively young, the Preschool and Primary Locus of Control Scale of similar format to the CNS - IE constructed for younger 4-9 year-old children was also administered to the seven year-old children. Their scores correlated with those of the CNS - IE ( $r=.37$ ;  $N=400$ ;  $r=.35$ , Boys = 200;  $r=.32$ ; Girls = 200). Only CNS - IE scores were utilized in this study.

During test administration, and after making sure that they knew how to respond to items, the test was administered orally by the examiner reading aloud each item twice and asking the children each time to mark either "yes" or "no" in the space allocated across the items.

The answer sheets were then collected and the responses were scored following Nowicki-Strickland's scoring procedures; the higher the score obtained, the more external the child's orientation. The subjects scoring in the 10 to 16 range were assigned to the internal category and those scoring in the 17 to 23 range were assigned to the external category. Consequently, there was a total of eight groups, consisting of 4 internal (male, female ages 7 and 12) and 4



external (male, female ages 7 and 12); thus, a total of 80 subjects with an equal number of subjects in each condition was established. Table I shows the experimental characteristics of the sample.

#### 5. Administration of the Game.

The subjects were taken individually from their classrooms by the examiner. Each child was greeted and was seated at a chair around a table on which rested the game panel. He was told that he was to play a game with another person who was in the next room and that he should listen attentively to the tape recorder which would give him specific instructions on how to play the game.

The experimental design provided for a game with four consecutive phases, each consisting of fifteen, five-second trials with a five-second inter-trial interval.

At the beginning of each phase, detailed instructions were given to the children through a tape recorder, followed by three pre-phase trials to allow the child to familiarize himself with the apparatus. They were then probed to ascertain their understanding of the instructions and familiarization with the game. The experimenter then left the room. The same procedure was repeated with each new phase. (The specific instructions for each phase are presented in Appendix 3.)

Table I  
 Characteristics of the Experimental Sample: IE, Sex, Age

Groups	Ages (in months)				CNS Scores				L.C.
	7		12		7		12		
	Mean	SD	Mean	SD	M	SD	M	SD	
Internal Males	84	2.89	145	3.81	13.40	2.07	12.22	2.22	
Internal Females	85	2.91	147	3.83	13.00	2.05	12.50	2.07	
External Males	86	2.93	146	3.82	21.20	1.99	20.60	2.07	
External Females	87	2.94	147	3.33	20.00	2.16	20.20	2.44	

N = 80

In phase 1, the person (P) received a message from the other person (O), a pre-programmed computer. Each of the fifteen trials of this phase began with the onset of the yellow "go" light for five seconds followed by the random onset of either the blue or the red stimulus light for five seconds. If the player pressed the "correct" response button (under the light that came on) within the five-second time limit of each trial, he obtained a point. Under this condition, O reinforced P one hundred-per cent of the time, thus giving him a maximum of fifteen points.

In phase 2, it was P's turn to send messages to O. P could send a message to O if he chose to press either of the response buttons under the blue or the red stimulus light within five seconds of the onset of the yellow "go" light. In this situation, P enabled O to obtain a maximum of fifteen points. The purpose of this phase was to establish one hundred reciprocal reinforcement by P during each of the fifteen trials. Thus, four subjects who did not meet this criterion were eliminated from the study and replaced by other individuals from the participant pool.

Phase 3 was identical to phase 1; however, in this case, P obtained only nine messages (random onset of blue and red stimulus lights), a total of sixty per cent partial reinforcement by O, as compared to one hundred per cent reinforcement during phase 1.

Phase 4 was identical to phase 2; however, in this instance, P had the choice of either reinforcing or not reinforcing O.

Table II presents an overview of the experimental procedure.

Average time taken by all the subjects in starting their departure from the classroom, listening to taped instructions, playing the game and returning to their respective classes totalled forty minutes. The experiment was conducted over a period of ten consecutive days. Discussion with teachers as well as with the participating students after the experimental study indicated that the subjects were aware that they were playing the game with another person of the same age from the school. Although some subjects wanted to know the name or meet the other person, this information was held and anonymity guaranteed to the subjects. In addition to experimental manipulation, a post-game questionnaire was administered to the participants on an informal basis (see appendix 4). The intent of this scale was to insure that the children understood the nature of the phases and were aware of the consequences of their choice behaviour. Because of the sporadic nature of their answers, the data were not subjected to quantifiable analysis. However, qualitative aspects were gleaned from these responses.

Table II  
The Experimental Procedure

Phase 1	Phase 2	Phase 3	Phase 4
O → P	P → O	O → P	P → O
15 trials	15 trials	15 trials	15 trials
Continuous 100%	100%	Random 60%	Opportunity for P to react
Reinforcement	Cooperative Behavior of P Established	Partial Reinforcement Uncooperativeness of O Established	to partial cooperativeness of O during phase 3

P = Player or experimental subject

O = Other, pre-programmed computer

## 6. Experimental Design and Hypotheses.

After the completion of the experiment, the response measures of all the dependent variables for each of the four experimental phases were tabulated in three blocks of five trials each.

The measures of the dependent variables were:

1. Response latency, operationally defined as the time taken by P (person) to press the response button after the stimulus light to either receive a point of reinforcement or to send a signal to O (other).
2. A retaliatory response was defined as the failure on the part of P to send a signal to O during a five-second trial period in phase 4. Additional analysis of the dependent variable included first trial of retaliation, length of longest consecutive retaliatory run and last trial of retaliation. The independent variables consisted of the IE locus of control orientations, sex, age, experimental phases and trial blocks.

Since the main interest of this study was to investigate the response latency and retaliatory responses displayed by each experimental group following the partial reinforcement by the other, the null hypotheses are stated as follows:

1. There is no significant difference in response latency between the internal and external subjects in phases 2 and 4.
2. There is no significant difference in retaliatory responses between the internal and external subjects in phase 4.
3. There is no significant difference in response latency between the twelve and the seven year-olds in phases 2 and 4.
4. There is no significant difference in retaliatory responses between the twelve and the seven year-old subjects in phase 4.
5. There is no significant difference in response latency between male and female subjects in phases 2 and 4.
6. There is no significant difference in retaliatory responses between male and female subjects in phase 4.

## CHAPTER III

### PRESENTATION OF RESULTS

This chapter will present results stemming from the research findings mainly in terms of hypotheses formulated at the end of the previous chapter. The summaries of all analyses of variance on the response data will be shown and commented upon utilizing individual comparisons for the experimental variables used in the study.

#### 1. The Statistical Findings.

This section will present analyses of variance for the measures employed in the experimental design. To facilitate comprehension, the reader will be presented with a brief description of how the response data were operationally defined, measured and grouped prior to the presentation of the summary of the statistical treatment.

The study called for an overall analysis of variance of the response latency and retaliatory response data. In addition, the fifteen trials of response latencies were grouped into 3-5 trial blocks in each of the four experimental phases. However, during phases 3 and 4, there were a number of trials, within each of the three trial blocks, in which a response was not made (player retaliated by not sending a message to the other). Consequently, in order to

prevent confounding of retaliatory responses with response latency data during these phases, data within each trial block of both phases 3 and 4 were "corrected" by computing the mean from within the trial block, and taking this to be the "score" for that particular trial. Additional analyses limited to the fourth experimental phase dealt with the total number of retaliatory responses, the first trial of retaliation, length of the longest consecutive retaliatory run, and the last trial of retaliation response. The overall analysis, therefore, consisted of a five-way repeated measure analysis of variance composed of the following factors:

2 (internal x external locus of control) x 2 (sex) x 2 (ages 12 and 7) x 4 (experimental phases) x 3 (trial blocks) for the dependent variable response latency.

Table III presents the "corrected" summary of the overall analysis of variance in response latency for the four experimental phases. However, since the major interest of the present study was to investigate the response latencies shown by each experimental group during phase 4, compared to their response latencies in phase 2, and since phases 1 and 3 were just established to set up the experimental conditions, they were not considered as essential for interpretation and were discarded. Consequently, a separate analysis was performed on the response latency data obtained in phases 2 and 4. Table IV presents the summary of the analysis of variance

Table III

Overall Table of Variance for Response Latency over the Four Experimental Phases

Source	Sums of Squares	df	Variance Estimate	F	P
<b>Between</b>					
I-E	2428.884	1	2428.884	23.97	0.001
S (Sex)	26.334	1	26.334	0.25	0.611
A (Age)	119.709	1	119.709	1.18	0.280
I-E x S	0.026	1	0.026	0.01	0.987
I-E x A	138.776	1	138.776	1.36	0.245
S x A	0.234	1	0.234	0.01	0.961
I-E x S x A	18.426	1	18.426	0.18	0.671
Error	7295.308	72	101.323		
<b>Within</b>					
P (Phases)	11968.578	3	3989.526	41.21	0.001
I-E x P	5112.511	3	1704.171	17.59	0.001
S x P	39.344	3	13.114	0.03	0.938
A x P	119.369	3	39.789	0.41	0.745
I-E x S x P	22.786	3	7.595	0.07	0.971
I-E x A x P	153.469	3	51.156	0.52	0.663
S x A x P	64.494	3	21.498	0.22	0.881
I-E x S x A x P	78.603	3	26.201	0.27	0.846
P/Error	20915.258	216	96.829		
<b>TB (Trial Blocks)</b>					
I-E x TB	366.793	2	183.396	4.73	0.010
S x TB	457.431	2	228.715	5.90	0.001
A x TB	230.256	2	115.128	2.97	0.051
I-E x S x TB	1630.752	2	815.376	21.05	0.001
I-E x A x TB	657.477	2	328.738	8.48	0.001
S x A x TB	794.331	2	397.165	10.25	0.001
I-E x S x A x TB	659.252	2	329.626	8.51	0.001
TB/Error	5576.166	144	38.723		
<b>P x TB</b>					
I-E x P x TB	837.097	6	139.516	4.42	0.001
S x P x TB	575.277	6	95.879	3.04	0.001
I-E x S x P x TB	3009.972	6	501.662	15.92	0.001
A x P x TB	5291.552	6	881.925	27.98	0.001
I-E x A x P x TB	4256.414	6	709.402	22.51	0.001
S x A x P x TB	2704.577	6	450.762	14.31	0.001
I-E x S x A x P x TB	4781.706	6	796.951	25.29	0.001
P x TB/Error	13612.967	432	31.511		

Table IV

The "Corrected" Table of Variance for Response Latency over the Experimental Phases 2 and 4

Source	Sums of Squares	df	Variance Estimate	F	P
Between					
I-E	1691.252	1	1691.252	10.53	0.001
S (Sex)	0.468	1	0.468	0.01	0.957
A (Age)	129.168	1	129.168	0.80	0.372
I-E x S	2.552	1	2.552	0.01	0.900
I-E x A	0.252	1	0.252	0.01	0.968
S x A	3.852	1	3.852	0.02	0.877
I-E x S x A	8.802	1	8.802	0.05	0.815
Error	11560.383	72	160.560		
Within					
P (Phases)	9039.352	1	9039.352	53.91	0.001
I-E x P	4960.102	1	4960.102	29.58	0.001
S x P	1.302	1	1.302	0.01	0.930
A x P	13.002	1	13.002	0.07	0.781
I-E x S x P	14.352	1	14.352	0.08	0.770
I-E x A x P	11.718	1	11.718	0.06	0.792
S x A x P	52.668	1	52.668	0.31	0.576
I-E x S x A x P	0.018	1	0.018	0.01	0.991
P/Error	12072.317	72	167.671		
TB (Trial Blocks)	8348.654	2	4174.327	97.88	0.001
I-E x TB	72.204	2	36.102	0.84	0.431
S x TB	61.287	2	30.643	0.71	0.489
A x TB	99.837	2	49.918	1.17	0.313
I-E x S x TB	7.904	2	3.952	0.09	0.911
I-E x A x TB	11.754	2	5.877	0.13	0.871
S x A x TB	39.654	2	19.827	0.46	0.629
I-E x S x A x TB	1.304	2	0.652	0.01	0.984
TB/Error	6141.066	144	42.646		
P x TB	4022.829	2	2011.414	60.07	0.001
I-E x P x TB	60.529	2	30.264	0.90	0.407
S x P x TB	31.329	2	15.664	0.46	0.627
I-E x S x P x TB	18.029	2	9.014	0.26	0.764
A x P x TB	67.379	2	33.689	1.01	0.368
I-E x A x P x TB	2.512	2	1.256	0.03	0.963
S x A x P x TB	7.462	2	3.731	0.11	0.894
I-E x S x A x P x TB	14.262	2	7.131	0.21	0.808
P x TB/Error	4821.333	144	33.481		

in response latency for phases 2 and 4, across the independent variables of I-E (2), sex (2), age (2).

A response latency is operationally defined as the time taken by the P (person) to press the response button after the onset of the stimulus light, to either receive a reinforcement (a point) or to send a signal to the O (other).

A significant I-E main effect [ $F(1,72) = 10.5$ ;  $P < .001$ ] provided evidence to reject the initial null hypothesis of no difference in response latency between the internal and external groups during experimental phases 2 and 4. This clearly demonstrates that the internal group, on the average, displayed slower response latency ( $\bar{X} = 20.86$ ) during phases 2 and 4, than their external counterparts ( $\bar{X} = 17.10$ ). However, this finding is further elucidated by the significant I-E phase interaction effect [ $F(1,72) = 29.58$ ;  $P < .001$ ] and is illustrated in Figure 1. Duncan's Multiple Range Test indicated a non-significant difference ( $P > .05$ ) in mean response latency between the internal ( $\bar{X} = 13.30$ ) and external ( $\bar{X} = 16.00$ ) groups during phase 2. During phase 4, in contrast, the internal group displayed significantly slower ( $P < .01$ ) response latency ( $\bar{X} = 28.40$ ) than did the external group ( $\bar{X} = 18.20$ ), whereas the external group maintained similar response latencies between phases 2 ( $\bar{X} = 16.00$ ) and 4 ( $\bar{X} = 18.20$ ). Thus, the experimental hypothesis holds only for the internal group, whereas the I-E main and the I-E

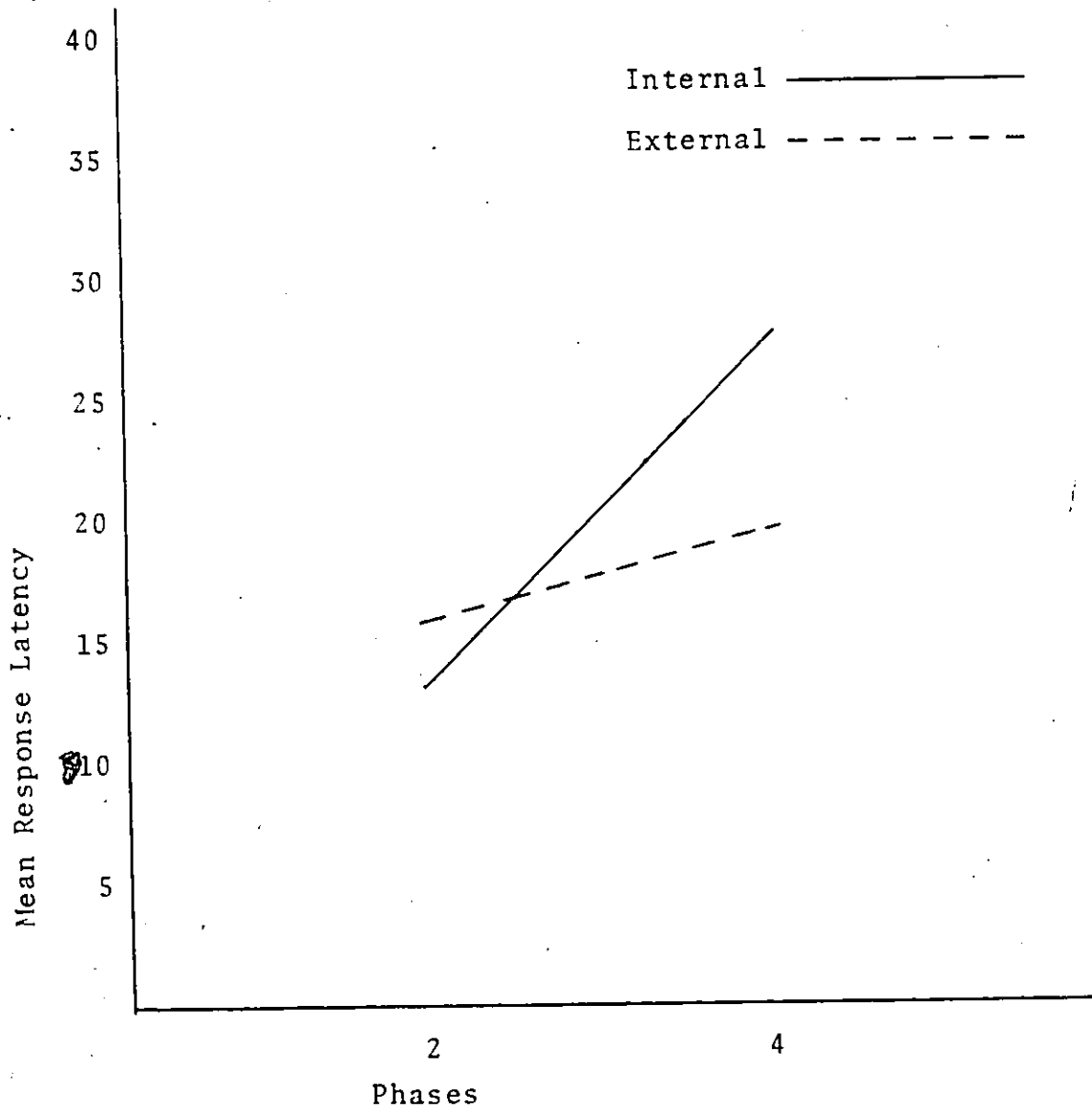



Figure 1.- Representation of Mean Response Latency of Internal and External Groups in Experimental Phases 2 and 4.

phase interactions do not differentially affect the external group's response latencies. It would seem that, in response to the partner's 100% co-operative strategy of phase 1, both the internal and external groups reacted with similar (shorter) response latencies during phase 2, whereas, following the opponent's shift in strategy (from 100% co-operation phase 1, to 60% partial co-operation in phase 3), the internal group, on the average, took significantly longer to make a response during phase 4. The external group, on the other hand, maintained their previous response time.

As can be seen from Table IV, age and sex effects on response latency measures did not reach statistical significance. Therefore, hypotheses three and five of the present study were retained. Although not a specific hypothesis of the present experiment, a significant phase main effect [ $F(1,72) = 53.90; P < .001$ ] on response latency measures was found, indicating that the treatment condition of phase 4 produced significantly longer response latency from the subjects in phase 4 ( $\bar{X} = 23.30$ ) than the treatment condition of phase 2 ( $\bar{X} = 14.60$ ). This suggests that the partner's 100% co-operative strategy of phase 1 produced shorter response latency from the subjects during phase 2, whereas the opponent's shift in strategy in phase 3 elicited significantly longer response latency from the subjects in phase 4. In



addition, a significant trial block main effect [ $F(2,144) = 98.90$ ;  $P < .001$ ] on response latency measure was found. Duncan's Multiple Range Test demonstrated a significant difference in response latency ( $P < .01$ ) between first trial block ( $\bar{X} = 24.00$ ), second trial block ( $\bar{X} = 19.20$ ) and third trial block ( $\bar{X} = 13.70$ ), across phases 2 and 4. However, this finding is further clarified by the significant phase  $\times$  trial block interaction effects [ $F(2,144) = 60.07$ ;  $P < .001$ ] on response latency measure, and is illustrated in Figure 2. Duncan's Multiple Range Test demonstrated non-significant difference ( $P < .05$ ) in response latency between first ( $\bar{X} = 16.30$ ), second ( $\bar{X} = 14.40$ ) and third ( $\bar{X} = 13.20$ ) trial blocks of phase 2. In contrast, however, a reliable difference ( $P < .01$ ) in response latency was found between first ( $\bar{X} = 31.60$ ), second ( $\bar{X} = 24.00$ ) and third ( $\bar{X} = 14.30$ ) trial blocks of phase 4. These findings demonstrate that the partner's 100% co-operative strategy of phase 1 failed to produce observable variations in response latency from the subjects, during each of the three trial blocks of phase 2, whereas the opponent's sudden change of strategy in phase 3 produced longer response latency from the subjects during the first trial block of phase 4, which gradually gave way to a decreased response latency during the second trial and third trial block of phase 4.

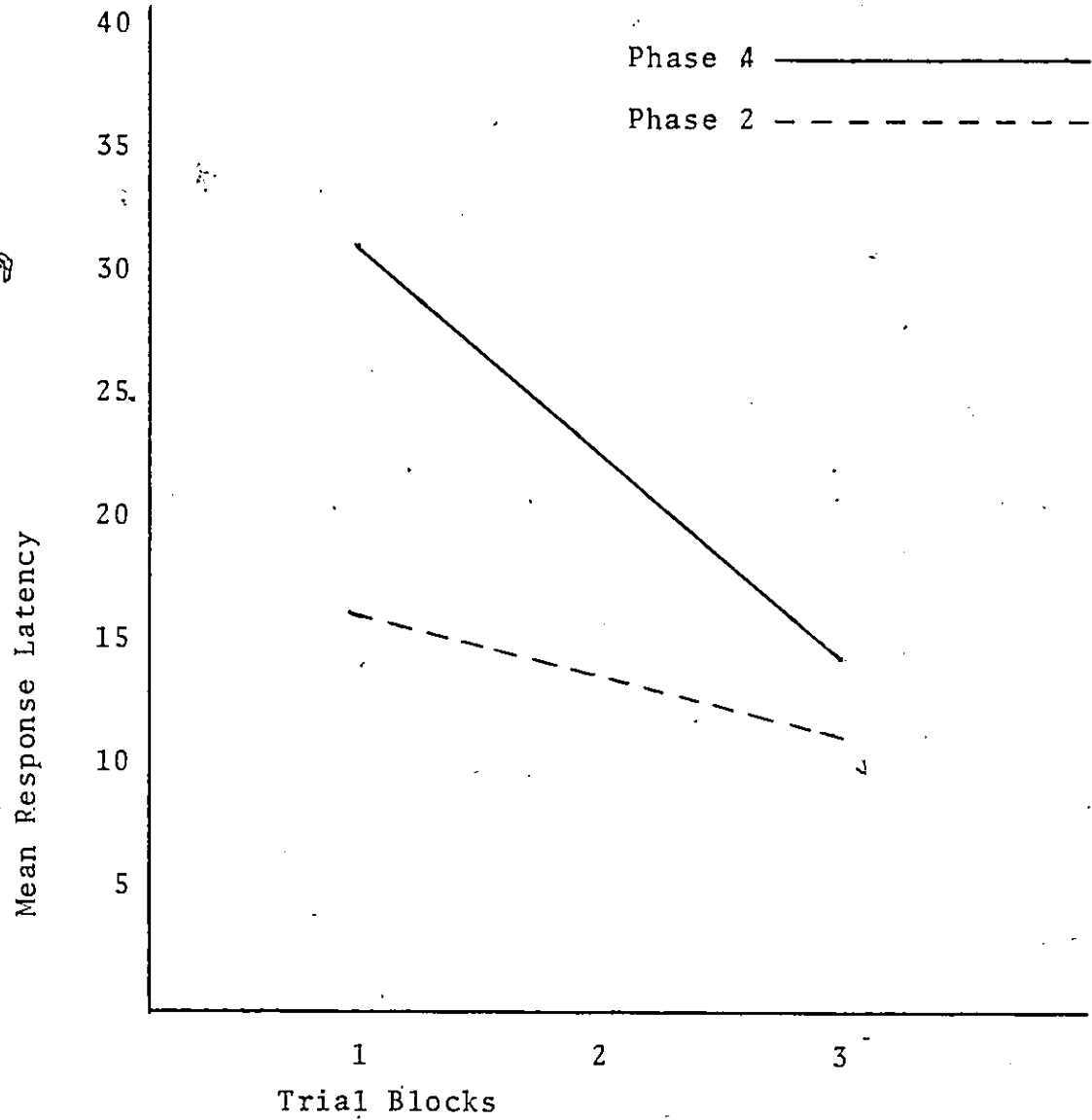


Figure 2.- Representation of Mean Response Latency of the Subject Sample of Three Trial Blocks over the Experimental Phases 2 and 4.

A retaliatory response is operationally defined as a failure on the part of the subject to send a signal to his opponent during a 5-second trail period of phase 4. Table V shows a summary of the analysis of variance for the total retaliatory responses of phase 4. As expected, a significant I-E main effect [ $F(1,72) = 30.7$ ;  $P < .001$ ] on total retaliatory response measure warranted the rejection of the second null hypothesis of the present study. The present data suggest that the internal subjects, following the opponent's shift in strategy in phase 3, demonstrated, on the average, more retaliations during phase 4 ( $\bar{X} = 6.40$ ) than did the external subjects ( $\bar{X} = 0.70$ ). However, in an attempt to examine trial block effects on retaliatory response measure, a separate analysis was performed on the retaliatory response data obtained in the 3-5 trial blocks of phase 4. Table VI shows a summary of the analysis of variance for the retaliatory responses in the three trial blocks of phase 4. As is evident from the table, the I-E x trial block interaction effect [ $F(2,144) = 0.04$ ;  $P > .9$ ] did not reach the statistical significance required. However, a significant trial block main effect [ $F(2,144) = 3.96$ ;  $P < .02$ ] on retaliatory response measure was found, and is illustrated in Figure 3. Duncan's Multiple Range Test revealed a significant difference ( $P < .05$ ) in retaliatory responses between the first trial block ( $\bar{X} = 1.3$ ) when compared with the second trial

Table V

Table of Variance for the Total Retaliatory Response  
in Phase 4

Source	Sums of Squares	df	Variance	F	p
I-E	382.812	1	382.812	30.16	0.001
S (Sex)	15.312	1	15.312	1.21	0.275
A (Age)	56.112	1	56.112	4.42	0.038
I-E x S	0.612	1	0.612	0.05	0.827
I-E x A	43.512	1	43.512	3.43	0.068
S x A	12.012	1	12.012	0.95	0.334
I-E x S x A	0.112	1	0.112	0.01	0.925
Error	913.700	72	12.690		

Table VI

Table of Variance of 15 x 3 Trial Blocks  
of Retaliatory Response in Phase 4.

Source	Sums of Squares	df	Variance Estimate	F	P
I-E	127.604	1	127.604	30.16	0.001
S (Sex)	5.104	1	5.104	1.21	0.275
A (Age)	18.704	1	18.704	4.42	0.038
I-E x S	0.204	1	0.204	0.05	0.826
I-E x A	14.504	1	14.504	3.43	0.068
S x A	4.004	1	4.004	0.95	0.333
I-E x S x A	0.037	1	0.037	0.01	0.925
Error	304.566	72	4.230		
TB (Trial Blocks)	3.033	2	1.516	3.96	0.021
I-E x TB	0.033	2	0.016	0.04	0.957
S x TB	1.633	2	0.816	2.13	0.122
A x TB	0.133	2	0.066	0.17	0.840
I-E x S x TB	0.233	2	0.116	0.30	0.737
I-E x A x TB	0.133	2	0.066	0.17	0.840
S x A x TB	3.433	2	0.916	4.48	0.012
I-E x S x A x TB	0.900	2	0.450	1.17	0.311
TB/Error	55.133	144	0.382		

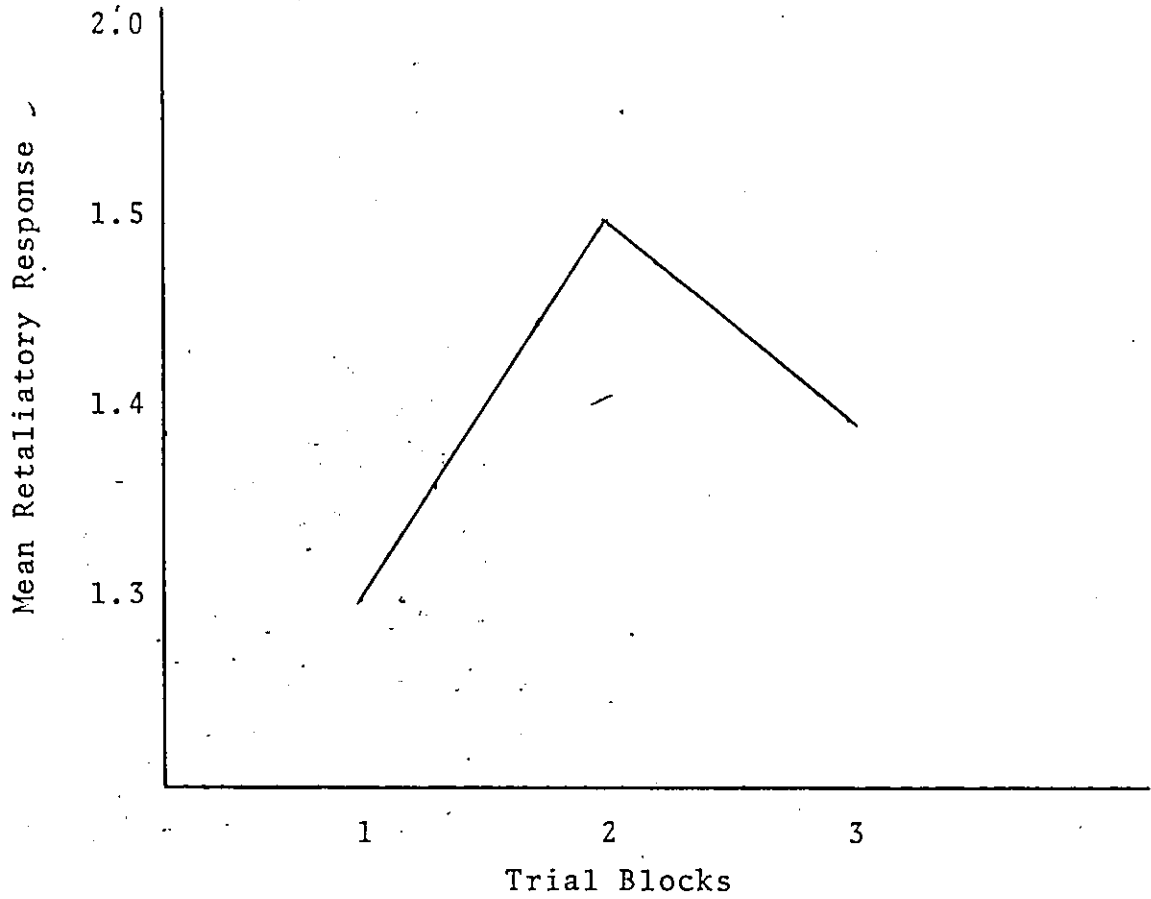


Figure 3.- Representation of Mean Retaliatory Response Behaviour of Subject Sample in Three Trial Blocks of Phase 4.

block ( $\bar{X} = 1.5$ ). However, comparisons between the first trial block ( $\bar{X} = 1.3$ ) and the third trial block ( $\bar{X} = 1.4$ ) or between the second trial block ( $\bar{X} = 1.5$ ) and the third trial block ( $\bar{X} = 1.4$ ) did not yield significant differences ( $P > .05$ ). Thus, during phase 4, following the shift in partner's strategy (phase 3), there was initially lower retaliatory responding in the first trial block, which gave way to a significantly more retaliatory behaviour ( $P < .05$ ) in the second trial block and again tended to decrease to lower retaliation at the third trial block.

Other measures of related interest were those of the first trial of retaliatory response, the longest consecutive trials of retaliatory run, and the last trial of retaliatory response of phase 4. These data were submitted to separate analyses of variances; the results appear in Tables VII through IX.

As may be seen from Table VII, a significant I-E main effect [ $F(1,72) = 33.5$ ;  $P < .001$ ] on the first trial of retaliatory response measure was found, with the internal subjects displaying more ( $\bar{X} = 0.5$ ) retaliatory responses during the initial trial of phase 4 than the external subjects ( $\bar{X} = 0.05$ ). This finding is further clarified by the significant I-E x sex interaction effects [ $F(1,72) = 7.5$ ;  $P < .002$ ] on the first trial of retaliatory response measure, and is illustrated in Figure 4. The Duncan Multiple Range Test

Table VII

Table of Variance for the First Trial of  
Retaliatory Responses in Phase 4

Source	Sums of Squares	df	Variance Estimate	F	P
I-E	4.512	1	4.512	33.49	0.001
S (Sex)	0.312	1	0.312	2.32	0.132
A (Age)	0.112	1	0.112	0.83	0.364
I-E x S	1.012	1	1.012	7.51	0.007
I-E x A	0.112	1	0.112	0.83	0.363
S x A	0.312	1	0.312	2.32	0.132
I-E x S x A	0.312	1	0.312	2.32	0.132
Error	9.700	72	0.134		

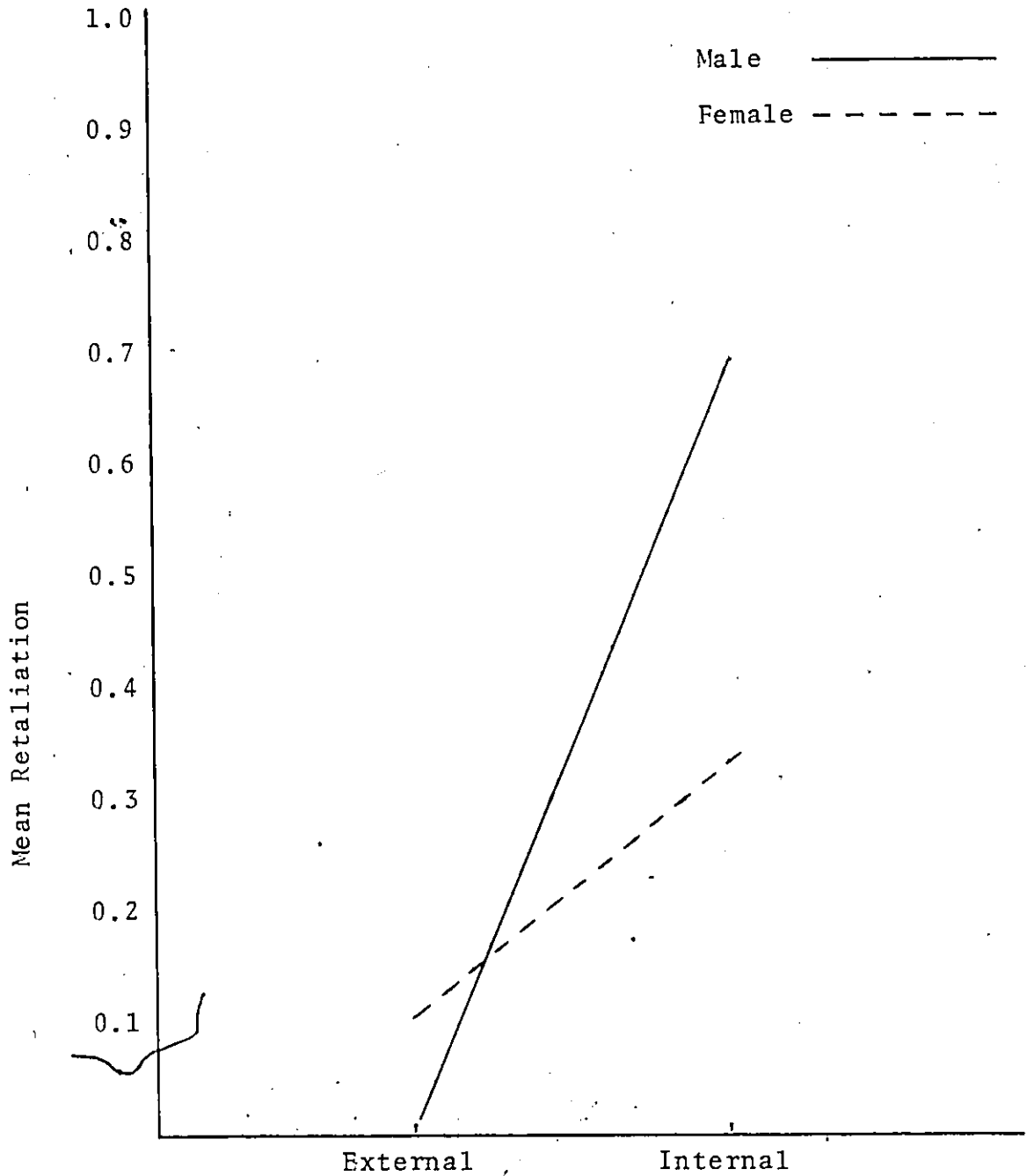


Figure 4.- Representation of Mean First Trial of Retaliatory Response Behaviour for Internal Male, Internal Female, External Male and External Female Groups in Phase 4.

reveals that the internal male group ( $\bar{X} = 0.7$ ), following partner's strategy change in phase 3, demonstrated significantly more retaliations ( $P < .05$ ) than the internal female group ( $\bar{X} = 0.35$ ) during the first trial of phase 4. In addition, these two groups (internal males and females) showed significantly more ( $P < .05$ ) initial (first trial) retaliations during phase 4 than either the external females or the external males. Furthermore, a significant I-E main effect [ $F(1,72) = 14.10$ ;  $P < .001$ ] on the longest consecutive trials of retaliatory response measure was found, and is presented in Table VIII. It appears from the data that the internal subjects made significantly more retaliations ( $\bar{X} = 3.30$ ) during a longer sequence of trials during phase 4, following the opponent's strategy change than their external counterparts ( $\bar{X} = 0.07$ ). Finally, a significant I-E main effect [ $F(1,72) = 32.10$ ;  $P < .001$ ] on the last trial of retaliatory response was found and is presented in Table IX, with internal subjects, on the average, demonstrating more retaliations ( $\bar{X} = 0.60$ ) following the opponent's strategy shift, during the last trial of phase 4, than the external subjects ( $\bar{X} = 0.12$ ). In summary, then, results obtained from I-E effects on various retaliatory response measures, taken as a whole, indicate that the internal subjects, on the average, demonstrated higher levels and more varied retaliatory action, following the partner's sudden change of strategy during phase 4 than did

Table VIII

Table of Variance for the Longest Consecutive  
Retaliatory Responses in Phase 4

Source	Sums of Squares	df	Variance Estimate	F	P
I-E	132.612	1	132.612	14.08	0.001
S (Sex)	12.012	1	12.012	1.27	0.262
A (Age)	32.512	1	32.512	3.45	0.067
I-E x S	7.812	1	7.812	0.83	0.365
I-E x A	21.012	1	21.012	2.23	0.138
S x A	1.012	1	1.012	0.11	0.743
I-E x S x A	0.112	1	0.112	0.01	0.913
Error	677.900	72	9.415		

Table IX  
 Table of Variance for the Last Trial of  
 Retaliatory Responses in Phase 4

Source	Sums of Squares	df	Variance Estimate	F	P
I-E	5.000	1	5.000	32.14	0.001
S (Sex)	0.450	1	0.450	2.89	0.093
A (Age)	0.800	1	0.800	5.14	0.026
I-E x S	0.999	1	0.999	0.99	0.999
I-E x A	0.450	1	0.450	2.89	0.093
S x A	0.800	1	0.800	5.14	0.026
I-E x S x A	0.050	1	0.050	0.32	0.572
Error	11.200	72	0.155		

the external subjects.

As can be seen from Tables V through VIII, none of the sex effects on various retaliatory response measures reached statistical significance. Therefore, the sixth null hypothesis of no difference in retaliatory response between male and female groups in phase 4 was retained. However, as is evident from Table IX, an exception was the single statistically significant sex x age interaction effect [ $F(1,72) = 5.10; P < .03$ ] on the last trial of retaliation measure, and is illustrated in Figure 5. The Duncan Multiple Range Test yielded significant differences ( $P < .05$ ) in the last trial of retaliation response between the male age twelve group ( $\bar{X} = 0.65$ ) and the male age seven ( $\bar{X} = 0.25$ ), female age twelve ( $\bar{X} = 0.30$ ) and female age seven ( $\bar{X} = 0.30$ ) groups, whereas the last three groups did not differ reliably ( $P > .05$ ). Consequently, following the partner's strategy change, the twelve year-old male group demonstrated significantly more retaliation during the last trial of phase 4 than did the seven year-old male, twelve year-old female and seven year-old male groups, respectively.

However, as can be seen from Table V, a significant age main effect [ $F(1,72) = 4.40; P < .03$ ] on total number of retaliatory responses measure provided evidence to reject the fourth null hypothesis of the present study which stated that there was no significant difference in retaliatory responses

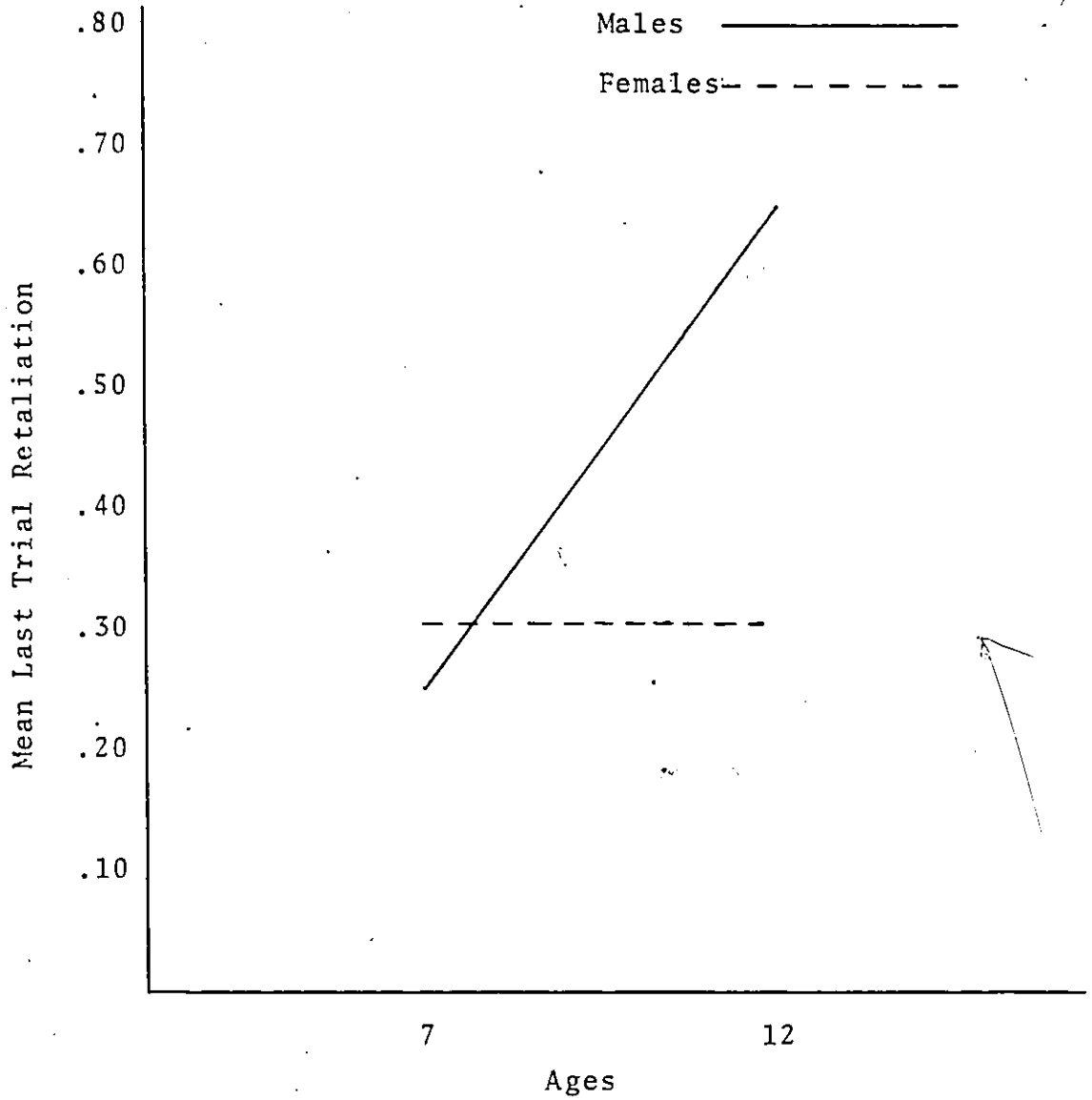


Figure 5.- Representation of Mean Last Trial of Retaliatory Response Behaviour for Male Age 12, Male Age 7, Female Age 12, and Female Age 7 Groups in Phase 4.

between the twelve and seven year-old groups during phase 4. It is clear, therefore, that following the opponent's strategy change in phase 3, the twelve year-old children, on the average, demonstrated a higher level of retaliation ( $\bar{X} = 5.0$ ) during phase 4 than did the seven year-old children ( $\bar{X} = 3.35$ ). Although age main effect on the first trial of retaliatory response measure fell short of the acceptable level ( $P > .36$ ) as seen in Table VII, however, a marginally non-significant age main effect [ $F(1,72) = 3.4$ ;  $P < .07$ ] on the longest consecutive trials of retaliatory response measure was found and is presented in Table VIII. It is apparent from the data that the older (twelve years) children, following the opponent's strategy change, tended to demonstrate more retaliations ( $\bar{X} = 2.6$ ) during a longer sequence of trials during phase 4 than did the younger (seven years) children ( $\bar{X} = 1.4$ ). Finally, this finding is further elucidated by the statistically significant age main effect [ $F(1,72) = 5.10$ ;  $P < .03$ ] on the last trial of retaliatory response measure, and is presented in Table IX. It is clear from the data that the twelve year-old children made significantly more retaliations ( $\bar{X} = 0.50$ ) during the last trial of phase 4, following the opponent's strategy shift than did the seven year-old ( $\bar{X} = 0.30$ ) children. In summary, results obtained on age effects on various retaliatory response measures are not as clear as those obtained from the previously presented I-E effects.

They nevertheless provide some evidence to show that following the strategy change of phase 3, older children demonstrated more retaliations during phase 4 than the younger children.

## CHAPTER IV

### INTERPRETATION OF FINDINGS

This chapter will present the interpretation of the statistical findings directly related to the specific hypotheses presented previously. To facilitate the reading of the manuscript, the hypotheses will precede each interpretation. Since the major concern of the present study was the comparison of personality, sex and age differences with overt behaviour through a controlled laboratory game situation, the discussion will emphasize these aspects, while trying to incorporate previous relevant empirical findings.

#### 1. Discussion of I-E Main Effect on Response Latency Behaviour.

It was noted in the previous chapter that the formally stated null hypothesis: there is no significant difference in response latency between internal and external subjects in phases 2 and 4, was rejected. It was therefore concluded that the degree of the partner's latency differentiated the internal subjects from the external subjects during phases 2 and 4, respectively. It would seem that after being exposed to the partner's fifteen trials of one hundred per cent co-operative strategy and later to fifteen trials of sixty per cent partial co-operative strategy, the internals, on the average, displayed significantly longer

response latency during phase 4 than did the external subjects. This conclusion deserves to be more closely examined for, since it merits consideration, the contribution it makes is of importance.

Recent available literature on gaming makes it clear that few studies have been conducted utilizing response latency as an index for measuring behaviour. The latency of a response has classically been used in various learning paradigms as a measure of conflict. If a subject entertains two competing responses and must choose between them, then the time taken to respond will be substantially longer than when he has only one potential response to give to a particular stimulus. In the present study, the delay in response time was taken to indicate that the subjects were in conflict and hesitant to respond immediately and that therefore they were weighing and choosing between the two available responses (to send or not to send a signal to the other) as a function of the partner's degree of co-operation. Consequently, based on the foregoing assumption, the delay in response time by internal subjects as compared to external peers might be attributable to their response uncertainty. That is, the internals were rather uncertain about whether to press the response button and send a signal (or a point) to the opponent. If this were the case, then it would seem that the internal subjects, on the average, take more time to resolve

the uncertainties created by the partner's varying strategies. In other words, before responding, they weigh and choose their actions more than do external subjects. These results lend rather strong support to the contention that the internals devote more attention to, or spend more time deliberating on, their decisions than do externals. These results can be expected on the basis of the locus of control variable as formulated by Rotter (1966). Since locus of control refers to the generalized expectancies for control over one's surroundings, a higher level of coping and mastery activity would be anticipated from internals. To obtain important positive outcomes and to avoid negative ones, internals should, over a range of situations, show more caution and calculating effort to control their environment than should externals. To a large extent, however, the internals' mastery seemed to be accomplished through their more active cognitive processing ability.

Furthermore, previous research has demonstrated that internal subjects have been found to demonstrate superior perceptual-cognitive abilities as compared to their external counterparts; presumably, internal subjects are able to extract more information from ambiguous situations and use this information more effectively to solve their problems (Lefcourt and Wine, 1969). Support for this contention comes from the examination of the present data; the statistically significant

I-E xphase interaction effects demonstrate that when reacting to the partner's one hundred per cent co-operative strategy during phase 2, ~~the~~ internal subjects do not differ significantly from the externals in their mean response latencies, whereas when reacting to partner's shifting strategy from one hundred per cent co-operation (phase 1) to sixty per cent partial co-operation (phase 3), the internal subjects displayed significantly longer response time during phase 4 than external subjects. Consequently, the external subjects failed to demonstrate observable variability of response latency between phases 2 and 4; that is, in the first instance, the analysis of the response latency data of phase 2 indicated no significant difference between the internal and external groups: they both reacted to the partner's one hundred per cent co-operative strategy in similar fashion. The interpretation for this finding was the predictability and reliability of the partner's one hundred per cent total co-operation during each of the trials of phase 1 which produced little conflict and offered less challenge (task difficulty) for the subjects. The predictability of the partner's co-operative behaviour offered little response uncertainty for subjects during phase 2 so that they were able with some degree of confidence to select the appropriate response rapidly and react accordingly. In addition, if reciprocating the partner's co-operative choices can be

construed as a manner of helping the partner who has been helpful, then perhaps the partner's one hundred per cent co-operation may have served to build up mutual good will and establish a norm of what was to be considered as "fair" behaviour. Consequently, the subjects learned to co-operate and to trust in the partner's good intentions and thus they returned points received from him in equal amounts. The preceding conclusions seem more appropriate for the internal subjects for, as noted previously, research has shown that internals are more open, more trusting individuals than are externals. They seem to help others and generally to do what they consider correct and ethical, even at the risk of social rejection or physical discomfort. They tend to attribute self-control to the behaviour of others, seeing them as responsible for their own actions, as they represent themselves. In view of the foregoing, it is possible that the internals of the present study returned the points received from the other in equal amount because they considered this to be their responsibility to a co-operative partner and as such, proper and correct. The external subjects, lacking the above qualities but being socially sensitive, may have performed in a fashion they believed was expected of them by the situation; they were simply doing what was socially the "right thing".

The examination of the response latency data of phase 4 sheds further light on this issue. Very noticeably, when reacting to partner's shifting strategy from one hundred per cent total co-operation (phase 1) to sixty per cent partial co-operation (phase 3), the internal subjects took significantly more time to make a response during phase 4, as compared to external subjects, who maintained their earlier response latency. This would suggest that the internal subjects, due to their partner's sudden change of strategy, were not only in greater conflict, but also more hesitant than the externals to press the response button as they considered their behaviour and weighed their decision to either co-operate or compete with the other. Thus, not only did the partner's less predictable behaviour present an interpretation challenge for the internal subjects, but they also faced the dilemma of choosing between co-operative and competitive response strategies. In addition, the internals had to be more vigilant if they were to take greater account of the partner's changing strategies and intentions and extract efficiently what was needed to resolve the conflict and choose the appropriate counter-reaction. All this would have necessitated a more effective use of reasoning on the part of internal as compared to external subjects. The externals' rapid responses, on the other hand, seem to suggest that they did not evaluate the partner's behaviour. As they were

faced with the ambiguous task situation, they preferred to continue with their earlier (phase 2) response pattern.

In short, it would seem, that the differential behaviour of internals and externals is based not only on differing expectations for control, giving rise to different decisions about the exertion of control (motivation), but also on differing efficiency with which this control is exerted (cognition).

In summarizing the results obtained from the response latency data, it could be concluded that there was rather strong support for the previously assumed cognitive-motivational differences between internal and external subjects with differing experimental conditions. In general, the internal subjects demonstrated considerably more variability during the game than did the external subjects. Their attentiveness, concern and interest changed with the kind of situation in which they were involved. When the less co-operative partner created conflict by his changing strategies and offered more challenge to compete, the internals became more cognitively alert, more attentive and inquisitive than the externals. In other words, the internal subjects, more readily than the external subjects, came to terms with uncertainties inherent in the experimental task: they recognized the discrepancies between the opponent's earlier one hundred per cent co-operation and later sixty

per cent partial co-operation and they realized that they had been unfairly exploited by the opponent, more so than did the externals. Consequently, with a better grasp of such information, contributing to the interpretation of ensuing events, they then were able, through more adaptive and rational decision-making, to determine their own strategies. The more co-operative and the less challenging partner, on the other hand, elicited some spontaneous co-operation from the internals. The externals, however, did not seem to draw such sharp distinctions about tasks as internals had done.

## 2. Discussion of I-E Main Effect on Retaliatory Response Behaviour.

It was noted in the analysis of the data that a significant I-E main effect on retaliatory response measure warranted rejection of the second null hypothesis. It was therefore concluded that in response to partner's shift of strategy from one hundred per cent total co-operation (phase 1) to sixty per cent partial co-operation (phase 3), the internal subjects, on the average, demonstrated a greater number of total retaliatory responses during phase 4 than did the external subjects. The immediate question, based on these results, is why internal subjects demonstrated relatively more retaliation against the partner's shifting strategy than did external subjects.

The experimental literature on the effects of opponent's strategy upon the subject's co-operative behaviour indicates that the subject tends to be rather insensitive to the opponent's level of co-operation. However, abrupt changes in strategy such as 0-100 per cent co-operation and 5-50-95 per cent co-operation and the reverse sequence have been found to give rise to changes in subject's co-operative behaviour.

Swingle (1968),<sup>1</sup> for instance, has reported that various pretreatment conditions affect subject's tendency to co-operate in a PD game. In his study, highly co-operative subjects who experienced a co-operative to competitive shift retaliated against the opponent's defection immediately and severely. Highly competitive subjects, on the other hand, showed a moderate tendency to become more co-operative following the opponent's shift to nonco-operative play. He concluded that subjects who co-operated with an initially co-operative opponent were angered by the abrogation of the established co-operative norm and reacted strongly by retaliating with a high level of nonco-operative choices.

The results of the present study demonstrate that internal subjects were more retaliatory following the strategy

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<sup>1</sup> P. G. Swingle, "Effect of Prior Exposure to Co-operative or Competitive Pretreatment upon Subject's Responding in the Prisoner's Dilemma", Journal of Personality and Social Psychology, Vol. 10, 1968, p. 44-52.

change of the opponent during phase 4, than were external subjects. This seems to suggest that they were more sharply affected by the opponent's (sixty per cent) less co-operative behaviour following the strategy change than were the external subjects. It would seem that the one hundred per cent co-operative pretraining established a co-operative norm which was to be regarded as ethical or fair behaviour. When the norm was violated by the partner's less co-operative acts during phase 3, the responsible party was perceived as a defector, and, therefore, unfair and unjust; this gave rise to moral indignation expressed in increased retaliation. In the present study, it was the internal rather than the external who showed the greatest reaction to partner's violation of the co-operative norm. The present results seem to show that the one hundred per cent co-operative strategy encourages the internals to more strongly retaliate against the opponent's later defection than do external subjects.

By way of interpreting these results, it should be pointed out that the relationship between personality variables and gaming behaviour is replete with weak and contradictory findings. One possible reason might be the frequent use of an overall measure of the subjects' co-operative or competitive behaviour. These gross measures are usually a combination of many aspects of behaviour: retaliation,

aggression, distrust and others. Swingle and Coady (1967)<sup>2</sup> and Swingle (1968)<sup>3</sup> have also pointed out that comparing the average number of competitive responses between groups exposed to different strategy manipulation may not be a sensitive index of treatment effects. Swingle (1968) concluded from his study that increased variability indicates that subjects differ widely in their perception, interpretation and/or reaction to similar strategic postures of opponents in conflict situations.

The most significant aspect of the present study is the finding that internals differed sharply from externals in their perception of the partner's strategy, interpretation of his intentions and reactions to similar strategic posture by the opponents. Consequently, the fact that internal subjects demonstrated relatively more retaliation during phase 4 than did external subjects seems to suggest that the internals, having co-operated with an initially co-operative other during phase 2 and subsequently experienced the shift in partner's strategy (during phase 3), were angered by the abrogation of the established co-operative norm, reacting in phase 4 with a higher level of retaliation or nonco-operative


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2 P. G. Swingle and H. Coady, "Effects of the Partner's Abrupt Strategy Change upon Subject's Responding in the Prisoner's Dilemma", Journal of Personality and Social Psychology, Vol. 5, 1967, p. 357-363.

3 P. G. Swingle, Op. Cit.

choices, than did the external subjects. These results appear consistent with the previously reported findings that internals do what they consider to be correct or ethical even at the risk of social rejection and that they tend to hold others responsible for their actions, just as they accept responsibility for their own, which could predispose them to greater hostility and thus to higher retaliation against the opponent's unjust defection. However, in view of the fact that internals are less influenced by social reinforcements, social pressure and generally are more circumspect in the face of such pressure to yield to influence, the present results could also be interpreted in a different, yet related, fashion.

It was noted previously that internals seemed to be more actively involved in attempts to control, influence or otherwise deal effectively with their own surroundings. Their behaviour appears to be mediated by their belief in the efficiency of their own efforts and by a desire to remain in control. Internals are more likely to resist the efforts of others who would attempt to influence, manipulate or otherwise control them, for to tolerate such blandishments by others is to abrogate personal dignity and control, and is tantamount to giving control to others. However, it is apparent from the literature that internals resist more "subtle" forms of influence as opposed to explicit suggestions.



Thus, it is possible to interpret this difference in influence technique in terms of interpersonal intentions, that is to say, if an opponent conveys his expectations for future co-operation to his partner, thus inviting the player to join him in a positive attitude which aims at establishing a norm of what is to be considered co-operative or fair behaviour, this shared attitude would be one that expresses respect for the subject as a person rather than as an object of manipulation or exploitation. In contrast, an unexpected change of strategy as described above may also be construed as a subtle technique of manipulation which pits the opponent against the player and suggests that the player will become a passive pawn of the other's manipulations. Consequently, since the internal resents being placed in a position where he is the pawn or where he is being "put down", so to speak, by the other's assumed knowledge and manipulation, they resisted and thus followed their own inclinations in determining the rational strategy. Therefore, little external pressure was brought to bear in such a way as to curtail their decision-making process. The internal subjects not only were able to perceive and discriminate the opponents' various strategies and intentions, but they also succeeded in extracting what was needed to exert control over outcomes in a more deliberate and calculated fashion, as they came to realize that the opponent was trying to manipulate and exploit them. Such behaviour

must imply more than a mere difference in cognitive activity. It would seem that the internal subjects differed from the external subjects, both cognitively and motivationally, and these differences were salient under the ambiguous or conflict situation. The task presented for the internal subjects the dilemma of locating or discriminating the partner's various behaviors and intentions and extracting what was needed to exert control over him. Therefore, it was in the decision to solve (or not to solve) this dilemma that it would seem the move was made from an expectancy of control to an exertion of control.

Based on the foregoing statements, it would be expected that internals, as compared to externals, would be better able to utilize the optimum strategy in their response. In other words, having reciprocated the partner's initial cooperation during phase 2, and having subsequently realized the partner's intentions, the internals would react immediately and severely to the opponent's defection and manipulation and later return to more co-operative responding, to force or lure the opponent back to greater co-operation in the future. Support for these contentions comes from the behavioural data: the statistically significant main effect of I-E on first trial of retaliation response of phase 4, which seems to demonstrate that the internal subjects reacted immediately with a higher level of retaliatory responses

against the opponent's defection than did the external subjects. Furthermore, this gave the internals an opportunity to reassert their control or influence over the other's outcome; to allow the opponent's exploitative actions to go unchallenged would be tantamount to giving him control and an opportunity to repeat his exploitative acts in the future. Thus, having initially retaliated against the opponent's harmful acts, the internals returned to a more co-operative strategy. The external subjects, in contrast, retaliated less during the first trial of phase 4, and continued their co-operative responses during the subsequent trials. Conceivably, the externals, having lower expectancies of obtaining higher outcomes than internals, were satisfied with the points already obtained and did not wish to "push their luck" by antagonizing the "benevolent" opponent. It is also possible that, due to their cognitive limitation, they failed to recognize alternative strategies. Since externals perceive themselves as pawns of external social manipulations, they gave in, relinquishing their control to the opponent. Furthermore, this finding is clarified by the behavioural data, the statistically significant interaction effect of I-E x sex on first trial of retaliation response of phase 4, which seems to suggest that the internal males were the most angered by the abrogation of the established co-operative norm and by the other's attempt to manipulate or otherwise

control their outcomes. Therefore, they were more eager to control the other's outcomes by retaliating and reasserting control of their own outcomes than were the internal females. The external (male and female) groups, in contrast, showed relatively little concern over winning points or over the exploitative manipulations of the opponent. Thus, once again, the previously posited differential cognitive-motivational behaviour of internals and externals is exemplified. The fact that the internal subjects differed cognitively as well as motivationally from the external subjects could be seen from the various statistically significant first trial of retaliation responses of phase 4, previously discussed. It would seem that the internals not only are better able to recognize the "optimum" or rational strategy, but they are more motivated to win and to assert their control over the outcome of the opponent than are the external subjects. However, in view of the I-E x sex interaction effect on first trial of retaliatory response of phase 4, it is evident that within the internal groups (male and female), it was the internal females who retaliated relatively less than the internal males. Considering the many conflicting results reported by the literature on sex differences, it would seem that internal females are, at first, relatively less able to recognize the "rational" strategy and less motivated to win or to reassert their control over the other's outcomes through

retaliation. However, since no differences were found on subsequent retaliatory measures, it is possible that females were reluctant to show initial unkindness, perhaps considering it "unfeminine". This issue is further clarified by the statistically significant I-E effect on longest consecutive retaliatory run of phase 4. It is evident from the data that the internal groups, following their return to cooperative responding, had to once more reassert their control over the opponent's outcomes, giving him less points through a series of retaliatory response trials, thereby hoping that the other had learned his lesson. This also gave the opponent a "taste" of what was in store for him if he tried again to exploit them or control their outcomes. Finally, the behavioural data of the statistically significant I-E effect on last trial of retaliatory response, seem to suggest not only that the internals tried to further reduce the opponent's outcomes, through greater retaliation during the last trials of phase 4, but also more than the externals, they attempted to imply to the other that they would neither tolerate his exploitation nor be manipulated by his demands. On the other hand, the findings of shorter response latency and lower retaliatory response scores of the external group suggest their inability to recognize the rational strategy, or to maximize their outcomes, to resist and control ensuing events. Since their expectations involve

a view of events as being due to sources outside their control, they co-operate and conform to the demands of the "exploitative" other.

Finally, it should be noted that originally, the experimental design called for an overall analysis of the following measures: response latency, retaliatory response and post-game questionnaire measures. However, since the younger children were unable to grasp certain subtleties in the questions or responded randomly to the questionnaire items, it was not possible to analyze post-game questionnaire results quantitatively; therefore, they were interpreted qualitatively. These results, together with spontaneous comments after the game, offer valuable insights into the possible meaning of present behavioural data. The post-game questionnaire results would seem to offer support since 82.5 per cent (33 out of 40) of internal subjects indicated that the opponent was fair or friendly the first time, but not the second time and that this angered them, whereas 87.5 per cent (35 out of 40) of the externals thought the opponent was fair all along. In addition, 75 per cent (30 out of 40) of internal subjects implied that exploitation, if left unchecked, is more likely to be repeated, whereas only 20 per cent (10 out of 40) of externals made this comment.

In conclusion, the questionnaire data are in agreement with the behavioural results, revealing substantial evidence to verify the previous notions about the cognitive-motivational aspect of locus of control. However, before drawing any general conclusions, it must be acknowledged that many of the main effects previously established and discussed in the present study have been influenced by differential age effects; thus, it would be useful to note if the game played by twelve and seven year-old children yields the same cognitions and motives as that played by internal and external children. It is from this standpoint that attention will be focussed on the next topic.

### 3. Discussion of Age Main Effect on Retaliatory Response Behaviour.

As indicated in the previous chapter, the expected age effects on response latency measures did not reach statistical significance ( $P > .10$ ). Therefore, the third null hypothesis of no difference in response latency between the twelve and seven year-old children in phases 2 and 4 was retained. One might have anticipated age effects paralleling the I-E variable, since the same characteristics that differentiate internals from externals frequently differentiate older children from younger ones. The reasons for the failure to obtain statistically significant differences in response latency between these two groups remain unclear at present. However, one might conjecture that the task directions discouraged subjects

from taking advantage of the benefits to be accrued from the control of their response latencies, so that, instead of taking more time to weigh and choose their behaviours or reconsider alternative actions, both age groups responded rapidly to the opponent's shifting strategy. It is also possible that co-operative pretraining may have reduced the ensuing conflict created by the opponent's strategy change. Another hypothesis is that subjects decided early (beginning of phase 4) on a course of action, and thus did not require time to consider alternative strategies during the actual trials.

Nevertheless, evidence was obtained from the behavioural data (statistically significant age main effect on total number of retaliatory responses measure) to warrant rejection of the fourth experimental null hypothesis of no difference in retaliatory responses between twelve and seven year-old children. It was found that the twelve year-old children, on the average, demonstrated a higher level of total retaliations against the opponent's shifting strategy than did the seven year-old children.

Coady (1970)<sup>4</sup> has reported that various pretreatment conditions affect children's tendency to co-operate in both PD and power games. He found that fifty pretraining trials

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<sup>4</sup> H. Coady, Behavioral Correlates of Moral Judgement, unpublished Ph.D. dissertation, University of Ottawa, 1970.

on either eighty per cent co-operative or eighty per cent competitive strategies by the programmed opponent on a PD game produced similar choices by the subjects. That is, those exposed to a co-operative strategy responded to the partner in a similar manner; however, those exposed to competitive strategy reciprocated this choice in kind. In addition, when these various pretreatment conditions were followed by an additional fifty trials of an unconditional co-operative strategy by the opponent in a power matrix, the older children reacted with more competitive choices, whereas the younger children remained relatively insensitive to the strategy change. Coady concluded from his study that the younger children, due to their egocentric quality of thinking, were incapable of adequately assessing the opponent's gaming behaviour, "since he is unable to assume the role of an equal status member".

The fact that, in the present study, the older children demonstrated more retaliations than the younger children seems to suggest that they were more affected by the opponent's reduced (sixty per cent) co-operation following the strategy change. That is, they differed considerably from the younger ones in their perceptions of the partner's various strategies and intentions, and reacted negatively more than did the younger children to the opponent's strategic postures, these latter remaining relatively insensitive to

the opponent's strategy change. These results are consistent with Coady's findings in demonstrating that systematic variations in the partner's strategy influenced the subject's game strategy. That is, the programmed opponent who played cooperatively for the fifteen consecutive trials of phase 1 produced similar co-operation from both groups during phase 2. However, when he shifted his strategy from one hundred per cent co-operation (phase 1) to fifteen trials of sixty per cent partial co-operation in phase 3, this produced more retaliations from the older children than it did from the younger ones. These results are also consistent with previous literature findings (Coady 1970)<sup>5</sup> indicating that younger children, in general, tend to be relatively non-responsive to interpersonal aspects of their relationships with others. They are uninterested in co-operating or competing, regardless of how the other responds. However, as they grow older, they become more responsive to these interpersonal aspects, and both interested in and reactive to variations in the behaviour of the other and, in general, more competitively oriented in their bargaining relationship.

By way of interpreting these results, Piaget (1965)<sup>6</sup> observed that younger children between the ages of two and

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5 Ibid.

6 J. Piaget, The Moral Judgement of the Child, New York, The Free Press, 1965.

seven, when playing a game, observe older children playing and imitate the ritual. They are aware that there are rules which govern their activities, and though their knowledge of them is rudimentary, they consider them as sacred and un-touchable. Their practice of the rules is egocentric; that is, they are imitating what they have seen, for their own ends, unaware even of their isolation from the game as a social activity. They derive pleasure from the psychomotor activity of developing skills. In this age range, though children may have companions "playing" with them, each of them is playing his own game and, if the companion is an adult, at the conclusion of the "game", the child is likely to say "Who won?" since he has no sense of how it all happened or of what winning means. Cognitively, the child is egocentric; he has not yet differentiated himself from the external world. He cannot place himself in a group as one among several others and mutually share an activity. However, there is a strong desire to imitate the ritual of his social group. Egocentric play, then, is a transitional stage between the purely individualistic play of motor activity, where there is no awareness of what one ought to do with the rules and the truly social play of co-operation. The younger children in the egocentric stage take an adamant verbal stand that rules are sacred and unchangeable. They believe that the rules have been handed down from adults or God may have

formulated them. Any alteration in the rules is considered a transgression. The combination of egocentric play and a belief in the sacredness of the rules is a curious paradox. On the one hand, the child feels the weight of obligation to honor and respect the rules regulating the game, while, on the other hand, he virtually ignores them when he plays. The resolution of the paradox is the child's perception of what he is doing; namely, that he is humbly submissive to each rule in every detail. Thus, during the stage of heteronomous obedience, the child has a sense of obligation towards the rules and they influence his actions but he does not yet have the necessary cognitive structure to apply the rules in any form except imitation.

The older child, between the age of eight and twelve, moves from the purely psychomotor pleasure of the younger ages to pleasure gained from competing with others according to a set of rules to which they have agreed. Unlike the egocentric child, the older child recognizes the rules as essentially for regulating the game as a social activity. At this age, children begin to carefully watch each other to be sure the other is playing by the rules agreed upon because winning only has meaning in the context of a given set of rules; the motive to co-operate with one's peer is strong. Gaps in intention and practice are more likely to be the result of a lack of knowledge of the rules rather than a lack of respect

for them. At about age eleven or twelve, heteronomy starts to give way to autonomy. It is through co-operative play, together with greater cognitive maturity, that the child sees rules as the product of mutual consent rather than as a code of laws handed down by authorities. The older child develops the ability to reason abstractly, and at this time, codification of the rules takes on great importance. Children at this age are interested in rules for rules' sake and frequently spend more time legislating for every possible event than they spend in actual play; no detail will be left to chance. Every possibility that might affect the game in some way will be included in the frequently heated discussions setting up the rules. There is a strong desire to resolve conflict and co-operate at this age and the rules provide the structure for both. It is at this age, when rules are known very well and agreed upon in the minutest detail, that one finds the closest correlation between consciousness of the rules and the practice of them.

As the older child begins to relate to his peers, in co-operative play, he experiences relationships of mutual respect. He sees his opponent as someone like himself and he experiences the other's respect for him. Prior to this, the only respect the child knew was unilateral; that is, the respect he had for adult authority. Because the adult is both bigger and more powerful, the child does not experience

mutuality in that relationship. The adult controls; he can give or withhold, punish or reward. The child has no sense of equality with adults. It is this relationship of unilateral respect or adult constraint that perpetuates the stage of heteronomy. Rules are seen as emanating from adults and enforced by them and the child's relationship with adults is one of respect and abedience.

Based on Piaget's two-stage theory of moral development, it would seem that the one hundred per cent co-operative pretraining (during phases 1 and 2) may have established a norm of what was to be considered as fair behaviour, a bond of solidarity, based on logical principles of mutual respect, reciprocity and equity. When the co-operative norm was violated by the other party (during phase 3), the transgressor was perceived as unjust, giving rise to moral indignation. In addition, since the older children, at age twelve, are generally more mature cognitively than seven year-old children, and better able to assimilate information from their experiences, they were thus able to more accurately perceive the opponent's various strategies and intentions and retaliated more, in an attempt to do to the offender something comparable to what he had done previously, to bring home to him the nature of his offense and perhaps to deter him on future occasions. The younger children, in contrast, retaliated less, which seems to suggest that due to their

egocentric cognitive limitations, they did not assimilate information from their experiences and failed to accurately perceive the opponent's strategies or intentions. In addition, since their respect for rules is unilateral, they seem to follow task instructions literally, believing that retaliation is contrary to task instructions and, therefore, violation would result in punishment by the authority.

However, if the task of the present study is thought of as a series of problems to be solved by rational processes, and if the development of these processes in the Piagetian sense is a concomitant of development, there would be more rational problem-solving by the older children than by the younger ones; consequently, the fact that the older children demonstrated relatively more retaliations than the younger children seems to attest that they were more rational in their decision-making; that is, they attempted to maximize their gains in points to the levels of the opponent's total scores.

Given this fact, it would seem that the older children, having experienced a change in the other's strategy, would be more concerned than the younger ones by the abrogation of the co-operative norm and would react with more initial retaliation, simply to make the exploiter aware of his act. Once having communicated this intention, they would return to a co-operative responding.

However, since the behavioural data of the age main effect on first trial retaliatory response measure did not reach significance, it could be thought that both age groups tended to show more generosity and more co-operation to the other in a desire to match the co-operation shown by the opponent in the first trial of phase 3 (first co-operative move following strategy change).

A bargainer who makes an initial offer followed by frequent concessions may be viewed by the other as "a sucker" willing to settle for less than one who adopts a stance of initial toughness. Thus, an initial concession, followed by frequent others, is less likely to restore equity than a stance of initial toughness followed by a gradual softening of demands, which has the effect of communicating a picture of the bargainer as a worthy opponent. Given this belief, the bargainer becomes increasingly concerned with the apparent loss of face he has incurred in the other's eyes and so becomes increasingly competitive and retaliatory. Since the age main effect on longest consecutive retaliatory run measure fell short of the significance level ( $P < .07$ ), this would seem to suggest that the older children tended towards utilizing their retaliatory responses over a longer sequence of trials in an attempt, not only to maximize their own gains in points, but also to reduce the opponent's outcomes considerably. It would appear, therefore, that in reducing the

opponent's outcomes during a longer sequence of trials, the older children, more than the younger ones, were trying to take a stance of progressive toughness, not only to gradually impress upon the other an image of themselves as equal and worthy opponents but also of individuals who are capable of restoring equity to an inequitable relationship. The younger children's tendency for utilizing shorter sequences of consecutive retaliatory trials would seem to suggest that they were relatively less concerned about winning more points (maximizing their outcomes through consecutive retaliations) or reducing the opponent's outcomes substantially; consequently, they tended to utilize shorter consecutive retaliations during the sequence of trials. It is possible that they failed to understand the rational strategy or in the absence of clear experimental instructions (that they did not have to send a message to the other if they did not wish to do so), they thought co-operation rather than retaliation was the rule to follow, and thus obeyed task instructions literally. However, the statistically significant age main effect on last trial of retaliation measure sheds further light on this issue. It is evident from the data that the older children retaliated more on the last trial of phase 4 than did the younger ones, in an effort to further reduce the opponent's outcomes, bringing their points to approximately the level of the opponent's total score. They may

have considered this kind of progressive toughness sufficient to "put things right again", or for the breach of the social bond incurred by the transgressor to be felt. In other words, for the older children, this was sufficient to bring the principle of reciprocity into play. Younger children, on the other hand, made relatively fewer retaliations during the final trial of phase 4, suggesting that they were not interested in restoring equity to the relationship. It is possible that, since the rule of fair play was externally imposed upon them, it also required an external imposition to put things right again, perhaps calling upon the external authority to punish the transgressor.

Pruitt (1968)<sup>7</sup> noted that decision-makers are often hesitant to abandon their previous interpretation of the motives of another party even when faced with contradictory evidence. When co-operative behaviour changes to nonco-operative behaviour, for example, the change may not be interpreted immediately as a shift to a strategy of nonco-operation. If the change in behaviour is not recognized as indicating a basic strategy change, the response to the change is reduced. This "reduction" in response to a change in the other party's behaviour is essentially an assimilation

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<sup>7</sup> D. G. Pruitt, "Instability and Sudden Change in Interpersonal and International Affairs", The Journal of Conflict Resolution, Vol. 13, 1969, p. 18-38.

process; more evidence is required to recognize an event which is contrary to previous expectations about the other. Based on the foregoing, it is possible that the older children's initial generosity and forgiveness and subsequent toughening was due to their inability, during the early trials of phase 4, to recognize the change in the other's behaviour as a basic strategy shift, and that they required further trials to assimilate information from past experience, before they could recognize the other's behaviour as a basic strategy change and decide to increase their retaliation accordingly.

These assumptions would seem to be borne out by the post-game questionnaire, as well as by the spontaneous remarks made by children after the game. When asked "Who won the game?" 45 per cent of the younger children (18 out of 40) answered "I won the game", even though some of these had in effect lost the game by a considerable margin; fifty-five per cent of these children (22 out of 40) remained puzzled and could not answer, apparently not knowing who had won the game. This would suggest that the younger children, in general, remained isolated from the game as a social competitive activity. In contrast, 62.5 per cent of the older children (25 out of 40) said they had neither won nor lost the game ("I got as much as my opponent"), whereas 37.5 per cent (15 out of 40) said they had won the game, and had, in effect won

it. In addition, to the question: "Was the opponent fair?", eighty per cent of the older children (32 out of 40) said "He was fair the first time (phase 1), but not the second time (phase 3)", whereas 62.5 per cent of the younger children (25 out of 40) replied simply "He didn't play the game the way he was supposed to". Another aspect which is noteworthy is the information gleaned from spontaneous remarks by the older children. Some of these children indicated that they had been "suckered" or "trapped" by the opponent's early co-operation. That is to say, they perceived the partner's early one hundred per cent co-operation as part of the same strategy. Although the partner's early co-operation appeared to be genuine at first, after the change in strategy (sixty per cent partial co-operation), it appeared gradually to have been a trap, setting them up for exploitation; consequently, these factors could have reduced the previously hypothesized differences in mean response latency scores between the two groups. That the older children differed in cognition and motive from the younger ones can be seen from the various retaliatory measures previously discussed. It would seem that the older children attempted at first to be relatively more co-operative and more generous towards the opponent and gradually increased their retaliation throughout the sequence of trials in an effort to establish near equity with the other. Thus, they were better able to

recognize the optimum strategy and more capable of utilizing it in a rational optimum fashion to maximize their outcome and to bring equity to their relationship, whereas the shorter response latency and retaliatory response scores of the younger group would seem to suggest that they acted instantaneously and were relatively unaware of the game as a social competitive activity. Thus, they failed to recognize or utilize the optimum or rational strategy.

Finally, it is noteworthy that the previously stated fifth and sixth experimental hypotheses concerning sex effects on response latency and retaliatory response measures did not reach the statistically accepted level. One might have anticipated sex effects paralleling the I-E variable, since the same characteristics that differentiate internals from externals frequently differentiate sexes. In view of the previous inconsistent findings on sex differences in experimental games, the finding of no difference in the present study between male and female groups on either response latency or retaliatory response measures was not totally surprising. An exception was the single significant finding of a sex x age interaction effect on the last trial of retaliatory responses, which seems to demonstrate that the twelve year-old males showed more retaliations during the last trial of phase 4 than the twelve year-old and seven year-old female and seven year-old male groups.

The underlying reasons for this and other non-significant sex differences previously noted remain unclear at present. However, a few hypotheses might be advanced. It might be that the task employed in the present study was appealing and sex appropriate for both male and female children, thus reducing the previously expected differences between the two groups. Another possible reason is that, as a result of the recent women's liberation movement, the former gap between the personalities of boys and girls in experimental games, in a sense, has been narrowed. The girls might have acted more competitively, or boys more co-operatively, than they ordinarily do in other situations where they are more competition- or co-operation-conscious. The present results, unfortunately, do not allow for an easy advocacy of these or other possible hypotheses. There are, however, characteristics of most conflict of interest situations which elicit both co-operative and competitive response tendencies. Knowledge of both the absolute and the relative importance of various intellectual, motivational and situational determinants of co-operative and competitive behaviour for each sex level would be required if one were to predict sex differences for particular conflict of interest situations. It is clear that more experimental inquiry into the psychological basis of co-operative and competitive behaviour in children is necessary before results such as these can be readily interpreted.

## SUMMARY AND CONCLUSIONS

The review of the literature indicates that the construct of internal versus external locus of control of reinforcement has emerged as a variable of considerable importance in relation to understanding and predicting a broad range of behaviours. The scale has been successful in predicting moderately well in mastery tasks but less successful in certain other situations. It is being recognized that the relatively unsuccessful predictions are partly due to the failure of researchers in the past to consider such mediating variables as age, sex, and the nature of the psychological situation in their research design, and partly due to the problems of impurity or multidimensionality and general insufficiency of the scale approach to personality research. Consequently, following a presentation and discussion of the I-E construct approach to personality research, the importance of considering age, sex and psychological situation in a single design was suggested. In anticipation of a controlled laboratory gaming situation to obtain clearer behavioural indices of cognitive-motivational aspects of locus of control, age and sex which previous research failed to provide, an introduction to these bargaining situations was described. The next chapter dealt with the sample, description of the experimental apparatus, description and

administration of the CNS-IE scale, administration of the game, statistical design and hypotheses.

Since the main concern of the present study was to investigate the relationship between personality, age, sex and overt behaviour, a comparison of different personality variables classified as internal-external attitudes, ages twelve and seven years, and male-female, was investigated on both response latency and various retaliatory response measures.

The first null hypothesis that there is no significant difference in response latency between the internal and external subjects during phases 2 and 4, was rejected. It was found that the internal group took, on the average, a significantly longer time to make a response to the partner's latency than did the external subjects. This finding was further clarified by the significant I-E x phases interaction, indicating no significant difference in response latency between internals and externals during phase 2, when responding to partner's one hundred per cent co-operative strategy, whereas the internal group demonstrated significantly longer response latency during phase 4, following partner's strategy change from one hundred per cent co-operation (in phase 1) to sixty per cent partial co-operation (in phase 3). The externals continued their previous rapid responding following the same strategy change.

The second null hypothesis stating that there is no significant difference in retaliatory responses between internal and external groups during phase 4, is rejected, internals, on the average, demonstrating more retaliations following the opponent's strategy change than the externals. This finding was further clarified by the significant I-E main effect and I-E x sex interaction on first trial of retaliatory response, as well as by the I-E main effect on longest consecutive retaliatory response and on last trial of retaliatory response measures, which together indicated that the internal group, on the average, demonstrated a higher level of and more varied strategic retaliations against the opponent following the strategy change than did externals.

The third null hypothesis stating that there is no significant difference in response latency between the twelve and seven year-old groups in phases 2 and 4 would be accepted.

However, the fourth null hypothesis which stated that there is no difference in retaliatory responses between the twelve and seven year-old groups during phase 4, was rejected. It was found that the twelve year-old children, on the average, showed more retaliations against the opponent following his strategy change than did the seven year-old children. This finding was further clarified by both the

marginally non-significant ( $p < .7$ ) I-E age effect on longest consecutive retaliatory response and the statistically significant I-E age effect on last trial of retaliatory measure. Taken together, these findings indicated that older children generally showed a higher level of and more varied retaliatory responses toward the opponent than the younger children.

The fifth null hypothesis which stated that there is no difference in response latency between male and female groups during phases 2 and 4, was retained.

Finally, the sixth null hypothesis of no difference in retaliatory response between male and female groups during phase 4 would be accepted.

In terms of future research, many suggestions can be offered, since the field investigated in this dissertation has been relatively unexplored with children. Consequently, a few suggestions considered important will be presented.

Despite the general agreement that an internal subject has better cognitive information processing ability than external subjects, several questions surrounding this effect have been left unanswered in the literature. To give a specific example of an unresolved issue, it is not clear whether an internal subject demonstrates heightened cognitive activity in all situations, or only in situations which allow some degree of control. Several studies have suggested that a congruity between personal expectancies for control and

situational opportunities for such control seems to facilitate performance. These studies have failed to delineate adequately the nature of such situation-personality interactions. The findings of the present study indicated that the internals' cognitive activity (attentiveness, concern and interest) changed with the type of situation in which they were involved. In maximum ambiguity or high-conflict situations, the internals demonstrated more heightened cognitive activity than externals, whereas in the situation where there was little conflict, such sharp distinctions in cognitive ability were not found between internals and externals. More research is needed if the nature of such situation-personality interactions is to be adequately delineated. This could perhaps be achieved utilizing a series of tasks with varying degrees of certainty and varying degrees of control, which would allow subjects to extract information from their environment.

Experimental games, a highly structured interaction situation, have been a valuable tool for research with adults and have very rarely been used for observing children. They have proven useful in assessing the cognitive and motivational differences in groups of individuals and in providing interesting answers to such general issues of personality research as the degree of cross-situational consistency in an individual's behaviour. The findings of the present study

also indicated that they are highly sensitive to and very discriminant of, behaviour demonstrated by children in varying situations. Therefore, it is believed that similar gaming techniques can be used to study personality variables as they are related to behaviours in children, such as fairness-unfairness, justice-injustice, trust-distrust, co-operation-retaliation and other dependent measures desirable from this kind of research. In addition, the procedure could also serve as a measuring instrument to explore the developmental aspects of cognitive-motivational behaviours which have been utilized only with adults.

The promise of experimental games as tools for personality assessment has not yet been fulfilled, to a large extent, because of failure to exploit their greatest strength, namely, their status as samples of behaviour in well-defined, tightly controlled and yet meaningful interaction situations.

Finally, the results of the present study leave sex effects a still entirely open question. It is clear that more systematic inquiry is needed into the psychological basis of co-operative-competitive behaviour in children, before precise predictions could be made concerning sexes.

## ANNOTATED BIBLIOGRAPHY

Joe, V. C., "Review of the Internal-external Construct as a Personality Variable", Psychological Reports, Vol. 28, 1971, p. 619-640.

Reviews recent research concerning J. Rotter's concept of internal-external control of reinforcement. Twelve areas are covered: (a) the internal-external (I-E) scale; (b) personality; (c) attempts to control the environment; (d) achievement; (e) reactions to threat; (f) ethnic group and social class differences; (g) parent-child relationships; (h) risk-taking; (i) reactions to social stimuli and (j) the relation to the I-E measure of anxiety adjustment and learning.

The evidence generally supports the validity of Rotter's concept. Implications and limitations of the research are presented, and suggestions for further work in specific problem areas are made.

Lefcourt, H. M., "Recent Developments in the Study of Locus of Control", Progress in Experimental Personality Research, Brenda A. Maher (Ed.), New York, Academic Press, Vol. 6, 1972, p. 1-39.

A summary of recent research with the construct internal versus external control of reinforcement is presented. Specific attention is drawn to the relationship between perceived control and resistance to influence, cognitive activity and the preference for delayed reinforcement, achievement behaviour and the response to success and failure. Research concerned with familial and social determinants of, and changes in, locus of control are also reviewed. Experiments generally report significant but low magnitude relationships in the predicted directions between locus of control and various criteria. Several writers, however, have offered valuable criticism deriving from empirical tests of the assumed multi-dimensionality of the locus of control construct.

-----, Locus of Control: Current Trends in Theory and Research, Hillsdale, New Jersey, Lawrence Erlbaum Associates, 1976, v-211 p.

This volume provides an extensive description of the theory and research pertaining to the locus of control variable. It organizes the research literature into areas that are manageable and coherent. The perception of causality presented in the book is shown to have ramifications for various social phenomena, from resistance to coercive pressures, cognitive activity, achievement-related behaviour and psychopathology to the social antecedents of and changes in

locus of control. It demonstrates the relevance of personality constructs to important social issues, and how research workers grapple with these issues under laboratory conditions. Apart from being an introductory volume to the area of locus of control, it could also serve as a manual for researchers who wish to explore this construct.

Nowicki, S. and B. Strickland, "A Locus of Control Scale for Children", Journal of Consulting and Clinical Psychology, Vol. 40, 1973, p. 148-154.

The study presents reliability and validity evidence concerning a new measure of generalized locus of control for children. Construction procedures leading to the final forty-item scale are described. Preliminary work showed that scores were not related to social desirability or intelligence test scores but were related to achievement. Continued research with the instrument conducted over a wide range of subjects. Populations have provided additional construct validation across variables such as popularity, ability to delay gratification and prejudice.

Phares, J. B., Locus of Control: A Personality Determinant of Behavior, Morristown, New Jersey, General Learning Press, 1973, p. 1-24.

A summary of theory and recent research with the locus of control construct is presented. Special attention is drawn to the relationship between perceived control and skill and chance situations mastery of the environment, social influence, achievement behaviour, delay of gratification, success and failure experiences, adjustment and defensiveness, social origins or antecedents of I-E, and personal versus system control. Valuable discussion is also offered on the multi-dimensionality of the locus of control variable.

Piaget, Jean, The Moral Judgement of the Child, New York, The Free Press, 1965, v-410 p.

A cognitive approach to the study of the moral development of the child viewed in terms of an interactional process between the child and concepts through which reality relations are established. Moral judgement is discussed in comparison to phenomena characteristic of various stages of development.

Rotter, J. B., Social Learning and Clinical Psychology, Englewood Cliffs, New Jersey, Prentice-Hall, 1954, vii-466 p.

The volume presents the author's initial attempts at formulating a systematic social learning theory approach to personality. It offers experimental evidence which supports

many of the hypotheses prescribed in the book. It attempts to apply the social learning theory to two aspects of the clinician's most important problems: (1) the measurement of personality (personality diagnosis) and (2) psychotherapy. Efforts are made to formulate a systematic theory (mathematical model) of personality from which to draw specific principles for actual clinical practice.

-----, "Generalized Expectancies for Internal Versus External Control of Reinforcement", Psychological Monographs, Vol. 80, No. 1 (whole No. 609), 1966, p. 1-28.

This monograph describes the concept of internal control of reinforcement: the degree to which an individual believes that reinforcements are contingent upon his behaviour. It presents a comprehensive review of the work on the development, validity and reliability of the scale measuring the attitudes of internal-external control, along with a substantial amount of research in support of the construct.

-----, J. E. Chance and E. J. Phares, Applications of a Social Learning Theory of Personality, New York, Holt, Rinehart and Winston, 1972, v-624 p.

The social learning theory of Rotter is described and illustrated in this book. It expands on and revises the earlier formulation of SLT, and shows the application of the theory to many different areas of human behaviour. It is an up-to-date statement of the theory, which includes a number of recent experimental and theoretical articles selected to illustrate applications of the social learning theory of personality. It provides integrative summaries of this research in six areas of complex human learning, personality development, personality theory and measurement, social psychology and the social sciences, psychopathology and psychotherapy.

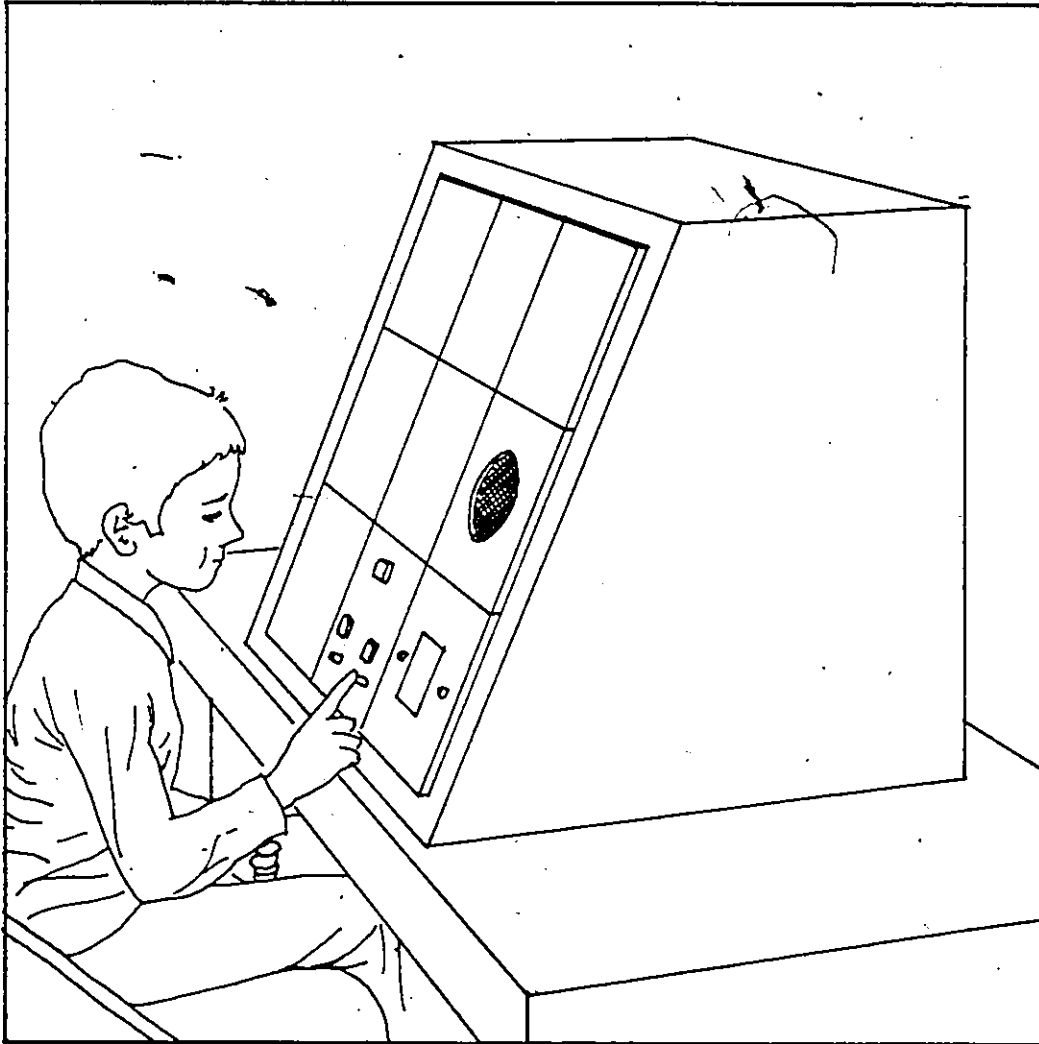
Swingle, Paul G., Experiments in Social Psychology, New York, Academic Press, 1968, ix-298 p.

A series of experimental studies with practical exercises for use in the undergraduate laboratory of social psychology. Included in this selection is an excellent introduction to the use of gaming methods for experimental purposes.

APPENDIX 1

SKETCH REPRESENTATION OF THE EXPERIMENTAL APPARATUS

6



SKETCH REPRESENTATION OF THE EXPERIMENTAL APPARATUS

APPENDIX 2

QUESTIONNAIRE UTILIZED FOR MEASURE OF  
LOCUS OF CONTROL ATTITUDES

## Nowicki-Strickland Scale

- (Y) 1. Do you believe that most problems will solve themselves if you just don't fool with them?
- (N) 2. Do you believe that you can stop yourself from catching a cold?
- (Y) 3. Are some kids just born lucky?
- (N) 4. Most of the time do you feel that getting good grades means a great deal to you?
- (Y) 5. Are you often blamed for things that just aren't your fault?
- (N) 6. Do you believe that if somebody studies hard enough he or she can pass any subject?
- (Y) 7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?
- (Y) 8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do?
- (N) 9. Do you feel that most of the time parents listen to what their children have to say?
- (Y) 10. Do you believe that wishing can make good things happen?
- (Y) 11. When you get punished does it usually seem it's for no good reason at all?
- (Y) 12. Most of the time do you find it hard to change a friend's (mind) opinion?
- (N) 13. Do you think that cheering more than luck helps a team to win?
- (Y) 14. Do you feel that it's nearly impossible to change your parent's mind about anything?
- (N) 15. Do you believe that your parents should allow you to make most of your own decisions?
- (Y) 16. Do you feel that when you do something wrong there's very little you can do to make it right?

- (Y) 17. Do you believe that most kids are just born good at sports?
- (Y) 18. Are most of the other kids your age stronger than you are?
- (Y) 19. Do you feel that one of the best ways to handle most problems is just not to think about them?
- (N) 20. Do you feel that you have a lot of choice in deciding who your friends are?
- (Y) 21. If you find a four-leaf clover do you believe that it might bring you good luck?
- (N) 22. Do you often feel that whether you do your homework has much to do with what kind of grades you get?
- (Y) 23. Do you feel that when a kid your age decides to hit you, there's little you can do to stop him or her?
- (Y) 24. Have you ever had a good luck charm?
- (N) 25. Do you believe that whether or not people like you depends on how you act?
- (N) 26. Will your parents usually help you if you ask them to?
- (Y) 27. Have you felt that when people were mean to you it was usually for no reason at all?
- (N) 28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?
- (Y) 29. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?
- (N) 30. Do you think that kids can get their own way if they just keep trying?
- (Y) 31. Most of the time do you find it useless to try to get your own way at home?
- (N) 32. Do you feel that when good things happen they happen because of hard work?
- (Y) 33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?

- (N) 34. Do you feel that it's easy to get friends to do what you want them to?
- (Y) 35. Do you usually feel that you have little to say about what you get to eat at home?
- (Y) 36. Do you feel that when someone doesn't like you there's little you can do about it?
- (Y) 37. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?
- (N) 38. Are you the kind of person who believes that planning ahead makes things turn out better?
- (Y) 39. Most of the time, do you feel that you have little to say about what your family decides to do?
- (N) 40. Do you think it's better to be smart than to be lucky?

APPENDIX 3

INSTRUCTIONS USED IN THE GAMING SITUATION



D

## Instructions used in the Gaming Situation.

## Phase 1.

Today we are going to play a game in which you will be able to win points. You will be playing the game with a person in your class.

Now, listen carefully, and I will tell you how to play the game - it's called "Get a message, send a message".

In front of you is a box with a yellow light and two other lights, one green and one blue, with buttons under them. When this yellow light comes on (experimenter points), watch the other lights, one of them will come on. It comes on because one of the other children in your class has sent the message to you. If you press the button under the light that comes on, then you will get one point. You must press the button as soon as the green or blue light comes on or you will miss your chance. If the yellow light comes on, but the blue or green light do not, then the other person in your class did not send the message, so that you can't get your point. The person who gets the most points wins the game. Continue until I tell you to stop.

Do you understand how to play the game?

## Phase 2.

Now, it is your turn to send the message to the other person in your class.

When the yellow light comes on, choose one of the buttons and press it. When you do this, then the other child will know which light is on and can press the button to get their point. You must press one of the buttons as soon as the light comes on, or the other child will not get their point. Continue sending the signals until I tell you to stop.

Do you understand what to do?

## Phase 3.

Now, it is your turn to get the green or blue signal from the other person.

When this yellow light comes on (experimenter points), watch the other lights, one of them will come on. It comes on because one of the other children in your class has sent the message to you. If you press the button under the light that comes on, then you will get one point. You must press the button as soon as the green or blue light comes on or you will miss your chance. If the yellow light comes on, but the blue or green light do not then the other person in your class did not send the message, so that you can't get your point. The person who gets the most points wins the game. Continue until I tell you to stop.

Do you understand how to play the game?

## Phase 4.

Now, it is your turn to send the message to the other person in your class.

When the yellow light comes on, choose one of the buttons and press it. When you do this, then the other child will know which light is on and can press the button to get their point. You must press one of the buttons as soon as the light comes on, or the other child will not get their point. Continue sending the signals until I tell you to stop.

Do you understand what to do?

APPENDIX 4

POST-GAME QUESTIONNAIRE

## Post-Game Questionnaire.

NAME \_\_\_\_\_ SCORE: \_\_\_\_\_

AGE \_\_\_\_\_

DATE OF BIRTH \_\_\_\_\_

SCHOOL \_\_\_\_\_

1. Did you like playing this game? YES \_\_\_ NO \_\_\_
2. Would you like to play this game again? YES \_\_\_ NO \_\_\_
3. Do you think the other person was trying to get more points than you were? YES \_\_\_ NO \_\_\_
4. Do you think the other person played the game fairly? YES \_\_\_ NO \_\_\_  
Why? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Do you think the other person got more points than you did? YES \_\_\_ NO \_\_\_  
WHO WON THE GAME? \_\_\_\_\_
6. If you played the game again with the same person, who would get the most points? SELF \_\_\_ OTHER \_\_\_
7. How would you go about getting more points?  
\_\_\_\_\_  
\_\_\_\_\_
8. Did the other person try to stop you from getting more points by sending the signal too slowly? YES \_\_\_ NO \_\_\_
9. Would you like to play with this person at recess? YES \_\_\_ NO \_\_\_
10. Did you try to stop the other person from getting points by sending the signal too slowly? YES \_\_\_ NO \_\_\_

11. If you were to play this game again, would you like to play with the same person or someone else?  
SAME \_\_\_ OTHER \_\_\_
12. Do you think you could have received more points if you had another person to play with?  
YES \_\_\_ NO \_\_\_

APPENDIX 5

ABSTRACT OF

Locus of Control, Age, Sex and Interpersonal  
Bargaining in Children

## ABSTRACT OF

Locus of Control, Age, Sex and Interpersonal  
Bargaining in Children<sup>1</sup>

The main concern of the study was to demonstrate the relationship between locus of control, age and sex differences and overt behaviour. Locus of control, as measured by Rotter's formulation, was measured through the application of the Nowicki-Strickland Locus of Control Scale for Children. The experimental groups consisted of eighty subjects, divided equally according to the following categories: internal-external locus of control, ages twelve and seven, males and females, on the dependent variables of response latency and retaliatory response measure.

A controlled laboratory gaming approach was utilized to obtain the behavioural data.

The initially stated null hypothesis that there is no significant difference in response latency between the internal and the external subjects in phases 2 and 4 was rejected. It was therefore concluded that the degree of partner's latency differentiated the internal subjects from the external subjects during phases 2 and 4, respectively.

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<sup>1</sup> Jack H. Papazian, doctoral thesis presented to the School of Graduate Studies of the University of Ottawa, Ontario, August 1977, xii-181 p.

This finding was further elucidated by the statistically significant I-E x phases interaction, which demonstrated that when reacting to the partner's one hundred percent cooperative strategy during phase 2, the internal subjects do not differ significantly from the external subjects in their mean response latencies, whereas when reacting to partner's shift in strategy from one hundred percent cooperation (phase 1) to sixty percent partial cooperation (phase 3), the internal subjects displayed significantly longer response time during phase 4 than the external subjects. Consequently, the external subjects failed to demonstrate observable variability of response latency between phases 2 and 4.

The second null hypothesis, which stated that there is no significant difference in retaliatory responses between internal and external subjects in phase 4, was also rejected. It was found that, in response to partner's shift in strategy from one hundred percent total cooperation (phase 1) to sixty percent partial cooperation (phase 3), the internal subjects demonstrated, on the average, a greater number of total retaliatory responses during phase 4 than did the external subjects.

The finding was further clarified by the behavioural data: the statistically significant I-E main effect on first trial of retaliatory response of phase 4, which seemed to demonstrate that the internals made more retaliations during

the first trial of phase 4 than did the externals. In addition, the statistically significant I-E x sex interaction demonstrated that the internal males retaliated most during the first trial of phase 4, followed by the internal females, who in turn made more retaliations than the external male and female groups. Furthermore, the statistically significant I-E main effect on longest consecutive retaliatory response of phase 4, indicated that the internal subjects made more retaliations during a longer series of response trials than did the external subjects. Finally, the statistically significant I-E main effect on last trial of phase 4 demonstrated that the internals made more retaliations during the last trial of phase 4 than did the external subjects.

The third null hypothesis stating that there is no significant difference in response latency between twelve and seven year-old children in phases 2 and 4 was retained.

However, the fourth null hypothesis, which stated that there is no significant difference in retaliatory responses between twelve and seven year-old groups in phase 4, was rejected. It was found that the twelve year-old children, on the average, demonstrated a higher level of total retaliations against the opponent's shifting strategy during phase 4, than did the seven year-old children. This finding was further clarified by the marginally non-significant age main effect on longest consecutive retaliatory response measure,

which seems to demonstrate that the twelve year-old children tended to utilize their retaliatory responses over a longer sequence of trials during phase 4 than did the seven year-old children. Finally, the statistically significant age main effect on last trial of retaliatory response measure demonstrated that the older children retaliated more during the last trial of phase 4 than did the seven year-old children.

The fifth null hypothesis, which stated that there is no significant difference in response latency between male and female groups in phase 2 and 4, was retained.

Finally, the sixth null hypothesis of no difference in retaliatory responses between male and female groups in phase 4 was also retained.

The results of the study were interpreted in the light of both Rotter's internal vs. external locus of control construct and Piaget's conceptualization of moral development.