

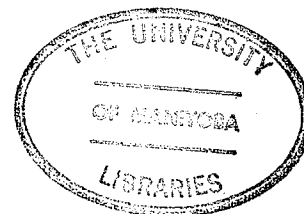
PERCEIVED PARENT BEHAVIOR, LOCUS OF CONTROL BELIEFS,
AND ACHIEVEMENT BEHAVIOR IN ADOLESCENTS

A dissertation
presented to
the Faculty of Graduate Studies
University of Manitoba

In partial fulfillment
of the requirements for the degree
Doctor of Philosophy

by
David Stephen Abrahamson

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DAVID STEPHEN ABRAHAMSON

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ABSTRACT

As a consequence of earlier research into the correlates of parent attitudes and behavior, two problems were identified which occupied the studies presented herein. The first concerned the predictive validity of Schaefer's Children's Reports of Parent Behavior Inventory. The second involved the development of an alternative measure of locus of control beliefs, which would more adequately assess the unidimensional versus multidimensional issue.

The new multicontent locus of control measure was constructed and assessed in a test-retest study, in which item and subscale reliabilities together with social desirability involvement and the measure's factor analytic structure were first evaluated. Administered to over 800 University of Manitoba introductory psychology students, roughly equated for sex, the original measure and its revision demonstrated a single factor structure which accounted for 25% to 45% of the total scale variance.

In a second study, Schaefer's perceived parent behavior measure, the new locus of control measure and two social desirability scales were administered to approximately 600 Grade 7 to Grade 12 students in three Winnipeg school divisions. Information on student academic performance and father's employment were also obtained.

Factor analyses of the new locus of control measure replicated the findings in the college population with respect to the variance accounted for by the scale and with respect to its single factor structure.

Hypotheses regarding the relations between CRPBI factor scores and the new measure of locus of control were tested and results indicated that adolescents' beliefs in their own or an individual's ability to control the environment (more generally labelled a belief in internality) are related to perceptions of parental acceptance, firm control and psychological autonomy. An hypothesis predicting a greater relationship between adolescent internality and parental acceptance for younger adolescents was tested with equivocal results (although the direction of prediction is maintained in the data). The prediction that parental acceptance is related curvilinearly to adolescent academic achievement behavior, in that moderate rather than high or low acceptance is tied to achievement, was contradicted by evidence which suggested that high as opposed to moderate maternal acceptance was tied to higher adolescent academic achievement. Perceptions of both mothers' and fathers' firm control and psychological autonomy were shown to be linearly related to adolescent achievement, while only maternal acceptance showed this relationship to achievement. The highest relationship obtained between the major variables of the study was that between adolescents' locus of control beliefs and their academic achievement.

Recommendations for future research based on issues derived from this work encompassed the following topics: research tactics in elaborating our understanding of the dimensionality issue; the measurement of social desirability; and the elaboration of assessments in perceived parent measures.

Lastly, theoretical consequences in the research are considered.

The relationship between the results and a general model specifying ties between parent behaviors and adolescent behaviors and attitudes are discussed. The application of several theoretical perspectives, including that of social learning theory, to the conceptualization of parent behavior are evaluated and the pragmatic implications of this research are suggested.

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TABLE OF CONTENTS

	Page
LIST OF TABLES	
LIST OF FIGURES	
Chapter	
I. INTRODUCTION	1
THEORETICAL OPTIONS	3
Freudian Theory	4
Social Learning Theories	11
Critique	15
Rotter's Social Learning Theory	16
Background	16
Theory	18
Critique	22
THE CHARACTERIZATION OF PARENTAL BEHAVIORS	23
Theoretical Framework	23
Reliability and Validity	24
Children's Reports of Parent Behavior	26
LOCUS OF CONTROL	28
Basic Definition	28
Generalizability of Expectancy	29
Development of Rotter's Scale	30
Multidimensional Approaches	38
Critique	45
Relationships with Other Variables	46
PARENT ATTITUDES OR BEHAVIOR AND LOCUS OF CONTROL	48

	Page
Acceptance versus Rejection	48
Young Adults	48
Adolescents	57
Children	63
Firm Control versus Lax Control	64
Psychological Control	65
Summary	66
PARENT ATTITUDES OR BEHAVIOR, LOCUS OF CONTROL, AND ACHIEVEMENT	67
Parenting and Achievement	67
Locus of Control Beliefs and Achievement	68
HYPOTHESES	70
General Model regarding Parent Behaviors, Adolescent Attitudes and Their Consequences	74
STUDY I: DEVELOPMENT OF A MEASURE OF LOCUS OF CONTROL BELIEFS . .	75
Chapter	
II. METHOD	76
CONSTRUCTION OF THE MULTICONTENT LOCUS OF CONTROL (MLC) MEASURE	76
Dimensions in Item Construction	76
Labels	78
Item Construction	79
SUBJECTS	79
PROCEDURE	80
Chapter	
III. RESULTS	81
CHARACTERISTICS OF THE MLC	81

Item Reliabilities	81
Item Correlations	81
Factor Analyses	83
STRUCTURE OF TWO MAJOR MEASURES OF SOCIAL DESIRABILITY .	90
STUDY II: PERCEIVED PARENT BEHAVIOR, ATTRIBUTIONS OF CONTROL, AND ACHIEVEMENT BEHAVIOR IN ADOLESCENTS	93
Chapter	
IV. METHOD	94
SUBJECTS	94
PROCEDURE	95
Chapter	
V. RESULTS	97
Factor Analysis of the CRPBI	97
Factor Analysis of the MLC	97
Factor Analysis of the Social Desirability Measures .	99
HYPOTHESES	103
Hypotheses 1 to 6: Relations between CRPBI Factor and the MLC	103
Hypothesis 7: Age-related Contribution of Parental Acceptance to Adolescent Locus of Control Beliefs . .	106
Development of a Grade Score to Represent Achievement	112
Hypothesis 8: Curvilinear Relation between Parental Acceptance and Adolescent Achievement	113
Hypotheses 9 and 10: Relations between CRPBI Factors and GPA	114
Hypothesis 11: MLC Relation to GPA	114
Hypothesis 12: Sex Difference in MLC Relation to GPA	116

Chapter	Page
VI. DISCUSSION	119
PROBLEMS IN MLC ITEM CONSTRUCTION AND THEIR SOLUTIONS	119
THE SOCIAL DESIRABILITY PROBLEM	121
SAMPLE CHARACTERISTICS AS VARIABLES	128
HYPOTHESES	129
Hypotheses 1 to 7: Relations between CRPBI and MLC	129
Hypothesis 8: Curvilinear Relation between CRPBI F_{R-A} and GPA	131
Hypotheses 9 and 10: Relations between CRPBI and GPA	132
Hypothesis 11: MLC Relation to GPA	134
Hypothesis 12: Sex Difference in MLC Relation to GPA	135
GPA AS A MEASURE OF ACHIEVEMENT	136
SURVEY OF RESULTS	137
THEORETICAL IMPLICATIONS	138
Results from the Perspective of the General Model	138
Conceptualization of Parent Behaviors	140
Theoretical Options	141
Lower-level Concepts	144
Stimulation	145
Freedom to explore	146
Demand	147
Parent attitudes and feelings	148
MLC and Rotter's Social Learning Theory	149

	Page
Pragmatic Implications	150
SUMMARY	153
REFERENCE NOTES	158
REFERENCES	161
APPENDICES	173
APPENDIX A - CONSTRUCTION INFORMATION ON THE MLC	174
Ancillary Information on Construction of the MLC	175
Original (120-item) MLC	177
APPENDIX B - TEST-RETEST STUDY DATA ON THE MLC	187
Ancillary Information on Analyses of the MLC	188
Item Reliability	188
Item Correlations	188
Factor Analysis Approach	189
Factor Analytic Results	191
Subcells	191
Cells	192
APPENDIX C - TEST-RETEST STUDY SOCIAL DESIRABILITY DATA	252
APPENDIX D - HIGH SCHOOL STUDY APPLICATION MATERIALS	258
Letter of Application to Schools	259
Form Letter for Parental Permission	264
APPENDIX E - HIGH SCHOOL STUDY ADMINISTRATION MATERIALS	265
High School Study Directions	266
First Package	269
Second Package	281

APPENDIX F - THE DEVELOPMENT OF LARGE SAMPLE SIGNIFICANCE TABLES FOR THE PEARSON r AND HIGHER ORDER CORRELATIONS	292
Rationale for Significance Tables	293
APPENDIX G - HIGH SCHOOL STUDY DATA	298
Ancillary Information on the Academic Achievement Criterion	299
APPENDIX H - SUPPLEMENTARY CRITICISMS OR ISSUES AND THEIR RESPONSES	319
Unidimensional versus Multidimensional Interpretations of Locus of Control Beliefs	320
Question	320
Answer	320
Attitudes	322
Behavior	324
The Use of Multiple Regression and Correlation	325
Question	325
Answer	325
The Age or Grade Variable in the High School Study	327
Comment	327
Answer	328
CRPBI	328
MLC	331
Hypotheses	336
Issues Pertinent to MLC Dimensionality	343
Comment	343
Answer	344
The item correlation criterion	344

	Page
Factor analyses of item sums	348
The internal-vs.-external wording and personal-vs.-general reference dichotomies . . .	351
Crowne-Marlowe SD variance in the MLC	352
Additional Review of the Literature	354
Comment	354
Answer	354
Parental antecedents	354
Learned helplessness	356
Attribution theory	357
New References	361

LIST OF TABLES

Table	Page
1. Varimax Rotated Factor Loadings of I-E Scale Items Based on Franklin's Correlation Matrix	32
2. Categorization of Rotter's I-E Scale Statements	37
3. Categorization of Levenson's I, P, & C Scale Items	39
4. Categorization of the Nowicki-Strickland Scale Items	40
5. Categorization of MLC Statements	77
6. Test-retest Reliabilities of the Original 120 Items of the MLC for the Total Sample	82
7. Unrotated Factor Loadings of Revised MLC Cells for Total Sample, Males, and Females	85
8. Correlation Between Revised MLC Cells and Marlowe-Crowne and Edwards SD Scores	86
9. Unrotated Factor Loadings of the First Order Partial Correlation Matrices of Revised MLC Cells (Edwards SD Variance Removed) Obtained from First Session Responses of Males and Females	88
10. Unrotated Factor Loadings of the First Order Partial Correlation Matrices of Revised MLC Cells (Edwards SD Variance Removed) Obtained from Second Session Responses of Males and Females	89
11. Unrotated Factor Loadings of Edwards SD Scale Items for the Total Sample	91
12. Unrotated Factor Loadings of Crowne-Marlowe SD Scale Items for the Total Sample	92
13. Varimax Rotated Factor Loadings of CRPBI (Mother and Father) Scales for Total Sample	98
14. Unrotated Factor Loadings of the First Order Partial Correlation Matrix of Revised MLC Cells (Edwards SD Variance Removed) for the Total Sample	100
15. Unrotated Factor Loadings of Edwards SD Scale Items for the Total Sample	101

Table	Page
16. Unrotated Factor Loadings of Crowne-Marlowe SD Scale Items for the Total Sample	102
17. Zero-order Correlations between CRPBI Factor Scores and MLC Total	104
18. Partial Correlations between CRPBI Factor Scores and MLC Total (Edwards SD Variance Removed)	105
19. Statistics on CRPBI Factors Before Entry into Regression Equation Predicting MLC Total (Edwards SD and Blishen SES have been entered)	107
20. Summary of Stepwise Regression Analysis in Which MLC Total is Predicted by Prior Entry of Edwards SD and Blishen SES While CRPBI Factors are Tested Last	108
21. Zero-order Correlations between CRPBI Rejection-vs.- Acceptance Factor and MLC Total	109
22. Partial Correlations between CRPBI Rejection-vs.- Acceptance Factor and MLC Total (Edwards SD Variance Removed)	111
23. Zero-order Correlations between CRPBI Factor Scores and Grade Point Average	115
24. Statistics on CRPBI Factors and MLC Total Before Entry into Regression Equation Predicting GPA (Edwards SD and Blishen SES have been entered)	117
25. Summary of Stepwise Regression Analysis in Which GPA is Predicted by Prior Entry of Edwards SD and Blishen SES Followed by Testing of CRPBI Factors While MLC Total is Tested Last	118
26. Categorization of One-sided MLC Statements	122
B-1 Test-retest Reliabilities of the Original 120 Items of the MLC, Males Only	194
B-2 Test-retest Reliabilities of the Original 120 Items of the MLC, Females Only	195
B-3 Test-retest Reliabilities of MLC Categories Based On All 120 Items of Original Scale, Total Sample	196

Table	Page
B-4 Test-retest Reliabilities of MLC Categories Based On All 120 Items of Original Scale, Males Only	197
B-5 Test-retest Reliabilities of MLC Categories Based On All 120 Items of Original Scale, Females Only	198
B-6 Correlations Between 110 Most Reliable MLC Items, Total Sample	199
B-7 Correlations Between 110 Most Reliable MLC Items, Males Only	212
B-8 Correlations Between 110 Most Reliable MLC Items, Females Only	225
B-9 Relation Between Original and Revised MLC Items	238
B-10 Test-retest Reliabilities of MLC Categories Based On 72 Items Chosen from Reliability and Inter- correlation Criteria, Total Sample	239
B-11 Test-retest Reliabilities of MLC Categories Based On 72 Items Chosen from Reliability and Inter- correlation Criteria, Males Only	240
B-12 Test-retest Reliabilities of MLC Categories Based On 72 Items Chosen from Reliability and Inter- correlation Criteria, Females Only	241
B-13 Three-factor Varimax Rotation of Original MLC Subcells Based on Principal Components Analysis, Total Sample	242
B-14 Two-factor Varimax Rotation of Revised MLC Subcells Based on Principal Axes Analysis, Total Sample	243
B-15 Correlations Between Original MLC Cells, Total Sample	244
B-16 Correlations Between Original MLC Cells, Males Only	245
B-17 Correlation Between Original MLC Cells, Females Only	246
B-18 Unrotated Factor Loadings of Original MLC Cells for Total Sample, Males, and Females	247
B-19 Correlations Between Revised MLC Cells, Total Sample	248
B-20 Correlations Between Revised MLC Cells, Males Only	249
B-21 Correlations Between Revised MLC Cells, Females Only	250

Table	Page
B-22 Correlations Between Revised MLC Categories and Marlowe-Crowne and Edwards SD Scores	251
C-1 Correlations Between Edwards SD Scale Items, Total Sample	253
C-2 Correlations Between Crowne-Marlowe SD Scale Items, Total Sample	256
F-1 Significant Zero-order Correlation and First-order Partial Correlation Coefficients for Total Sample, Males, and Females	296
F-2 Significant Zero-order Correlation and First-order Partial Correlation Coefficients for Grades 7 and 8, Grades 9 and 10, and Grades 11 and 12	297
G-1 Correlations Between 81 Revised MLC Items, Total Sample	300
G-2 First Two Unrotated Factors of Revised MLC Subcells Based on Principal Axes Analysis, Total Sample	308
G-3 First Two Unrotated Factors of Revised MLC Subcells Based on Principal Axes Analysis, Males Only	309
G-4 First Two Unrotated Factors of Revised MLC Subcells Based on Principal Axes Analysis, Females Only	310
G-5 Correlations Between High School Study Variables, Total Sample	311
G-6 Correlations Between High School Study Variables, Males Only	312
G-7 Correlations Between High School Study Variables, Females Only	313
G-8 Correlations Between High School Study Variables, Grades 7 and 8	314
G-9 Correlations Between High School Study Variables, Grades 9 and 10	315

Table	Page
G-10 Correlations Between High School Study Variables, Grades 11 and 12	316
G-11 CRPBI Scale Scores by Grade	317
G-12 SES, Edwards SD Scale Score, Crowne-Marlowe SD Scale Score, MLC Row Sums, Column Sums and Total, and GPA, and Their Standard Deviations by Grade	318
H-1 Zero-order Correlations between CRPBI Factor Scores and Grade Level	330
H-2 Varimax Rotated Factor Loadings of CRPBI (Mother and Father) Scales for Grade 7 and 8	332
H-3 Varimax Rotated Factor Loadings of CRPBI (Mother and Father) Scales for Grade 9 and 10	333
H-4 Unrotated Factor Loadings of Revised MLC Cells for Two Female Subsamples	335
H-5 Second-order Partial Correlations between CRPBI Factor Scores and MLC Total (Edwards SD and Blishen SES Variances Removed)	338
H-6 Second-order Partial Correlations between CRPBI Factor Scores and GPA (Edwards SD and SES Variances Removed) . . .	341
H-7 Comparison of Average Within-subcell Item Correlations to Correlations with Items Outside the Subcell for Three Randomly Chosen Subcells	347
H-8 Correlations between Two Social Desirability Measures and Revised MLC in the High School Sample	353
H-9 Unrotated Factor Loadings of the First Order Partial Correlation Matrix of Revised MLC Cells (Crowne-Marlowe SD Variance Removed) for the Total High School Sample . . .	355

LIST OF FIGURES

Figure		Page
H-1	Hypothesized and Obtained Relations between CRPBI F_{R-A} and GPA	340

CHAPTER I

INTRODUCTION

According to Baldwin (1960) one of the major stages in the growth of child development was the appearance somewhere between 1935 and 1945 of an interest in the effects of childhood experience upon adult personality. During this period child developmentalists turned to studies of the effects of weaning, toilet training, birth injuries, broken homes, institutionalization, maternal absence, and maternal rejection upon the psychological development of the child. In opposition to the prevalence of growth studies before this period, this stage appears to have marked a new appreciation of the environment's input into the development of the child. Although this period, as a consequence, more closely approximated the environmentalist bias of the main stream of psychological research, its onset appears to have been due to a different theoretical position. Baldwin (1960) ties the genesis of this stage to the influence of Freud.

The early research of this period attempted to test specific Freudian hypotheses. Unfortunately the hypotheses were often so simplified no Freudian considered them legitimate representatives of the theory, especially when the studies appeared to controvert an asserted Freudian hypothesis. Gradually this interest was replaced by attention to more general characteristics of the childhood experience. In addition, research progressed away from the testing of any specific theoretical hypothesis and became a more general study of the influence of childhood experience upon personality and its growth. As Baldwin

(1960) noted, these latter developments accompanied the addition of further theoretical alternatives to the inquiry into childhood experience and its consequences for personality development. Specifically they marked the convergence of learning theory and research in child development by way of the translation of Freudian concepts into the terminology of general behavior theory. The work of Dollard and Miller (1950), Whiting and Child (1953), and Mowrer (1950) exemplifies this early effort. Parsons and Bales (1955) in their sociological analysis of child development in terms of role changes and their focus on the dynamics of family interaction leading to the socialization of the child via changes akin to those in psychotherapy would also seem to fit, albeit somewhat loosely, into this group.

As Ausubel (1957) has recognized, the progression to Freudian theory was not an immediate or total admission of the environment's prepotence over the development of the child. Instead Freudian theory maintained a preformationist attitude in its hypothesizing of libidinal drives that prevailed in any environment. The theory was at best predeterminedist in proposing stages of development which were not so much passed through via a process of qualitative differentiation based partly on environmental influence as they were seen as inevitably appearing as a consequence of inherent biological processes. The environment was seen as mediating the expression of these drives. It was not viewed as a determinant in defining the essential qualities of these drives. The step toward a convergence of learning theory with Freudian concepts, in this light, can be seen as an increasing predilection for environmentalistic theory in the study of personality

development. Subsequent to the early efforts at rapprochement with the reigning theory of personality development, general behavior theory found sufficient strength to offer itself as a theoretical alternative independent of the encumbrances of psychoanalytic phraseology. This is not to say, however, that such phraseology was entirely omitted in the more recent theorizing. Instead there seemed to be a progressive enhancement of the mechanism offered by learning theory over the explanations of processes offered by Freudian theory. Under the label of social learning theory a number of independent formulations relevant to aspects of personality development were offered. All of these formulations share a common foundation: The environment is prepotent in determining development. Rotter (1954), Sears (Maier, 1969), Lundin (1961), and Bandura and Walters (1963) provide examples of such an application of learning principles to the study of human development.

THEORETICAL OPTIONS

Theoretically, then, what is available to the researcher interested in the myriad issues contained under the label of parent-child interactions? One may choose from a number of psychoanalytic (including here neopsychoanalytic) perspectives or from a number of viewpoints largely classifiable under the social learning theory label. Adequate summaries of Freudian theory on child development are available in a number of sources (e.g., Baldwin, 1967; Langer, 1969), therefore this classical theory will be only briefly summarized.

Freudian Theory

In Freudian theory the child is born with an id structure that is motivated by pleasure-seeking and aggressive instincts. Out of the increasingly demanding interchange with his environment the child develops a secondary structure meant to aid him in this interchange. His ego differentiates or matures out of the initial motivational structure. As a consequence the child becomes increasingly able to appreciate the limitations of reality and increasingly effective in serving his needs within that reality. Concurrent with this maturation of cognitive function, the child goes through stages of psychosexual development in which there is a progressive shifting of primary libidinal gratification to various organ systems. This shifting of pleasure centers from mouth to anus to genitals reflects a shifting of instinctual aims. The result of this change is that the emotional impact of socializing events in childhood vary according to these shifts. Thus the behavior of the child's caretaker and the circumstances at the time of these shifts are assumed to play strong roles in the personality development of the child. Each stage confronts the child with new needs and therefore new problems. The nature of the solution of the problems of each stage determine the residue of fears, fantasies, defenses and expectations left at each stage. For example, excessive nurturance or sufficient denial of libidinal needs at the oral stage leads to a fixation of functions characteristic of this stage. Apparently depending on the substage in which the inappropriate handling of the infant occurs, the child later will manifest behavior characterizable as oral dependent or oral aggressive. Similarly at the

anal stage, inappropriate handling of the infant's instinctual needs in the context of his socialization can lead to an excessive fixation of libidinal drive on such generalizable functions as neatness, order or punctiliousness. The growing capacity of the child to autonomously serve some of his own needs is importantly involved in the activities of this stage. Severe socialization practices could lead to an overly inhibited child, while compulsive autonomy (negativism) would be attributed to inadequate socialization. Shyness and shame are expected to be learned at this stage as a consequence of socialization practices. At the phallic or genital stage the appearance of a basic conflict, the Oedipus complex, is seen by Freud as setting the motivational foundation for the young boy's development of masculine interests and values. Solution of the conflict is hypothesized as occurring through identification of the male child with his father. This identification, for Freud, involved the development of the desire to be like the father who controls both punishments and desired objects. For girls, Freud proposed an analogous although more complex process for the ultimate development of feminine interests and values. A further consequence of the resolution of the Oedipus complex is the development of the super-ego or conscience. For Freud the formation of this structure was importantly related to the trauma generated by the Oedipal conflict.

These are the general hypotheses of Freudian theory most immediately relevant to caretaker influence on personality development. What would appear to be the assets and liabilities of this approach to the experiential sources of development? One is immediately struck by the richness of detail and empirical intuition of the theory. The

theory contains a vast number of hypotheses relevant to human development and to the nature of the interaction between humans. Furthermore, despite the specificity of its hypotheses, the theory is a general one intended to encompass all of human behavior. However, as a formal theory researchers have recognized many defects in the psychoanalytic perspective. Primarily it lacks a logical structure, terms are badly defined and operational definitions are almost entirely lacking. Instead the theorist is often faced with metaphorical statements whose value as theoretical principles is unclear. Furthermore, the theory appears to have been revised little as a consequence of new data. Possibly this is due to the many alternate ways within psychoanalytic theory of explaining a specific behavior. Nonsupport for the operation of a specific mechanism can be interpreted as due to the mediation of other mechanisms, that the mechanism studied may still operate in other circumstances, that its operation in the setting of the study was limited by the artificiality of the situation or the triviality of the measurements. This apparent lack of ability of the theory to revise itself may also be due to the dependence of the theory on data obtained from the therapeutic setting. These data are inevitably confounded with the therapist's interpretation. Furthermore, historical attempts to revise the structure of the theory have been labelled as the reappearance of pathological resistances within the revisionist. While the use of mechanisms proposed in the theory to question the truth value of the critic is improper in scientific debate, especially in the history of this theory where the motivations of the critic were impugned, a partial explanation of this unwillingness to adapt theo-

retically may be found in a major goal of the theory. Its development as a theory did not take place in a scientific setting nor was the theory intended simply to mirror truth. Rather the goal of the theory was to abet change within a therapeutic environment. The nature of this change was assumed to take place within the mental structure of the individual. In the recent past of experimental psychology a theory about what people think, feel, dream, and fantasy, rather than about how they behave, was unacceptable. The focus of the theory on pathological processes has set the stage for a sampling bias in data collection. Psychoanalytic theory makes strong arguments about the equivalence of pathological and normal processes. Its further dependence on data from the therapeutic context is unlikely to alter those arguments. Baldwin (1967) makes an additional point relevant to the scientific value of the theory. The role of the stimulus situation in eliciting thoughts and feelings would appear to be under-emphasized in psychoanalytic theory. Congruent with historical changes in the theoretical preferences of researchers in child development, Baldwin is recognizing the contemporary unacceptability of postulating predetermined drives as adequate explanations of development. Further, and more immediately relevant to the goals of this essay, the theory does not focus adequately on the intellectual processes. The hypothesis of an ego as a kind of pressure cap controlling the realistic or efficient release of libidinal energies does not begin to approach the need for a theory which recognizes the involvement of complex intellectual processes in motivational and personality development. More will be said later regarding neopsychoanalytic theorists who recognized this weakness.

A popular alternative to classical Freudian theory in conceiving personality development within the psychoanalytic framework is to be found in the writing of Erikson (1963). The work of Erik Erikson, while psychoanalytic in origin, offers new perspectives to the study of parent-child interactions. As a participant in ego psychology Erikson gave equal status to the ego in his description of psychological structures, their processes and dynamics. This emphasis on ego function coordinated well with Erikson's more optimistic viewpoint on man's adaptability within his biosocial context. He has stressed the adaptive and creative powers of the individual for providing a unique way of life. A stage approach to characterizing man's interpersonal development, his theory sets the individual within the framework of family influences and within a social setting determined by the family's historical and cultural heritage. Development is herein defined as "an evolutionary process based upon a universally experienced sequence of biological, psychological, and social events,...(Maier, 1969)." In contrast to other theoretical perspectives, Erikson's clearly is a lifespan theory and as such views the young adult parent as a participant in the personality development of the young child while contemporaneously participating in his own development. Clearly this implies a reciprocal exchange of influences in development. The major conflicts and attainments of the developing individual are put into stages each of whose onset is determined by biological, psychological and institutional forces. Personality development in outline is best represented in this theory by a brief characterization of each stage. While Erikson sees the essential resolution of the

conflict arising at each stage as most propitiously attained within the time limits of that stage, he indicates that elements of every conflict have precedents and consequents in the remaining stages.

In stage one is found the conflict providing a foundation for all later development. The goal of the infant is to acquire a sense of hope in his environment. The conflict then is to develop a sense of basic trust over against a sense of basic mistrust. In stage two the infant gains a realization of his own will. He is to acquire a sense of autonomy while combating senses of doubt and shame over that autonomy. In stage three the child is to realize purpose in his life. In similarity to the previous stage the child faces the problem of acquiring a sense of initiative while overcoming a sense of guilt for this new achievement. In stage four the major theme is reflected in the child's determination to master tasks before him. Competence is the child's goal. The conflict revolves around acquiring a sense of industry over against a sense of inferiority. In stage five we find the last reformulation and expansion of Freud's stages of development. The goal of the adolescent is to establish a fidelity in self identity. A mastery of the previous conflicts of childhood is implied in the child's resolution of the problem of a sense of identity in opposition to identity diffusion. Adulthood brings the problem featured in stage six. Love is the goal. The young adult must face the need to develop a sense of intimacy and solidarity over against a sense of isolation. In stage seven Erikson sees the development of a new union as the ground for a new goal. The adult must turn his attention toward providing for others, for fulfilling the meaning implied in the concept of

care. The adult must develop a sense of generativity and avoid a sense of self-absorption. In stage eight comes the effort of consolidating one's life. The aged or fully mature adult now must attempt to develop a sense of integrity from his life's experiences and avoid a sense of despair.

This skeleton of Erikson's theory suggests as with its predecessor, that there is here a great wealth of hypotheses appropriate for future research. In fact this theory is particularly rich for research in personality development within the family setting. Unfortunately, up to the present this theory has not initiated much research in parent-child interactions. As with the more traditional psychoanalytic theory this viewpoint has depended on case studies for its development. An attempt to put this theory into categories, behaviors or terms more usable in the research setting is likely to elicit a partial repetition of the controversies aroused in the now historical attempt to put Freudian concepts into simplistic operational definitions. Possibly the effort required in making a viable translation of concepts is now recognized more generally and the impetus for theoretical development is thereby redirected to more easily defined variables. The testing of traditional psychoanalytic propositions has not remained a widely popular enterprise and it appears that no related psychoanalytic theory has been publicly accepted as a general resource for research. A potential handicap as well as asset to theories of this sort has been the much-argued proposition that a study of personality deviation provides the essential clues to an understanding of normal development. Without qualification such an assumption precludes the scientific study

of normal children. Lastly, as characteristic of psychoanalytic theory in general this theory provides the researcher with no acceptable mechanism for its own development or change. The criteria for theoretical progress are unclear. In sum, this is a theory whose viability has not yet been tested. Its applicability for characterizing developmental processes within a research framework is largely unknown.

Social Learning Theories

As already indicated, an historical alternative to Freudian or other psychoanalytic theory developed in the late 1940's and early 1950's which, couched in learning theory language, depended on learning and reinforcement as explanatory principles. Initially an attempt to translate Freudian hypotheses into a testable framework, this was quickly recognized as an entirely different theoretical structure. Theories today which depend on learning and reinforcement principles as primary modes of explanation for some aspect of child development are labelled social-learning theories. The essence of this viewpoint is to be found in its initial assumption. Nearly all human behavior is learned. The categories of behavior as, for example, found in naive psychology are not an inherent aspect of that behavior. Instead all behavioral units, however large and integrated, are the adventitious products of learning. Behavior inevitably is to be explained by the principles of reinforcement, stimulus generalization, schedules of reinforcement, mediating responses and/or inhibition. This perspective has not yet yielded a singular theory. There are today many ways for describing and explaining many of the phenomena of development. However, in agreement with Baldwin (1967), there would appear a consensus

about the origins of social development. In brief, infantile dependency is generally asserted to be the root of nearly all socialization. It is seen as determining under most conditions the developmental changes in the expression of aggression. Furthermore, it is given essential functions in the appearance of identification and conscience. That dependency itself is seen as the product of learning principles is no surprise. Parental contributions to social and personality development of the child are clearly recognized. In fact, the unquestioned faith in the primacy of environmental influence has probably contributed to a study of the parent that surpasses any previous effort. At the same time, this theoretical perspective has attempted to respond to areas of behavior that might be thought immune to this type of analysis. Specifically imitation and observational learning have reached a level of research importance that would have been improbable outside of this theoretical framework. What can be offered in the way of a critique of this perspective? Baldwin (1967) has offered the most accessible commentary.

The essential features of social learning theory are those that make learning theory historically distinctive. The study of the human must be objective. This premise has been consistently interpreted as meaning that all properties of the organism must be hypothesized on the basis of his behavior. Naive concepts or any which are based on subjective knowledge are rejected within this approach. As a consequence of this premise, theorists have focused on designing a coherent and testable scientific theory which is assumed to be comprehensive in its application. The emphasis on replicability of findings has tended to

clarify descriptions of research. Furthermore, research within this framework has been more theoretically guided in its inception than psychological research in general. In addition the criterion of objectivity has led to the belief that theoretical progress is made best through the disconfirmation of hypotheses. The strategy of theory building within learning theory was to begin with simple problems and build, through concepts developed at this level, explanations for more complex phenomena. The initial emphasis was on the gaining of factual material (data) relevant to the theories as they stood. Recently however, the argument that all contributions to science must be factual has shown progressive signs of weakening. The problems faced by social learning theory have probably contributed to this steady retreat from the initial position. Dependency, identification, frustration, and guilt are all concepts whose meanings have had subjective histories. Social learning theory has not stayed with the initial strategy of objectivity.

Another distinctive feature of learning theory was the strong attempt to let theory guide research. With its entry into increasingly difficult problems, theoretical guidelines were lost and purely empirical variables were introduced into research. Variables such as "warmth" and "withdrawal of love" were introduced without any explanation of their involvement in theoretical structure. The unfortunate aspect of this change would appear to be its occurrence without adequate recognition that the rules of the game of research had changed. While maintaining the aura of a carefully and conservatively built theory, learning theory extensions into child development appear to

have lost at least temporarily, the theoretical integration they presumed to have in the recent past.

A third feature of learning theory was its emphasis on parsimony in the construction of concepts. This emphasis would appear to have been as much a vehicle for the argument that learning is the foundation for all behavior as a means by which fruitless speculation was to be eliminated in scientific discussion. While the contribution of parsimony to learning theory has been disputed, Baldwin (1967) notes that many of the concepts accepted today within this framework were once rejected on the basis of this criterion. Furthermore this change appears to have occurred more as a result of a change in the public attitude of theorists than as a consequence of new data.

Also distinctive to learning theory has been its explanation of behavior in terms of concepts that describe behavioral changes but which do not attempt to picture the underlying events mediating these changes. Possibly one could argue that the historical distaste for subjective and mentalistic concepts created this predilection for what Baldwin (1967) calls a theory of acquisition over against a theory of action. Without a knowledge of structure this perspective is irrevocably limited to predicting behavior based on historical events. Recent theorizing has attempted to correct this limitation. Mischel (1970, 1973) has proposed what has been labelled a cognitive social learning theory of personality. In an attempt to develop a more adequate theoretical approach to personality Mischel has entered what more generally may be called cognition, cognitive style, elaborations of personal expectancies, personal values and self-regulatory mechanisms

as major variables. These variables introduce structural characteristics and new internal dynamics to the framework of social learning theory. In opposition to most social learning theories, this viewpoint would appear to require a proper allocation of causal variance to structural versus more directly historical causes. In regard to cognitive components, this recent theory has at least one important precedent. Rotter's (1954) expectancy construct, although dependent on history, is a mediating or cognitive variable determining some of the relationship between environment and behavior.

For Baldwin (1967) there is a last distinctive feature of learning theory. This is the historical development of the theory in the laboratory. The predilection for experimental characterization of developmental changes in the natural world has various problems. In essence they suggest that experimentally defined mechanisms cannot be expected to be the source of behavioral changes in an uncontrolled environment. For developmentalists this means that the application of learning theory concepts to the growing child depends on an adequate mapping of the child's world. In sum, the viability of this theoretical orientation has been tested thoroughly in the laboratory. Its adequacy for clarifying environmental contributions to behavior development in the child's natural habitat is to be questioned.

Critique

While the social learning viewpoint has had limitations and problems, its adaptability and its empirical contributions must also be recognized. It has not lived up to its initial standards and in fact in the 1960's sometimes had been attributed with the amorphous quality

of explaining any behavior not already unquestionably related to other mechanisms. At the same time its proponents have shown a willingness to respond to criticism and the study of antecedent conditions in the natural world, for example, would appear to be receiving increasing attention. Furthermore, the attempt to broaden the applicability of learning theory to behaviors previously categorized under subjective labels is not in itself undesirable. At least this approach could lead to a clarification of the objective elements in such concepts as identification or expectancy. In the social learning theory of Rotter (1954) is found much to which the present critique applies.

Rotter's Social Learning Theory

Background

Rotter's theory, developed as an attempt to account for human behavior in relatively complex situations, is perceived by its proponents as a molar theory of personality based on an expectancy construct and more traditional reinforcement concepts. Investigators previous to this formulation have been concerned with man's ability to control his personal environment. Alfred Adler is credited with the most extensive writing on the overcoming of helplessness and the development of mastery (Lefcourt, 1966b). In contrast to the rigid historical determinism of Freud, Adler in his social psychological theory proposed that man is motivated more by his expectations of the future than he is by experiences of the past. He denied that these goals were teleological in nature. Instead, in agreement with Hans Vaihinger from whom these notions were derived, Adler felt these fictional goals existed subjectively here and now as strivings or ideals which influenced the

present. In addition to these fictional finalisms (Hall & Lindzey, 1957), Adler attributed to man a final goal which gave consistency and unity to his personality. In the order of Adler's thought on this, he proposed that man's final goal was to be aggressive, to be powerful, and, finally, to be superior. According to Adler, each man had his own concrete and personal mode for attempting to achieve perfection. The power for this striving for superiority was to be found in a sense of inferiority or of incompleteness that man experienced in childhood.

The efforts of White (1959, 1963), although not recognized by Rotter as contributing to his construct of locus of control, also may be seen as tied to referents related to Adler's construct of striving for superiority. In an attempt to reconstruct the motivational theory underlying psychoanalytic ego psychology, White has developed the notion of "effectance motivation" for "competence" and has described the mental state related to this motive as a "feeling of efficacy." He has argued that in several disparate realms of psychological study there has developed a feeling that primary drive notions are inadequate for explaining important aspects of behavior. The behaviors inadequately explained in terms of primary drives all appear to be part of the process by which an animal or child learns to interact effectively with his environment. On this basis he proposes a universal motive by organisms to achieve competence. This motive is described by White as a moderate but persistent force which is able to account for the learning that must inevitably occur between the appearance of strong homeostatic need states. White appears to suggest that the more extensive the cortical association areas of the organism the more important

such a motive would be in the organism's development.

Similarly the stages dealing with the development of will, autonomy, and mastery as posited by Erik Erikson (1963) would appear to appeal to referents concerned with the growing child's ability to control his personal environment. Rotter, Chance and Phares (1972) also give credit to the influence of J. R. Kantor (probably in regard to the organismic influence he would have provided) and to Kurt Lewin for the "cognitive" or "field" theory influence.

Theory

In defining the learning theory influence of their social learning theory of personality Rotter, Chance and Phares (1972) make these points:

- 1) The needs of a person as described by personality constructs are learned or acquired.
- 2) Early, acquired goals in humans appear as the result of satisfactions and frustrations that are largely controlled by other people.
- 3) For any behavior to occur regularly in a given situation it must have become available to the person using it by leading to some reinforcement(s) during previous learning experiences.
- 4) A person's behaviors, needs, and goals are not independent, but exist within functionally related systems the nature of whose relations is determined by previous experience.

However, recognizing the precedence by a number of other theorists in including an expectancy construct into their hypothetical structures, Rotter emphasizes within his perspective that, "The occurrence of a

behavior of a person is determined not only by the nature or importance of goals or reinforcements but also by the person's anticipation or expectancy that these goals will occur (Rotter, Chance & Phares, 1972)." Furthermore these expectations are determined by previous experience and, he asserts, can be quantified. This brings us to the four basic concepts of his theory utilized in predicting behavior.

The first concept, behavior potential, is defined as the potentiality of any behavior occurring in any given situation as calculated in relation to any reinforcement. Within this concept behavior may be that which is capable of being measured either objectively or indirectly. The second concept, expectancy, is defined as the probability held by an individual that a particular reinforcement will occur as a function of a specific behavior on his part in some situation. Expectancy is interpreted as being independent of the value of the reinforcement and is herein viewed as a subjective probability which is not of necessity inaccessible to objective measurement. At the same time, its subjectivity implies that the level of expectancy cannot be calculated simply on the basis of an individual's objective history of reinforcement. One must consider, in addition, the generalizations of the individual from related past experiences. Therefore, level of expectancy is determined by expectancies developed from past experiences in situations perceived by the individual as equivalent to the present situation and by the generalization of expectancies based on experiences in other situations. The relative contribution of these two kinds of underlying expectancies to the total expectancy is expected to vary according to the novelty of the present situation for the indi-

vidual. Changes in expectancy are thought to be influenced by two general variables. The surprise value of an occurrence is expected to determine the degree of expectancy change in that unexpected occurrences are hypothesized to contribute to a greater change than expected events. The second variable, the number of previous experiences with a given situation, is hypothesized to determine a decreased amount of expectancy change as the amount of previous experience is increased.

This brings us to the third concept, reinforcement value, which is defined as the degree of the person's preference for that reinforcement to occur if the possibilities of occurrence of all alternatives were equal. Generally, however, reinforcement value is determined by the value of reinforcements with which it has been associated and by one's expectancy that its occurrence leads to the appearance of associated reinforcements. The fourth concept, the psychological situation, reflects Rotter's recognition of an organismic and field theory influence. The traditional learning concept of the stimulus is apparently too narrow and rigid a term to reflect the recognition that an individual is continually reacting to aspects of an external and internal environment. Furthermore the term stimulus does not reflect either the recognition that different aspects of the environment affect each other nor that the individual reacts selectively to many kinds of stimulation in a manner consistent with his experience.

Rotter combines these basic variables to establish the fundamental proposals in his theory. Although they have often been presented in a quasi-mathematical format they may be stated verbally. The primary formula says that the behavior potential in a given situation in

response to a given reinforcement is a function of both the expectancy of the reinforcement and of that reinforcement's value. This would appear to be equivalent to the general interpretation of reinforcement value as previously given.

A secondary formula generalizes this statement to a set of situations and reinforcements in a manner consistent with basic generalization notions in learning theory. Why is there this redundancy of the basic formula? It is because this is a learning theory of social behavior and for Rotter, this much of the theory is essentially a discussion of the molecular constructs of the theory. That is, the concepts developed so far apply to specific units of behavior. Outside the laboratory this conceptualization of behavior limits its applicability. Therefore, he has developed broader analogues of several of the basic concepts. For example, the concept of "need potential" is the generalized analogue of behavior potential. The difference according to Rotter, is that need potential refers to groups of functionally related behaviors rather than to single behaviors. Furthermore functional categories of need potential may vary in generality and objectivity so that they may be defined according to the level of analysis in which the researcher is interested. Similarly, "need value" is defined as molar extension of reinforcement value in that it is defined as a mean preference value of a set of functionally related reinforcements. Also, "freedom of movement" is defined as a broadening of the concept of expectancy. According to Rotter, Chance and Phares (1972), "Freedom of movement is defined as mean expectancy of obtaining positive satisfactions as a result of a set of related behaviors

directed toward obtaining a group of functionally related reinforcements." A generalized formula may be created from these molar concepts. Essentially the formula states that need potential is a function of freedom of movement and need value. This is clearly an extension of the more molecular formula.

Critique

For Rotter then the theory is not one concerned with how molecular principles explain relationships between complex situations and complex behaviors. Instead the focus is on predicting these behaviors in specific situations. In addition the theory attempts to describe vehicles for picturing the generality of behavior. That is, this is an attempt at describing the development of individual differences from the perspective of learning principles. This social learning theory then shares many of the assets and flaws of such theories. However, the authors of the theory have recognized some of learning theory's limits and have attempted to extend these limits. For example, this theory is publicly willing to consider subjective behaviors for which indirect evidence exists. At the same time, the theory's authors recognize the inability of learning theory at present to be anything other than a vehicle for analysis and specifically leave the question of underlying events and structures to the future. Thus, while learning theory in the past has pointed more loudly to the influence of the environment in personality development than alternative formulations, its general unwillingness to handle subjective concepts as subjective concepts and the impression often made that the theory accounts for subjective events and mental structures makes Rotter's formulations more desir-

able. Furthermore, the concept of expectancy within the theory would appear to allow for the assumption of a unitary personality that operates, to some degree, independently of environmental events. The adjective, unitary, here is not to be interpreted according to the classic picture of traits which have been viewed as largely independent of situational factors. Instead a unitary personality is the one referred to in phenomenological reports and the one Mischel (1973) describes as evident in the intelligent discrimination made between situations. That is, the evidence for situational specificity made with regard to so many noncognitive personality dimensions may be interpreted as consequences mediated by cognitive events.

THE CHARACTERIZATION OF PARENTAL BEHAVIORS

Theoretical Framework

Becker (1964) in reviewing the history of research into the effects of parental discipline on child development has indicated by the absence of commentary that the study of parental contributions to the child's personality development has not had a consistent theoretical framework. While psychoanalytic theory provided an initial rationale for research into this area, and other perspectives, for example the field theory of Kurt Lewin, offered later insights into research, even the more recent influence of learning theory would not appear to have established a total dominance over contemporary research effort. In fact, one might speculate that the attempt to dimensionalize parental behaviors has proceeded in a manner largely independent of a specific theory of child development. At the same time, the

results of research in this area would not appear to have been wholly empirical or atheoretical in that a gross anatomy of parent behavior gradually became apparent. Factor analytic techniques, largely, suggested that the disparate behaviors of parents may be reduced to a far less numerous set of dimensions. Based on the results of a large number of previous studies, Becker (1964) recommended a conceptual framework of three dimensions. Parental behavior was to be seen as varying in terms of restrictiveness versus permissiveness directed toward the child. Parental behavior was further to be characterized by variation in warmth or hostility. Lastly Becker dimensionalized parental behavior as varying from anxious-emotional involvement to calm detachment. Important to the relevance of this analysis was Becker's demonstration that parent types, as conceptualized earlier in this area, fit into discrete and unique sections of the three-dimensional space prescribed by his conceptual framework. Furthermore Becker (1964) pointed out that the affectional nature of the parent-child relationship is correlated with certain types of discipline and that restrictiveness-permissiveness in dealing with children is largely independent of the affectional relationship. In addition a review of the research on the child behavior consequences of parental treatment suggested that these two dimensions indicated both subjective and objective consequences for the child that were relatively unique.

Reliability and Validity

Since the appearance of Becker's (1964) writing, research has further established the reliability of dimensions in reported child-rearing practices or attitudes and in actual parent-child interactions.

Schaefer's (1965a, 1965b) development of an inventory for children's report of parent behavior has shown substantial stability to revision (Renson, Schaefer & Levy, 1968; Schludermann & Schludermann, 1970), as well as cross-national or cross-cultural replicability of its major dimensions (Renson, Schaefer & Levy, 1968; Schludermann & Schludermann, 1971). At present, however, efforts in relating variations in these dimensions to personality variables of the child would not appear to have kept pace with the primary methodological effort. Progress here would be important as well. The construct validity of dimensions of child-rearing would gain additional meaning if their influences were further clarified. At the same time, the predictive validity of reports on child-rearing would be both corroborated and developed further. Becker and Krug (1965) have questioned the predictive validity of an instrument developed earlier by Schaefer and Bell (1958) which also dimensionalized parental characteristics. The questionnaire was the Parent Attitude Research Instrument (PARI). While it is possible to answer the criticism of Becker and Krug (1965) in several ways (or to respond to these criticisms at several levels), it would be essential ultimately to respond to such criticism by showing additional relationships between the PARI and/or other inventories (which dimensionalize child-rearing practices), and independently established dimensions of child personality. The demonstration of relationships in the above manner would be consistent with a primary assumption of parent-child research. That is, variations in child personality are assumed to be heavily influenced by the nature of the parental environment.

Children's Reports of Parent Behavior

The research on interpersonal family experiences has demonstrated two main trends. Most of the empirical literature has focused on relating objectively described parental behaviors and attitudes to the child's responses. A second approach has involved study of the child's perception of his parents from a phenomenological point of view. Research of the first kind has indicated that a significant part of child behavior is related to parental management and rearing practices as reported by an observer (Goldin, 1969). At the same time, we already have noted the apparent limitations of present parent report measures in giving unequivocal evidence of relationships to child variables (Becker & Krug, 1965). Possibly as a consequence of these difficulties, the appearance of systematic studies of the child's report of parental behaviors (and attitudes) has redirected attention to a long-held assumption. That is, some portion of child behavior must be related to the child's perception of persons and situations. Inasmuch as phenomenological reports show a less studied history, yet are utilized in other measures of different personality variables, it is argued that such methodologically harmonious variables ought to be studied for suspected relationships. As limited support for this argument, it should be noted that Becker and Krug (1965) have already noted conceptually consistent correlations of the PARI with other self-report measures.

Schaefer's (1965a) development of a children's report scale thus far has received the most thorough attention among the scales on children's reports presently in the literature. Unlike many other

measures which may be characterized as ad hoc in their development, this inventory developed out of a selection of parent behavior concepts that was guided by a conceptual model developed from factor analyses of psychologists' ratings of parental behavior. The model showed substantial agreement with other, independently formulated models based on different types of data. These conceptual models led to the formulation of a hierarchical conceptual scheme for parental behavior that, in its development as an inventory, proved to be impressively reliable. For these reasons, Schaefer's Children's Reports of Parental Behavior Inventory (CRPBI) can be chosen as a representative measure of children's reports.

Subsequent to the development of the inventory from the previously mentioned conceptual models of parent behavior and attitudes developed by Schaefer (1959, 1961) and others (Roe, 1957; Slater, 1962), Renson, Schaefer and Levy (1968) published a shorter revised version of the original 26-scale, 10-items-per-scale, inventory. This version was reduced to 18 scales of 8 or 16 items per scale and its development had been based on item analyses and factor analyses of the original version (published in Schaefer, 1965b). Independently Schludermann and Schludermann (1970) developed a shorter revision of the original inventory utilizing 18 scales of 5 or 8 items per scale. The factor structure of this revision was found to be very similar to that of Schaefer's original inventory (1965a) and to the factor structure of the French translation of the original version (Renson, Schaefer & Levy, 1968). Analyses of the CRPBI and its revisions have resulted consistently in a three-factor structure. The factors have been

labelled Acceptance-vs.-Rejection (or, F_{A-R} , with the first subscript indicating the positively scored end of the dimension in the particular factor rotation being discussed), reflecting a bipolar dimension of parental behavior in accordance with the child's description of the degree to which a parent accepted or rejected him; Psychological Autonomy-vs.-Psychological Control (or, F_{PA-PC} , with subscript order determined as in the first factor mentioned), representing the degree to which a parent has attempted to control the child through psychological pressure techniques; and Firm Control-vs.-Lax Control (or F_{FC-LC}), reflecting the degree to which a parent has controlled a child by direct means. The economy and demonstrated applicability of the Schludermann revision to Canadian populations makes it most appropriate as the CRPBI version of choice.

LOCUS OF CONTROL

Basic Definition

As already recognized, an important and complex personality dimension of recent interest to researchers has been one concerned with man's ability to control his personal environment. As Lefcourt (1966, 1972) has noted, approaches to this topic have been diverse. At the same time, few of the initial efforts in this area were directed toward establishing constructs which are integrated within an elaborated theory easily matched to the requirements of research. However, Rotter (1954), in his presentation of a social learning theory, proposed a model for control behavior based on variations in expectancy. Rotter suggested that the determination of behavior in a given context is not

only dependent on the value of the reward to a person but that the person's expectancy that the behavior in question will yield a reward is also a highly influential variable. According to this notion, a person may wish for a specific reward, but feel that he has no skill which will allow him to achieve the reward. Thus, for a given situation, a person will expect no contingency between effort on his part and the attainment of certain goals. In other circumstances, the same individual may recognize that there is a substantial connection between his behavior and some desired outcome. He then would see himself as controlling the rewards derivable from those situations. This continuum of expectancy with regard to control of one's environment underlies the basic hypothesis coming from the theory. Rotter (1966) predicts that if a person perceives a reinforcement is determined by his behavior (in Rotter's language, he indicates a belief in "internal control"), then the consequence of either a positive or negative reinforcement will strengthen or weaken, respectively, the probability of that behavior recurring in the same or a similar situation. If this person sees the reinforcement as being beyond his control (he indicates a belief in "external control"), the behavior preceding the reinforcement is less likely to be strengthened or weakened.

Generalizability of Expectancy

Expectancies with regard to locus of control, whether internal or external to the individual, are assumed to be generalizable to other situations. In fact, Rotter and others have proposed an expectancy extended to a variety of life situations. If such highly generalized attitudes or beliefs with regard to locus of control exist, they would

constitute an important dimension of individual differences. Individual variation on such a dimension would determine the influence of reinforcements in any reward situation.

Development of Rotter's Scale

Rotter (1966) has dealt with the development of measures of locus of control as a personality variable. The initial attempt to measure locus of control attitudes was begun by Phares (1957). James (1957) revised Phares' test, and Liverant, Rotter and Seeman attempted to broaden the James-Phares scale while developing subscales for different content areas of item reference (e.g., achievement, affection and social-political attitudes) and controlling for social desirability. From an originally lengthy inventory, the final measure was reduced to a 29-item, forced-choice scale in which 6 items were fillers intended to somewhat disguise the purpose of the test. Unacceptably high item correlations with the Marlowe-Crowne Social Desirability (SD) Scale (Crowne & Marlowe, 1964) together with inter-subscale correlations as high as intra-subscale correlations had forced abandonment of the original intention to measure specific subareas of locus of control attitudes. Rotter (1966) reported two factor analyses of the final revision of the internal-external (I-E) scale, both of which appeared to suggest that the measure was essentially homogeneous in its dimensionalization of this attitude. Such a finding could easily have been construed to support the previously stated assumption that locus of control attitudes are generalizable to a variety of situations. That is, one attitude potentially influences an individual's responses to a variety of specific subareas. The first factor analysis reported by

Rotter (1966) has never been published in a manner which would allow reassessment of Rotter's initial analysis. However, Franklin's (1963) dissertation which contains the second factor analysis referred to by Rotter contains the correlation matrix for this analysis. Franklin found that the I-E scale performance of 1,000 high school students suggested the existence of a first, general factor which purportedly accounted for 53% of the total scale variance. However, a principal components analysis of the correlation matrix (diagonal values = 1.0) of the I-E scale items based on this sample indicated a different interpretation of the data. This reanalysis indicated a two-factor varimax rotation to be most appropriate according to a variety of criteria. The first factor accounted for 12.8% of the total scale variance and the second factor for 6.2% of the total scale variance. Items loading high on the first factor (see Table 1) suggested a dimension in which one pole referred to "luck" as the arbiter of events in one's life and the other pole emphasized personal control and effort as the major components influencing events relevant to one's life. The second factor appeared to reflect respondents' beliefs in the degree of control, people, in general, might have over political and social institutions. This reanalysis may be subject to criticism in that different factor models and criteria for rotation were used. However, this is not the usual assessment for factorial invariance in that the very same correlation matrix is used. Furthermore, insofar as principal components analysis does not make a distinction between common and unique variance and extracts the maximum variance from each succeeding factor, its initial factors are likely to account for more variance

Table 1

Varimax Rotated Factor Loadings of I-E Scale
Items Based on Franklin's Correlation Matrix

Item	Factor Loadings	
	Factor I	Factor II
2. Many of the unhappy.	.397	.022
3. One of the major....	-.015	-.273
4. In the long run.....	-.054	-.374
5. The idea that.....	.324	-.229
6. Without the right...	.301	-.170
7. No matter how hard..	.229	-.263
9. I have often found..	.255	-.136
10. In the case of the..	.246	-.257
11. Becoming a success..	.361	-.155
12. The average citizen.	.050	-.641
13. When I make plans...	.411	-.072
15. In my case getting..	.374	-.242
16. Who gets to be the..	.364	-.253
17. As far as world.....	.088	-.569
18. Most people don't...	.639	.115
20. It is hard to know..	.178	-.213
21. In the long run the.	.365	.148
22. With enough effort..	.156	-.514
23. Sometimes I can't...	.190	-.321
25. Many times I feel...	.570	-.008
26. People are lonely...	.212	-.311
28. What happens to me..	.367	-.090
29. Most of the time I..	-.005	-.489

Note. Each item is represented by the first words of the initial statement. Omitted items 1, 8, 14, 19, 24, and 27 are fillers.

than does the common factor model used by Franklin. In addition, the reanalysis does not suggest merely a different solution than that described by Franklin, it describes a solution potentially congruent with a common factor analysis on subjects of a different age and time (Mirels, 1970) which is to be described shortly.

Gurin, Gurin, Lao and Beattie (1969), in an attempt to adapt the I-E scale to more relevant control issues in a conceptualized Negro population, created a scale made up of I-E scale items (some of which were rewritten) and of new subcultural items. Given to a subject sample of over 800 males and over 800 females, a factor analysis of the resulting data led to four factors of approximately the same structure for both males and females. The authors interpreted the results as consistent with a distinction between the self and others and a separation of the individual from the system in the mind of the Negro student. The variance accounted for by each factor was not indicated. However, this article appeared as the first public suggestion that locus of control attitudes were not as generalized as previously conceptualized.

Mirels (1970) in a factor analysis of the I-E scale responses of 159 male and 157 female college students found evidence for a two-factor rotation. For males, the first factor accounted for 10.9% and the second factor for 8.6%. The respective figures for females were 12.1% and 6.7%. The two factors were essentially congruent with those obtained in the later reanalysis of Franklin's (1963) work. Mirels further pointed out that items loading high on the first factor focused on the individual as the target of control while items loading

high on the second factor focused on the system as the target of control. First factor items were stated largely in the first person, while none of the second factor items were stated in the first person. This was the first clear public statement that the I-E scale did not appear to measure a simple and unitary generalized belief in locus of control attitudes.

Joe and Jahn (1973), while adding to the forced-choice format of the I-E scale by requiring the respondent to indicate the extent to which he agreed with his selection of statement relative to the other statement, found that factor analysis of this data yielded a two-factor solution the dimensions of which were descriptively similar to those of Mirels (1970). The findings were based on separate analyses of the performance of 168 male and 120 female college students. In contrast to Mirels' findings, however, were the findings that the first factor for the males accounted for 49.2% and the second factor for 18.0% of the total variance. For females the respective percentages were 45.5% and 18.9%. While Abrahamson, Schludermann and Schludermann (1973), in factor analyses of the I-E item responses of 120 male and 113 female college students, had corroborated the findings of Mirels (1970), and had further suggested limited evidence for a third control factor relevant to social acceptance, the results of the Joe and Jahn study had suggested that, while there is evidence for a distinction of sub-areas of control attitudes, there may also be validity in the assumption of a generalized expectancy of control.

Others (Bond & Tornatzky, 1973; Cherlin & Bourque, 1974; Collins, 1974; Kleiber, et al., 1973; MacDonald & Tseng, Note 6; Minton, Note 7;

and Reid & Ware, Note 10) have published factor analytic studies in which the I-E scale was analyzed. When the 23 item pairs were analyzed without separation into their alternative statements and the items furthermore were answered in a Likert--agree-disagree--format the results corroborated the two-factor findings of Mirals. Even those studies changing item format or factor analytic method generally agreed on the content of the factors derived.

A review of the item content of the I-E scale indicates that the items are mixtures of several discrete categories of content. First, there are many statements in the scale which have no content. That is, they do not specify the situation within which the respondent is to determine the applicability of the assertion. Apparently such items were constructed because of the assumption of generalizability of control attitudes. Rather than allowing subjects' responses to establish this assumed generality across categories of content, such items suggest generality of control attitudes by fiat. For example, statement 2a of the I-E scale which says, "Many of the unhappy things in people's lives are partly due to bad luck," is such a general item and may be compared to statement 5b which says, "Most students don't realize the extent to which their grades are influenced by accidental happenings," and which specifies the content category for consideration as educational achievement. It may be argued that a scale loaded with such "general philosophy" items and mixed with content items would, under certain kinds of measurement, suggest the existence of a general factor or generalized attitude.

Second, the remaining items of the I-E scale may be broken into

three discrete categories of content. Statements refer either to political or social systems, to educational achievement or some other achievement context, or to social acceptance or likability. It should be noted that some I-E scale statements involve a mixture of two of these content categories. What is relevant here is that these content areas, including the general philosophy category, do not sample in a balanced manner across the three origins of control as specified in any of the items. (Although not previously mentioned, the I-E scale allows the respondent to attribute control to either luck or some related force, to skill, effort, understanding or other variables which are intrinsic to the individual, or to other people who have some relevant power.) For a demonstration of this the statements of the I-E scale have been categorized according to the described dimensions (see Table 2). The importance of this unbalanced sampling of categories is that any dependence on the I-E scale as a basis for resolving the question of the dimensionality of locus of control attitudes begins with built-in biases. MacDonald and Tseng (Note 6) have recognized this in their arguments for the retention of the concept of generalized expectancy. They pointed out that a measurement of generalized expectancy based on items that specify the situation demands in advance equal numerical representation of these important situations. This problem of unbalanced sampling across categories of content in the I-E scale unfortunately extends to other measures of locus of control beliefs as well. Content analyses of Levenson's scales (Levenson, 1972) and the Nowicki-Strickland Scale (Nowicki & Strickland, 1973) indicate equally unsatisfactory samplings of locus of control beliefs across the dimen-

Table 2

Categorization of Rotter's I-E Scale Statements

Content of Control	Origin of Control						
	Luck		Skill		Others		
	I	They	I	They	I	They	
General Philosophy	Internal	9b 15a 25b	16b* 18b	13a 28a	2b 16b* 21b		
Political, Systems	External		9a 2a 13b* 15b 18a 21a	25a 28b	13b*		
Education, Achievement	Internal				3a 12a 17b 22a 29b		
Social Acceptance	External			29a	3b 12b* 17a* 22b		12b* 17a*
Education, Achievement	Internal		11a*	23b	6b 10a 11a*		5a
Social Acceptance	External		5b 6a 11b 16a	23a	10b		
Social Acceptance	Internal				4a 7b 20b 26a		
Social Acceptance	External		26b*		4b 7a 20a 26b*		

Note. * means double placement of item. Labels explained, pp. 76-79.

sion of content (see Tables 3 and 4).

Multidimensional Approaches

Attempts at developing new measures of control attitudes which make more salient the various categories of control have already begun. Levenson (Note 5) and Reid and Ware (Notes 9, 10) have independently developed measures which show a distinction by respondents between various kinds of control attitudes. Levenson has developed a set of scales which are meant to measure relatively separate dimensions of internal control, "chance" control and control by "powerful others." Labelled I, C and P scales, respectively, Levenson apparently constructed them from a conceptual distinction of external forces. She reasoned that people who saw the world as essentially disordered would think and behave differently than people whose view of the world was that of an ordered place which was controlled by others. On this basis 8-item scales in a Likert format were developed into a unified, 24-item attitude scale. The I, P and C scales were constructed to measure a subject's beliefs in internality, powerful others and chance as factors in his own life situation. Internal consistency of the scales was reported to be high by Levenson. Furthermore, the author reported minimal correlations of items and scales with the Crowne-Marlowe (1964) SD scale. Intercorrelations between scales resulted in expected negative correlations between the internal scale and the two external scales, and a plausible positive correlation between the two external scales. Differential correlations with independent measures added validity to the conceptual distinction between the I, P and C scales.

Table 3

Categorization of Levenson's I, P, & C Scale Items

Content of Control	Origin of Control					
	Luck		Skill		Others	
	I	They	I	They	I	They
Internal			5 18 19	21 23		
General Philosophy						
External	2 6 7	10 14			3 11 13	15 22
Internal			1			
Education, Achievement						
External	16				8	
Internal			9			
Social Acceptance						
External	24				17	17
Internal			4			
Psychomotor Skills						
External	12				20	

Note. Labels are explained on pages 76-79.

Table 4
 Categorization of the Nowicki-Strickland Scale Items

Content of Control	Origin of Control					
	Luck		Skill		Others	
	I	They	I	They	I	They
Internal General Philosophy		40*	28 38	32 40*		
External	1 21 8 24? 11 29	3 7 10	16	19	5*	
Internal Education, Achievement			4? 22	6		
External			37*		37*	
Internal Social Acceptance			20 25			
External	27		33* 36*		5* 33* 36*	
Internal Psychomotor Skills						
External		17			18	
Internal Social Influence		13*	26 34	9 13* 30		
External			12 31 14 35 23* 39*		23* 39*	
Internal Uncategorized Content			2 15?			
External						

Note. * means double placement of item;
 ? means item is a dubious indicator of locus of control beliefs.

However, Cone (1971) had indicated that the I-E scale was substantially correlated with the Edwards (1957) Social Desirability (SD) scale and, at the same time, showed little relationship with the Crowne-Marlowe SD scale. Cone's interpretation of this variation between SD scale measures in their correlation with the I-E scale is based on a factor analytic study by Edwards, Diers and Walker (1962). These authors had factor analyzed the responses of students to the Minnesota Multiphasic Personality Inventory (MMPI) and three other personality scales. The results suggested that the Edwards SD scale most directly assessed social desirability while the Crowne-Marlowe assessed the tendency of respondents to look good through falsifications. In other words, the Crowne-Marlowe scale, but not the Edwards SD scale, gave evidence of the willingness of respondents to lie. Inasmuch as the Levenson scales similarly had been evaluated only for Crowne-Marlowe social desirability, the Levenson I, P, and C scales, in an unpublished study, the Edwards SD scale and the CRPBI were administered to 318 University of Manitoba undergraduates in the early part of 1973. Correlations between the Edwards and Levenson scales (I scale, $r = .29$; P scale, $r = -.33$; C scale, $r = -.38$; $p < .00,000,01$ for all values) were significant and fairly large for correlations usually found in the personality-social area.

Nevertheless, this finding is not as telling against the Levenson scales as might be presumed without further information. Principal components analyses of the 39-item Edwards SD scale suggested it may be an inadequate foundation for the measurement of social desirability. Analysis for the total sample of 318 students showed that the first two

factors accounted for 13.7% and 5.0% of the total scale variance. In addition the correlation matrix for every analysis contained what seemed to be an unacceptable number of negative correlations. If there was any evidence for a single, first factor as one might have expected in the Edwards SD scale, it was for a single, weak factor. Other evidence suggested a multiple factor solution. Thus the controlling variable as measured in this study is itself subject to question.

Whatever the implications of social desirability involvement in the Levenson scales, other evidence also was somewhat critical. Principal components analyses of the Levenson scales items yielded a somewhat unsettled factor structure. Criteria generally indicated a two- or three-factor solution. In the three-factor solution items usually loaded most highly on the appropriate factor, suggesting that Levenson's construction of a tripartite measure was reasonable. However, a two-factor solution appeared equally tenable and represented, in the first factor, an amalgamation of P and C scale items. Items loading high on the second factor were I scale items intermixed with negative loading C scale items. Cluster analyses of item correlations demonstrated no clarifying information except to show that P and C scale items clustered at higher correlation levels and that the appearance of I scale items coincided with the intermixing of items from all three scales. Clearly, some of this confusion can be assigned to the directional wording of items within a scale. Items in the two external scales are worded externally and the I scale is made up of internally worded items. While recognizing this problem, it is difficult to see how one might account for this confounding without



rewriting the measure.

While the possibility of a generalized belief with regard to locus of control as measured by a single unidimensional scale remains unsettled, Levenson (1975) has more recently interpreted each of her scales as generalized measures subject to the limitation apparent in the label of each scale. That is, Levenson perceives her scales to be measures of generalized beliefs regarding internality, generalized beliefs regarding powerful others and, lastly, generalized beliefs regarding the influence of chance. None of the scales is interpreted by her as otherwise situation specific. This view is intuitively appealing in that it ascribes as broad an interpretation as possible to each scale. Unfortunately, this perspective may not be reasonable when the relationships between the scales are considered. Levenson (1974) has reiterated an earlier finding that the P and C scales correlate with each other ($r = .59, p < .01$), while the I scale shows nonsignificant relationships with the P and C scales ($r = -.14$ and $-.17$, respectively). In the previously mentioned study run at the University of Manitoba, correlations between the Levenson scales based on the responses of 318 students were similar with significance obtained for the I-C scale relationship (P-C, $r = .532, p < .00,000,000,2$; I-P, $r = -.088, p > .05$; I-C, $r = -.287, p < .00,000,02$). Therefore, while the I and P scales may represent effectively independent dimensions of locus of control beliefs, the remaining relationships between the scales suggest a phenomenological interdependence. This interdependence may not be reflected in behavior (Levenson, 1974), but insofar as the variability within each scale may be qualified by variation in another scale, the

generality of any single scale is limited to the degree to which it fails to demonstrate independence of the alternative measures. On the other hand, this relationship between the I, P and C scales may represent the variance attributable to an overriding generalized locus of control belief whose variance is not of the magnitude initially indicated by Rotter (1966). Finally, with regard to Levenson's interpretation of generalized beliefs of locus of control, it should be recognized that no factor analyses have yet been published of each of the individual scales. Table 3 has already indicated that each individual scale is heavily weighted with general philosophy items and, therefore, on an a priori basis assumes rather than allows for an evaluation as to the generality of the belief questioned by the scale. Additionally, the research so far published on the behavioral accompaniments of specific scale responses neither supports nor negates the assumption of generality of any Levenson scale.

Reid and Ware (1973a) developed two measures of locus of control beliefs that would appear highly congruent with those developed by Levenson (1972). The factors labelled "fatalism" and "social system control" are said to reflect the respondent's agreement or disagreement that luck, fate, or fortune as opposed to ability, hard work and/or personal responsibility determine one's outcomes, and to reflect the belief that people are controlled by social system forces, respectively. Subsequently, Reid and Ware (Note 9) proposed the existence of a third independent locus of control factor. This latter factor was labelled "self-control" reflecting an individual's self attribution of responsibility for outcomes. Reid's and Ware's publications suggest several

limitations in their scales: 1) No evidence is reviewed to indicate that Edwards social desirability is not influencing some of their results (In fact, data by Reid and Ware (Note 10) in one study suggest that Crowne-Marlowe social desirability correlates at least as highly with their scales and with the I-E scale as these scales do with any other outside variables.); 2) and their work has not indicated a conceptual search for further dimensions along which locus of control beliefs may vary.

Critique

Whereas the preceding review of locus of control measures in the last few paragraphs has emphasized methodological or research criticisms, it is equally or more important to note that these instruments have been built on contrasting assumptions about the nature of control attitudes. The I-E scale has been constructed on the assumption that locus of control attitudes were generalizable while the scales of Levenson and Reid and Ware have been constructed on the assumption that control attitudes were intrinsically situation specific.

In contrast to these positions, it is the argument of this paper that a final decision as to the generalizability of control attitudes is unwarranted based on the information available. Instead future measurement of locus of control attitudes which seeks to further clarify this problem needs to begin with an instrument into which no a priori assumption is built. Furthermore the instrument needs to allow for the established existence of subdomains of control attitudes in the face of an overriding generalized attitude regarding locus of control. In sum, this has been an argument for the development of multidimen-

sional measures of locus of control attitudes with sufficient categories to allow treatment of these categories as scales. Factor analytic methods would then indicate whether or not such scales exhibit also an overriding generalized expectancy.

Relationships with Other Variables

Whatever conceptual or methodological criticisms may be made of existing measures of locus of control attitudes, they have established some consistent relationships with other variables. Rotter (1966) has pointed out several aspects of the I-E scale's capacity to predict behavior. Specifically he notes the measure has succeeded in establishing performance differences between internal and external groups in partial reinforcement situations, differences in value placed on achievement, differences in socioeconomic status, and suggested differences in active participation and involvement with one's environment. As a slightly more specific example, Rotter (1966) in summarizing the research on achievement motivation concludes that there is general agreement that a tie exists between internality and greater motivation in achievement. Lefcourt (1966) concludes that internality appears to be predictive of achievement-related variables when the materials are relevant to the subjects' goal strivings. Lefcourt (1972) in a review of more recent research does not dispute the earlier summaries and adds to the above by pointing out that research has further indicated that persons with internal control expectancies tend to be more cognitively active than those with external attitudes. At the same time, these authors have pointed out that sex differences may limit the generality of these conclusions on some measures. Furthermore, Lefcourt (1972)

has pointed out that research in the area has been predominantly with grade-school children and that research with age groups beyond this are necessary as part of the need to look at prolonged achievement activity in relation to control expectancies. Similarly, research attempts to establish correlates of more conceptually restricted measures of locus of control beliefs have shown some recent success. Efforts by Abramowitz (1973); Berzins (Note 2, an attempt to generate a typology of internal and external persons); Gootnick (1974); Lao (1970); Levenson (1974); Nowicki (Note 8); Sanger and Alker (1972); Stephens (Note 13); and Wilkins (1975) have indicated that the predictability of behavior in limited settings may be enhanced by the use of more specific measures of locus of control beliefs. Whether the gain in prediction is sufficient to justify current distinctions in content or in origin of control beliefs remains to be settled. However, it is certain that more important theoretical gain would be obtained from a distinction of beliefs in external control (origin), for example, than from a distinction between control beliefs in achievement as opposed to social acceptance (content). In sum, there is unquestionable evidence of research progress based on the use of presumed unidimensional and generalizable measures of locus of control. At the same time, research into the implications of more restricted dimensions of locus of control beliefs is proceeding and has not yet shown its limits.

PARENT ATTITUDES OR BEHAVIOR AND LOCUS OF CONTROL

Acceptance versus RejectionYoung Adults

Both Lefcourt (1966) and Rotter (1966) in their early reviews pointed to the apparent paucity of research work on antecedents of locus of control. Lefcourt (1972) suggested that effort in familial sources of locus of control attitudes in the intervening time had been moderate. At the same time, he recognized increasing interest in the area. His review of the research suggested at least some consistency to the data. Specifically, a warm, accepting home with predictable, consistent standards is more commonly reported by internal children and adolescents than their external counterparts. At the same time, expressions of parental attitudes about the same elements seem unrelated to the child's locus of control. Crandall (1973) in summarizing a more thorough sample of research on parental contributions pointed to similar conclusions. Both verbal reports of parent practices and the few studies of observed parent behaviors indicated that parental warmth, praise, supportiveness, consistency, lack of criticism and lack of authoritarian or covert control tend to be related to internal attitudes in the child. Furthermore Crandall's brief review of studies suggested that research had not been so moderate since 1966 as Lefcourt (1972) had suggested. Abrahamson (Note 1) independently had come to similar conclusions based on what was then available from the published research. Unfortunately the study reported by Abrahamson (Note 1) did not corroborate the previous evidence indicating that reported parental nurturance would be related to internality. However, the study did

indicate that the level of control utilized by parents related minimally to locus of control attitudes. Firm control, as opposed to reported lax control, minimally predicted internality. Also, what has been called "psychological autonomy" as opposed to "psychological control" predicted internality in a college student sample. This study was based on 120 male and 113 female undergraduates serving out required experimental participation for course credit. The respondents had taken the Schludermann and Schludermann (1970) revision of the Schaefer (1965a) CRPBI and the I-E scale. The surprise that the least contradicted hypothesis based on the published literature then available to the author had been contradicted here led to a post hoc breakdown of the data. Correlations of the three CRPBI factors and the 18 CRPBI scales with the I-E scale total and with I-E scale two-factor and three-factor rotations for the total sample, according to sex of respondent and according to sex of parent were made. While no statistical judgments could easily be made, the author noted the appearance of stronger correlations between the CRPBI scales making up the Psychological Autonomy-vs.-Psychological Control factor and I-E scale performance for subject and parent breakdowns (e.g., average correlations based on absolute Fisher's z values for scales loading on the rejection and lax control factors as opposed to those loading on the psychological control factor for the total sample were .077 and .139, respectively). At the same time the majority of scales loading heavily on the CRPBI Acceptance-vs.-Rejection factor did not appear to vary in absolute value throughout the breakdown of the data sources.

A more recent study at this University (previously referred to in

the evaluation of Levenson's I, P and C scales) involving the administration of Levenson's (1972) locus of control scales which measure a respondent's attributions of control to chance, self or to powerful others, the Schludermann and Schludermann (1970) version of the CRPBI, and the Edwards (1957) SD scale to 153 male and 165 female undergraduates has yielded similar results. CRPBI Acceptance-vs.-Rejection appears to show no significant correlation with these measures of locus of control attitudes.

Between the administration of the two previous studies unpublished information was obtained which also tended to limit the generalizability of the hypothesized relationship between parental warmth and supportiveness and children's locus of control beliefs. Brolund (Note 3) reported a study involving the administration of the Roe and Siegelman (1963) Parent-Child Relations Questionnaire (PCR), the Heilbrun (1964) Parent-Child Interaction Rating Scale (PCIR), and the I-E scale to 61 male and 41 female University of Manitoba undergraduates. The PCR consists of 130 items for each parent which assess a respondent's perception of a myriad of specific behaviors. Of the ten subscales making up the inventory, four of the subscales deal with type of reward and punishment used toward the respondent. The other six subscales deal with varieties of perceived affectional behavior on the part of the parent. The PCIR consists of eight parent nurturant modes. The respondent rates each mode on a five-point scale, each point being descriptively anchored to an essential characteristic of parent behavior. The PCIR allows for a single total score. Intercorrelations within sex of respondent and sex of parent between the resulting

eleven perceived parent behavior scores and the I-E scale indicated a possible significant correlation between PCR Direct-Object Punishment and I-E scale performance for males (for mothers only). Similarly, but for both parents, PCR Direct-Object Reward appeared to correlate positively with degree of respondent internality for males. No degree of assurance as to significance of other correlations is possible without a more careful check. Brolund apparently failed to account for multiple and probably intercorrelated comparisons in his statistical evaluation. While for these reasons this study cannot be interpreted as a serious criticism of the parental nurturance-child internality hypothesis (i.e., because of the failure to obtain significant correlations of the sort expected. A larger subject sample may have indicated otherwise), a contradiction may be implied in the relationships that seemed to be supported. The use of objects in rewards and punishments does not suggest any simple conceptual ties to the nurturance hypothesis. That is, the giving of both rewards and punishments occurs across most of the variation in parental nurturance or rejection. Therefore, it is likely that other variables, in addition to parental nurturance, determine the nature of an immediate response to an adolescent's behavior. As a consequence, these other variables determining the instrumental, moment by moment control of behavior, to the degree that they influence the immediate and temporal rewards and punishments for specific behavior, are likely to be the correlates of adolescent locus of control beliefs.

Gfellner (1972) administered a modified version, as described by MacDonald (1971), of the Perceived Parenting Questionnaire (PPQ)

together with the I-E scale to approximately 500 male and 500 female undergraduates at North Dakota State University. The PPQ is a 21 item scale considered to index nine general parent practice variables. MacDonald (1971) had reported that parental nurturance on this scale was related to I-E scale internality when the middle 50% of the subjects as classified by the PPQ subscales were removed. As an attempted replication of MacDonald's finding, Gfellner intercorrelated the PPQ subscales with total I-E. She reported only that for the female population PPQ maternal nurturance intercorrelated $-.085$ with the respondents' I-E scores. Paternal nurturance correlated $-.046$ with I-E scores. Gfellner's data (as much as was available several years later) were reanalyzed at the University of Manitoba to check for the intercorrelations of all PPQ subscales with I-E scale performance for both males and females. In addition the PPQ was factor analyzed in an attempt to further stabilize whatever information might have been relevant to parental warmth and support in the measure. There was an inexplicable loss of some of the male sample data. Therefore these analyses subsequent to the completion of the thesis were based on 366 males and 508 females. Factor analyses of the PPQ items and scales indicated a very clear two-factor solution. A later study at the University of Manitoba indicated that these two factors were comparable to the Acceptance-vs.-Rejection factor and the Psychological Autonomy-vs.-Psychological Control factor of the CRPBI. (Factor scores based on principal components analyses of the CRPBI and PPQ scales yielded a correlation of $-.619$ between CRPBI Rejection-vs.-Acceptance and the PPQ first factor and a correlation of $-.485$ between CRPBI Psychological

Control-vs.-Psychological Autonomy and the PPQ second factor.) The clarity of the PPQ two-factor solution led to a correlation of only these factors and the PPQ scales with the I-E scale. No attempt was made to correlate a total PPQ score with the I-E scale for subsections of the overall sample because the PPQ total was so evidently a confounding of the two factors. Only one of the correlations between the I-E scale and the PPQ factors or scales was over .20. However, the sample size of Gfellner's data was sufficiently large to yield a number of significant results. Correlation of the I-E scale (scored for the number of external choices made) with the PPQ first factor (which may be interpreted as equivalent to the CRPBI Psychological Control-vs.-Autonomy factor) was .115. Correlation of the I-E scale with the PPQ second factor (comparable to the other named CRPBI factor) was .041. In a minimal sense, then, parental psychological control and rejection were tied to student external control beliefs. For subsections of the sample, perceived parental psychological control behaviors remained low but significant predictors of college student beliefs in external control. On the other hand, perceived maternal acceptance seemed more indicative of internal beliefs for female college students. At best, the nurturance hypothesis appeared to be a very limited predictor of locus of control beliefs for college students.

Davis and Phares (1969), after administering the I-E scale, and Schaefer's revised CRPBI (Renson, Schaefer & Levy, 1968) to introductory psychology students at Kansas State University, looked at the CRPBI vs. I-E relationship from an ANOVA design. From a subject sample of 120 (30 male internals, 30 male externals, 30 female internals and

30 female externals) Davis and Phares found evidence to suggest that several CRPBI scales which load on Acceptance-vs.-Rejection indicated a significant relationship between parental warmth and internality. The authors then cite a second study involving the administration of the Maryland Parent Attitude Survey (MPAS; Pumroy, 1966) and the I-E scale to parents and the I-E scale to general psychology students. The MPAS is a 90-item forced-choice questionnaire from which four scales are obtained. The scales are labelled Disciplinarian, Indulgent, Protective, and Rejecting to indicate the general parent attitude. Redundant application of a single ANOVA design indicated no differences in I-E significantly related to the four MPAS scales. This, incidentally, corroborates the finding by Tolor (1967) in his administration of the MPAS and I-E scale to two small and select samples (22 teachers, and 25 male and 9 female graduate students).

Cromwell (1963), in referring to data published by Cromwell, Rosenthal, Shakow and Zahn (1961), apparently looked at the relationship between Schaefer's (1965a) CRPBI (for mother only) and several measures of locus of control (James-Phares external control scale, Liverant forced-choice internal-external scale, Bialer-Cromwell children's locus-of-control scale). The CRPBI scales were pooled into four separate categories: overt control, covert control, protective-ness, and hostility. Although failing to clarify further the manner in which these scales were handled he indicates that, in a sample of 13 white male conscientious objectors, the greater the degree to which normal subjects attributed protective attitudes to their parents, the greater they answered in the direction of external locus of control.

At the same time this relationship was absent in an externally-skewed sample of 15 white male schizophrenics. Possibly in contrast to this the Liverant scale data indicated that perceived parent behaviors of hostility were related to external attitudes for both groups. Although MacDonald (1971) interprets the first finding as contradictory to an hypothesis that internal beliefs are associated with parental warmth, the whole set of findings relevant to the nurturance hypothesis simply could be said to be unclear in their implications.

Levenson (1973b) in an attempt to parallel the procedures used by MacDonald (1971) administered the PPQ and her Internal, Powerful Others, and Chance scales to 193 male and 83 female introductory psychology students at Texas A&M University. Consistent with MacDonald's analysis, the data were analyzed separately for each parent in a 2X2 ANOVA design. Sex of subject was one variable and top third versus bottom third of the subjects on each PPQ subscale made up the other variable. The dependent variables were the subjects' responses to the I, P and C scales. As with the Davis and Phares (1969), the MacDonald (1971), and the Brolund (Note 3) studies, this meant the redundant application of the same design to data which could not be construed as independent. In other words, this involved multiple comparisons on subscales which are not independent. Levenson's analysis involves the repeated application of 54 2X2 ANOVA designs. Noting that Hays (1963, p. 376) indicates the possibility of a Type I error when α is small to be approximately $n\alpha$ where n refers to the number of comparisons, it can only be noted that deriving any information from this study on a statistical basis is extremely improbable. This is unfor-

tunate in that if one was able to accept Levenson's statistical analysis, this study would have provided support for the nurturance hypothesis. One means of clarifying the reliability of any of these studies with statistical problems would be to replicate each study with exactly the same instruments and design. While the statistical flaws would survive with the replication, the first study could be the foundation for more specific predictions based on a per hypothesis error rate. Another alternative would be based on an attempt to equate in some empirical way the instruments utilized in these studies. A summation of the research so far cited as relevant to the nurturance hypothesis allows only this conclusion. In so far as college age students and adults are concerned, there would appear to be no established relation between remembered or perceived parent behaviors capable of being labelled warm or supportive and the respondent's contemporary locus of control attitudes. Alternatives to this conclusion might be that extremes of acceptance or rejection have not been sampled adequately in studies to date, or the relationship is nonlinear, or the relationship is so weak as to be uninformative except in a multivariate prediction setting, or some combination of the above. The work by Abrahamson (Note 1) and the later analyses of the Gfellner (1972) data would be consistent with the idea of a very tenuous relationship. Furthermore, this generalization may not apply to situation-specific locus of control beliefs not yet studied in this regard. The study previously referred to on page 41 which evaluated Levenson's I, P and C scales for Edwards social desirability also provided information regarding the relationship between the CRPBI and Levenson's scales.

Analyses suggested that perceived maternal acceptance was tied to females' Chance scale performance even after social desirability variance was deleted from the relationship. Crandall (Note 4), in a report of longitudinal research on locus of control beliefs based on young adults who had participated in the Fels program since birth, proposed the preceding conclusion after finding that maternal warmth, protectiveness and supportiveness contributed to internality in childhood, but not in young adulthood.

Adolescents

Reimanis (Note 11; cited in Levenson, 1973b), Shore (1968), Patsula (1969) and Nowicki and Segal (1974) appear to be the only presently available studies of parental antecedents of junior high and high school adolescents' beliefs in locus of control. Shore administered two measures of locus of control beliefs (a semiprojective measure and an objective scale) to 279 boys in the seventh through ninth grades of a Syracuse, New York, suburban high school. The adolescents also indicated their perceptions of parental psychological control, overt control, intrinsic acceptance, and warmth. Parents were also sent questionnaires of locus of control beliefs (of a general nature and relevant to childrearing) and of their attitudes concerning authoritarian control and disciplinarian control of children. The results indicated that father and both parents together, according to their degree of perceived responsibility for their child's behavior and future success "contributed" to the adolescent expression of internality. Furthermore, support was obtained for a prediction of a positive relationship between adolescent internality and perceived parental

intrinsic acceptance and warmth. Although the instruments and design of the study have not been made available to this author, it would appear necessary to tentatively accept the nurturance hypothesis for the adolescent ages. Quite possibly adolescence is the last significant period in development during which parental warmth and protectiveness is related in a moderate and linear manner to locus of control beliefs. One might speculate that this relationship would diminish with approach in age to young adulthood.

Patsula (1969), in his dissertation research, administered the 192-item version of Schaefer's CRPBI, the I-E scale, the Feeling of Personal Powerlessness Scale (FPPS; devised by Patsula, 1968, from items loading substantially on the first factor of an administration of items from Dean's Alienation Scale, Srole's Anomie Scale and McClosky-Schaar's Anomy Scale), Crandall's, Katkovsky's and Crandall's (1965) Intellectual Achievement Responsibility Questionnaire (IAR; which has 17 items describing positive achievement and 17 items describing negative achievement experiences), and a revision of Moulton's Dominance in Discipline Scale (1966) to 220 boys and 220 girls in the eighth grade within six schools of a Catholic school system in Western Canada. Two subsamples (apparently 110 boys and 110 girls each) were created to establish a means for replicating the results. A factor analysis of the I-E scale total, totals of two versions of the FPPS, the two IAR subscales, and IAR total all together yielded a two-factor structure for Patsula. Factor I, on which the FPPS and I-E scale had heavy loadings, he labelled "General Powerlessness." Factor II, on which the two IAR subscales loaded heavily, was labelled "School-

Related Powerlessness." Separate factor analyses of the mother and father forms of the CRPBI and intercorrelations of the resulting three factors in each with General Powerlessness indicated replicated support only for contributions by maternal Psychological Control-vs.-Psychological Autonomy (Sample I, $r = .250$; Sample II, $r = .180$) and by paternal Lax Control-vs.-Firm Control (Sample I, $r = .214$; Sample II, $r = .231$) to students' statements regarding powerlessness.

Patsula had interpreted any significant result (at $p < .05$) in either subsample to indicate support for his hypotheses. He therefore had found significant relationships between all CRPBI factors and General Powerlessness save one. In contrast, the view taken in this proposal is that a replication is repetition of a previous test, and any attempt to base support for an hypothesis on redundant comparisons inflates the possibility of a Type II error. It can be argued that as with previous multiple comparisons the increase in the probability of a Type II error is approximately $n\alpha$ when α is small and n refers to the number of replicated or multiple comparisons. While replications in which the comparisons are either all significant or all nonsignificant allow simple inferences, multiple comparisons in which significance is indicated for some but not all tests require interpretation of a more troublesome nature. Such results may be treated as a simple failure to corroborate the hypothesis and therefore be handled as entirely nonsignificant, or the results may be seen as reflecting the amount of error in the measures used and be spoken of as uninterpretable results yielding insufficiently supported hypotheses needing future study with larger samples and/or improved instruments. The present approach in

this paper has been and will be to present only comparisons in which replications within the study are all significant.

For boys alone only paternal Acceptance-vs.-Rejection (Sample I, $r = -.214$; Sample II, $r = -.238$) and Lax Control-vs.-Firm Control (Sample I, $r = .229$; Sample II, $r = .298$) correlated significantly with their General Powerlessness scores. For girls alone only maternal Psychological Control-vs.-Psychological Autonomy ($r = .252$; $r = .188$) correlated significantly with their General Powerlessness scores.

Intercorrelations of the CRPBI factors with the I-E scale indicated that only maternal Acceptance-vs.-Rejection ($r = -.166$; $r = -.165$) and Lax Control-vs.-Firm Control ($r = .171$; $r = .163$) showed replicated significant relationships with students' locus of control beliefs. For boys alone only paternal Acceptance-vs.-Rejection (only alpha levels given) showed a significant relationship with their I-E scale performance. For girls no replicated relationships were established between CRPBI factors and the I-E scale.

Finally, when socio-economic status (Blisshen, 1967), sex and scholastic aptitude (as indicated by the California Test of Mental Maturity) were controlled, the only replicated significant correlate of General Powerlessness was maternal Psychological Control-vs.-Psychological Autonomy. When these controls were applied to the CRPBI factor with I-E scale correlations, no correlations proved to be significant with replication. Patsula's interpretation of significance and the consequence of his interpretation on his view of what hypotheses were corroborated led him to conclude that the above controls did not alter the results to any great extent. While the above findings may be inter-

preted as contradicting this statement by Patsula, his presentation of data does not allow an easy check of the influence of the controls on the CRPBI with I-E relationships.

The results of Patsula's study are difficult and awkward to place in any scheme. The study would appear neither to support a nurturance hypothesis nor to question it. Several trends seem to be suggested by this study. First, even the nonsignificant relationships yielded results in the predicted directions. Second, parents would seem to have a differential influence on adolescent locus of control attitudes. Third, if we accept Patsula's equating General Powerlessness with any measure of generalized beliefs in locus of control, the pattern of significant results suggests that like-sexed parents are perceived by adolescents as contributing most to their locus of control attitudes.

In possible contradiction to the speculation that nurturance is a parental variable of decreasing importance in predicting locus of control beliefs from childhood to adulthood, Nowicki and Segal (1974) administered a locus of control measure (the Nowicki-Strickland Personal Reaction Survey) and a modified version of the PCIR (see p. 50) to 58 male and 54 female high school seniors. In contrast to Brolund (Note 3) they correlated their locus of control measure with four of the modes in the PCIR rather than with a total of the modes. The authors report that for males internality was associated with greater perceived maternal affection, while for females internality was associated with greater perceived paternal affection, trust and security and greater perceived maternal affection, encouragement, trust and security. It should be cautioned that the authors appear not to have accounted for

multiple comparisons in their statistical analysis and therefore no statistically based inferences seem possible. This problem might be corrected by the use of multivariate correlational analysis (i.e., multiple correlation) inasmuch as the totalling of the modes by Brolund (Note 3) reflected the recognition that the PCIR essentially samples behaviors characterized as warm, supportive and protective. While no other studies using high school students are in evidence for comparison, the authors' asserted findings would appear acceptable within the framework already applied to the nurturance hypothesis. The finding of far fewer relationships for males than females between parental nurturant behaviors and internality would appear consistent with the growing differences in society's expectation between males and females at that age. Self-support and professional development would be stronger expectations for males than females and possibly these expectations have a generalized influence on locus of control beliefs. Consistent with this Lao (1973) cites evidence to suggest that background and recollection of childhood are less adequate than college experience in predicting the locus of control attitudes of 99 upperclassmen in a white southern college. Extended to high school students' locus of control attitudes, this study could be interpreted to mean that the scholastic and general social environment is beginning to take precedence over parental contributions to locus of control attitudes especially for males. One might expect to find parental correlates of locus of control attitudes for females to last into the early college years.

Children

The review by Crandall (Note 4), while not directly addressed to the question of the soundness of all research on the nurturance hypothesis, does suggest that there appears to be far less question of the applicability of this hypothesis to studies of children. That is, the research suggests with some consistency that parental nurturance is an important predictor of childhood internality. For example, Katkovsky, Crandall and Good (1967) used the Parent Behavior Rating Scales to evaluate mother-child interactions in the home, interviewed both parents in regard to their relationships with their children and administered the Parent Reaction Questionnaire to assess parental reaction to the child's achievement behaviors. Correlations of these measures with the IAR indicated that parent behaviors characterized as warm, praising, protective and supportive were positively associated with children's beliefs in internal control in the academic setting. On the other hand, parental behaviors such as dominance, rejection and criticality appeared to be negatively associated with internal IAR beliefs. Also noteworthy is the finding that boys were more likely to develop an internal orientation under maternal nurturance while girls were more likely to develop an external orientation if they had experienced parental rejection and authoritarian control.

As an example of nonsupportive findings, Chance (1972), in looking at several personality correlates of school children's achievement performances gave the IAR to 59 boys and 55 girls and the PARI to their mothers. Transforming the 23 scales of the PARI (see p. 25) into three quasi factor scores following the factor analytic findings of Zuckerman,

Ribback, Monashkin and Norton (1958), she intercorrelated these "factors" with all other measures. As she interprets her findings, internal beliefs on the part of boys is associated with less maternal concern about controlling the child's behavior (PARI first factor, Authoritarian-Control), while for girls there is no PARI with IAR relationship. Recent research comments on the use of parent attitude report instruments in predicting children's locus of control attitudes have suggested they are not as predictive as perceived parent behavior measures (Becker & Krug, 1965; Goldin, 1969).

Firm Control versus Lax Control

Overall, it appears that the nurturance hypothesis has not demonstrated its applicability for college age subjects, but has shown tentative applicability to junior high and high school adolescents, and has been largely supported in both behavioral and perceived parent behavior settings. In so far as the literature deals developmentally with parent control behavior in correlation with locus of control beliefs, there appears to be no consistent influence provided by parental variations in strictness versus leniency. Abrahamson (Note 1) in a serious effort to clarify the research findings relevant to this dimension, proposed on inconsistent evidence that firm parental control would be more contributive to internality than lax control. The study testing this hypothesis with college students indicated weak but significant support for this hypothesis. A second study--previously reviewed in regard to Edwards social desirability involvement in Levenson's scales--suggested weak support for an I, P or C with CRPBI (Firm Control-vs.-Lax Control) factor relation for college females. Shore (1968)

found that for seventh through ninth graders, "the prediction of a negative relationship between children's internal control beliefs and perceived parental overt control was not confirmed." The evidence from Patsula (1969) provides no further help.

Psychological Control

However, for parental behaviors that attempt to control the child's behaviors in a manner that may be described as using psychological tactics, there is evidence suggesting such behaviors influence children's locus of control attitudes both in adolescence and adulthood. A careful analysis of the available literature by Abrahamson (Note 1) led to a prediction that CRPBI Psychological Autonomy would be predictive of I-E scale internality. Results indicated a significant but moderate relationship. The more recent study relating the CRPBI and Levenson scales also supported this hypothesis. Unfortunately, the simultaneous administration of the Edwards SD scale suggested that some of the relationship may be mediated by social desirability. In view of information presented earlier (see p. 41) regarding this study which suggested that the Edwards SD scale exhibits neither a clear nor strong factor structure, it was difficult to characterize the nature of this social desirability involvement in the relationship of the CRPBI with the Levenson scales. In addition to the serious question of the nature of social desirability measurement, a conclusion of this study was that criteria need to be made which allow an investigator to distinguish when social desirability measures indicate developmental consequences and when they are to be viewed as methodological flaws in instrument design. The study by Allaman, Joyce and Crandall (1972) suggested that

social desirability response tendencies (probably to be interpreted as an exhibition of need for approval) are to be seen as legitimate developmental consequences of parental practices. However, insofar as any instrument's item construction allows for the confounding of its assessment of an intended domain by the operation of a response set, it would seem that this problem is prior to any assertion that what is being measured is actually the instrument's ability to predict need for approval or fear of disapproval. In retrospect, the conception of social desirability as either indicating response set or developmental consequence is too simplistic.

With adolescents, Shore (1968) obtained partial support for the hypothesis that perceptions of parental psychological control would be correlated with externality in adolescents. Patsula (1969) again provided mixed evidence on this hypothesis.

Summary

In summary, the contribution of perceived parental nurturance to young adults' beliefs regarding locus of control is to be seriously questioned. Furthermore, the application of the nurturance hypothesis to adolescence remains tentative inasmuch as several but not all studies find support for the hypothesis with this age group. If we accept Crandall's (Note 4) evaluation of Fels research, the nurturance hypothesis attains its most applicable position in childhood. Adolescence then appears to be an interim period during which the childhood relationship between perceived parental nurturance and locus of control beliefs is lost. Perceived parental behaviors that may be labelled as either controlling or psychologically controlling appear to contribute

in unclear ways to adolescent or young adult attitudes regarding locus of control. That is, the inconsistent support in the literature for such a relationship may reflect sex of parent differences and/or sex of child differences and interactions of these two variables in contributing to locus of control beliefs.

PARENT ATTITUDES OR BEHAVIOR, LOCUS OF CONTROL, AND ACHIEVEMENT

Parenting and Achievement

While the initial purpose of this study is to establish a correlate of children's and/or adolescents' perceptions of parent behavior, one should note that a similar search for indicants of validity in the locus of control concept led researchers in the 1960's to a study of the relationship between locus of control beliefs and achievement motivation and behaviors. Aspects of this search are outlined in Rotter (1966), Lefcourt (1966) and Lefcourt (1972). From the direction of achievement in females, Stein and Bailey (1973) appear to have provided a more thorough review of this area. While achievement has served as an index of the validity of locus of control attitudes, it has also served as a dependent variable in respect to parental attitudes and behaviors. Again Stein and Bailey (1973) appear to provide the most recent survey of this literature. The importance of research into achievement then is its double function in clarifying the importance of parental behaviors and attitudes and in clarifying the intermediate construct labelled locus of control beliefs.

Stein and Bailey (1973) separate the evidence relevant to parental contributions to their children's achievement behavior into the two

categories of child-rearing practices recognized by Becker (1964). That is, they review parental practices characterized as variations from warmth to hostility and from permissiveness to restrictiveness. Ultimately arguing that achievement orientation depends on emotional independence, assertiveness and competitiveness they propose that evidence from several sources suggests that nurturance (especially maternal) is related to achievement behavior in a curvilinear fashion. Inasmuch as most studies do not sample the effects of extreme hostility and rejection, the majority of research suggests a negative relationship between nurturance and achievement. Thus they propose that for females especially a moderate, but not high, level of warmth or nurturance is most conducive to achievement behavior. Citing Becker (1964) as stating that permissiveness with moderate or high warmth is associated with independence in children while restrictiveness under these conditions is associated with dependency and conformity, Stein and Bailey indicate that permissiveness is positively associated with achievement orientation in most cases. At the same time, recognizing the results of Baumrind (1971) in which authoritative (not authoritarian) parents were associated with high achievement in girls and, when also nonconforming, were associated with high achievement in boys, these reviewers suggest that other variables such as placing high demands on the child may be important additional factors.

Locus of Control Beliefs and Achievement

In summarizing the literature relating children's or adolescents' locus of control beliefs to achievement behavior, Rotter (1966) asserts that a relationship between internality and achievement motivation is

generally, although not always, supported. Lefcourt (1966) with greater moderation suggests that internality appears to be predictive of achievement-related variables when the materials are relevant to the subjects' goal strivings. Lefcourt further suggests that the literature up to that time had established this relationship for boys but not for girls. Rotter (1966) admits that specificity may be another variable limiting the generality of this relationship. Lefcourt (1972) noted that the largest number of studies have linked locus of control beliefs with grade-point average, achievement test scores and school-room achievement behavior among grade-school children. Thus achievement behavior in most studies has been specified as taking place in the highly structured academic situation. At the same time Lefcourt (1972) has found it necessary to recognize that the overwhelming majority of studies do report an association between internality and achievement behavior, and manage to do so in spite of extensive variation in instruments used to measure locus of control. Stein and Bailey (1973) note that while the literature appears to suggest a weaker link between internality and achievement for females, when females are exposed to failure on a task, they exhibit as much achievement behavior as do males.

The sex difference in the I-E with achievement behavior relationship appears to continue into adolescence. McGhee and Crandall (1968) report two studies in which subjects ranging from grade school through high school were administered the IAR. Correlations between the IAR and report-card grades indicated internality was related to higher report-card grade averages for boys in both studies. However, this

relationship was not replicated for girls. Inasmuch as the second study involved a proportionately larger sampling of adolescents one may speculate that adolescence as well is a period in which the above sex difference is maintained. At present this appears to be the only study focusing on these variables in adolescence.

HYPOTHESES

The preceding review of the literature led to summary statements in which the hypotheses of this proposal were largely stated. At the same time the amount of material reviewed necessitates a clearer statement of these hypotheses.

A review of the major instruments utilized in the measurement of locus of control beliefs indicated the presence of both methodological and theoretical problems related to their continued use. Theoretically no instrument in use appears to be constructed for an adequate assessment of both specific and generalized locus of control attitudes. While no hypothesis is presently offered other than that research indicates locus of control beliefs are multidimensional in character (while an overriding unidimensionality still remains plausible), a tentative solution to this issue would have important ramifications for locus of control theory.

The primary purpose of this research was to establish relationships between parent-child practices and child attitudes and behavior. Previous research on the relationship between locus of control beliefs and parental practices had indicated that parental nurturance contributed to internality in children but was unrelated to young adult

beliefs in locus of control. Adolescence then appeared to be an important interim period for developmental changes in this relationship. Similarly, in adolescence, parental behaviors that may be described as controlling have not shown the expected contribution to locus of control beliefs in the few applicable studies. A number of studies, although not with any apparent consistencies, suggest that important variables to be considered here are sex of parent, sex of child, and the interaction of these two variables. With varying degrees of tentativeness the following hypotheses are offered:

- (1) Generalized beliefs in internality in adolescence are related positively to perceived maternal acceptance.
- (2) Generalized beliefs in internality in adolescence are related positively to perceived maternal firm control.
- (3) Generalized beliefs in internality in adolescence are related positively to perceived maternal psychological autonomy.
- (4) Generalized beliefs in internality in adolescence are related positively to perceived paternal acceptance.
- (5) Generalized beliefs in internality in adolescence are related positively to perceived paternal firm control.
- (6) Generalized beliefs in internality in adolescence are related positively to perceived paternal psychological autonomy.
- (7) Parental acceptance will contribute more to internality in early adolescence than in late adolescence.

Although the data of Patsula (1969) and Abrahamson (Note 1) appear to concur in suggesting that adolescents' or young adults' locus of control beliefs are likely to be most closely associated with their

perceptions of the like-sexed parent and that adolescent and young adult males, more than females, are likely to show correlates in their locus of control beliefs with perceived parental behaviors, the failure in other relevant studies to support these as hypotheses resulted in their exclusion here as formal hypotheses.

The combining of parent-child practices, "children's" locus of control beliefs, and "children's" achievement behaviors as variables in a single study has a precedent in the work of Solomon, Houlihan, Busse and Parelius (1971). Within this perspective locus of control beliefs are seen as mediating parental behaviors. Parental behaviors, thereby, become more indirect variables in determining achievement behaviors. As the review of this area suggested moderate parental warmth appears to contribute to achievement behavior. On the other hand, high parental warmth (babying) appears to minimize achievement behavior. Thus any attempt to demonstrate a simple linear relationship between parental acceptance or warmth and adolescent locus of control beliefs may yield evidence which suggests parental warmth is negatively related to adolescent internality, especially in samples where perceived, extreme parental rejection is minimally represented. Thus the evidence requires the hypothesis that:

- (8) Perceived parental acceptance is related curvilinearly to adolescent achievement behavior in that moderate, as opposed to low or high, parental acceptance is most likely to be related to adolescent academic achievement (i.e., grade-point average).

The evidence relating parental permissiveness to children's

achievement, in the light of the Baumrind (1971) study, suggests that the nature of control is important in that the authoritative parent who was seen as attempting to direct the child's activities in a rational and issue-oriented manner rather than in an authoritarian or coercive manner facilitated the development of a child's competence. This and other information indicates that the authoritative parent in expressing firm control is more likely to facilitate achievement-related behavior than the permissive parent whose control is lax or moderate, while the authoritarian parent who is more likely to be psychologically controlling may contribute less to a child's achievement than the parent who disavows dependence on psychological controls. Thus two hypotheses follow:

- (9) Perceived parental firm control is related positively to adolescent academic achievement.
- (10) Perceived parental psychological autonomy is related positively to adolescent academic achievement.

Inasmuch as the research literature seems to suggest that the parental variables which contribute to children's locus of control beliefs are the same as, and contribute in an equivalent manner as, those which are related to children's achievement behaviors, it is no surprise to find that research generally indicates that children's beliefs in internality are predictive of their achievement behavior. Thus, it may be hypothesized that:

- (11) Adolescents' beliefs in internality are related positively to their academic achievement.

Inasmuch as the literature suggests that this relationship is also

influenced by the sex of the child it is also hypothesized that:

- (12) In the event that a sex difference appears in the above hypothesized adolescent I-E with achievement relationship, the relationship will be stronger for males than for females.

General Model regarding Parent Behaviors,

Adolescent Attitudes and Their Consequences

An overview, then, of the hypotheses offered in this section should imply several things. First, it is assumed that perceived parental behaviors have correlates with both adolescent expectancies and with adolescent behaviors. At the same time, consistent with Rotter's social learning theory, it is assumed that adolescent expectancies in so far as they represent a subjective evaluation of the operations of reinforcements, make a unique contribution to the prediction of adolescent behavior. However, as apparent in this section, neither set of predictor variables, perceived parental behaviors and adolescent locus of control beliefs, are to be interpreted as either independent or as totally correlated predictors of adolescent behaviors. Instead it is assumed that they make interrelated, yet partially unique, contributions to the behavior of the adolescent. It is the hope of this study to add somewhat to the present understanding of the relationship between parent behaviors, adolescent attitudes and adolescent academic achievement.

STUDY I:

DEVELOPMENT OF A MEASURE OF
LOCUS OF CONTROL BELIEFS

CHAPTER II

METHOD

CONSTRUCTION OF THE MULTICONTENT LOCUS OF CONTROL (MLC) MEASURE

Dimensions in Item Construction

In order to develop a measure which allowed an assessment of the relative strengths of unidimensional versus multidimensional perspectives, statements dealing with locus of control beliefs were written to equally fill up the sections of Table 5. As can be seen from the table, origin of control beliefs and content of control beliefs were made major variables in determining the construction of a statement. Origin may be interpreted as the source of power, competence or influence determining a consequence in question in a statement. Content refers to the situation, context or arena within which the question of control is raised.

Origin of control was specified as either the influence of chance, or powerful others, or personal skill or ability. The particular content categories used were chosen because they represented content most common in locus of control measures previously reviewed. Within the categories of origin of control, statements were written such that agreement with them would indicate beliefs in internality and externality by the respondent. That is, each statement written was either internal or external in outlook whatever its origin. Furthermore both internal and external statements were written for each origin or content category. In addition, any statement was either personal or general in reference. In other words each statement verbalized an

Table 5
Categorization of MLC Statements

Content of Control	Origin of Control						
	Luck		Skill		Others		
	I	They	I	They	I	They	
Political, Systems	Internal	1	10	22	4	16	25
		37	46	58	40	52	61
		73	82	94	76	88	97
		109	115			113	119
Education, Achievement	External	19	28	31	13	34	7
		55	64	67	49	70	43
		91	100	103	85	106	79
Social Acceptance	Internal	8	35	20	11	14	32
		44	71	56	47	50	68
		80	107	92	83	86	104
		114	120			117	111
Political, Systems	External	26	17	29	2	5	23
		62	53	65	38	41	59
		98	89	101	74	77	95
Social Acceptance	Internal	15	33	27	36	30	12
		51	69	63	72	66	48
		87	105	99	108	102	84
		112	118			116	110
Political, Systems	External	6	24	18	9	21	3
		42	60	54	45	57	39
		78	96	90	81	93	75

attitude about oneself (I) or about people in general (They). As with the distinction between internal and external statements, any origin or content category was meant to contain an equal number of personal and general statements.

Labels

In order to simplify later work with the measure structural labels were applied to the categories just described. First, the second smallest unit of the scale was labelled a "subcell." For example, statements numbered 11, 47 and 83 comprise a subcell. The scale has 36 such subcells. Identification of a particular subcell was established by order of the cells counting from left to right and from the top of the table down. The example of a subcell just given was for subcell 16. Four subcells making up the cross-section of a particular origin and content of control were labelled a "cell." The previous subcell together with subcells 15, 21 and 22 constitute cell 5. As with subcells, the nine cells of the matrix are identified by order from left to right and top to bottom. The measure was also constructed to serve someone interested in a more restricted dimension of locus of control beliefs. Therefore, in scale construction, columns and rows of the matrix in Table 6 were given structural labels. The six rows of the matrix were designated "subrows" and identified by number from top to bottom. Subcell 15 is found in subrow 3 of the matrix. Designation of a particular content of control was attached to the label "row." For example, one finds cell 5 in row 2. Subrows 3 and 4 make up row 2 and one could as easily call this an education, achievement subscale of the overall measure. As with the subrows, the three rows were numbered

from top to bottom. Columns of the scale were treated in equivalent manner. There are six "subcolumns" identified by order from left to right. Subcell 15 is in subcolumn 3. The three rows of the scale are numbered from left to right and cell 5 is found in column 2 which is made up of subcolumns 3 and 4.

Item Construction

Approximately 150 statements were written and/or categorized into the original matrix. Very few of these items were taken from other measures of locus of control beliefs. For the original version of the measure 120 items were categorized as shown in Table 5. Awkward or inappropriate statements were to be eliminated by this selection. The matrix of categories contains 36 subcells and, presuming no loss from later assessments, the number of items in the measure was intended to be a multiple of 36. However, 12 extra statements were retained and added to the end of the list (further explanation regarding these statements is in Appendix A). The scale was named the Attitude Action Series to provide a noninformative label for the respondent and to identify it in later scoring and analyses. However, in reference to its construction, the measure is referred to as the Multicontent Locus of Control (MLC) Measure in this writing.

SUBJECTS

852 undergraduate students serving out their required research participation in the introductory psychology program provided the initial sample. After eliminating materials from respondents from single parent families, without recent contact with one or both parents,

or reports from respondents that were incomplete to the point of irreparability, measures were available ultimately on 388 males and 426 females. Age range of the respondents was between 17 and 22 years.

PROCEDURE

During specially scheduled sessions Ss were administered the 120-item MLC, the Crowne-Marlowe SD scale (Crowne & Marlowe, 1964), the Edwards SD scale (Edwards, 1957) and the PARI (Schaefer & Bell, 1958). They completed the MLC and the PARI (see p. 25) statements together with the Crowne-Marlowe SD scale during a first session. After one week Ss returned to complete the MLC and the PARI a second time followed by the Edwards SD measure.

CHAPTER III

RESULTS

CHARACTERISTICS OF THE MLC

Internal responses on the MLC items were scored 1 and external responses scored 0. Therefore internal responses on all larger sections of the MLC were represented by higher scores. Test-retest administration of the MLC and administration of the two social desirability measures yielded information relevant to several aspects of scale development. Test-retest reliability, item intercorrelations, MLC structure and social desirability involvement were initial interests. However, structure of the social desirability instruments also appeared as important information from this study.

Item Reliabilities

Test-retest correlation of the 120 MLC items was based on the responses of the undergraduate sample of 814 students (males = 388; females = 426). Items having test-retest correlations (phi coefficients) less than .22 in the total sample were eliminated from item intercorrelations. As can be seen in Table 6, none of the 120 correlations were negative and the weakest test-retest correlation was .165.

Item Correlations

The degree of item reliability was not in perfect agreement with an item's intercorrelation with other items. Therefore, while it had been hoped to establish a minimal cutoff on the number of substantial intercorrelations with other items, the desired number of items (36 or

Table 6

Test-retest Reliabilities of the Original 120 Items

of the MLC for the Total Sample

Item	ϕ	Item	ϕ	Item	ϕ	Item	ϕ
1	.476	31	.466	61	.291	91	.473
2	.572	32	.494	62	.323	92	.401
3	.366	33	.392	63	.392	93	.339
4	.329	34	.516	64	.329	94	.497
5	.409	35	.334	65	.182	95	.524
6	.460	36	.165	66	.220	96	.423
7	.264	37	.181	67	.438	97	.391
8	.364	38	.339	68	.454	98	.303
9	.481	39	.480	69	.366	99	.255
10	.307	40	.299	70	.216	100	.242
11	.463	41	.514	71	.380	101	.228
12	.327	42	.328	72	.487	102	.169
13	.312	43	.489	73	.406	103	.424
14	.352	44	.323	74	.340	104	.436
15	.228	45	.297	75	.276	105	.216
16	.361	46	.230	76	.478	106	.325
17	.460	47	.346	77	.288	107	.356
18	.326	48	.292	78	.379	108	.285
19	.486	49	.421	79	.421	109	.215
20	.386	50	.416	80	.286	110	.184
21	.441	51	.257	81	.358	111	.298
22	.502	52	.245	82	.199	112	.179
23	.422	53	.385	83	.416	113	.260
24	.294	54	.380	84	.227	114	.391
25	.372	55	.300	85	.348	115	.269
26	.438	56	.384	86	.432	116	.235
27	.447	57	.394	87	.278	117	.406
28	.353	58	.447	88	.415	118	.330
29	.435	59	.359	89	.423	119	.357
30	.222	60	.307	90	.304	120	.368

72) for the final version necessitated retaining two items (numbers 9 and 81) which did not correlate over .20 with any other item for the total sample. (Appendix B provides additional information on item intercorrelations.) Inasmuch as the a priori requirement for a balanced scale preceded any more consistent criterion for item intercorrelations, the item(s) of each subcell having the poorest reliability in the total sample of respondents were deleted. However, if item reliabilities were over .30, a more reliable item of a subcell was eliminated if it showed substantially fewer and/or weaker correlations with other items in the total sample. Test-retest reliability of the original 120-item MLC was .834 while test-retest of the revised 72-item MLC (2 items per subcell) was .837 for the total sample of respondents.

Factor Analyses

Principal axes analyses of the nine MLC cells was felt to be the best assessment of the factor structure of this instrument. The cells differed only in regard to their combination of origin and content of control. Analyses of other personality measures have been based on subscale constructions and work by other researchers had suggested that correlations between locus of control items were not generally large. Therefore, to minimize some of the plausible item specificity problem, elements made of item sums were analyzed. In all probability there are other dimensions along which locus of control beliefs can vary which were not considered by these evaluations of locus of control statements (e.g., responsibility for success versus responsibility for failure) and item sums would help minimize some of this uncontrolled item specificity.

Principal axes analyses of MLC cells, for the total sample or by sex of respondent of the revised 72-item questionnaire, indicated, in every case, a single factor solution (see Table 7). Analysis of the total sample yielded eigenvalues of 3.55 and .74 and these first two factors accounted for 39.5% and 8.2% of the total scale variance. For males the first two factors yielded eigenvalues of 3.71 and .66, and accounted for 41.2% and 7.4% of the total scale variance. For females these unrotated factors showed eigenvalues of 3.43 and .79 and accounted for 38.1% and 8.8% of the total scale variance.

The MLC, in contrast to Rotter's I-E scale, does not show a multi-factor solution. Apparently the better balancing of item content across the major dimensions of locus of control beliefs as characterized in recent research eliminates the fractionation found in more poorly balanced scales. However, these results do not mean that Rotter's assumption regarding a unidimensional and generalized locus of control belief is finally demonstrated. The present analyses fail to negate the possibility of other dimensions pulling the scale together. For example, social desirability variance, which has not been eliminated by a choice of items, may be a source of the single factor solution. Table 8 shows the correlations of the Crowne-Marlowe SD scale and the Edwards SD scale with revised MLC cells. While correlations with the Crowne-Marlowe SD scale are in the range usually reported for the I-E scale, the correlations with the Edwards scale are fairly high and generally consistent with those found by Cone (1971) with the I-E scale. Therefore, if any social desirability variance was determining the structure of the MLC it seemed likely to be due to the

Table 7
 Unrotated Factor Loadings of Revised MLC
 Cells for Total Sample, Males, and Females

Cell ^a	Total Sample		Males		Females	
	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
1	.658	-.289	.648	-.285	.676	-.283
2	.643	-.469	.651	-.427	.645	-.492
3	.689	-.407	.727	-.383	.667	-.410
4	.669	.263	.681	.236	.653	.291
5	.603	.211	.608	.219	.595	.217
6	.584	.207	.595	.245	.574	.201
7	.658	.237	.676	.243	.637	.215
8	.575	.135	.573	.090	.576	.152
9	.561	.205	.604	.143	.513	.239

^aAs described on p. 78 and specified in Table 5, labels clarifying the nature of the items making up the cells are: (1) political, systems-luck, (2) political, systems-skill, (3) political, systems-others, (4) education, achievement-luck, (5) education, achievement-skill, (6) education, achievement-others, (7) social acceptance-luck, (8) social acceptance-skill, and (9) social acceptance-others.

Table 8
 Correlation Between Revised MLC Cells
 and Marlowe-Crowne and Edwards SD Scores

Cell ^a	First Session MLC				Second Session MLC			
	Crowne-Marlowe		Edwards		Crowne-Marlowe		Edwards	
	Males	Females	Males	Females	Males	Females	Males	Females
1	.071	.095	.273	.307	.054	.049	.199	.278
2	.097	.049	.236	.261	.092	.073	.264	.272
3	.132	.048	.240	.301	.081	.080	.260	.321
4	.082	.138	.234	.314	.063	.154	.227	.353
5	.038	.071	.119	.255	.028	.148	.204	.272
6	.016	.027	.129	.204	-.025	.074	.157	.243
7	.035	.103	.204	.344	.069	.093	.248	.345
8	.119	.169	.166	.253	.093	.177	.154	.302
9	.156	.187	.205	.318	.125	.195	.206	.335

^aCell labels are given in footnote on p. 85.

Edwards scale. Four matrices of first-order partial correlation coefficients were constructed by the removal of Edwards scale variance from the zero-order correlation matrices of the 72-item MLC cells from the first session data for males alone and females alone and from the second session data of males alone and females alone. These matrices were comparable to the matrices of residual coefficients in centroid analysis. As with previous analyses, principal axes analyses of these residual matrices indicated single factor solutions. For males, the first two factor eigenvalues for the first session matrix were 3.03 and .56, and these factors accounted for 33.7% and 6.2% of the total scale variance. The second session administration of the MLC, for males, showed eigenvalues of 3.90 and .86, and the first two factors accounted for 43.4% and 9.6% of the total scale variance. Analysis of the females' first session data yielded eigenvalues of 2.50 and .81 with these factors accounting for 27.8% and 9.0% of the total scale variance. Females' second session data showed eigenvalues of 3.24 and .94 with variance accounted for by these factors of 36.0% and 10.5%. MLC cell factor loadings for these four analyses of the first-order partial correlation matrix of revised MLC cells are found in Tables 9 and 10. Again, but not without limitation, these analyses enhance the credibility of Rotter's assumption of a unidimensional and generalized belief regarding locus of control. The evidence is not complete and future analyses of this data may add more information on the issue. In addition, it is probable that for certain situations, certain questions and certain samples that the larger amount of variance predicting attitudes or behavior is tied to more restricted dimen-

Table 9
 Unrotated Factor Loadings of the First Order
 Partial Correlation Matrices of Revised MLC Cells
 (Edwards SD Variance Removed) Obtained from First
 Session Responses of Males and Females

Cell ^a	Males		Females	
	Factor I	Factor II	Factor I	Factor II
1	.578	-.280	.628	-.306
2	.603	-.378	.589	-.466
3	.686	-.311	.566	-.388
4	.611	.260	.564	.337
5	.547	.211	.522	.256
6	.559	.288	.476	.229
7	.623	.170	.537	.200
8	.481	-.022	.495	.147
9	.510	.141	.300	.245

^aCell labels are given in footnote on p. 85.

Table 10
 Unrotated Factor Loadings of the First Order
 Partial Correlation Matrices of Revised MLC Cells
 (Edwards SD Variance Removed) Obtained from Second
 Session Responses of Males and Females

Cell ^a	Males		Females	
	Factor I	Factor II	Factor I	Factor II
1	.653	-.321	.647	-.278
2	.643	-.497	.639	-.538
3	.716	-.457	.667	-.465
4	.708	.214	.613	.294
5	.637	.249	.570	.210
6	.620	.215	.593	.213
7	.687	.321	.593	.268
8	.618	.163	.549	.195
9	.637	.143	.513	.276

^a Cell labels are given in footnote on p. 85.

sions of locus of control beliefs.

STRUCTURE OF TWO MAJOR MEASURES OF SOCIAL DESIRABILITY

In the test-retest study an opportunity was available to review the analyses of the Edwards scale and to extend the information about the structure of social desirability scales to the recently more accepted Crowne-Marlowe scale. Principal axes analyses of the Edwards scale answered by 813 respondents again indicated an unclear factor structure (see Table 11). Eigenvalues of the scale for the first three factors were 3.85, 1.37 and .81. Variance accounted for by these factors was 9.9%, 3.5% and 2.1%. Analyses by sex of respondent indicated no real differences from the overall analysis. As above, the second factor accounted for an insufficient amount of variance according to the usual criterion. Cluster analyses indicated that factor definition was restricted to very few items. Principal axes analyses of the Crowne-Marlowe scale items indicated, at best, an equally dissatisfactory structure (see Table 12). Eigenvalues for the first two factors were 3.23 and .78, and these factors accounted for 9.8% and 2.4% of the total scale variance. Splitting the 808 respondents into male and female samples indicated no greatly different interpretation.

Table 11
Unrotated Factor Loadings of Edwards
SD Scale Items for the Total Sample

Item	Factor I	Factor II	Item	Factor I	Factor II
1	-.230	.234	21	.293	.231
2	-.179	-.069	22	-.331	-.087
3	.508	.255	23	.123	.031
4	.437	.186	24	.366	-.086
5	.178	.099	25	.068	.224
6	.328	.052	26	.150	.163
7	-.240	-.173	27	.527	.131
8	-.437	-.193	28	.371	-.410
9	.348	-.335	29	.459	.263
10	.207	.036	30	.457	.025
11	.148	.220	31	.302	-.063
12	.223	-.435	32	-.279	.266
13	-.312	.206	33	.297	.187
14	-.178	.012	34	.184	.021
15	.284	-.180	35	.336	-.129
16	.372	-.004	36	.364	-.162
17	.045	.176	37	-.208	.205
18	.218	.101	38	.415	-.103
19	.242	.121	39	.434	-.156
20	.293	.122			

Note. Items are scored for position.

Table 12
 Unrotated Factor Loadings of Crowne-Marlowe
 SD Scale Items for the Total Sample

Item	Factor I	Factor II	Item	Factor I	Factor II
1	.171	.138	17	.280	.201
2	.336	.185	18	.215	-.099
3	-.247	.118	19	-.398	.019
4	.341	-.139	20	.292	.277
5	-.216	.092	21	.403	.001
6	-.358	.175	22	-.281	.226
7	.256	.186	23	-.336	.181
8	.310	-.005	24	.303	.260
9	-.298	.111	25	.333	.230
10	-.261	.024	26	.388	-.014
11	-.213	.155	27	.183	.238
12	-.314	-.048	28	-.358	.183
13	.454	.121	29	.166	-.263
14	-.251	.129	30	-.411	-.032
15	-.402	.107	31	.280	-.060
16	.377	.185	32	-.186	.008
			33	.386	-.070

Note. Items are scored for position.

STUDY II:

PERCEIVED PARENT BEHAVIOR, ATTRIBUTIONS OF CONTROL,
AND ACHIEVEMENT BEHAVIOR IN ADOLESCENTS

CHAPTER IV

METHOD

SUBJECTS

Respondents were junior high and high school students from three school divisions (six schools) in Winnipeg. The overall sample of 575 students (after elimination due to incomplete data) was composed of subsamples separated by grade and sex: Grade 7 males ($n = 35$), Grade 7 females ($n = 43$), Grade 8 males ($n = 32$), Grade 8 females ($n = 40$), Grade 9 males ($n = 52$), Grade 9 females ($n = 52$), Grade 10 males ($n = 59$), Grade 10 females ($n = 57$), Grade 11 males ($n = 29$), Grade 11 females ($n = 41$), Grade 12 males ($n = 71$), Grade 12 females ($n = 64$). All of these respondents were living at home with both parents.

After an initial failure to obtain all students in a single school division, a format was developed for applying to several school divisions. (The school division rejected the application because of the time required per student and because the administrator reviewing the proposal felt the study would obtain more information about home life than the community would tolerate.) After initial contact with the superintendents, a form letter explaining the project and examples of research materials were delivered to their offices. Included in this representation was a form letter indicating the information felt acceptable for sending to parents in an application for permission to use their children in this study. Ultimately, four out of nine school divisions contacted gave permission and/or recommendation to apply to specific schools for subjects. In one of these divisions a junior high

school principal indicated his feeling that the reading level of the measures was too difficult for Grade 7 or 8 students. While continuation of the study would have been allowed, sufficient students were available from the remaining three divisions and no further attempt was made to obtain respondents from this division. Several schools developed their own letter to parents.

PROCEDURE

In coordination with the sending of letters of permission, timetables were arranged for the administration of the research materials. Respondents were to be given a brief, personal data sheet, the CRPBI, the revised MLC, the Crowne-Marlowe SD scale, and the Edwards SD scale. Inasmuch as the completion of these materials was expected to require as long as two hours from the younger students, they were arranged into two packages in order to adapt to possible restrictions in the daily schedule of the schools. The first package--personal data sheet, and CRPBI--could be given in a first hour session. The second package--personal data sheet, MLC, Crowne-Marlowe scale, and Edwards scale--could be completed in a separate session. Only one school required such a repeat session.

After initial directions, students filled out the personal data sheet and then answered the questionnaires on IBM answer sheets. This minimized the steps necessary to place the data on computer cards.

At the end of the grading period during which the materials were administered to the respondents, students' grades were obtained from the schools. The administration of materials to respondents took place

from June of 1974 to February of 1975. The last grade information was obtained in June of 1975.

CHAPTER V

RESULTS

Factor Analysis of the CRPBI

Principal components analysis of the CRPBI yielded the expected three-factor solution. These first three factors accounted for 36.8% (Rejection-vs.-Acceptance), 17.7% (Firm Control-vs.-Lax Control) and 12.9% (Psychological Control-vs.-Psychological Autonomy) of the total scale variance. Factor loadings of the varimax, three-factor rotation for the total sample are found in Table 13. Spencier (1971) obtained a three-factor extraction based on the responses of 160 thirteen and fifteen year old males and females of both rural and urban populations. The only change from this previous analysis was the shared loading of scales between the Psychological Control-vs.-Psychological Autonomy factor and the other two factors.

Factor Analysis of the MLC

Principal axes analyses of the 36 revised MLC subcells for the total sample and by sex of respondent generally supported a single factor structure. As previously indicated these analyses are not felt to be as important to a characterization of the structure of the MLC as analyses of the revised MLC cells. Principal components analyses of the nine cells by grades (Grade 7 and 8, Grade 9 and 10, Grade 11 and 12), by sex of respondent and for the total sample further provided some support for a single-factor interpretation of the MLC. Construction of a matrix of first-order partial correlations among the nine cells after removal of Edwards SD variance was done for the total

Table 13
 Varimax Rotated Factor Loadings of CRPBI
 (Mother and Father) Scales for Total Sample

Scale	Factor Loadings		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}
1. Acceptance	-.884	-.083	-.168
2. Childcenteredness	-.870	-.062	-.002
3. Possessiveness	-.563	.095	.531
4. Rejection	.648	.104	.602
5. Control	.033	.681	.465
6. Enforcement	.211	.639	.434
7. Positive Involvement	-.901	.036	-.058
8. Intrusiveness	-.140	.385	.628
9. Control through Guilt	-.042	-.006	.747
10. Hostile Control	.378	.318	.733
11. Inconsistent Discipline	.214	-.274	.598
12. Nonenforcement	.102	-.797	.100
13. Acceptance of Individuation	-.740	-.223	-.252
14. Lax Discipline	-.247	-.794	.063
15. Instilling Persistent Anxiety	.274	.267	.723
16. Hostile Detachment	.738	.021	.500
17. Withdrawal of Relations	.339	-.042	.672
18. Extreme Autonomy	-.025	-.756	-.061

sample. Principal axes analyses of this matrix, as in the test-retest study, indicated a single factor solution (see Table 14). Eigenvalues for the first two factors were 2.41 and .54. These factors accounted for 26.8% and 6.1% of the total scale variance.

Factor Analysis of the Social Desirability Measures

Principal components analysis of the 39 Edwards SD items indicated, as before, an unclear factor structure. The first two factors accounted for 11.0% and 6.6% of the total scale variance. Before rotation the large majority of items showing a substantial contribution to factor composition loaded on the first factor (see Table 15). Principal components analysis of the 33 Crowne-Marlowe SD items indicated a slightly clearer two-factor structure (see Table 16). However, cluster analysis showed the factors to be based on even weaker correlations than found between Edwards SD items. In the matrix of Crowne-Marlowe items the highest correlation was .26. In the Edwards correlation matrix the highest correlation was .34. In spite of these scale characteristics the Edwards SD scale showed consistently larger relationships with other variables than the Crowne-Marlowe SD scale. As in the test-retest study, the Crowne-Marlowe scale showed so little relationship with other variables as to be relatively useless as a control variable. For example, correlations of the Edwards SD scale with the MLC and factors of the CRPBI, for the total sample, are .407 (MLC), -.169 (mother's F_{R-A}), .072 (mother's F_{FC-LC}), -.367 (mother's F_{PC-PA}), -.148 (father's F_{R-A}), .045 (father's F_{FC-LC}) and -.314 (father's F_{PC-PA}), while correlations of the Crowne-Marlowe SD scale with these variables are .104 (MLC), -.150 (mother's F_{R-A}), .109 (mother's F_{FC-LC}),

Table 14
Unrotated Factor Loadings of the First Order
Partial Correlation Matrix of Revised MLC Cells
(Edwards SD Variance Removed) for the Total Sample

Cell ^a	Factor I	Factor II
1	.418	-.320
2	.510	-.383
3	.494	-.367
4	.568	.221
5	.563	.198
6	.546	.193
7	.616	.131
8	.478	.094
9	.435	.096

^aCell labels are given in footnote on p. 85.

Table 15
 Unrotated Factor Loadings of Edwards
 SD Scale Items for the Total Sample

Item	Factor I	Factor II	Item	Factor I	Factor II
1	.290	-.009	21	.465	-.324
2	.302	-.147	22	.375	-.341
3	.425	.117	23	.226	-.057
4	.410	.155	24	.314	.251
5	.292	-.354	25	.231	-.326
6	.421	-.152	26	.388	-.309
7	.353	-.326	27	.512	-.161
8	.421	-.297	28	.249	.426
9	.388	.313	29	.441	.140
10	.200	.019	30	.416	.045
11	.270	.056	31	.326	.207
12	.294	.269	32	.121	.250
13	.222	.041	33	.272	.154
14	.312	-.347	34	.127	.038
15	.076	.351	35	.299	.382
16	.388	.111	36	.359	.305
17	.207	-.474	37	.089	.194
18	.118	.324	38	.429	.247
19	.449	-.246	39	.407	.381
20	.323	-.065			

Table 16
 Unrotated Factor Loadings of Crowne-Marlowe
 SD Scale Items for the Total Sample

Item	Factor I	Factor II	Factor III	Item	Factor I	Factor II	Factor III
1	-.038	.396	-.310	17	.025	.435	.135
2	.190	.324	.072	18	.083	.025	-.235
3	.364	-.142	-.035	19	.380	.043	.381
4	.372	.150	.008	20	-.032	.347	-.303
5	.318	-.184	.009	21	.343	.232	.018
6	.450	-.103	.099	22	.408	-.125	.080
7	.027	.387	.121	23	.402	-.174	-.255
8	.229	.283	-.026	24	.116	.510	.114
9	.308	.259	-.179	25	-.190	.456	.203
10	.367	-.172	.095	26	.214	.194	-.004
11	.229	-.199	.082	27	-.013	.394	-.408
12	.421	-.023	.248	28	.444	-.243	.035
13	.149	.428	.107	29	.421	-.303	-.207
14	.300	-.079	-.445	30	.384	.237	.180
15	.491	-.051	-.094	31	.311	.019	-.304
16	.240	.403	-.070	32	.098	-.012	.415
				33	.305	.199	.070

-.073 (mother's F_{PC-PA}), -.221 (father's F_{R-A}), .130 (father's F_{FC-LC}) and -.095 (father's F_{PC-PA}). For this reason only the Edwards scale was retained again as a control measure.

HYPOTHESES

Hypotheses 1 to 6: Relations between CRPBI Factors and the MLC

Information relevant to hypotheses 1 to 6 are found in Tables 17 and 18. Table 17 shows zero-order correlations between MLC 72-item totals (internal scores are high) and the CRPBI factors (rotation on the first factor yielded high scores on Rejection; on the second factor rotation resulted in high scores on Firm Control; and high factor scores on the third factor represent Psychological Control). The relationships are in the predicted direction and the smallest correlation is significant at $p < .001$ (see Appendix F for significance tables and their rationale).

Inasmuch as the Edwards SD scale showed substantial correlations with the two measures being interrelated, a calculation of the first-order partial correlation between MLC total and the CRPBI factors with Edwards scale variance removed is shown in Table 18. Again, all relationships are significant. The smallest correlation is significant at $p < .005$ (all significance tests assessing the formal hypotheses are one tailed). In Tables 17 and 18 only the zero-order correlations between MLC and the Psychological Control-vs.-Psychological Autonomy factor are sizeable. This relationship is reduced to levels comparable to the others when Edwards scale variance is removed, indicating the larger social desirability involvement in the Psychological Control-

Table 17
 Zero-order Correlations between
 CRPBI Factor Scores and MLC Total

	CRPBI					
	Father			Mother		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}	F _{R-A}	F _{FC-LC}	F _{PC-PA}
MLC	-.152**	.137**	-.294****	-.181***	.133*	-.248****

* $p < .00, 1.$

** $p < .00, 05.$

*** $p < .00, 001.$

**** $p < .00, 000, 000, 1.$

Table 18
 Partial Correlations between CRPBI
 Factor Scores and MLC Total
 (Edwards SD Variance Removed)

	CRPBI					
	Father			Mother		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}	F _{R-A}	F _{FC-LC}	F _{PC-PA}
MLC	-.102*	.130****	-.192*****	-.125***	.114**	-.116**
	* _p < .00, 75.					
	** _p < .00, 5.					
	*** _p < .00, 25.					
	**** _p < .00, 1.					
	***** _p < .00, 000, 5.					

vs.-Psychological Autonomy factor (high SD scores tied to Psychological Control). At the same time, it is important to recognize the independent contribution made by these factors in predicting locus of control beliefs. A multiple regression analysis predicting MLC total from the Edwards scale, a socio-economic (SES) index of paternal occupations (Blishen, 1967) and the six CRPBI factors was run next. The introduction of variables was by stepwise inclusion in conjunction with a two-step preestablished hierarchy. That is, the control variables, Edwards SD and SES, were forced into the prediction equation first. Other than being first or second in the equation, their order was determined by the criteria implied in stepwise inclusion (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). The six CRPBI factors were then tested for inclusion in the prediction equation, their acceptability and order being determined by the stepwise inclusion criteria. After the inclusion of the two control variables, the F ratios for the six factors not yet in the equation proved to be significant at $p < .05$ or better (see Table 19). Subsequently, all father factors were introduced as significant predictors of MLC total. The order of their entry was Psychological Control, Firm Control and Rejection. The entry of the last variable, the Rejection-vs.-Acceptance factor, maintained a highly significant regression equation, $F(5, 569) = 37.01, p < .001$ (see Table 20). All mother factors failed to predict MLC total significantly.

Hypothesis 7: Age-related Contribution of Parental Acceptance
to Adolescent Locus of Control Beliefs

Table 21 shows zero-order correlations between the CRPBI Rejection-vs.-Acceptance factor (by parent) and MLC total. The visual pattern

Table 19
 Statistics on CRPBI Factors Before Entry into
 Regression Equation Predicting MLC Total
 (Edwards SD and Blishen SES have been entered)

Predictors	Partial r	Tolerance	F ^a
Father			
F _{R-A}	-.091	.973	4.744*
F _{FC-LC}	.120	.994	8.380***
F _{PC-PA}	-.195	.902	22.455*****
Mother			
F _{R-A}	-.117	.969	7.975***
F _{FC-LC}	.108	.993	6.716**
F _{PC-PA}	-.122	.865	8.651***

^adf = 1, 571.

*p < .05.

**p < .01.

***p < .005.

****p < .001.

Table 20

Summary of Stepwise Regression Analysis in Which MLC
Total is Predicted by Prior Entry of Edwards SD and
Blishen SES While CRPBI Factors are Tested Last

Variable ^a	R	R ²	r ^b	B ^c	S.E. _B ^d	b ^e	t ^f
Edwards SD	.407	.165	.407	.514	.062	.322	8.271**
Blishen SES	.439	.193	.178	.097	.024	.151	4.127**
Father							
F _{PC-PA}	.473	.223	-.294	-1.755	.350	-.193	-5.012**
F _{FC-LC}	.486	.236	.137	1.040	.326	.117	3.195*
F _{R-A}	.495	.245	-.152	-.885	.330	-.099	-2.679*

^aPredictors passing forward (stepwise) inclusion criteria are listed as entered.

^bZero-order correlation.

^cUnstandardized coefficient; Y intercept = 29.974.

^dStandard error of B.

^eStandardized coefficient.

^f $t = (r_{y(i.12\dots k)})^{(N-k-1)/1-R_{y.12\dots k}^2}$, where the numerator is a part correlation and k is the number of independent variables and

df = 575-5-1.

*p < .01.

**p < .001.

Table 21
 Zero-order Correlations between
 CRPBI Rejection-vs.-Acceptance
 Factor and MLC Total

MLC	CRPBI			
	Father		Mother	
	Grades 7-9	Grades 10-12	Grades 7-9	Grades 10-12
	-.230***	-.109*	-.263****	-.126**

* $p < .05$.

** $p < .02, 5$.

*** $p < .00, 01$.

**** $p < .00, 001$.

of correlations in Table 21 suggest support for hypothesis 7 in that there is an apparently larger relation between the variables for the younger grades. This is the simplest comparison between ages within the adolescent sample. Using Fisher's \underline{r} to \underline{Z} transformation, tests across the age groups for differences in perceived paternal acceptance behavior indicate a significant difference at $\underline{p} < .07$. Difference in perceived maternal acceptance as related to MLC is significant at $\underline{p} < .05$. Inasmuch as hypothesis 7, as worded, is twice tested by the use of the two comparisons, a per hypothesis error rate would lead one to reject an interpretation of these results as substantively supporting the hypothesis. These results appear more nebulous after partialling out the variance due to the intended control variable, Edwards social desirability (see Table 22). While in absolute terms the changes are still there, they are now so reduced as to be unsupportable statistically ($\underline{p} > .05$).

As a side interest, it should be noted that Edwards social desirability appears to be correlated with the CRPBI and with the MLC in an age-related manner. Correlation of the father rejection factor with Edwards SD by Grades 7 and 8, Grades 9 and 10 and Grades 11 and 12, respectively, is $-.270$, $-.237$ and $-.012$. Correlation of the mother Rejection-vs.-Acceptance factor with Edwards SD by the above ordering of grades is $-.325$, $-.200$ and $-.046$. Correlation of the MLC total with Edwards SD by the above ordering of grades is $.572$, $.391$ and $.283$. The size of these subsections of the overall sample, again by the above ordering of grades, is 150, 220, and 205.

Table 22
 Partial Correlations between CRPBI
 Rejection-vs.-Acceptance Factor and
 MLC Total (Edwards SD Variance Removed)

MLC	CRPBI			
	Father		Mother	
	Grades 7-9	Grades 10-12	Grades 7-9	Grades 10-12
	-.225***	-.104*	-.253****	-.113**

* $p < .05.$

** $p < .02, 5.$

*** $p < .00, 05.$

**** $p < .00, 005.$

Development of a Grade Score to Represent Achievement

The development of a score for a student's grade was not as automatic as for other variables of the study. Schools varied in the number of grades assigned to a student for a given course. Furthermore, one high school assigned numerical grades, while the remainder of the schools in which the study occurred gave letter grades. Inasmuch as the study was not concerned with between-school differences in the variables, a mean was derived for the numerical grades and a similar mean was derived for a numerical transformation of the letter grades from the other two high schools. These means were assumed to represent equivalent grades and the weight or coefficient establishing their equivalence was very simply derived. All grades subsequently were transformed to their appropriate numerical value for a real or hypothetical letter grade. Due to the variation in the number of grades available on any student (respondents were taking varied programs with different courses) traditional internal consistency measures were not applicable. Therefore an approximation to techniques used in test-retest or alternate forms studies was developed. The list of grades on each student was divided into odd and even sums based on the order of the grades as recorded. Means of these odd and even sums were calculated based on the number of grades entering their respective sums for each individual student. The correlation between these odd and even means was .671 for the total sample.

Hypothesis 8: Curvilinear Relation between
Parental Acceptance and Adolescent Achievement

Hypothesis 8 proposes a curvilinear relationship between parental acceptance or rejection and adolescent academic achievement. In order to assess this hypothesis a polynomial regression equation was constructed. The Rejection-vs.-Acceptance factor scores for each parent were squared and cubed. Then these variables together with the original factor scores were entered into a multiple regression program (Nie, et al., 1975). The order of the variables was forced in that the original factor scores were entered first, the squares of the factor scores entered next, and their cubes entered last. Entry of the original factor scores first into the equation eliminates any variance they contribute from being evaluated in later steps. Therefore, even if a new criterion variable was not being predicted, this would not be a retest of previous comparisons. Each entry was tested for the significance of its addition to the predictor group. According to hypothesis 8, one would predict that the square of the factor scores contributed significantly to predicting grade point average (GPA). The test (Nie, et al., 1975, p. 372) that the squared term, derived from the father factor scores, contributed to predicting adolescent grade point average proved to be nonsignificant, $F(1, 572) = .127$. However, the square of maternal rejection factor scores predicted adolescent grade point average significantly, $F(1, 572) = 7.32$, $p < .01$. Unfortunately, the direction of the relationship is positive rather than negative. This implies that the quadratic aspect of the two-variable relationship is to be described by a U-shaped line rather than an inverted U. The

hypothesis proposes an inverted U relationship and this leads us to conclude there is no support for hypothesis 8.

Hypotheses 9 and 10: Relations between
CRPBI Factors and GPA

Hypotheses 9 and 10, relating perceived parental control and psychological control to adolescent GPA, are dealt with in Table 23. While the hypotheses are again subject to double testing in that there are perceived paternal and maternal factors, the significance levels attained by the correlations are, for the weakest correlation in the table, significant at $p < .02$. Of interest to the reader, the above tests for significance cover the relation between perceived paternal and maternal Rejection-vs.-Acceptance factors and adolescent academic achievement, although no hypothesis was made regarding the linear relationship between these variables.

Hypothesis 11: MLC Relation to GPA

As an initial answer to hypothesis 11 which predicted a positive relation between the degree of adolescent internality and achievement, correlations between MLC totals and adolescent GPA are .394 for the total sample and .383 and .341 for males and females respectively. The weakest of these correlations is highly significant ($p < .00,000,000,1$). Finally, a multiple regression analysis (Nie, et al., 1975) was run in which adolescent GPA was predicted by a forced ordering of the variables important to hypotheses 9 to 11. The criterion variable was predicted first by the two control variables, Edwards SD scale and SES index. Their variance then was controlled for

Table 23
 Zero-order Correlations between CRPBI
 Factor Scores and Grade Point Average

	CRPBI					
	Father			Mother		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}	F _{R-A}	F _{FC-LC}	F _{PC-PA}
GPA	-.097*	.098*	-.174***	-.141**	.153**	-.201****

*_p < .01.

**_p < .00,05.

***_p < .00,005.

****_p < .00,000,1.

in the subsequent forcing in of the six CRPBI factors. Finally, all the significant variables among the preceding were treated as control variables in the final entry of MLC total as a predictor. That is, stepwise inclusion of variables occurred within a three-step pre-established hierarchical inclusion of predictor variables. After the inclusion of the SES index in the set of predictors, calculation of the F ratios for variables not yet in the equation indicated that all variables remained significant predictors of adolescent GPA (see Table 24) save for the paternal Rejection-vs.-Acceptance factor, $F(1, 571) = 2.49$ (the next smallest $F(1, 571) = 4.16, p < .05$). Note also that the entry of MLC total as the last predictor (see Table 25), after controlling for all previously significant predictors of GPA, is highly significant, $F(1, 568) = 63.78, p < .001$.

Hypothesis 12: Sex Difference in MLC Relation to GPA

Data already have indicated that the presumption in hypothesis 12 of sex differences in locus of control and achievement relationships is not statistically supportable.

Table 24
 Statistics on CRPBI Factors and MLC Total Before
 Entry into Regression Equation Predicting GPA
 (Edwards SD and Blishen SES have been entered)

Predictors	Partial r	Tolerance	F ^a
Father			
F _{R-A}	-.066	.973	2.488
F _{FC-LC}	.085	.994	4.164*
F _{PC-PA}	-.131	.902	9.927***
Mother			
F _{R-A}	-.111	.969	7.143**
F _{FC-LC}	.139	.993	11.289****
F _{PC-PA}	-.156	.865	14.174****
MLC Total	.349	.807	79.208****

^adf = 1, 571.

*_p < .05.

**_p < .01.

***_p < .005.

****_p < .001.

Table 25

Summary of Stepwise Regression Analysis in Which GPA is
 Predicted by Prior Entry of Edwards SD and Blishen SES
 Followed by Testing of CRPBI Factors
 While MLC Total is Tested Last

Variable ^a	R	R ²	r ^b	B ^c	S.E. _B ^d	b ^e	t ^f
Edwards SD	.167	.028	.167	-.014	.015	-.039	-.899
Blishen SES	.203	.041	.120	.007	.005	.052	1.343
Mother							
F _{PC-PA}	.254	.064	-.201	-.268	.087	-.127	3.091*
F _{FC-LC}	.291	.085	.153	.223	.081	.105	2.731*
F _{R-A}	.307	.094	-.141	-.145	.086	-.066	-1.690
MLC Total	.431	.186	.394	.075	.009	.343	7.986**

^aPredictors passing forward (stepwise) inclusion criteria are listed as entered.

^bZero-order correlation.

^cUnstandardized coefficient; Y intercept = 3.844.

^dStandard error of B.

^eStandardized coefficient.

^f $t = (r_{y(i.12\dots k)})^{(N-k-1)}/1-R_{y.12\dots k}^2$, where the numerator is a part correlation and k is the number of independent variables and

df = 575-6-1.

*p < .01.

**p < .001.

CHAPTER VI

DISCUSSION

PROBLEMS IN MLC ITEM CONSTRUCTION AND THEIR SOLUTIONS

Two issues prevent a greater acceptance of the MLC as a unidimensional measure of locus of control beliefs. First, as previously noted (see p. 87), the content of the items, the nature of the sample of respondents and the social or cultural context in which the MLC is answered can be expected to influence the number of factors obtained from the measure. Second, the specification of alternative origins within an item can be expected to contribute to single or minimal factor solutions.

Other item content may yield a multi-factor structure. However, the present results suggest that single factor solutions are probable when care is taken to make items or scales with different content comparable in all other respects. Whether single or multiple dimensions are obtained in a measure may otherwise be determined by the generality of the item. Items which very carefully detail the situation to which they are applied are most likely to yield multi-factor solutions. One would expect a respondent to be more objective and to make distinctions more appropriate to situational variables in a decision-making situation that is rich in information relevant to the decision. However, items lacking situational information are more likely to yield to a respondent's attitudes and such items would more fairly reflect the dimensional nature of the attitudes unconfounded by variance of a situational or item specific nature.

To a limited degree, the nature of the sample of respondents has been considered in this research. Neither the sex nor age of the respondents, within the age limits of the present study, have shown differential factor structures. On the other hand, the context for responding was not manipulated beyond the standard considerations made to insure complete and unbiased testing. Therefore, a number of conditions exist in locus of control measurement which might yield multi-factor solutions. That such multi-factor results have not occurred, in spite of the variation in correlation of items of different content, suggests a single factor model is most appropriate for conceptualizing generalized expectancies.

Regarding the second issue, items providing both an internal and external declaration within a single statement are often difficult to categorize as to origin. This means that items specifying both options are either in a kind of category that involves both chance and skill or another amorphous category that labels items as a mix of skill and powerful others. At the beginning of the test-retest study it was necessary to enter the undergraduate subject pool while a sizable sample was still obtainable. This forced a premature closure on the issues in item construction. As a consequence distinctions between origin categories are minimized and this is critical to the assessment of dimensionality of locus of control beliefs. The two-sided item construction makes the legitimate distinctions between the luck, skill and powerful others categories vague. One may question whether multi-dimensionality could ever be demonstrated across origins of control.

While this sort of item construction eliminates the indefinite

aspect of a one-sided statement which leaves the unstated alternative to the mind of the respondent, the two-sided item construction retrospectively appears to force a unidimensional perspective rather than assess the vitality of that view. Several responses to this problem are possible. First, as previously noted, not all items of the MLC are two-sided. Table 26 is a categorization of the items which are essentially one-sided. For the original MLC it is possible to fill all except two subcells of the matrix with these one-sided items. To complete the matrix two items are noted which suggest the alternative origin category, but which have an overall character that allows a clear categorization. Factor analysis of the nine cells made up of sums of these items would be a fairer evaluation of the dimensionality issue. A similar approach could be taken with regard to items making up the revised MLC. However, here seven subcells would have to be filled with two-sided statements varying in the clarity with which they fit a single origin.

Second, it is important to recognize that previous research has demonstrated some important relationships with other variables based on an assumption of unidimensional measurement. Applied to this research, the assumption of unidimensionality in the hypotheses tested appears to be generally supported in view of the positive results.

THE SOCIAL DESIRABILITY PROBLEM

The measurement of social desirability also presents us with unique problems. The social desirability measures used in this research initially were thought to be respectable devices with a sound

Table 26
Categorization of One-sided MLC Statements

Content of Control	Origin of Control					
	Luck		Skill		Others	
	I	They	I	They	I	They
Political, Systems	37 (37)	10	22 (22)	4 (4)	113	119
	109	115 (46)	58 (78)	40	(52)	(25)
External	<u>91 (55)</u>	64 (64)	31 (75)	13	106 (70)	7
		100 (73)	67 (31)	49 (13)		79 (43)
Education, Achievement	114 (44)	120 (71)	20 (20)	47 (11)	<u>117 (80)</u>	32
			56 (56)	83 (47)		68 (32)
External	26 (77)	17 (17)	29 (29)	2	5	23
	62 (26)	53 (53)	65	38 (2)	41 (5)	95 (59)
Social Acceptance	98 (62)	89	101 (65)			
	112	118 (69)	27 (27)	36	116	110
Internal	(15)		63	72 (36)	(30)	(48)
			99 (63)	108 (72)		
External	6	24	54	9 (9)	21 (21)	3 (3)
	42 (6)	60 (24)	90 (54)	45	93 (57)	39 (39)
		96 (60)		81 (45)		

Note. Original MLC items are outside parentheses while revised MLC items are in parentheses. If an original and revised scale item are the same, they are adjacent within a subcell. Underlined items suggest both alternatives, but are the most one-sided of the items within a subcell.

methodological history and the first factor analyses of the instruments were made with the idea of demonstrating that respectability. The measures were to be used as control variables to provide a means of eliminating variance in other questionnaires that could not be attributed solely to their major functions. This remained the major purpose of the two social desirability scales. Unfortunately, neither measure of social desirability offers an impressive factor structure. Possibly other item characteristics outweigh the social desirability issue of many of the statements and some more deliberate formation of item sums such as has been done in the MLC is needed to indicate social desirability structure. Factor analytic techniques provide their unique picture of the measurement situation. Internal consistency measures, in indicating the stability of the scales, would offer an alternative characterization. Without this sort of additional information the factor analytic picture presented of the two scales by this research makes the generally more substantial correlations of the Edwards SD scale with other variables something of a surprise. It would appear that some sort of distinction needs to be made between the two scales (especially when one considers their correlation which is .207 for the total sample). Crowne and Marlowe (1960) appear to characterize the Edwards scale as an assessment of pathological symptomatology. A review of the items of the Edwards scale seems to assess one's willingness to admit being slightly odd or eccentric, anxious, dependent and possibly inept. On the other hand, the Crowne-Marlowe SD scale contains many statements which are so innocuous as to be easily admitted to by most respondents. For some respondents and from some

perspectives it may even be that the answer keyed as socially undesirable is preferred because, for example, it may reflect a contemporary view of skill in handling other individuals. No inconsistency exists here with the conclusions in the Edwards, Diers and Walker (1962) study. They interpreted the Crowne-Marlowe SD scale to be essentially a lie scale. This is corroborated by the earlier Crowne and Marlowe (1960) study in which the highest correlation of their scale with the MMPI (see p. 41) scales is with the L (or Lie) scale. It should be noted in this respect that the items of the Crowne-Marlowe scale were chosen partly because of the improbability of their occurrence. While lying may be tied to social desirability, the two constructs have not yet been shown to be congruent. They can load on separate factors (Edwards, et al., 1962), but it remains unclear whether this separation is due to a component of psychopathology in the Edwards scale, the component of lying in the Crowne-Marlowe scale, or both of these. Possibly the innocuous nature of the items of the Crowne-Marlowe scale minimizes the expression of whatever social desirability content remains in the scale and its correlation with measures uncorrected for social desirability could be enhanced by a more deliberate elicitation of subjects' need for approval and/or fear of disapproval in the report situation. On the other hand, the appearance of pathological content in the Edwards SD scale may in itself elicit a more defensive posture in the respondent, thereby enhancing the social desirability content of the scale. This may account for the general difference in strength of relationships found for these two measures.

The general assumption regarding social desirability responses has

been that they show widespread inter-cultural agreement and, as a consequence, a priori scaling of an item on the basis of its social desirability is highly predictive of the probability of its later endorsement. Orvik (1972) presented evidence which contradicts both of these assertions. From items of the MMPI an inventory was created which sampled a range of SD values and, independently, a range of mental health involvement according to prior scaling. Subjects from three distinct reference groups having divergent political and/or social domains and for whom membership was voluntary rated these items according to different reference points. They first rated the items in terms of their applicability to themselves (self-report). In addition and in the following order, they rated the items for social desirability from their individual or personal viewpoint, from the viewpoint of the group to which they were a member and from the perspective of people in general. Q correlation and Q factor analysis (assessment of the covariation between subjects rather than between items or scales) indicated that only when social desirability ratings were referenced to people in general was there evidence of general agreement. When referenced to the individual or his group, subjects clustered according to this group membership. Furthermore the inclusion of the subject's viewpoints regarding item social desirability, whether personal, or group oriented, added substantially to the predictability of self-reports. Moreover, the gain in prediction over a priori social desirability scale values was greatest when the social desirability rating was from the individual's own point of view. It is difficult to say whether this last finding represents a fair position for judgment

regarding social desirability or a position which merely vindicates the subject's self-report. Independently Klassen, Hornstra and Anderson (1975) have shown that the Crowne-Marlowe SD scale total score differs on such demographic characteristics as age, education and race. It is possible that cultural changes from the time of publication of these measures have been such as to require a re-examination of the cultural definitions of socially desirable responses.

We may conclude at least that a means of indicating a more coherent character to social desirability measurement is needed. The finding by Crandall, Crandall and Katkovsky (1965) of an age relationship in a children's social desirability questionnaire implies something further. Differences in social desirability may be due in part to developmental events and, as such, these differences are themselves interesting.

It might be speculated further that differences in social desirability responses or need for approval derive from parental behaviors. Unfortunately a study such as the present one does not allow the researcher to ascertain whether the correlation of the CRPBI with Edwards scale, for example, is due to response bias or is simply an indicator of perceived parent contributions to an expression of need for approval (or admission of neurotic symptoms). Among several alternatives for clarifying this confusion would be the separate administration of parent behavior and/or attitude measures to parents and an administration of need for approval measures to their children. Administration of a social desirability measure to the parents and partialing out of this measure's variance from the relation of the other

parent measures with their children's measures would indicate what parent behaviors are tied to their children's need for approval above the mimicry of social desirability attitudes between family members.

Another possibility would be to reconstruct a perceived parent behavior measure based on the forced-choice technique developed by Heineman (1953) and used by Christie and Geis (1968) in their measurement of Machiavellian attitudes. The item constructions in this approach might eliminate social desirability response bias in the items while contemporaneously allowing a respondent's perception of parent behavior to be predictive of his need for approval. This reconstruction of present perceived parent behavior measures might have the added advantage of brevity. The better measures in this area seem to be excessively long in view of the correlations obtained between the CRPBI and the PPQ (see p. 51). The PPQ is less than half the length of the CRPBI, while, at the same time, the PPQ gives evidence of measuring two of the three CRPBI factors with some adequacy. The development of a control for social desirability is not made easier by the indications in this research that social desirability correlates are age-related for the major measures. Not only do the correlations of the MLC and the CRPBI Rejection-vs.-Acceptance factor show higher correlations with Edwards SD the younger the adolescent, but the Edwards scale shows decreasing correlations with GPA for Grades 7 and 8, Grades 9 and 10, and Grades 11 and 12, respectively (these correlations are .341, .160 and .116 for the grades as given). This implies that proper corrections for social desirability also need to take age into account. For example, this may mean that it is unsatisfactory to run analyses on

variables across an age range for which there are found age-related correlations. This suggests that later and proper analyses either confine themselves to more limited age ranges for which correlations do not vary with age or that, ultimately, the age-related correlations be somehow introduced as control variance. In that changes in these correlations with age may also be viewed as interactions between the factors of age and social desirability, a term representing the multiplication of these two factors could be derived. The relationship of this term with the third variable of interest would represent the control variance of the age-related correlations which is to be removed. (Nie, et al., 1975, pp. 372-373, describe the general multivariate model for such interactions.)

SAMPLE CHARACTERISTICS AS VARIABLES

Previous comments suggested some difficulty in obtaining a sufficient sample of junior high and high school students. This probably affected the study by forcing sampling to take place in areas where tensions between school administration and the community were less active and/or where school administrators felt the interference of research was defensible. At the same time, while all sampled schools were predominantly middle class in character, a range of student SES backgrounds was obtained. There does not appear to be a selection factor operating with regard to SES that was not already inherent in the choice of school divisions to which applications were initially made. On the other hand, the choice of divisions that are generally middle class in character probably restricted the range of student

report on at least one variable. Student reports of parent rejection may be less common for middle than for lower class respondents. In most studies in which the CRPBI is used it is probably safe to assume that the CRPBI Rejection-vs.-Acceptance reflects a dimension of relatively favorable parent behaviors. Unless a deliberate attempt is made to assess specific groups such as juvenile delinquents it may be that the range of parent behaviors as conceived in CRPBI scales contributing to the Rejection-vs.-Acceptance factor is not reflected in respondents' reports. While this discussion of sampling has been in large part speculative, an answer to the questions raised would be to develop a standard means of characterizing the range of perceived parent behaviors.

HYPOTHESES

Hypotheses 1 to 7: Relations between CRPBI and MLC

The relationships between the CRPBI factors and the MLC total answering hypotheses 1 to 6 are generally consistent with those found in the correlational studies preceding this research which is based on the MLC. These relationships are significant even after the elimination of socio-economic variance. The failure of the maternal CRPBI factors to predict the MLC total after the entry of all paternal factors is not entirely surprising. It suggests merely that perceptions of father and mother behavior by adolescents are largely equivalent and interchangeable. As characteristic of earlier research, the relationships are also fairly low. At the same time, each of the perceived parent behavior factors contributes something unique to the prediction

of locus of control beliefs.

Hypothesis 7, the prediction that CRPBI F_{R-A} and MLC total are more highly related for younger adolescents, is not wholly supported in this research. Neither is it clearly negated. Instead the difference between one age and another in variance describing the relationship is minimal because the maximum relationship at the earlier age is not large. This is unfortunate because the zero-order correlations describing the relationships between parental acceptance and locus of control beliefs maintain the hypothesized pattern when one breaks the overall sample into two-year segments (rather than three-year segments as was done) and compares these. What appears to be required is a statistical technique for identifying patterns in the size of correlation coefficient values. There are few, if any, studies which have taken into consideration this possibility. As a consequence, the hypothesis that parental acceptance contributes to adolescent internality more in early than late adolescence remains an issue requiring more careful study.

Possibly the degree to which perceptions of parent behavior predict locus of control beliefs can be enhanced by a distinction regarding outcomes. Responsibility for success versus responsibility for failure has been a dichotomy in other measures of locus of control that has shown some usefulness (Crandall, Katkovsky & Crandall, 1965). In addition, a study by Epstein and Komorita (1971), has indicated a distinction in this direction. Using three scales related to what they characterize as the factor of Neurotic-Possessive Control (the scales were Possessiveness, Intrusiveness and Hostile Control) and a scale

related to the factor of Inconsistent Discipline, the authors found both indices related to assertions of responsibility for success by preadolescent Negro boys. However, only the three Neurotic-Possessive Control scales predicted the boys' statements regarding responsibility for failure (all of these significant relationships were slightly larger than .30). Overall, to return to the present study, the sum of predictability due to the parent measures is sufficiently low to expect that something in parent behaviors not measured by the CRPBI may contribute to locus of control beliefs. The only alternative to this conclusion is to look at interactions between CRPBI factors for an enhancement of prediction. Previous research has shown little inclination to consider the consequences of predicting from, for example, the interaction of F_{R-A} and F_{PC-PA} .

Hypothesis 8: Curvilinear Relation Between CRPBI F_{R-A} and GPA

The prediction of a curvilinear relationship between the Rejection-vs.-Acceptance factor and GPA, while not at all supported, led to some interesting problems for future research. The possibility of only a maternal curvilinear (quadratic) relationship holding true seems appealingly close to a public caricature. We often direct the responsibility for excessive loving of a child to mothers. Rarely are fathers blamed for extremes in loving involvement with their children. The attractiveness of this possibility is dampened somewhat by the demonstration of a cubic relationship between these variables for fathers, $F(1, 572) = 7.03$, $p < .01$, but not for mothers, $F(1, 572) = 1.18$, $p > .20$.

Hypotheses 9 and 10: Relations between CRPBI and GPA

The linear relationship between CRPBI factors and GPA is more encouraging. Both Firm Control and Psychological Autonomy appear as significant predictors of adolescent academic achievement. Even an unpredicted relationship is partly demonstrable. Parental Acceptance appears as a correlate of GPA. When both social desirability and SES are partialled out, only this relationship drops out. Again it is the paternal Rejection-vs.-Acceptance factor that fails to show a relationship with GPA. It seems that a father's perceived acceptance or rejection are not adequate predictors of adolescent academic achievement when a social desirability rating of the child's report and/or the family's socio-economic situation are considered. As with the prediction of locus of control beliefs, even the combination of perceived parent behavior factors does not contribute greatly to the prediction of adolescent academic achievement. Whether this reflects a limitation in the range of parent behaviors expressed in this sample is not clear. It may also be, inasmuch as our model of analysis for this study implies that parent behaviors are mediated through their children's personalities, that we should expect no more prediction from parent behaviors. This would be consistent with the appearance of a stronger prediction of the MLC than GPA. Unfortunately a visual comparison of the variance accounted for by the CRPBI factors in Table 19 with the same in Table 24 does not support this. As said before in this discussion (see p. 131), a general belief in the influence of parents indicates that we look at other parent behaviors or characteristics for enhancing the prediction of adolescent or young adult achievement

behaviors. One should note that Becker and Krug (1965) came to a similar conclusion in their review of the PARI. For example, one would expect parent attitudes about school and their academic achievement records to be informative about their children's scholastic achievements. At the same time, it may be that aspects of personality other than locus of control beliefs are more closely tied to parental behaviors.

Few other studies relating the CRPBI to self-report measures of personality constructs are available. However, it is possible to outline some plausible directions from a combination of sources. As early as the 1940's, research existed (Stott, 1941) which attempted to relate family life, (to be more specific, adolescent reports of parent behavior) to the respondent's adjustment as measured by another test. While the structure of the scale developed by Stott is not clear, his results suggested that reported parental warmth and lack of perceived restrictions were indicators of adjustment. Slater (1962) in a comparison of college freshmen's views of parent role patterns and their self-reports on the MMPI, found that dimensions on these two measures were correlated. A general scale of parental warmth and emotional supportiveness was found to be indicative of MMPI factors of ego strength and extraversion. A second scale, describing the degree to which parents made inhibitory demands and were punitive, "predicted" MMPI ego weakness and extraversion. Items which correlated equally with the two parent role scales correlated more selectively with the MMPI factors. That is, a scale made of items describing parental warmth and strictness (as opposed to parental coldness and permissive-

ness) predicted only the MMPI factor of extraversion. An orthogonal scale made of items describing parental warmth and permissiveness correlated only with the MMPI ego strength factor. Correlations between the parent role scales and the MMPI factors were generally .20 to .30. Heilbrun (1964) found two measures of behavioral consistency, previously tied to adjustment in adolescents, to be related to the degree of parental nurturance as reported by college students. Becker and Krug (1965), in their review of the PARI, suggest that aggressive and withdrawn child behaviors are among the most supportable of correlates of this measure. Authoritarian control and hostility-rejection appear to be indicators of aggression while only the second factor is offered as a correlate of withdrawn behaviors. Taken together, these results suggest that variables whose content is emotional rather than intellectual or cognitive would be more related to the factors of the CRPBI. Measures of anxiety, self-esteem and dependency may be important in this respect.

Hypothesis 11: MLC Relation to GPA

The last multiple regression analysis supports the hypothesis that internal beliefs are related to academic success. Table 26 demonstrates that both mother CRPBI factors and the MLC predict GPA. Even after the influence of social desirability and SES are taken into account, the MLC nearly doubles the variance explaining GPA. It would have been interesting to see whether this relationship is unique beyond the prediction of academic achievement made for a standard intelligence test. This was not possible in that the length of time taken by the administration of measures already was a maximum and, while school records

often contained various measures of intelligence, there was no standard assessment available in the schools sampled. Several studies (e.g., Patsula, 1969) have indicated a substantial relationship is to be found between adolescent intelligence and locus of control beliefs or related measures. The decision not to consider intelligence measures is felt to be acceptable insofar as the primary concern of the last study is to make some tentative demonstration of the predictive validity of the CRPBI and MLC.

Hypothesis 12: Sex Difference in MLC Relation to GPA

The failure to support hypothesis 12, the expectation that sex differences would show a greater relationship for males than females between adolescent locus of control beliefs and their academic achievement, is not surprising. The second study reported by McGhee and Crandall (1968), which failed to replicate the finding of a prior study indicating a relation between locus of control beliefs and grade averages for females, was limited in sample size. While differences between high and low internal children were maintained in the comparisons of the second study, the reduction in sample size probably would have led to a rejection of all relations between the two variables in the first study. As a consequence, the general conclusion of research into these correlates at adolescence is that they are not demonstrably different. This is a simpler conclusion than its alternative in that it requires no explanatory mechanism for behaviors which vary across sex.

McGhee and Crandall (1968) cite other research indicating sex differences between children's locus of control beliefs and achievement.

Perhaps this is to be explained by the use of standardized achievement tests in these earlier studies. All of these earlier studies assessed specific achievement skills rather than general academic achievement. It may be that in adolescence as well as in childhood locus of control beliefs relate to specific achievement skills in a manner determined partly by sex. This possibility is not answered by the analyses completed on this research.

GPA AS A MEASURE OF ACHIEVEMENT

Perhaps the use of grade scores has affected the other results in a manner that would separate this approach to achievement measurement from the use of standardized achievement tests. The reliability of GPA is sufficiently high to warrant comparisons between groups, but does not show the reliability desirable for individual assessment. Some loss in the CRPBI-GPA relationships could be explained by unreliability. However, the significantly higher relationships of GPA scores with MLC suggest that the loss is not so great as to eliminate distinctions in GPA relationships with other variables.

On the other hand, GPA is a global measure of achievement representing the unstated and inconsistent (inconsistent in that not all children were graded by the same teachers) biases of diverse teachers. The usefulness of GPA as a criterion is limited in that the formulae defining its application are not known. In contrast, achievement tests represent consistent and public operations by which achievement success may be evaluated. Furthermore, they are specific rather than global in their reference to achievement skills. It may be that specific

achievement skills are differentially predicted by the CRPBI and MLC. This does not appear to have been considered in previous research on these variables.

SURVEY OF RESULTS

While this program of research began as an effort to demonstrate the predictive validity of the CRPBI, other studies were found which had already begun this effort. Chance (1972), reviewing much earlier efforts to evaluate academic correlates and maternal antecedents of children's locus of control beliefs, had suggested that a close, positive mother-child relation fostered academic achievement even more than specific motives or expectancies regarding achievement. Patsula (1969), in his dissertation research, concluded that CRPBI Psychological Control, Rejection, and Lax Control contributed to adolescent externality as measured by a factor analytic combination of several measures of locus of control beliefs. Similarly, the predictive validity of a new measure of locus of control beliefs is evaluated in this study. The results suggest the measure relates to other variables in a manner suggested by previous research.

At the same time, the relationships obtained between the variables of these studies suggest that we may want to look at even younger ages down to middle childhood if we are to find a maximal relationship between perceived parent behaviors and children's locus of control beliefs. This is consistent with Crandall's (Note 4) conceptions about the age factor influencing the above relationship. Alternatively, we need to consider other parent determinants of locus of control beliefs.

If research is to continue on adolescent age ranges, it would also be desirable to attempt an evaluation of peer culture influences on expectancies of control. In addition, if future research is to continue its focus on locus of control beliefs, some workable solution to the dimensionality issue remains. Whatever the outcome it should be apparent that multivariate methodology is appropriate to a simultaneous consideration of both unidimensional and multidimensional perspectives. Finally, the CRPBI, while not a substantial predictor of locus of control beliefs for the total sample, appears to be related in an interesting way with SD or need for approval measures. That this relationship is not consistent with age implies some developmental change.

THEORETICAL IMPLICATIONS

Results from the Perspective of the General Model

A model specifying the expected relationships between the three major variables of this study was presented earlier (see p. 74). In essence, perceived parent behaviors were viewed as predictors of both adolescent attitudes and their behaviors. At the same time, adolescent attitudes were assumed to be unique in that they were not expected to be wholly derived from perceived parent behaviors. In addition, the variables of this study were viewed as specifications of the general labels of the model.

Further assumptions with respect to this model were as follows. First, while causal factors were not assumed to progress solely from parent behavior to adolescent attitudes to adolescent behavior, the major amount of attention was addressed to this causal thread. Second,

adjacent variables in the model were assumed to be more highly related than variables separated in this chain. In this framework attitudes were viewed as mediating variables, whose character added to the understanding of the variables on either side of the chain. Unfortunately, the evidence of this study indicates that the relationship between perceived parent behavior and adolescent locus of control beliefs is not consistently higher than that between parent behaviors and adolescent behaviors. This implies that locus of control beliefs are not mediating variables for what is presently measured by the CRPBI. Several explanations, other than that indicating a restriction in CRPBI measurement, are possible. First, it may be that some aspect of personality assessed by the CRPBI is also important in academic achievement. Second, there may be something in adolescent reports which tends to equalize the above relationships. As a consequence, it may be that parent report or observation of parent-adolescent behavior would demonstrate the mediating character of locus of control beliefs. Third, a unidimensional causal perspective is inappropriate for this data. Instead an interactionist position which points out the possible effect of adolescent academic achievement on adolescent locus of control beliefs and on parent behavior may add to the accuracy of the model describing parent-child relationships. This elaboration of the model could indicate CRPBI-GPA and MLC-GPA relationships are enhanced by the presupposition of causal influences coming from adolescent behavior. Therefore, CRPBI-MLC relations would not necessarily be larger than CRPBI-GPA relations, and MLC-GPA relations would be larger than the other two. The acceptability of this rationale depends on the assump-

tion of closer relationships between variables showing interactional causal patterns than between variables whose connections are unidirectional.

The results of this research do not contradict the major thesis of the model. Adolescent locus of control beliefs make unique contributions to the prediction of adolescent achievement above the prediction of such achievement obtained from a knowledge of perceived parent behaviors.

Conceptualization of Parent Behaviors

The construction of the CRPBI was guided by a conceptual model described to some extent in the introduction (see pp. 26-27). Ultimately the CRPBI was to be understood from the perspective of a hierarchical conceptual scheme for parental behavior (Schaefer, 1965a). The most molar and abstract concepts in this scheme were factor dimensions of love and hostility and autonomy versus control. These dimensions and combinations of their extremes were defined by concepts at an intermediate level of generality. The concepts became the scales of the CRPBI. Similar to the prior work of Schaefer (Schaefer, Bell & Bayley, 1959), these scales or concepts were defined by more specific and observable parent behaviors which were made items of the CRPBI. Schaefer, Bell and Bayley (1959) point to a theoretical source for their work in the ideas of theorists such as Adler, Sullivan, Horney and others who emphasize the contribution of interpersonal relationships to the development of personality. They also cite the influence of intuitive concepts obtained from fellow professionals who have studied mother-child interactions in various clinical situations.

These are the theoretical foundations of the CRPBI and its versions.

One should note that there is little in these theoretical influences to reflect parent influence of a directly cognitive character. Schaefer's (1965a) original version of the CRPBI contained scales labelled, "Sharing activities, plans and interest," "Encourages independence," and "Intellectual stimulation." Except for a few items, even this sampling of potential cognitive influence does not remain in the version of the CRPBI used in this research. This minimal assessment in the CRPBI of parental operations contributing to cognitive development could explain the failure of the CRPBI to better predict adolescent locus of control beliefs and achievement. Locus of control beliefs, in other research, have already been related to cognitive activity, achievement, (Lefcourt, 1972), and intelligence (Chance, 1972).

Theoretical Options

What is needed to improve measurement and theory regarding parent operations affecting cognitive development? With regard to theory, two options among other possibilities are recommended here: Social learning theory and Emmerich's functional-cognitive theory of parent role behaviors (1969).

Rotter's social learning theory points to three variables which affect parent behavior that may be related to their cognitive influence. These are reward value, expectancy, and reinforcement history. The reward value of cognitive skills could be a determinant in the willingness of parents to influence their children's cognitive development. Parents' personal expectancies regarding the probability of

of successful applications of cognitive skills should similarly affect their initiative in contributing to the cognitive development of their children. The reinforcement history relating to parental cognitive skills should affect not only their expectancies regarding the future use of cognitive skills, but ought to influence the level of cognitive skills they obtain and are able to demonstrate to their children. The application of social learning theory to parent attitudes and behaviors appears to require future demonstration.

Emmerich's (1969) functional-cognitive theory of the parent role does not appear to have been evaluated as a determinant of children's cognitive development, but its emphasis on parent cognition may point thereby to the cognitive consequences for child development. Influenced by theories of purposive behavior and those characterizing the way social goals are mediated through organized systems of action, Emmerich credits the sources of such influence to Brunswik, Dewey, Heider, Parsons and Tolman. This perspective on parent behavior divides parental roles into four components which are further characterized in corollary assumptions. These components are labelled "Goal Values," "Means-Ends Beliefs," "Means-Ends Capacities" and "Goal Achievements." Goal Values represent parental selection of positively and negatively valued behavioral outcomes for their child. These goals may vary in their affective and obligatory quality. Means-Ends Beliefs refer to parental beliefs concerning the effectiveness of various child-rearing methods for producing varied outcomes in the child. While Emmerich considers most measures of parent behavior and attitudes to be described in this component, measures of parent attitudes rather than

behavior would appear most appropriate in this category. Means-Ends Capacities is the label for the component describing parents' abilities for carrying out the acts thought to be effective in achieving desirable outcomes and reducing undesirable outcomes in the child. While Emmerich fails to make this distinction, this category would appear to be represented somewhat by measures or reports of parent behavior. Goal Achievements, the last component, refers to the extent to which a parent sees the child as meeting the standards of performance implied in parental goals. As an indicator of the match between goal and outcome, this component may reflect the success of parent role functioning and identify specific areas of child behavior troubling to the parent. These components serve as phases in a system of parent functioning. Each component is seen as determining the others through cognitive mediations by the parent. In addition, parent goals are recognized as multiple or diverse rather than singular and, as a consequence, child-rearing beliefs or capacities may be ordered into instrumental response hierarchies for such goal achievement.

Comparisons between these two theories are enlightening. Reinforcement value and Goal Value appear to be synonymous concepts. On the other hand, the distinction between beliefs and capacities is not as salient in a social learning framework. In the latter case one might separate expectancies from some conception of learned skill. Means-Ends Beliefs is an expectancy construct lacking the ties to personal evaluation of skills existing in Rotter's theory. On the other hand, Rotter has not separated the general expectancy regarding the reinforcement consequences for a specific behavior from a personal

expectancy in which one's own skills are evaluated with respect to prospective goals. While the data of this study suggest such a distinction is not generally obtained, certain prediction situations may elicit the distinction (Reid and Ware obtained such a distinction). Of further note, Emmerich's theory provides a criterion of success lacking in Rotter's work. The usefulness of such a construct can be shown in the distinction between a conception of achievement need and GPA. In Emmerich's theory GPA would represent Goal Achievement while achievement need can be Goal Value in its application to parent motivations. A final comparison indicates that Rotter's theory may more clearly define the nature of events determining parent behavior. Essentially the theory points to a learning history, while Emmerich's position simply refers to cognitive mediation to explain parent behavior origins. An integration of conceptions in both of these theories would be desirable in the future. A learning analysis of the determinants of cognitive mediation in parent roles could benefit from the improvement in definition of concepts and social learning theory would benefit from an enrichment of meaning in its concepts.

Lower-level Concepts

While the more generalized theoretical approaches may help to understand parent operations which affect cognitive development, a review of the literature suggests several lower level concepts are tied more clearly to cognitive growth. A brief review of the parental correlates in the literature suggests that the findings may be broken into four roughly discrete categories: the degree or nature of stimulation provided the young child; the freedom, as opposed to restriction,

available in the child's environment; demands by parents; and parental attitudes or feelings which might create a general atmosphere in the child's environment. While the research often deals with child rather than adolescent samples, there is little to suggest that the general character of the variables is different across these ages.

Stimulation. In regard to the stimulatory nature of the child's environment, Bing (1963) found that fifth grade children with high verbal IQ had received more maternal verbal stimulation during infancy and early childhood and had received more story books from their mothers. Honzik (1967) in predicting longitudinal mental status of children followed from 21 months to 30 years from the family setting at 21 months found that the adequacy of play facilities was positively correlated with the child's intelligence. In this study, years of parental schooling was also related positively to the children's longitudinal mental status although Honzik interpreted this variable to represent the genetic character of parent-child relationship and partialled it out of all other comparisons. Whether or not parent education represents a genetic component, it seems likely that education affects not only the stimulation afforded in the child's environment, but also the freedom of children and demands made on them. Both Honzik (1967) and White (1971) point to the activity level of the mother as a variable affecting the mental abilities of the child. Clarke-Stewart (1973) has related maternal verbal stimulation directed to the child with the child's comprehension and expressive language. In addition, the mother's mediation of play materials to children was related to their cognitive development and complexity of play. Furthermore, the

total amount of maternal stimulation was found to be highly related to the infant's overall development.

Freedom to explore. Bing (1963) has indicated that the enhancement of nonverbal abilities seems to be due to the freedom of the child to experiment on his own. In contrast, she found that the amount of restriction given the child was positively related to the degree children's verbal skills exceeded nonverbal skills. Consistent with the former result, Winterbottom (1958) found that mothers desiring little restriction for their children had sons whose achievement motivation was high, and White (1971) has indicated that a permissive and indulgent mother, who encourages her child in his explorations, is providing effective child-rearing practices for intellectual development. It also appears that providing the vehicles for personal exploration affect the cognitive status of children. Winterbottom (1958) found that the age of independence expectations affects children's need for achievement. Mothers making early independence demands had children with higher need for achievement than mothers showing later demands. Chance (1972) added to this by demonstrating that a stronger belief on the part of boys that they control the reinforcement outcomes of intellectual achievement efforts is associated with earlier independence expectations and less concern by their mothers about controlling the child's behavior. These and the following two findings also have relevance for the demand character of parenting. Winterbottom (1958) has pointed out that more mothers of children showing a high need for achievement express their earlier demand for independence by rewards through verbal, material and physical means. Brown (1965) has

interpreted Winterbottom's data to indicate that parental support of self-reliance is fundamental to children's achievement motivation. McCall, Appelbaum and Hogarty (1973), in a study of developmental changes in mental performance, conclude that parents who take a moderate, rationally structured approach to discipline are more likely to have children who show gains in IQ. Similarly, White (1971) points to supporting but noncontrolling involvement in the child's activity as a contribution to intellectual development.

Demand. The demand character of the child's early environment as a variable in the development of children's need for achievement (Winterbottom, 1958) and in IQ gain (McCall, et al., 1973) already has been partly presented. Winterbottom has emphasized demand for independence as a causative variable. McCall, Appelbaum and Hogarty have pointed to acceleration and encouragement in intellectual tasks. Honzik (1967) has pointed to parental concern with educational achievement as a contributor to children's mental status. Greenfield (1971) has hypothesized that early and constant frustration in goal attainment and the growth-promoting sequencing or nature of goals set for the child by caretakers are two important factors in determining early expectations regarding learning and the early rate of cognitive growth. This suggests that the number, relevance and difficulty, for the child, of parental demands are important variables in school readiness. The nature of this demand may be further understood in other than its objective qualities. The nature of parental responses to children's action in the face of demand may be determinative. Winterbottom (1958) has concluded that mothers who evaluate their children's accomplish-

ments more are more likely to be parents of children with strong achievement motivation. Furthermore, as noted by Winterbottom and McCall, Appelbaum and Hogarty, reward and encouragement are important correlates of the demand situation. Stein and Bayley (1973) citing other research, point to encouragement of achievement as a basis for achievement orientations and behavior.

Parent attitudes and feelings. Parent psychological characteristics also may be influential in this context. Brown (1965) has suggested that parental aspiration is a variable influencing children's achievement motivation and there is recent evidence supporting Greenfield's (1971) contention that parent beliefs in the responsivity of their environment is tied to children's beliefs that they control rewards and outcomes in their world.

Whatever progress theoretical development may show regarding parental contributions to children's cognitive growth, these four categories of parental influence appear to represent viable determinants in the research literature. Future theory should encompass them. Perhaps it should be noted that several descriptive rather than psychological variables used in the sociological literature relating parental or family variables to children's attitudes and behaviors regarding educational and occupational achievement may be understood within such psychological concepts. Parental educational background and occupational status are generally accepted correlates of children's academic and occupational interests and behaviors (Crandall, 1963; Siemens, Note 12). The meaning of these variables as determinants of children's attitudes and behaviors is to be found in the manner in

which they change the environment of the child. The educational background of the parent may, for example, alter the nature of stimulation provided the child and the demands or expectations made regarding the child's intellectual development. Freedom to explore, to independently establish a mental understanding of one's environment, may be more the opportunity of a child whose parents have learned to appreciate such variables in their educational experience or who have maintained educational commitments as an expression of such values.

MLC and Rotter's Social Learning Theory

Present evidence on the MLC indicates that: it is unidimensional, even after controlling for social desirability influences; there is a low percentage of total scale variance in the first factor; and it predicts GPA, and relates to social desirability and an index of socioeconomic status, in the direction and to a degree commensurate with other measures of locus of control beliefs (e.g., Cone, 1971; Lefcourt, 1972).

This latter outcome suggests that the MLC is a measure comparable to other indices of locus of control beliefs. The initial finding supports Rotter's (1966) belief that such attitudes have a basic and unqualified generality. This question of generality is primary to future theorizing about the nature of expectancy. If other dimensions limit the generality of expectancy beliefs they should be a part of the theory and their unique aspects should be explained within the theory. Furthermore, if, for example, a variable indicating the internal versus external format of the items is the limiting factor in the generality of expectancies, then this construct may not be powerful. Such a con-

clusion could be made on the argument that a methodological variable determines the structure of the measure more than the theoretical nature of the items.

While the evidence so far discussed supports the early assumptions in the literature regarding locus of control beliefs, the second finding from this research indicates that generalized locus of control beliefs cover a smaller portion of the total variance of a measure of locus of control beliefs than originally proposed by Rotter (1966). This conclusion does not eliminate the theoretical value of the expectancy construct in that prior evidence has demonstrated the utility of the expectancy construct. However, it does suggest that other variables must be considered when one is concerned with maximizing this utility. Lefcourt (1972), Seeman (1972) and Rotter (1975) all point to the need to consider reinforcement value when attempting to maximize predictions from locus of control beliefs. This recognition of the simultaneous operation of constructs in Rotter's social learning theory is consistent with the situationalism of Mischel (1973) who has noted the inability of trait research to consistently account for large portions of the variance in any prediction situation.

Pragmatic Implications

While the methodological and theoretical implications of this research have been presented, the consequences for application of this knowledge have not yet been suggested. Such extensions can only be tentative. This is true, not only because of the theoretical and methodological orientation of the issues initiating the studies, but because the level of relationships obtained and the correlational

character of the research leaves many alternative causes unexplained.

First, the public investment in North America in ameliorating the consequences of ethnic, racial and social class inequalities especially for the developing child have emphasized the need to understand how that child's environment operates in maintaining a generational consistency in inequality. The present data are informative in this matter in several respects. First, the appearance of low relationships between paternal vocational status and the other variables of the study indicate that family resources do affect parent behavior, and adolescent attitudes and achievement. At the same time, parent behavior contributes to adolescent attitudes and behavior in a manner incompletely explained by paternal vocational status. Furthermore, adolescent attitudes develop out of a context not completely contained by paternal vocational status and parent behavior. In addition, the results suggest that adolescent characterizations of parent behavior and adolescent beliefs regarding their ability to modify important aspects of their world are pervasive across a sample having substantial socio-economic variety.

For the social planner, the data support the general view that resources tied to job status do affect parental skills and their children's attitudes and performance relevant to successful accomplishments in their immediate environment. At the same time, for the social worker or the professional involved in providing support services to families showing social needs, the evidence suggests that, given an adequate economic base, parent behaviors are not solely a consequence of economic conditions. Solutions to the development of competent

parent behavior must be shown by the counselor, clinician, or researcher to be found elsewhere. The skills required for successful parenting, while not completely pictured, do indicate that behaviors relevant to the demonstration of adolescent achievement skills and attitudes, must provide an environment characterized by moderate affection and involvement, firmness and consistency in control without domination or autocracy. The school psychologist, teacher or school administrator should also be prepared to realize these preliminary conditions determining the responsivity of their clients or students to the academic environment. Furthermore, it is important to the effectiveness of their work to understand that the attitudes their students bring to school are generalized. Adolescent beliefs regarding their personal competence within academic achievement is not entirely disparate from their expectations regarding skills in other areas of their lives. Finally, inasmuch as the learning environment provided by the family may not differ qualitatively from that in the classroom, it behooves teachers to recognize that implications derived herein for parent behavior also apply to their classroom behavior. Acceptance, the minimal use of techniques that may be described as psychologically controlling and the existence of control appropriate to the needs of a learning environment are concepts that should guide teachers' behavior.

SUMMARY

Previous research trends had suggested the need for study of complementary issues relating to parent contributions to children's and adolescents' attitudes and behavior. Research culminating in the development and analysis of Schaefer's Children's Reports of Parent Behavior Inventory, a child report measure, had outlined dimensional characteristics of parent behavior that seemed basic to an adequate representation of parent influences on their children. Furthermore, this research had demonstrated the reliability of such measurement over time and cultural boundaries. Coincident with this methodological progress, there appeared the need for more understanding of the validity of measurement in this area.

In the area of social learning one concept developed concerned the attitudes or expectancies regarding control of one's environment. Attempts at the measurement of these expectancies, which were labelled locus of control beliefs, suggested the beliefs were unidimensional and broadly generalizable. Early research findings on the correlates of locus of control attitudes supported the preceding characterizations of these beliefs and early reviews on locus of control research pointed to a need to establish the precursors of such attitudes. A perspective on more recent research indicated that while parental contributions to locus of control beliefs have been more thoroughly evaluated, limitations in previous approaches, especially regarding research designs and their statistical treatments, have not enabled researchers to adequately estimate the variance accounted for by parental determinants of these beliefs. Additionally, from factor analytic studies and a growing

feeling by researchers that a measure of such initially presumed generality should have shown a clearer pattern of correlates, an alternate view of locus of control measurement as yielding multiple dimensions of locus of control beliefs has emerged. The research of this thesis therefore attempted to more carefully delineate the relationship between perceptions of parent behavior and locus of control beliefs while at the same time providing a new alternative measure of such beliefs. The new measure of locus of control beliefs was designed for a more careful assessment of unidimensional versus multidimensional conceptualizations.

The development of a new measure of locus of control beliefs produced a further need to establish predictive validity. In this case the new measure was expected to show relationships with other variables in a manner largely consistent with previous measures of locus of control attitudes. A previously established correlate of locus of control beliefs has been academic achievement. As a behavioral measure academic achievement was expected to add validity not only to a new measure of locus of control attitudes but to further clarify the behavioral accompaniments of perceptions of parent behavior.

Items were developed to assess attitudes with regard to locus of control. Test-retest administration of 120 of these items together with Edwards and Crowne-Marlowe Social Desirability measures to over 800 college students provided information on the reliability and correlation among the items and on the social desirability involvement of selected sums of these items. Elimination of items on the first two criteria led to the construction of a shorter measure of locus of control beliefs which, together with a short personal data sheet,

Schaefer's Children's Reports of Parent Behavior Inventory, and the two measures of social desirability were administered to approximately 600 adolescents from grades 7 through 12 in junior high and high schools in three school divisions in Winnipeg. Subsequently, information on student grades was obtained for the period in which the testing occurred.

Hypotheses regarding the relations between CRPBI factor scores and the new measure of locus of control were tested and results indicated that adolescents' beliefs in their own or an individual's ability to control the environment (more generally labelled a belief in internality) are related to perceptions of parental acceptance, firm control and psychological autonomy. An hypothesis predicting a greater relationship between adolescent internality and parental acceptance for younger adolescents was tested with equivocal results (although the direction of prediction is maintained in the data). The prediction that parental acceptance is related curvilinearly to adolescent academic achievement behavior, in that moderate rather than high or low acceptance is tied to achievement, is not supported. Instead perceptions of moderate maternal acceptance appear to be tied to lower academic achievement than perceptions of high maternal acceptance. Perceptions of both mothers' and fathers' firm control and psychological autonomy were shown to be linearly related to adolescent achievement, while only maternal acceptance showed this relationship to achievement. The highest relationship obtained between the major variables of the study was that between adolescents' locus of control beliefs and their academic achievement.

Factor analyses provided support for a conception of unidimen-

sional, generalized locus of control beliefs. However, limitations in item construction and item content preclude any final acceptance on the dimensional nature of locus of control attitudes. Several approaches which could improve understanding regarding this issue are discussed.

Analyses of social desirability measures, which originally were entered in the project as control variables, indicate that present understanding of this construct is incomplete. Analyses and approaches toward solving these problems are offered and variables contributing to the determination of the adolescent sample are discussed. The finding of age-related correlates for several of the control variables is reviewed in terms of its influence on developmental research.

The nature of the major variables--adolescent reports of parent behavior, their locus of control beliefs and grade point average--and their influence on the results are evaluated. The character of the relationships obtained between perceived parent behaviors and the other variables suggest that the CRPBI may predict emotional, more than intellectual, attitudes and behaviors of the respondent.

Theoretical implications from the research are also presented. The results are viewed as supporting a general model which pictures perceived parent behaviors as predictors of adolescent attitudes and behaviors, while simultaneously viewing adolescent attitudes as unique contributors to these behaviors. Results suggest alterations in the model, one of which is to formally recognize the influence of adolescent behavior on parent behavior.

The conceptualization of parent behavior expressed in the CRPBI is reviewed because evidence suggesting that its assessment is of vari-

ables largely determining emotional consequences for the respondent. Social learning theory and a functional-cognitive theory of parent role behaviors are evaluated for their ability to identify parent behaviors that may have cognitive consequences. Lower-level concepts which have appeared to describe parent contributions to children's cognitive development in the research literature are offered as rudimentary contributions to theory development.

Finally, the nature of the locus of control measure developed in this research is related to social learning theory, and the pragmatic implications of this research are drawn for the reader.

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APPENDICES

APPENDIX A

CONSTRUCTION INFORMATION ON THE MLC

Ancillary Information on Construction of the MLC

As indicated on page 79 the original MLC was to be a 108-item scale. However, 12 extra items were retained and added to the end of the list. These statements were retained because, while they were acceptable in other respects, they appeared to negate only one of the two external origins. For example, an item could have negated the influence of powerful others without indicating which of the alternative origins, chance or skill, was the source of control. Levenson's items had this one-sided character and, from a logical perspective, the rejection of a single external viewpoint did not imply that the respondent was affirming an internal attitude. One of the original goals in the construction of items was to generate items which eliminated this lack of precision. Initially it was intended that all statements specify both an internal and external option so that the respondent knew what alternative was to be affirmed. However, as item construction progressed, some question was raised as to the value of this initial goal. Statements containing two alternatives often proved to be wordy, awkward or excessively complex. Furthermore, it was difficult to categorize statements having both an internal and external option. Ultimately, such items were assigned to a category on the basis of what appeared to be their strongest or most salient option. At the same time, items proposing or rejecting only a single internal or external statement were brought into the scale as item construction continued. Partly because of this change the last twelve items in Table 5 were included in later construction of the original measure's sections. That is, they entered into later factor analyses of the

measure and participated in correlations with other instruments of the test-retest study. While it was important to create a scale whose subcategories had an equal number of items, the retention of the last twelve items was due in part also to their individual reliabilities. Furthermore, the initial factor analyses of the scale were preliminary to reduction in the scale's length based on item reliabilities and intercorrelation.

ATTITUDE ACTION SERIES

This questionnaire is a series of attitude statements. Each represents an opinion held by some people. In the development of the questionnaire no attempt was made to create statements which had right or wrong answers. We expect you to disagree with some items and agree with others. Our interest is in the extent to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate whether you agree or disagree by checking the appropriate space in front of each statement. First impressions are usually best so you needn't ponder any item. You may feel that some statements require qualification before an answer can be given. In such cases choose the best answer based on your interpretation of the statement. In any case, give an answer to each statement.

-
- | Agree | Disagree | |
|-------|----------|--|
| () | () | 1. If I ever got elected to any office in this community it would be due more to my effective campaigning than to lucky circumstances. |
| () | () | 2. In most schools the grading system is so unfair that it has no relation to what the students know. |
| () | () | 3. Public acceptance or rejection depends to an important degree on the important people a person knows. |
| () | () | 4. By taking an active part in political and social affairs people can improve the quality of life in their community. |
| () | () | 5. My personal goals in life certainly can be dominated by people who control things important to me. |
| () | () | 6. I feel that my degree of popularity is primarily a matter of the looks and temperament I happened to be born with. |
| () | () | 7. As far as events in this city are concerned, most of the people are the victims of decisions by others. |
| () | () | 8. In the future, how much money I make will depend primarily on how hard I work and how competent I am and much less on the lucky breaks I might get. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 9. Not everybody can learn to get along with others. |
| () | () | 10. If people are dissatisfied with their society they should blame themselves more than the past history of their country or bad luck. |
| () | () | 11. In the case of the well-prepared student there is rarely, if ever, an unfair test. |
| () | () | 12. If one wants to be a social success it is more important to develop social skills than to have pull with influential people. |
| () | () | 13. Social systems in our society are so complex that even with the best of social techniques and knowledge people cannot eradicate social problems. |
| () | () | 14. Whether I obtain good marks or poor marks depends not so much on the teachers but on what I do or do not do. |
| () | () | 15. In my experience I have found that my not being as popular as I would like to be should not be looked upon as a chance misfortune but as a stimulus to improve my social personality. |
| () | () | 16. If I made a determined effort I could help to improve the local conditions in our community, even though my efforts would probably meet with strong local opposition. |
| () | () | 17. Many grades obtained by students on exams are influenced significantly by accidental happenings. |
| () | () | 18. The number of friends I have depends more on the crowd I am with than on what I am like or what I do. |
| () | () | 19. Each country has its own historical destiny and I don't think I could influence developments in our country one way or the other. |
| () | () | 20. When I set out on a task I usually expect to accomplish the goals implied in it. |
| () | () | 21. In school I found that my social success or failure was very much dependent on whether I was in or out of tune with the social leaders of the class. |

- | Agree | Disagree | |
|-------|----------|--|
| () | () | 22. I feel that if I really wanted to I could contribute to making this country a better place to live in. |
| () | () | 23. Most often people become professionally successful because they have rich and powerful relatives to help them. |
| () | () | 24. Whether neighbors like a person or not is largely a fate that cannot be easily altered. |
| () | () | 25. The leaders of this community are not as all-powerful as many people think: if their policies are not liked, the people can get rid of them. |
| () | () | 26. Personal achievements of mine are often heavily influenced by chance factors. |
| () | () | 27. How many friends I have depends on how nice a person I am. |
| () | () | 28. The kind of government we get depends primarily on chance factors because political developments are impossible to predict and to control. |
| () | () | 29. Usually there is no direct connection between how hard I study and the grades I get. |
| () | () | 30. In the past I found that it was not necessary to have influential friends in order to be accepted by the social group as long as I held the right attitudes toward other people. |
| () | () | 31. When I look at the problems of my community, I usually feel that I cannot do anything to improve the situation. |
| () | () | 32. It is not at all important to have influential relatives in order to be admitted into selective educational programs such as medicine or law. |
| () | () | 33. Popularity is not so much a matter of good or bad luck but something which one can do much about by developing social skills that appeal to others. |
| () | () | 34. I can do little to improve things in my city because all the important decisions are made by a small but powerful group of people. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 35. If people do not succeed in their careers they should blame themselves rather than chance causes. |
| () | () | 36. Others can become more popular by improving social skills and by developing their personality. |
| () | () | 37. Just because I do not like the way this city is governed does not entitle me to accept it as inevitable in my life. |
| () | () | 38. The idea that people get ahead in life by doing good work is an illusion. |
| () | () | 39. Knowing influential people is an extremely important way of being socially acceptable. |
| () | () | 40. In the long run people are responsible for bad government on a national as well as on a local level. |
| () | () | 41. I think that my chances of getting high grades depend primarily on who my teacher is. |
| () | () | 42. If I am not as popular as I would like to be, it is because my chances of getting into the right crowd were always small. |
| () | () | 43. The democratic system of government is an illusion because much of the decision-making power lies in the hands of a powerful few. |
| () | () | 44. If I fail on a test I tend to blame myself rather than unfortunate circumstances beyond my control. |
| () | () | 45. People who try hard to make many social contacts are wasting their time because many of these efforts are counter-productive. |
| () | () | 46. A severe economic depression in our country would be more the result of bad judgments by its citizens than the effect of chance factors. |
| () | () | 47. Capable people who fail to succeed have not made maximum use of their abilities. |
| () | () | 48. If one wants to avoid social rejection it is more important to know how to get along with other people than to have one or two influential friends. |

- | Agree | Disagree | |
|-------|----------|--|
| () | () | 49. It is difficult for people to change anything through the political processes. |
| () | () | 50. Getting good marks primarily depends on how hard I work rather than what kind of a teacher I get. |
| () | () | 51. I have found that social success is not so much a matter of good or bad luck as it is of the social skills I have developed. |
| () | () | 52. If I decided to stand up for my rights to the people in power, I would not have to put up with many disliked governmental policies. |
| () | () | 53. Attaining success in studies or in a profession is primarily a matter of the lucky breaks people get at the right times. |
| () | () | 54. Whether other people ignore me or appear to desire my company is something about which I can do little. |
| () | () | 55. There is little I can do about inflation, unemployment or other undesirable economic conditions because the economic system is determined by impersonal laws beyond the control of any individual or government. |
| () | () | 56. I think that success in school primarily depends on how well I study. |
| () | () | 57. I can make many friends if only the group leaders do not make a deliberate effort to exclude me. |
| () | () | 58. With enough effort I could wipe out some of the political corruption in this city. |
| () | () | 59. Entrance into high paying occupations depends primarily on knowing the right people and little on your abilities. |
| () | () | 60. Social rejection is primarily a matter of luck and depends on the kind of crowd the person happens to be with. |
| () | () | 61. The argument that a society is usually controlled by some powerful clique is an excuse for people who are too unmotivated to exercise their rights and responsibilities. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 62. In the past I found that my educational successes and failures were primarily a matter of chance. |
| () | () | 63. People who reject me as a person would change their attitudes if I attempted to influence their feelings. |
| () | () | 64. Society's structure today is primarily the result of historical and economic processes which are beyond the control of any individual or small group of citizens. |
| () | () | 65. My success in any job is unlikely to be determined mostly by my effort. |
| () | () | 66. Whether I am liked or disliked depends more on how friendly I am toward others than on how I get along with the important people in my group. |
| () | () | 67. In our mass society I think that as an individual there is very little that I can do which could contribute to the solutions of any social problem. |
| () | () | 68. Students do not have to depend on a teacher's whims in order to get high grades. |
| () | () | 69. People who are unpopular are the ones with wrong attitudes toward others and its no use blaming chance circumstances for their unpopularity. |
| () | () | 70. There is little chance of my doing any better in life because the people who are on the top of our social system effectively keep me down. |
| () | () | 71. People who argue that luck is very important for educational success are lazy people who want to have an excuse for their failures. |
| () | () | 72. People are lonely because they don't try to be friendly. |
| () | () | 73. I cannot blame history, fate, or anything else if I do not like some things in our society because I can change the present if not the past. |
| () | () | 74. People today have little chance to advance in their jobs by doing good hard work. |
| () | () | 75. If the parents of classmates don't approve of a person's family background, there is little that an individual can do to make friends. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 76. The average citizen can have an influence in government decisions. |
| () | () | 77. If I studied to become a teacher, scientist, or doctor and failed, it would probably be because I needed some help and important people did not give it to me. |
| () | () | 78. There is not much use in trying to please people. If I am lucky they like me; if I am out of luck then they don't. |
| () | () | 79. The poor people in this society cannot have a better deal simply because the people at the top keep them down. |
| () | () | 80. When making decisions about my future I found that making a decision to take a definite course of action turned out better than trusting fate. |
| () | () | 81. No matter how hard a person tries, some people just never will like that individual. |
| () | () | 82. The "historical destiny" of a country is shaped more by the decisions of its citizens than by some historical fate. |
| () | () | 83. If people worked harder they would get better jobs and would make more money. |
| () | () | 84. The popularity or unpopularity one experiences is primarily a matter of one's personality and not a matter of whether one knows important people. |
| () | () | 85. There is very little that parents can do to improve the quality of life for their children in their community. |
| () | () | 86. If I am capable, I can get ahead in my job even if my boss is against me. |
| () | () | 87. I do not think that I was born with the characteristics which people like or dislike in me, so I can improve them. |
| () | () | 88. If I do not accept unquestioningly the programs laid down by politicians in office but work for improvement in my community and district, I can influence these programs and their outcome. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 89. People often succeed at chosen tasks because they are meant to succeed. |
| () | () | 90. If I ever run into a situation where I have very few friends, I think there is little that can be done. |
| () | () | 91. I do not think that I can do anything about war or peace in the world but I have to live with whatever chance might bring. |
| () | () | 92. Most of my failures in school or work were the result of ignorance or laziness, or lack of ability, or all three. |
| () | () | 93. If I am accepted by my social group, it is primarily because the group leaders like me. |
| () | () | 94. If I made an effort, there are many things I could do in order to improve the life in my community. |
| () | () | 95. Getting good marks depends primarily on what kind of teachers the students get. |
| () | () | 96. Good friends are hard to come by; a person has to wait largely for chance to bring them along. |
| () | () | 97. If people are sufficiently eager to exercise their political rights, they can get rid of many strong political leaders they do not like. |
| () | () | 98. The career I end up in probably will be chosen more from uncontrollable events in my background than from anything else. |
| () | () | 99. I can pretty well influence the number of people who like me or dislike me by the things I do. |
| () | () | 100. The political activities of the last twenty years have convinced me that luck more than anything has determined government solutions to pressing societal and economic problems. |
| () | () | 101. I found that hard work usually does not pay off. |
| () | () | 102. Even when I am out of tune with the social leaders of my peer group, I can still be popular with others if I make an effort to get to know them well. |

- | Agree | Disagree | |
|-------|----------|---|
| () | () | 103. Even if I devoted all my time and energy to political and social goals there is little chance that my efforts could make any impact. |
| () | () | 104. People do not need to have influential connections in order to get ahead in life. |
| () | () | 105. People who have an unattractive personality need not resign themselves to an unpleasant fate, but can become more likeable by changing their attitudes and habits. |
| () | () | 106. I do not hope for any improvement in our community because powerful people with vested interests resist any change. |
| () | () | 107. Many poor people would be better off if they stopped blaming their unfortunate circumstances and showed a willingness to improve their situation. |
| () | () | 108. People who want to know why others like or dislike them need only make the effort. |
| () | () | 109. Luck, chance, or fateful processes have not been a major variable in the decisions of society that have been relevant to me. |
| () | () | 110. Society's acceptance of an individual is seldom determined by a person in a position of prestige. |
| () | () | 111. People who want to accomplish a large problem of unique interest to themselves do not have to depend on support from others. |
| () | () | 112. I do not think that it is purely a matter of luck if I am liked or not liked. |
| () | () | 113. I am not obliged to simply follow the policies set by leaders of any institution or organization. |
| () | () | 114. Luck doesn't influence very much the outcome of tasks I do. |
| () | () | 115. Uncontrollable or fateful causes seldom determine social changes for people. |
| () | () | 116. Student leaders don't determine the approval others give me. |

- | Agree | Disagree | |
|-------|----------|--|
| () | () | 117. I can usually succeed in a task even if important people work against me. |
| () | () | 118. People who have an unattractive personality need not resign themselves to an unpleasant fate. |
| () | () | 119. Political and business leaders do not really control this country or its people. |
| () | () | 120. Successes of any sort are seldom the result of fate. |

APPENDIX B

TEST-RETEST STUDY DATA ON THE MLC

Ancillary Information on Analyses of the MLC

Item Reliability

Test-retest correlations for males alone and females alone generally corroborated the elimination based on the total sample in that items eliminated by this criterion for either males alone or for females alone or both. The choice of a criterion of .22 as the cutoff was arbitrary. At the time, no packaged program for intercorrelating more than 110 items existed at the University of Manitoba computer center. This cutoff eliminated 10 items of the original 120-item scale. Items deleted were 36, 37, 65, 70, 82, 102, 105, 109, 110 and 112. This deletion was temporary in that all items were used later for the construction of the original MLC categories.

Item Correlations

The inability to establish a standard criterion for minimal item intercorrelations might have been eliminated had a 36-item measure been of acceptable length. However, test-retest reliabilities of subcells and cells had indicated that item combinations added substantially to their reliability and the subsequent factor analyses suggested more stable results might be obtained with a 72-item measure. In addition, in the creation of the revised MLC, nine items were retained beyond the 72 needed because of their substantial intercorrelations with other items. They could not be used in factor analyses which required an evaluation of equivalent subscales (cells) nor were the nine items used in intercorrelations with other measures. However, they were saved for later analyses beyond those planned beforehand for the data.

As additional support for the contribution of almost all items of the original MLC, test-retest reliabilities of subcells, cells, subrows, subcolumns, rows and columns of the original and revised MLC measures indicated some loss of reliability when even the least reliable items and those showing the least intercorrelation with other MLC items were eliminated. Furthermore, out of a matrix of 110 items comprising 5,995 unique correlations, 77 correlations were negative and the largest of these was $-.070$. This is slightly more than one negative correlation in every 100 correlations and suggested the items generally were assessing the same sort of construct.

Factor Analysis Approach

Factor analyses provided a major technique in understanding the new scale and were viewed as follows. Principal components analyses (diagonal values of the correlation matrix are unities) or principal axes analyses (diagonal values of the correlational matrix initially are squared multiple correlations) were the alternative models. Principal components analysis transforms the original variables into a new set of composite variables that are orthogonal to each other. In other words, the factors that are extracted are exact transformations of the original variables. Principal axes analysis on the other hand, is based on a distinction between common and unique variance that affect relationships in the original correlation matrix. Variance in the original variables attributable to that common to other variables in the matrix (communalities) are estimated and factors are no longer derived but inferred. Principal components analysis would appear to be desirable in initial factor analyses of a new scale where a priori

assumptions of the underlying structure of the variables cannot be made. In addition, the data analyst may be unwilling to conceptualize factors that can never be observed in the sample at hand and wishes merely an economical description of the information contained in the original variable relationships.

A number of criteria were used in the determination of factors. None of the criteria were assumed to be infallible. First the eigenvalue of the last retained factor of the factor matrix should be greater than 1.0. Even for principal axes analyses this is a minimal criterion in that some factors for larger correlation matrices will not reappear in a replication study on a new but highly comparable sample. For principal components analysis Kaiser (cited in Mulaik, 1972) has shown that the number of eigenvalues greater than 1.0 is equivalent to the number of common factors that have positive generalizability in the sense of Cronbach's coefficient alpha. Second, among the criteria, the information in the unrotated factor matrix should reflect the information in the correlation matrix in that cluster analysis should show that variables loading substantially on a factor (greater than .40) are those which are most related in the correlation matrix. Third, in the unrotated factor matrix, the number of variables loading substantially on a factor should be higher than the order number of that factor. Fourth, the percentage of variance accounted for by the factor should be greater than the percentage accounted for by two of the variables if all variables contributed equal amounts of variance. Fifth, the greater the agreement between these various criteria the more likely a factor is to be accepted or rejected without further consideration.

Failure to obtain agreement between the various criteria enhances the degree to which subjective judgment is involved regarding the existence of a factor. In this case, past factor analyses have been concluded on a judgment of the meaningfulness of the factor in question. Meaningfulness was interpreted as the degree to which the analyst could perceive a common character to the variables loading on this factor which separated them from the remaining variables. Initial judgments as to differences between the variables loading on the factor and a few other variables led to the application of a crude form of content analysis in which all variables in the analysis were categorized according to the initial perceived distinctions. Successful classifications based on these differences determined the tentative acceptance of a factor.

Factor Analytic Results

Subcells. Factor analyses of the MLC began with principal components analyses (diagonal values are unities) of the 36 subcells of the 120-item questionnaire and principal axes analyses (diagonal values are squared multiple correlations) of the 36 subcells of the 72-item questionnaire. Neither analyses of subcells nor of individual items were presumed beforehand to be the best indicators of the structure of the scale inasmuch as the elements of the scale then would contain much variance specific to their more restricted content. In other words, distinctions such as internal versus external wording of a statement or personal versus general reference (I-they) in an item or item sums were felt to be dimensions of difference in locus of control beliefs that were secondary to dimensions of content and origin of control. In addition, the larger the matrix to be factored the more probable it is

that multiple factor solutions will be obtained.

For all analyses of MLC subcells the unrotated factor matrix indicated a much greater loading on the first factor than on all other factors together. However, principal components analyses suggested the most appropriate solution to be three factors. The first was made up of internally worded subcells, the second consisted of political, systems subcells and the third factor was formed by externally worded subcells. In the total sample, these three factors accounted for 25.5%, 7.3% and 5.8% of the total scale variance. Principal axes analyses (communality estimates = R^2) suggested a two factor solution in which the first factor was made up of education, achievement and social acceptance subcells and the second factor was made up of political, systems subcells. In the total sample, eigenvalues for the first three factors were 7.10, 2.06 and 1.09, and these factors accounted for 19.7%, 5.7% and 3.0% of the total scale variance. These results suggested two characteristics in the scale. First, political, systems content appeared to be more consistently interpreted by the respondents than other content arenas. Second, respondents distinguish between internally worded statements and externally worded statements.

Cells. In addition to principal axes analyses of the cells of the revised 72-item MLC, such analyses of the original 120-item questionnaire indicated a single factor solution (see Table B-18). Analysis of the total sample yielded eigenvalues of 4.12 and .65 for the first two factors. These two factors accounted for 45.8% and 7.3% of the total scale variance. For males only, eigenvalues for the first two factors were 4.28 and .58, and these accounted for 47.5% and 6.5% of the total

scale variance respectively. For females only, the first two unrotated factor eigenvalues were 3.99 and .69, and they accounted for 44.4% and 7.7% respectively.

Table B-1

Test-retest Reliabilities of the Original

120 Items of the MLC, Males Only

Item	ϕ	Item	ϕ	Item	ϕ	Item	ϕ
1	.471	31	.397	61	.298	91	.430
2	.590	32	.494	62	.182	92	.350
3	.389	33	.339	63	.414	93	.332
4	.317	34	.508	64	.366	94	.485
5	.393	35	.317	65	.207	95	.487
6	.417	36	.140	66	.237	96	.374
7	.255	37	.086	67	.436	97	.304
8	.329	38	.306	68	.465	98	.282
9	.457	39	.459	69	.331	99	.231
10	.249	40	.332	70	.204	100	.238
11	.421	41	.531	71	.358	101	.220
12	.364	42	.296	72	.393	102	.165
13	.248	43	.435	73	.390	103	.361
14	.282	44	.307	74	.419	104	.374
15	.175	45	.299	75	.268	105	.202
16	.399	46	.284	76	.457	106	.334
17	.488	47	.347	77	.315	107	.418
18	.286	48	.258	78	.331	108	.320
19	.490	49	.429	79	.409	109	.247
20	.282	50	.415	80	.250	110	.148
21	.416	51	.205	81	.326	111	.183
22	.486	52	.217	82	.219	112	.207
23	.413	53	.325	83	.405	113	.221
24	.251	54	.290	84	.229	114	.408
25	.362	55	.287	85	.347	115	.196
26	.385	56	.314	86	.458	116	.206
27	.413	57	.404	87	.296	117	.460
28	.300	58	.422	88	.408	118	.379
29	.447	59	.362	89	.414	119	.320
30	.140	60	.359	90	.261	120	.281

Table B-2

Test-retest Reliabilities of the Original

120 Items of the MLC, Females Only

Item	ϕ	Item	ϕ	Item	ϕ	Item	ϕ
1	.482	31	.509	61	.283	91	.513
2	.556	32	.496	62	.471	92	.457
3	.347	33	.230	63	.373	93	.338
4	.342	34	.521	64	.295	94	.505
5	.426	35	.350	65	.152	95	.560
6	.498	36	.197	66	.160	96	.467
7	.263	37	.278	67	.433	97	.462
8	.398	38	.371	68	.441	98	.324
9	.499	39	.499	69	.408	99	.282
10	.363	40	.268	70	.230	100	.244
11	.504	41	.497	71	.400	101	.241
12	.294	42	.358	72	.569	102	.172
13	.369	43	.538	73	.421	103	.479
14	.399	44	.334	74	.251	104	.494
15	.289	45	.293	75	.282	105	.222
16	.324	46	.178	76	.502	106	.322
17	.434	47	.343	77	.242	107	.297
18	.359	48	.331	78	.438	108	.231
19	.477	49	.419	79	.430	109	.175
20	.501	50	.419	80	.329	110	.215
21	.465	51	.328	81	.387	111	.395
22	.517	52	.272	82	.174	112	.128
23	.429	53	.446	83	.426	113	.291
24	.333	54	.472	84	.202	114	.371
25	.372	55	.312	85	.348	115	.332
26	.489	56	.471	86	.408	116	.261
27	.469	57	.394	87	.270	117	.359
28	.400	58	.456	88	.420	118	.258
29	.424	59	.347	89	.429	119	.392
30	.306	60	.245	90	.349	120	.455

Table B-3

Test-retest Reliabilities of MLC Categories Based
On All 120 Items of Original Scale, Total Sample

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.458	19	.471	1	.692	1	.695
2	.439	20	.524	2	.763	2	.722
3	.663	21	.351	3	.717	3	.707
4	.519	22	.541	4	.690	4	.666
5	.486	23	.467	5	.653	5	.689
6	.549	24	.547	6	.712	6	.761
7	.609	25	.430	7	.686	Rows	
8	.444	26	.508	8	.583	1	.818
9	.633	27	.453	9	.663	2	.780
10	.481	28	.473	Subrows		3	.745
11	.577	29	.351	1	.737	Columns	
12	.555	30	.405	2	.776	1	.776
13	.516	31	.519	3	.734	2	.752
14	.533	32	.513	4	.703	3	.786
15	.447	33	.479	5	.635	Total	
16	.521	34	.470	6	.721		.834
17	.526	35	.538				
18	.587	36	.552				

Note. Category labels are explained in Table 5 and pages 78-79.

Table B-4
 Test-retest Reliabilities of MLC Categories Based
 On All 120 Items of Original Scale, Males Only

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.474	19	.380	1	.701	1	.662
2	.426	20	.500	2	.755	2	.698
3	.653	21	.370	3	.711	3	.675
4	.519	22	.599	4	.643	4	.647
5	.474	23	.488	5	.649	5	.694
6	.545	24	.529	6	.710	6	.749
7	.588	25	.396	7	.678	Rows	
8	.470	26	.545	8	.579	1	.809
9	.597	27	.467	9	.664	2	.757
10	.454	28	.459	Subrows		3	.722
11	.607	29	.331	1	.741	Columns	
12	.531	30	.448	2	.760	1	.757
13	.521	31	.493	3	.707	2	.733
14	.507	32	.471	4	.708	3	.780
15	.419	33	.429	5	.643	Total	
16	.494	34	.435	6	.701		.820
17	.565	35	.559				
18	.552	36	.555				

Note. Category labels are explained in Table 5 and pages 78-79.

Table B-5
 Test-retest Reliabilities of MLC Categories Based
 On All 120 Items of Original Scale, Females Only

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.444	19	.557	1	.685	1	.731
2	.448	20	.546	2	.772	2	.744
3	.670	21	.327	3	.725	3	.742
4	.522	22	.486	4	.733	4	.691
5	.493	23	.446	5	.659	5	.688
6	.553	24	.562	6	.715	6	.775
7	.625	25	.466	7	.691	Rows	
8	.422	26	.456	8	.581	1	.828
9	.655	27	.426	9	.664	2	.803
10	.511	28	.494	Subrows		3	.770
11	.552	29	.369	1	.735	Columns	
12	.575	30	.354	2	.791	1	.795
13	.510	31	.545	3	.761	2	.775
14	.558	32	.548	4	.697	3	.797
15	.485	33	.521	5	.619	Total	
16	.549	34	.501	6	.741		.852
17	.495	35	.522				
18	.619	36	.547				

Note. Category labels are explained in Table 5 and pages 78-79.

Table B-6

Correlations Between 110 Most Reliable MLC Items, Total Sample

	Item																									
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1																										
2	136																									
3	131	189																								
4	185	189	092																							
5	069	023	215	078																						
6	055	046	105	164	119																					
7	012	134	123	044	084	073																				
8	262	190	212	197	119	102	081																			
9	080	104	113	147	083	097	117	108																		
10	116	079	033	213	078	094	005	178	114																	
11	097	281	158	129	072-001	082	185	046	174																	
12	211	222	319	246	160	101	046	297	133	112	197															
13	064	132	132	156	144	107	090	088	180	150	098	138														
14	174	184	140	185	047	100	046	255	114	151	211	239	110													
15	199	097	126	244	058	088	062	286	131	185	133	221	070	263												
16	152	107	091	299	078	107	065	124	150	162	144	142	138	129	158											
17	191	239	179	101	081	114	087	271	091	111	199	206	108	196	174	150										
18	142	136	196	137	114	133	081	168	126	099	066	223	107	217	206	100	150									
19	170	128	148	261	134	125	085	106	165	149	145	108	215	135	159	333	063	229								
20	264	155	144	244	136	116	084	273	123	162	176	224	112	266	291	153	193	225	149							
21	059	043	251	109	219	106	099	158	063	067	099	150	129	119	115	048	150	213	120	192						
22	182	150	113	331	133	121	070	145	152	146	170	200	173	151	153	409	095	159	500	228	092					
23	146	235	292	133	092	097	151	196	094	082	159	200	131	145	133	078	189	194	182	142	158	148				
24	080	091	096	146	130	139	083	133	170	127	082	156	135	150	152	108	105	198	232	177	135	224	122			
25	132	147	116	247	114	070	080	134	072	202	096	177	141	201	163	197	123	095	204	182	119	267	151	190		

Note. Decimal points have been omitted to conserve space.

Table B-6 continued

Item	Item																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
26	241	134	218	106	185	129	084	300	134	114	117	187	129	198	193	071	349	217	179	231	173	132	181	200
27	127	116	088	195	019	054	014	241	122	164	138	194	089	169	257	084	170	136	075	145	027	086	054	135
28	189	169	137	217	110	110	133	212	132	125	085	199	213	158	172	121	194	208	217	177	096	185	174	222
29	197	218	103	214	083	102	103	220	126	136	212	194	111	303	257	126	213	191	177	267	091	172	113	205
30	094	117	209	140	072	062	087	216	118	119	150	241	077	172	157	105	126	242	088	230	186	133	151	124
31	104	128	146	283	149	136	109	110	143	152	127	133	191	123	130	364	096	159	421	123	115	402	106	162
32	123	073	180	057	096	075	099	181	021	070	103	122	062	097	159	042	090	075	055	110	162	055	211	076
33	256	140	138	253	065	098	053	262	123	178	104	270	061	252	337	127	163	253	135	301	115	163	134	186
34	099	180	201	226	179	164	146	157	129	200	132	178	224	156	107	304	107	216	413	114	137	365	193	186
35	207	137	102	204	079	069	018	335	089	280	202	229	091	354	234	117	200	176	099	272	114	145	137	140
36	139	173	169	235	115	073	019	297	094	148	129	227	099	238	228	141	183	212	147	243	082	190	182	194
37	087	209	412	092	216	127	126	222	147	086	129	295	120	158	173	092	179	265	132	160	223	134	316	134
38	167	076	023	266	042	068	015	146	096	255	121	129	068	187	180	143	066	126	167	226	040	194	051	121
39	117	238	144	154	082	087	054	199	113	120	207	177	093	429	172	135	217	198	154	158	120	157	186	142
40	161	128	229	194	169	105	064	218	166	114	106	255	129	202	223	109	173	358	181	292	283	169	236	202
41	087	248	229	181	127	118	154	163	109	163	168	160	196	169	124	107	148	151	196	111	134	175	238	100
42	158	153	113	216	049	101	078	234	120	142	187	179	086	314	246	105	174	172	131	236	142	110	134	143
43	078	118	063	142	041	115	051	066	033	027	068	142	093	119	114	108	122	070	129	128	081	124	111	169
44	170	060	037	183	051	049	024	165	094	194	182	132	099	122	157	113	155	092	149	160	018	175	057	142
45	200	127	127	152	035	068	023	274	098	198	208	174	064	201	230	096	177	148	106	248	089	135	098	105
46	182	157	170	286	114	125	028	242	147	127	109	321	073	253	278	122	153	231	142	277	171	187	183	153
47	098	093	151	164	091	078	124	135	061	047	109	106	171	070	114	151	157	075	192	091	094	187	134	104
48	143	210	113	223	048	098	056	239	073	104	209	187	096	461	202	125	192	173	134	226	115	152	184	092
49	246	117	151	237	110	104	070	325	151	180	097	278	110	242	332	139	232	245	163	283	191	175	143	222
50	065	008	077	117	089	056	022	120	000	117	109	073	134	041	084	224	102	030	148	113	107	164	058	089
51	184	207	223	174	123	117	080	321	093	146	163	278	123	235	217	139	258	217	210	186	124	164	265	210
52	143	123	116	223	100	153	035	184	165	161	053	147	169	173	238	164	121	218	236	180	120	180	137	245
53	098	107	107	179	137	135	107	134	133	138	106	119	183	134	138	179	131	173	304	130	103	308	150	188
54	229	200	098	267	056	104	078	270	121	154	165	219	063	404	286	133	230	188	095	328	151	153	136	148

Table B-6 continued

		Item																							
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
26	168																								
27	102	182																							
28	141	247	166																						
29	187	189	219	221																					
30	164	181	180	100	206																				
31	241	146	088	190	127	136																			
32	116	127	030	109	113	161	058																		
33	220	218	258	191	296	251	153	115																	
34	285	174	078	210	121	134	425	108	176																
35	165	231	233	179	222	157	102	081	264	123															
36	177	230	236	190	286	176	144	087	285	162	289														
37	114	210	082	157	108	228	117	193	127	166	108	181													
38	246	103	178	172	208	099	142	022	231	135	228	245	071												
39	181	146	095	158	303	152	138	106	205	183	245	262	203	181											
40	165	259	144	218	225	250	174	104	298	194	210	282	236	213	208										
41	262	171	098	225	168	110	199	089	093	338	128	174	185	158	171	155									
42	122	146	207	194	312	172	134	103	294	109	274	278	034	182	288	204	111								
43	093	099	059	117	158	042	157	060	127	121	044	145	090	099	116	162	095	131							
44	127	153	181	169	201	142	130	078	165	060	179	117	070	222	086	102	064	146	050						
45	145	174	207	157	175	186	124	143	240	118	341	299	110	213	159	146	096	186	049	195					
46	143	195	291	221	304	278	150	149	400	113	217	280	213	212	214	314	134	240	117	177	208				
47	188	132	088	127	074	080	250	122	093	280	070	148	126	095	114	116	254	086	161	075	115	094			
48	181	170	171	171	330	153	130	118	235	131	268	301	147	178	575	194	155	322	107	131	184	318	101		
49	193	281	272	225	274	251	162	101	446	165	300	336	165	197	196	341	130	283	113	156	235	369	130	263	
50	147	075	026	054	083	060	151	069	068	139	100	039	071	077	065	060	100	042	084	106	074	036	165	078	
51	173	318	198	262	337	200	157	231	305	198	269	295	240	137	313	268	170	261	117	162	244	271	143	303	
52	157	226	174	248	223	116	184	064	276	197	110	232	178	190	192	242	106	163	119	124	144	247	165	171	
53	204	192	068	190	129	097	280	078	116	338	090	145	147	121	172	143	226	116	143	153	098	134	263	138	
54	180	211	262	186	424	202	109	136	350	109	257	283	119	201	323	266	102	346	151	152	236	332	067	473	

Table 8-6 continued

Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
26																								
27																								
28																								
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50		088																						
51		324	068																					
52		304	083	246																				
53		170	135	223	211																			
54		325	067	283	162	106																		

Table B-6 continued

	Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
55	034	051	171	057	185	138	034	109	019	053	063	146	092	116	091	077	102	274	116	119	277	115	150	148
56	150	096	148	202	092	104	078	118	120	125	149	147	198	124	148	375	061	124	366	161	111	409	140	156
57	213	195	249	166	148	114	116	325	102	113	150	300	100	228	224	165	197	239	166	223	149	177	281	168
58	173	149	238	136	180	161	054	256	129	188	124	238	126	187	195	102	209	286	198	202	197	145	242	235
59	113	139	149	195	067	076	072	139	081	192	120	190	120	145	159	187	140	129	214	154	099	235	193	122
60	244	210	161	234	116	114	043	288	094	131	119	218	070	301	264	168	243	219	139	262	131	182	156	191
61	045	057-012	054-070-025	020	013	019	043	090	006	048	040	053	109	008	037	065	028	003	077	011	031			
62	039	030	093	080	079	059	093	102	099	123	026	051	185	030	050	154	116	118	214	037	120	202	103	114
63	025	093	026	027-032-043	031	110	093	020	024	113	042	078	093	009	043	043	015	075	041	081	020	078		
64	056	091	096	144	087	086	085	059	114	086	099	094	206	053	029	247	026	115	353	034	051	345	141	106
65	087	161	108	072	059	041	038	137	046	065	158	104	051	228	119	088	128	107	077	107	137	059	077	049
66	083	060	071	072-025-007-009	143	079	131	124	141	022	099	192	076	113	109	065	089	069	090	049	094			
67	086	096	062	051	002-014	021	176	069	128	171	088	033	116	129	057	166	062	039	105	062	064	035	043	
68	071	035	013	056	007	007-005	121	037	120	168	059	013	061	107	100	110	062	048	077	062	054	015	028	
69	051-009	071	112	075	032	044	129	077	173	072	079	109	044	066	182	062	020	215	051	084	242	029	071	
70	021	154	107	110	021-023	052	178	035	055	026	116	056	070	143	090	109	095	091	087	053	084	157	085	
71	061	089	083	064	090	029	057	087	113	040	001	129	093	080	094	094	032	096	145	019	094	104	157	112
72	091	088	135	187	152	134	071	087	064	107	113	113	107	063	062	225	047	077	285	058	034	282	105	104
73	042	088	113	051	102	028	032	113	045	018	042	091	068	097	132	073	089	121	106	084	108	109	154	082
74	091	121	134	065	070	039	070	123	099	014	049	145	054	102	144	066	128	151	086	087	073	064	105	137
75	038	141	142	040	051	040	060	085	067	093	047	100	129	062	043	056	084	095	098	037	108	101	170	082
76	084	053	039	063-045-009	014	091-003	088	059	043	045	070	105	039	079	061	064	065	028	058	071	070			
77	000	044	074	025	091	070	135	051	163	043	026	070	119	001	042	158	043	041	048-008	087	061	067	094	
78	098	119	085	110	026	021	051	164	037	113	186	120	089	080	105	094	139	036	084	120	035	083	096	055
79	106	102	146	078	056	002	031	183	082	087	061	202	017	141	166	079	099	169	039	147	114	069	105	078
80	036	090	082	207	072	054	046	101	100	105	041	117	116	125	107	186	057	120	152	128	046	200	048	113
81	093	065	143	080	081	060	043	177	047	132	138	160	131	113	114	163	078	127	099	080	177	170	120	059
82	098	067	092	120-016	055-011	113	139	057	051	128	047	083	145	092	038	089	077	069	040	075	038	089		
83	078	104	108	233	031	053	052	071	111	130	095	085	121	112	087	309	047	114	329	043	021	360	077	111

Table B-6 continued

	Item																							
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
55	105	154-010	087	111	134	118	087	135	197	060	114	248	034	156	280	115	077	099	005	053	187	090	115	
56	237	128	064	153	134	075	342	030	137	343	125	104	147	163	153	145	175	103	107	157	099	128	216	115
57	184	203	134	189	261	288	165	230	239	192	199	255	261	132	235	231	202	230	149	120	158	269	142	260
58	150	328	168	248	265	226	156	124	303	190	202	278	274	132	237	356	148	196	160	121	164	212	086	193
59	269	116	111	137	104	140	196	102	166	253	152	200	155	191	165	131	270	145	074	149	164	173	153	180
60	190	287	191	242	312	224	153	092	297	149	266	312	202	221	315	292	140	254	156	129	211	352	129	339
61	016-010	095-008	027	012	092	014	040	037	080	038-034	037	016	042	009	022	068	088	068	031	012	043			
62	083	101	007	046	019	000	207	019	047	332	069	074	095	088	078	108	151	005	089	066	043	037	187	053
63	059	029	148	015	051	107	042	039	147	042	055	072	047	055	039	087	033	043	009	049	067	132	004	044
64	150	090-023	139	021	032	372	022	028	405	035	060	079	077	080	115	096	048	121	085	045	042	238	036	
65	094	125	012	070	155	088	056	109	097	085	173	103	149	044	287	077	145	138	026	050	101	114	082	248
66	072	124	184	081	090	174	099	094	167	049	200	103	075	077	054	134	060	116	016	086	193	122	069	114
67	120	142	101	103	122	083	066	093	128	049	233	105	085	080	078	044	092	112-037	090	231	083	064	120	
68	054	111	147	052	043	084	087	066	089	038	169	093	058	052	019	053	026	116	050	161	243	039	051	066
69	187	104	031	078	004	045	096	040	065	191	063	042	054	138	001	033	104	018	002	072	100	064	134	038
70	094	126	081	127	118	053	144	082	103	151	130	169	086	058	127	152	095	103	096	035	097	142	085	132
71	047	073	040	084	061	040	102	053	081	130	061	086	114-007	123	087	081	069	045	036-017	068	096	084		
72	207	091	081	119	039	067	221	067	067	321	093	056	087	107	044	055	213	023	071	112	040	037	226	062
73	058	117-004	097	080	096	069	032	100	120	090	113	129	011	131	115	084	048	016	003	058	127	060	129	
74	046	179	117	155	116	123	110	044	147	111	064	120	169	023	094	124	068	094	116	051	105	149	107	096
75	096	102	022	081	054	072	121	069	065	151	076	122	138	060	065	136	260	046	097	043	105	039	180	050
76	056	086	035	033	060	075	065	092	159	064	121	076	036	079	092	049	030	056	031	088	095	149	054	097
77	031	049	005	053-002	038	096	043	011	098	022	027	107-042	032	017	070	004	044	051	030-003	130-003				
78	100	117	153	095	048	051	115	050	122	084	211	168	050	141	111	085	108	085	051	120	216	074	102	156
79	069	127	107	059	093	180	069	096	198	067	150	135	174	082	096	173	061	062	020	093	101	228	048	110
80	129	116	080	161	074	111	188	053	128	179	121	157	068	150	125	111	124	121	031	056	114	152	127	100
81	110	119	068	077	002	116	212	122	095	187	162	082	153	091	072	124	106	061	074	106	131	041	149	117
82	048	107	104	075	061	118	117	077	152	080	078	064	082	036	069	071	049	076	050	112	057	043	051	110
83	179	098	040	113	075	069	271	005	106	324	099	078	076	117	112	058	176	070	023	107	096	110	130	104

Table B-6 continued

Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
55	138	025	110	108	139	073																		
56	141	255	144	174	283	077	100																	
57	264	074	337	150	158	248	163	141																
58	302	081	322	271	186	181	252	139	257															
59	173	142	146	166	200	112	115	213	206	165														
60	345	017	346	209	136	417	206	132	295	270	170													
61	072	088	043	108-010	016-064	097	008	038	015	006														
62	073	126	104	170	290-033	071	216	077	121	127-002	113													
63	089	002	058	068	006	072	017	037	065	058	098	066	135	091										
64	042	156	090	134	322-002	090	326	094	091	120	040	088	302	111										
65	079	036	176	052	037	155	058	122	195	158	094	156	070	154	138	107								
66	162	084	119	096	055	141	030	104	114	129	121	097	146	091	199	073	164							
67	118	099	115	057	058	153-005	106	091	077	160	124	145	098	182	064	206	280							
68	075	123	033	082	012	108-006	133	036	075	101	047	161	081	120	073	154	327	278						
69	096	194	066	083	189	037	041	225	083	061	169	050	108	270	150	254	108	181	186	109				
70	152-004		179	120	097	080	072	087	206	168	085	100	122	183	242	199	197	221	214	140	212			
71	063	041	129	136	111	029	087	102	141	129	090	060	076	154	182	171	171	112	086	065	135	259		
72	061	168	107	074	275	018	037	288	087	098	170	035	071	284	140	345	143	155	092	113	310	195	164	
73	106	032	158	126	065	038	163	039	172	169	045	086	096	133	211	147	222	155	172	045	113	297	213	143
74	192	049	169	233	071	072	070	083	183	238	061	139	127	143	251	166	179	211	217	142	162	305	259	185
75	071	036	125	103	102	019	080	101	112	158	158	036	062	176	101	192	146	155	098	093	130	212	194	140
76	102	014	153	061	044	082	010	073	110	063	094	093	153	143	262	126	225	261	234	180	169	291	200	170
77	047	103	083	119	095-011	048	114	035	097	032-029	079	126	033	129	074	075	028	071	061	065	154	091		
78	147	094	113	086	046	109-014	148	128	099	149	084	134	133	156	105	159	271	272	253	168	308	086	160	
79	183	023	137	098	023	096	092	092	175	170	106	109	108	105	344	118	214	240	240	157	159	289	179	165
80	152	066	130	157	152	073	053	145	131	146	159	107	122	212	248	236	186	196	208	125	234	282	204	231
81	117	147	124	093	136	048	132	182	155	139	115	046	114	195	109	198	174	151	136	127	185	190	177	246
82	138	041	077	116	057	076	023	092	097	105	080	082	150	107	244	120	209	293	214	186	171	250	223	136
83	053	143	149	168	197	079	014	299	060	065	192	075	135	227	183	310	155	122	138	102	278	217	220	379

Table B-6 continued

Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
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74	282																							
75	203	176																						
76	273	243	145																					
77	094	120	111	023																				
78	168	204	176	200	085																			
79	280	298	165	329	018	237																		
80	246	291	142	299	019	186	333																	
81	184	177	173	164	150	225	157	195																
82	272	299	146	304	057	220	333	298	171															
83	176	221	134	235	081	153	196	351	190	223														

Table B-6 continued

Item																								
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
84	056	052	082-018	072	057	056	110	052	043	050	021	080	063	050	045	130	088	095	023	062	063	133	085	
85	065	043	122	105	034	059	011	124	094	030	020	142	070	077	143	079	064	152	136	084	099	102	075	157
86	084	033	120	145	086	076	058	058	157	110	031	087	142	024	040	191	038	121	336	037	086	305	127	134
87	078	084	007	104-021-041	004	132	006	125	132	068	029	117	110	076	060	059	024	015	005	026	058	033		
88	092	073	192-008	158	082	080	101	074	046	053	158	071	060	073	025	085	214	085	094	275	075	138	110	
89	086	098	103	265	080	047	025	100	115	141	094	095	125	049	094	340	044	075	296	108	078	384	051	110
90	083	194	122	098	174	037	056	157	062	076	175	122	058	285	112	103	130	121	092	047	087	076	148	091
91	052	056	082	092	046	074	019	149	122	053	041	077	095	059	088	088	116	169	098	051	118	087	163	128
92	110	069	096	187	037	061	011	086	098	125	113	136	117	111	093	232	057	108	253	064	049	300	087	076
93	093	089	125	077	058	060	026	160	102	108	071	113	107	110	095	062	156	188	175	111	126	113	096	132
94	111	047	025	116-022-007-032	114	066	047	059	062	058	081	163	068	050	087	124	092	040	121	047	088			
95	105	118	130	077	050	027	042	128	077	059	033	122	045	078	088	090	137	092	145	080	044	099	095	127
96	024	116	064	095-019	004	018	100	052	055	054	090	043	056	081	041	058	027	046	068	026	049	085	073	
97	090	083	135	175	089	064	055	064	093	039	079	114	176	067	064	219	039	042	309	070	097	264	141	108
98	055	125	250	065	071	029	057	175	092	082	069	224	071	087	122	048	122	121	086	087	127	098	202	090
99	094	137	173	160	116	067	097	117	132	069	065	137	172	061	093	156	094	135	214	062	144	210	165	105
100	095	098	043	084	006-002	043	157	037	110	067	119-032	089	149	050	069	060	034	124	082	063	049	057		
101	069	050	061	082-013	009	019	161	052	064	086	106	072	110	208	087	085	085	070	097	042	063	024	142	
102	078	040	064	048	039	011-000	073	020	063	114	094	069	079	072	077	085	064	040	043	114	038	021-003		
103	064	009	020	072	029	018	020	013	001	056	038	021	044	035	028	086	011	035	121	035	015	101	032	003
104	138	058	076	054	027	024	027	195	108	116	095	106	062	088	116	053	167	096	081	122	057	078	070	066
105	081	039	091	020	038	044	041	150	064	089	071	078	024	049	071	082	116	061	074	034	055	064	066	043
106	064	082	092	052	070	019-020	068	105	060	068	126	055	069	078	047	080	142	073	071	096	037	098	072	
107	098	042	108	089	086	067	018	155	028	075	106	176	146	092	103	187	107	125	125	113	163	201	112	063
108	037	012	064	033	001	016-027	034	023	054	072	145	024	050	072	042	015	053	053	060	049	076	040	084	
109	023	049	113	079	074	049	110	096	074	133	069	124	103	025	051	122	099	083	110	139	116	151	093	058
110	154	084	112	079	042	065	025	232	121	135	137	135	067	109	112	066	149	123	137	116	084	091	131	106

Table B-6 continued

		Item																							
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
84	053	141-027	116	066	022	076	075	036	138	082	065	092	013	131	042	143	025	009	048	029	015	077	077		
85	080	152	062	109	054	101	120	037	161	101	130	123	129	081	145	067	082	097	074	048	047	104	074	081	
86	109	140	027	146	004	050	292	033	073	334	074	077	106	092	084	122	163	056	103	132	046	067	178	050	
87	106	027	033	082	112	067	030	097	099	029	159	068	042	088	144	052	054	151-039	083	128	096-001	200			
88	044	151-008	073-006	140	066	091	113	118	071	085	269	038	118	220	085	056	050	033	048	123	049	063			
89	188	050	055	146	050	048	334	065	080	325	082	088	068	121	062	083	139	047	032	065	104	112	169	070	
90	134	109	020	127	182	069	076	098	091	140	203	161	131	060	518	114	126	173	046	071	096	119	099	417	
91	040	154	068	140	031	084	118	057	098	108	078	107	126	030	079	165	105	094	125	073	093	097	069	056	
92	246	137	069	113	040	079	229	051	110	228	107	100	082	193	081	096	160	082	032	154	073	071	135	081	
93	050	210	101	177	132	108	154	053	128	137	146	191	125	051	174	105	112	151	045	120	131	148	083	126	
94	091	074	143	114	055	079	119	037	172	096	104	121	018	106	038	080	058	095	066	117	073	121	042	079	
95	066	183	060	213	063	070	092	052	102	050	094	131	112	073	087	111	101	105	043	119	095	114	084	107	
96	063	088	066	088	101	061	114	048	053	079	133	118	051	093	113	074	099	062	033	071	118	104	038	108	
97	153	103	004	142	036	038	294	052	100	295	055	055	089	073	087	120	155	069	099	039	109	061	178	056	
98	134	124	057	120	086	159	087	174	132	148	168	151	251	011	092	123	141	101	011	059	105	156	064	092	
99	173	158	039	170	050	076	245	116	110	297	086	129	151	052	100	144	213	075	082	031	090	115	178	118	
100	105	051	076	077	040	085	058	065	118	052	140	125	062	100	057	093	089	099	021	109	152	062	060	087	
101	046	107	099	049	079	081	119	068	162	019	137	100	037	061	086	123	012	075-005	102	095	109	055	106		
102	051	073	032	055	017	070	036	074	057	013	065	054	072-005	038	049	003	060-031	072	094	051	061	078			
103	038	031-043	055	019-004	056-030	008	054	030-005	021	053	065-001	006	033-026	051	041	059	033	042							
104	060	223	060	137	076	106	068	094	133	064	179	117	119	072	096	119	088	126	018	177	134	082	010	106	
105	071	103	051	108	090	079	106	080	093	057	125	083	062	014	056	037	093	074	005	112	086	014	031	046	
106	088	122	066	074	048	136	029	041	083	053	042	087	121	075	072	102	067	041-041	091	047	116	036	061		
107	110	140	035	065	037	123	172	101	096	159	174	115	142	072	094	152	077	068	035	118	132	095	107	109	
108	023	062	028	045	018	044	052	077	133	058	106	078	084	080	075	041	005	047	013	058	069	080	026	052	
109	179	076	039	099	056	063	155	085-001	209	077	009	107	038	022	042	210-016	020	075	064	041	188	060			
110	075	231	115	112	085	150	112	085	162	087	233	106	106	108	118	098	076	102	003	136	178	103	026	122	

Table B-6 continued

		Item																							
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
84	068	065	122	124	101	010	104	088	060	078	021	047	023	128	115	155	148	095	120	044	072	146	133	088	
85	158	047	128	178	071	022	076	095	124	159	070	108	133	174	228	184	170	206	185	101	106	319	265	156	
86	071	136	116	176	272-006	082	268	072	160	114	052	075	314	110	406	092	067	067	072	232	171	207	290		
87	081	049	120	023	023	173-013	052	074	064	072	062	099	072	189	059	194	222	220	168	145	204	109	100		
88	127	053	111	058	111	045	257	072	167	198	096	108	061	133	218	156	201	163	119	092	087	181	173	151	
89	076	137	074	143	225	034	019	321	108	097	187	057	133	228	214	369	053	161	195	128	307	246	166	392	
90	082	055	231	106	124	165	086	129	167	178	112	208	097	106	165	154	373	164	209	076	114	238	218	156	
91	138	043	101	202	144	007	102	070	131	180	072	088	094	193	161	174	111	132	147	102	085	203	197	101	
92	097	177	134	112	202	074	025	299	104	090	205	112	138	199	174	252	163	170	173	130	312	254	132	355	
93	119	035	229	148	102	083	088	102	168	210	118	186	093	193	185	201	232	153	230	098	167	279	205	158	
94	147	030	090	127	038	067-014	121	083	094	053	115	213	100	259	127	128	206	179	187	148	229	134	149		
95	135	058	185	118	107	078	032	060	139	158	106	125	086	179	187	144	170	176	182	123	152	237	159	168	
96	092-025	107	087	060	111	000	057	096	120	073	132	108	146	251	144	183	214	212	135	128	348	150	125		
97	095	089	134	162	206	004	060	309	116	117	161	066	098	240	138	416	137	136	127	090	203	235	166	286	
98	122	063	176	106	058	053	115	129	196	165	135	099	070	106	177	153	247	146	193	116	184	260	197	193	
99	092	050	152	142	188	057	108	184	187	186	191	124	083	233	199	327	152	145	162	092	218	267	216	263	
100	088	055	077	009	013	112-022	056	065	073	158	082	121	072	275	099	187	273	248	219	161	224	176	124		
101	134	069	086	134	010	063	039	090	087	110	085	106	162	124	259	141	154	294	241	213	170	279	163	122	
102	083	081	080	022	041	062	050	074	065	041	058	025	073	072	063	074	181	118	100	111	145	075	047	111	
103	029	071	035	087	042-002	010	134	033	046	015	060	129	082	121	119	127	089	079	089	179	163	134	106		
104	124	064	165	113	084	073	027	073	080	145	088	142	138	124	193	118	210	228	281	208	184	198	123	154	
105	100	049	121	069	055	042-003	109	073	087	090	037	112	113	137	099	171	172	200	169	158	145	107	140		
106	074	019	093	053	056	049	099	055	061	130	092	077	060	053	208	079	172	159	146	116	093	167	146	124	
107	107	150	117	071	116	090	129	215	151	095	132	078	136	177	114	240	213	168	187	144	183	213	169	202	
108	074	072	068	036	029	008	041	077	050	103	039	032	113	105	293	111	198	193	162	131	124	282	204	125	
109	028	162	060	092	136	016	063	203	100	060	145	043	028	206	088	236	133	119	094	117	211	155	124	278	
110	157	051	237	086	091	113	048	102	143	174	107	177	096	156	202	120	189	225	307	175	199	235	150	169	

Table B-6 continued

		Item																							
Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	
84	182	171	138	135	115	074	118	143	064	140	125														
85	295	370	169	282	086	206	288	337	144	345	234	184													
86	178	195	196	143	170	115	138	247	223	152	298	169	213												
87	170	206	102	258	027	163	244	210	108	222	170	130	162	053											
88	232	274	189	204	124	101	297	213	209	165	161	222	233	152	133										
89	165	220	131	221	091	197	255	363	225	247	475	139	271	318	203	180									
90	237	244	130	230	051	181	237	214	179	209	212	194	245	130	284	262	213								
91	180	259	190	136	133	131	185	171	112	224	198	181	276	202	068	240	155	171							
92	143	161	110	211	054	161	209	277	235	199	382	119	210	284	174	155	345	144	166						
93	256	320	171	296	086	165	257	260	173	222	232	191	321	230	186	221	237	264	288	214					
94	216	237	114	244	044	184	255	195	116	271	234	150	260	153	228	151	241	160	200	247	264				
95	261	307	149	254	104	158	246	271	150	221	197	186	268	223	166	178	200	209	196	206	328	262			
96	238	297	189	283	040	210	302	283	152	314	204	173	321	165	203	169	247	241	205	193	285	263	254		
97	221	244	148	190	104	140	188	296	195	194	365	187	286	301	109	182	361	189	185	303	259	213	197	248	
98	240	267	182	205	114	167	286	175	258	202	207	164	245	194	161	250	203	248	191	216	242	190	205	206	
99	283	292	222	222	059	156	269	357	214	258	315	181	290	276	164	246	336	214	213	241	320	204	294	224	
100	172	245	258	243	045	260	287	284	164	275	182	122	241	092	239	158	210	200	137	176	219	244	239	276	
101	227	311	125	329	070	236	358	291	190	348	225	179	320	127	258	187	239	240	198	199	269	347	232	324	
102	105	065	121	104	088	153	112	119	151	115	100	051	065	082	127	097	119	110	091	118	122	119	117	077	
103	152	136	085	115	039	103	150	201	119	077	213	068	124	112	081	081	165	133	083	119	128	145	095	132	
104	183	277	120	273	052	190	242	199	141	257	198	163	188	135	148	195	185	239	203	178	332	226	249	271	
105	149	153	152	198	085	197	171	123	122	183	111	167	155	141	138	076	143	159	120	169	188	146	149	165	
106	163	189	133	188	030	097	248	174	113	193	176	117	178	087	136	252	165	172	111	169	198	198	183	195	
107	161	191	181	206	075	196	204	193	418	204	186	105	201	218	096	222	237	159	150	257	211	147	147	161	
108	260	241	115	313	012	174	302	267	151	300	186	122	314	122	225	206	199	220	136	190	232	248	280	297	
109	080	144	219	086	113	172	108	077	188	092	187	099	126	200	081	095	194	104	107	198	112	088	073	087	
110	197	257	120	312	041	229	268	193	151	253	215	199	205	174	200	207	191	224	170	219	283	233	274	228	

Table B-6 continued

Item

Item	97	98	99	100	101	102	103	104	105	106	107	108	109	110
84														
85														
86														
87														
88														
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95														
96														
97														
98	201													
99	404	229												
100	162	206	241											
101	217	225	262	315										
102	078	182	085	134	114									
103	133	132	127	098	165	083								
104	179	283	187	229	283	127	115							
105	109	186	128	191	173	123	148	274						
106	113	210	177	170	263	117	134	218	160					
107	239	246	248	179	239	215	136	221	154	162				
108	179	246	162	288	320	098	140	231	123	256	182			
109	136	178	164	100	093	120	122	124	184	096	206	025		
110	167	255	192	228	262	136	129	419	301	221	237	291	153	

Table B-7

Correlations Between 110 Most Reliable MLC Items, Males Only

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1																									
2	165																								
3	155	229																							
4	251	220	142																						
5	100	063	215	131																					
6	083	080	111	211	136																				
7	-006	132	128	023	086	086																			
8	338	193	253	263	196	124	077																		
9	062	088	137	128	080	067	096	088																	
10	149	095	048	223	053	136	-046	197	092																
11	123	324	140	168	078	018	-017	174	034	183															
12	238	258	326	296	193	096	050	345	087	133	228														
13	058	117	135	215	152	112	134	112	209	168	074	148													
14	289	228	184	292	105	130	011	291	085	202	202	328	137												
15	202	094	128	341	104	114	042	139	168	200	153	139	182	220											
16	260	249	214	210	112	135	079	278	074	133	200	274	121	230	211										
17	183	205	238	176	146	177	095	183	100	127	048	261	130	255	118	164									
18	218	175	217	318	176	124	070	130	161	149	132	156	242	213	395	143	262								
19	377	212	165	322	167	163	060	268	114	176	196	210	133	401	215	217	224	200							
20	111	030	219	144	260	150	122	171	072	084	048	185	138	163	064	147	205	203	207						
21	250	191	166	385	147	125	024	199	116	155	183	225	186	224	451	187	196	517	277	147					
22	170	231	282	205	127	178	122	193	120	054	150	227	099	166	112	174	236	245	133	162	171				
23	096	146	147	183	156	173	096	152	189	151	098	219	148	206	170	130	296	262	196	207	255	121			
24	224	151	156	331	159	149	041	219	080	216	094	244	165	271	236	168	178	278	283	178	317	205	239		
25	268	180	173	156	160	130	105	296	082	138	066	206	080	236	126	375	244	244	251	152	198	185	214	234	

Note. Decimal points have been omitted to conserve space.

Table B-7 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26	108	148	105	248	035	089	013	250	119	130	204	218	142	210	134	189	113	149	243	013	158	091	135	173	
27	200	188	185	276	183	146	126	226	093	108	089	245	203	173	160	208	268	233	214	129	239	156	242	215	
28	291	271	145	316	089	160	061	268	098	180	251	263	142	426	190	252	280	222	373	119	209	135	264	281	
29	185	166	206	345	162	176	135	177	153	190	096	211	194	213	357	185	220	435	183	161	414	171	163	277	
30	134	092	173	100	188	115	109	204	044	052	104	137	070	155	049	105	132	096	183	165	106	188	078	227	
31	335	188	181	315	131	141	047	312	090	206	169	323	104	362	176	203	291	216	336	167	227	170	209	334	
32	149	189	253	314	231	207	147	210	108	211	118	247	239	212	302	169	294	450	164	177	394	224	240	320	
33	232	145	102	268	110	126-025	324	054	303		183	272	099	301	184	243	217	156	312	131	214	141	177	232	
34	196	199	211	349	117	133	014	319	071	209	175	272	116	351	208	203	236	259	312	116	258	185	198	315	
35	130	237	425	133	250	137	151	225	187	110	166	306	101	190	122	245	279	180	181	218	214	296	159	164	
36	222	136	094	358	109	102	003	157	117	273	153	192	113	246	212	090	175	269	281	119	274	116	176	348	
37	191	240	148	249	133	151	012	207	056	181	187	224	063	489	127	231	235	156	273	161	162	209	154	285	
38	232	205	258	263	214	126	094	244	184	159	080	268	113	283	156	210	357	233	315	293	219	242	301	271	
39	095	221	310	183	156	171	129	204	102	209	148	200	195	153	137	159	180	231	140	138	209	233	128	263	
40	244	208	139	261	099	197	076	239	092	187	217	266	130	377	136	202	186	212	369	165	163	188	216	211	
41	138	159	133	198	095	137	091	055	043	064	129	170	064	172	118	118	151	191	221	121	191	142	209	179	
42	182	091	112	212	089	072	052	178	108	156	211	183	124	188	140	187	130	182	226	055	201	089	135	179	
43	265	160	141	230	067	127-013	286	080	208		231	208	076	257	133	241	228	176	287	110	181	062	148	248	
44	227	175	195	359	132	153-010	253	133	128		160	373	073	337	199	193	202	207	356	164	227	207	178	233	
45	112	088	168	186	107	122	139	145	024-014		088	123	176	073	187	162	088	187	098	100	200	137	076	198	
46	212	220	142	321	103	119	005	239	021	160	217	264	066	510	171	189	176	164	322	165	176	205	115	283	
47	318	172	204	329	123	144	067	328	148	202	125	315	160	376	168	253	284	218	202	224	245	214	234	290	
48	105-023	096	122	128	078	015	086	064	123		093	068	153	076	236	146	003	140	148	152	156	043	083	115	
49	228	227	246	244	152	169	065	321	075	151	222	359	124	322	139	293	288	227	245	143	194	258	238	247	
50	185	160	132	267	141	166	016	208	129	155	081	171	184	222	221	157	266	243	206	177	206	152	257	238	
51	133	133	162	239	203	168	100	165	106	104	115	177	185	163	244	175	220	330	178	170	363	187	284	249	
52	303	205	119	361	113	131	156	312	075	200	183	299	111	511	214	250	188	157	401	215	165	142	177	262	
53	096	138	227	115	209	165	067	141	055	080	080	208	117	126	063	143	321	167	136	275	152	215	193	167	
54	192	106	151	210	135	137	056	128	111	117	154	155	183	145	395	091	145	379	233	145	436	176	200	241	

Table B-7 continued

Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
26	143																							
27	233	182																						
28	230	236	276																					
29	203	176	241	161																				
30	161	058	154	184	119																			
31	271	238	231	366	240	152																		
32	222	139	267	189	452	165	245																	
33	218	208	233	262	176	095	313	196																
34	274	256	239	326	238	121	364	237	315															
35	202	083	156	138	162	215	179	260	109	202														
36	177	202	208	294	243	031	303	199	282	333	122													
37	187	101	194	372	187	143	340	247	311	328	187	285												
38	304	102	258	296	229	169	410	252	262	299	226	273	275											
39	155	138	227	203	252	119	150	356	164	203	227	224	140	184										
40	137	244	228	421	179	123	390	152	287	365	113	265	347	260	194									
41	141	100	155	232	209	090	168	170	082	205	139	136	145	225	116	248								
42	170	213	200	258	151	088	231	096	224	168	111	280	140	186	105	231	084							
43	241	215	157	250	170	148	293	171	403	342	128	269	202	192	134	226	078	192						
44	192	317	238	373	214	183	465	115	264	330	224	270	257	356	150	335	225	213	205					
45	143	103	112	093	234	154	114	285	097	172	122	117	093	144	223	086	161	063	108	106				
46	171	203	194	404	216	211	364	146	315	358	147	266	591	272	176	375	162	175	222	427	102			
47	298	230	257	339	283	105	476	236	365	400	209	255	263	417	196	365	186	209	279	461	160	350		
48	056	025	060	088	121	041	088	141	127	023	067	124	134	043	061	078	089	084	086	064	147	093	059	
49	343	224	299	376	198	244	404	262	297	374	265	221	352	335	220	294	193	192	306	318	144	357	387	085
50	236	192	219	258	234	098	293	245	146	267	201	236	218	270	160	172	156	176	182	268	160	196	344	081
51	219	139	193	155	339	134	137	357	104	218	213	147	154	165	249	176	219	148	136	155	255	134	225	156
52	233	260	230	493	183	169	377	164	319	329	135	259	400	321	118	441	204	201	278	374	068	543	391	086
53	184	023	169	188	119	134	198	238	084	187	254	106	220	357	187	155	135	037	102	219	129	173	209	005
54	171	108	166	151	301	014	201	353	150	182	179	207	179	184	205	123	144	187	144	178	147	134	194	249

Table B-7 continued

Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
26																								
27																								
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48																								
49																								
50		276																						
51		253	234																					
52		354	203	122																				
53		155	121	169	151																			
54		187	192	340	139	128																		

Table B-7 continued

	Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
55	309	254	315	242	203	154	082	361	090	160	187	315	083	286	188	240	279	231	252	195	217	315	209	210
56	260	200	241	194	221	186	032	278	069	192	096	260	119	271	125	208	290	209	224	203	210	250	281	253
57	151	158	210	237	112	139	074	167	044	207	138	263	107	197	179	207	143	259	213	156	263	233	172	298
58	168	103	046	165-023	053	063	048	106	105	092	069	104	174	188	079	101	142	173	055	150	049	102	109	
59	094	066	113	160	123	095	089	153	117	154	008	115	193	128	244	170	182	218	111	203	245	122	169	171
60	160	096	121	185	152	138	064	147	027	094	103	180	075	171	188	154	193	177	230	126	195	142	168	181
61	051	041	032	057-038	022-019	035	064	028	057	098	025	114	008	031	036	059	075	008	068	025	038	109		
62	064	058	056	105	076	060	020	035	098	086	109	072	153	040	221	010	115	334	025	057	291	146	089	155
63	110	145	064	005	028	049-008	054-003	050	147	136-043	177	024	119	123	009	120	083	028	094-010	057				
64	084-015	049	023-029-017-047	065	072	085	063	091	010	055	019	107	047	026	006-000	037	013	033	073					
65	084	075	059	032	013	021-029	070	035	058	168	084	011	095	050	196	048	052	089	016	002-012	022	129		
66	071	032-019	008-004	007-047	022	057	106	143	049-008	028	066	107	038	026	048-002	009-000	017	023						
67	077-057	033	075	032	067	027	075	054	113	056	036	110	060	122	084-026	126	015	084	166	002	071	149		
68	073	099	076	079	016	018	061	114	004	036	010	100	020	083	041	088	116	067	076	009	061	141	029	132
69	038	028	045-019	036	041-019	024	077-024	-031	110	038	045	017	025	111	089-072	040	026	148	075	027				
70	110	078	147	168	070	090	047	032	066	100	054	120	136	106	246	083	082	297	070	019	307	103	102	199
71	127	074	073	061	100	074-000	047	007-027	055	097	031	127	060	095	143	118	089	072	094	120	097	101		
72	165	105	113	090	065	058	051	048	052-006	034	135	036	131	032	122	168	091	071	049	066	097	188	081	
73	046	093	150	030	055	039	052	039	050	122	081	113	061	067	040	043	092	089	019	114	096	102	070	112
74	083	050	028	022-088-003-063-013-005	016	039	024-037	053-001	050	076	029-018-056	054	036-030	048										
75	-010-023	039	013	107	094	095	026	155	040	042	046	097	026	042	060	014	037-057	102	028-016	083-019				
76	095	018	091	145-014	062-049	017	071	093	036	094	034	080	079	066	089	096	068	042	133	116	084	182		
77	152	088	057	058-039	012	016	113	006	086	155	089	032	067	085	118	054	117	093-045	050	046	027	083		
78	176	070	111	056	020	014-028	109	054	064	033	182-041	121	057	103	146	029	126	044	050	113	010	113		
79	072	053	054	130	011	065-043	008	059	037	040	062	060	061	126	088	099	132	080-017	050	131	030	055		
80	128	033	112	033	106	064	000	125-003	105	106	155	069	120	162	073	112	088	041	113	126	079	007	089	
81	098	020	036	066-022	046-059	036	097-025	-009	095	004	033	025	024	095	055	015-040	030	005	028	034				
82	117	047	082	170	012	061	023	023	065	091	056	078	083	055	268	027	091	294	016	003	324	051	082	143
83	100	044	121	020	177	045-008	074	062	005	029	065	009	075	051	109	106	039	054	073	043	125	009	050	

Table B-7 continued

Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
55	237	149	244	340	232	270	298	253	241	266	286	175	287	287	229	292	165	151	174	274	147	323	279	069
56	333	115	280	265	194	168	358	251	245	319	229	204	327	425	181	234	225	155	206	226	080	272	325	064
57	162	121	153	137	238	169	261	276	227	259	203	193	171	161	310	178	056	167	220	183	159	194	226	149
58	087	213	070	166	211	017	163	069	190	116	023	158	098	149	090	144	150	170	181	210	017	151	266	107
59	136	054	141	068	268	042	132	368	163	133	187	176	163	170	182	100	185	099	070	111	192	070	169	185
60	148	090	177	228	147	035	206	214	131	141	153	173	218	213	124	203	130	169	155	213	092	170	199	057
61	026	136-016	057	105	065	117	086	084	081	001	047	049	094	049	061	012	039	076	113-027	081	085-032			
62	092	000	093	011	306	058	051	337	057	057	115	097	060	109	142	028	101	081-002	040	175	008	061	071	
63	051-048	022	171	030	089	147	037	205	104	149	067	299	094	091	096	030	034	140	093-006	226	038-021			
64	102	117	060	058	065	060	137	026	142	126	013	083	009	105	053	068	053	053	163	121-020	082	129	019	
65	093	064	068	105	081	090	074	059	217	054	108	060	090	008	101	092	055	096	171	053	013	106	081	054
66	093	075	036	014	034	003	069	012	125	106	041	011	001	018	015	048	006	105	248	008-052	008	033	064	
67	093	078	046	016	163	046	063	089	068	004	063	114-018	016	078	036	053	090	089	069	092	026	087	166	
68	120	047	117	141	158	075	121	161	123	172	015	081	086	176	088	092	153	041	090	119	082	122	170-091	
69	052-009	015-009	089	025	047	083	021	005	045-080	070	039-027	025	042-018-048	003	035-003	025-029	093	106	048	046	140	072	071	118
70	083	089	092	054	245	075	132	311	105	044	132	092	043	039	175	066	039	020	043	126	060	152	107-015	
71	105-005	103	105	076	173	121	132	090	102	102	037	154	138	016	065	039	020	043	126	060	152	107-015		
72	157	086	121	064	134	062	142	086	072	140	122	058	085	128	024	086	129	058	114	156	061	123	182-016	
73	078	027	021	016	105	095	071	117	088	079	132	073	042	166	210	021	044-025	087	054	116	051	096-037		
74	-000-019-009	020	049	062	114	031	111	096	039	071	111	011-001	023	-004	056	056	153	001	124	075-052				
75	037	027	001-029	061-009	007	098	019	021	095-086-029-032	070-008	-001	007	001-033	047-067	039	104	048	151	050	121	007	104	138	014
76	090	024	089	058	083	108	134	131	086	072	081	080	101	100	102	061	048	151	050	121	007	104	138	014
77	134	136	074	038	099	021	133	083	222	124	006	105	026	069	072	051	025	080	213	049	067	110	117-003	
78	089	049	018	062	083	103	186	062	139	140	125	052	124	169	047	025	020	123	065	200	010	106	154-081	
79	030	055	128	030	160	081	073	127	102	113	040	107	165	078	053	064	023	045	079	089	055	096	112-001	
80	061	040	018-027	162	105	072	157	154	082	132	104	042	052	099	047	069	071	101-005	115	082	053	099		
81	055	077	077	077	106	079	112	065	056	057	009	024	017	034-019	030	-016	123	017	178-046	093	094-032			
82	061	038	106	002	235	047	114	254	078	094	049	117	020	062	103	017	038	114	071	100	085	049	063	110
83	101-036	081	083	064	096	063	073	085	076	113	054	102	141	087	016	041	049	028	055	012	105	126	018	

Table B-7 continued

		Item																						
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
55	418	198	219	315	203	177																		
56	332	273	258	222	313	202	316																	
57	194	145	222	156	146	209	222	239																
58	147	197	104	173-010	187	084	133	083																
59	158	224	351	056	106	198	148	192	150	099														
60	200	154	179	263	126	146	262	178	162	050	055													
61	047	072	053	071	022	058	074	062	131	070	016	042												
62	074	146	291-016	101	275	125	117	078	074	219	041	217												
63	127	000	-014	161	075	089	211	163	109	037-039	057	218	150											
64	091	091	057	080-041	064	076	102	120	112	002	035	245	128	182										
65	096	059	052	104-026	079	081	021	153	096-012	030	192	113	268	290										
66	024	029	037	096-032	148	009	055	116	107	014-006	173	128	197	350	330									
67	034	059	162	038	019	169	050	044	147	095	201-069	227	265	079	213	231	165							
68	141	102	121	091	084	052	176	192	074	037	084	096	322	248	290	299	264	219	215					
69	098	091	079-014	074	041	144	086	013-011	072	038	205	196	231	180	081	129	124	304						
70	119	087	273	047	049	268	122	121	190	032	214	029	221	365	120	140	117	165	289	206	217			
71	139	169	068	075	188	012	180	186	063	041	075	061	243	196	266	240	226	120	136	366	253	213		
72	162	222	122	056	061	070	226	211	096	076	083	100	319	215	231	281	246	194	209	369	322	242	356	
73	126	063	105	018	089	062	129	136	160-004	115-004	178	215	206	230	137	129	207	224	227	167	230	249		
74	104	051	033	049-025	019	086	035	048	078-030	042	332	185	337	350	228	221	198	347	315	206	387	355		
75	062	071	125-007	037	073	015	067	048	109	137-042	019	122	064	121	041	098	112	050	156	126	127	107		
76	114	130	097	064	058	105	070	091	135	096	076	035	352	180	238	236	184	174	228	272	266	267	273	321
77	081	076	076	099-032	115	111	082	127	104	036	000	243	121	195	349	335	310	182	404	149	192	264	298	
78	092	111	023	063	106	055	171	137	116	046	005	010	376	182	286	288	260	228	160	359	228	191	338	349
79	103	094	146	045	036	086	146	106	114	078	093	037	324	251	268	247	224	193	240	350	257	250	338	333
80	068	051	126	049	096	113	186	122	100	071	162	010	162	227	199	130	115	131	205	230	213	292	239	204
81	065	083	046	018	015	049	118	066-027	097-033	054	312	180	248	383	251	244	223	360	279	151	407	392		
82	088	098	191	065	013	243	106	047	174	088	144	155	292	340	191	172	162	213	286	263	236	398	253	246
83	081	094	046	094	165	078	097	079	015	020	057	034	157	114	230	143	137	043	134	200	184	082	247	233

Table B-7 continued

Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
55																								
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73																								
74	271																							
75	105	030																						
76	233	360	133																					
77	212	285	074	221																				
78	259	408	012	326	312																			
79	199	386	033	311	270	384																		
80	207	168	139	156	245	158	208																	
81	211	399	067	300	284	379	392	150																
82	170	363	108	310	222	232	410	236	310															
83	154	186	144	233	156	196	231	097	225	155														

Table B-7 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
84	076	012	107	028	014	063-019	021	012-009	-023	067-012-000-009	029	128	113	024	029	038	051	088	077						
85	085	011	083	083	072	090	033	040	113	063	024	058	122	063	064	079	098	271	004	092	229	133	106	106	
86	128	033-044	095-005-026-070	051-064	133	105	085-001	018	057	107	022-002	030-022	-012	016-003	103										
87	164	055	187	012	156	115	051	044	080	076	076	119	011	088	024	111	190	129	095	241	126	127	065	060	
88	127	038	092	201	066	042-057	056	114	113	033	067	059	034	288	081	080	266	104	035	362	028	064	179		
89	118	130	075	065	032	024-031	080-039	077	156	091-058	209	040	086	109	038	054	058	062	126	036	156				
90	086	032	086	066	069	091-043	122	074	005	055	100	019	030	025	078	161	107	002	093	058	141	094	092		
91	094	091	081	116	013	105	017	054	042	101	113	126	097	098	178	064	094	208	049	031	238	104	032	178	
92	119	054	106	029	057	091-020	114	057	044	031	125	042	113	019	105	157	147	063	078	066	093	065	070		
93	112-003-013	095-063	026-060	040	007-002	065	012	021	078	035-006	033	069	047	003	075	006	019	089							
94	125	114	079	041	013	067	057	072	037-004	-001	087-004	070	074	086	069	159	015	014	102	106	056	010			
95	055	081-002	037-036-005-026	037-015	014	047	051-035	017-033	025	030-023	036-045	-007	047-010	035											
96	111	088	139	166	087	052	047	026	062-020	082	105	144	096	176	079	044	265	082	130	248	145	054	169		
97	098	086	149	067	083	044-009	137	042	105	055	179	083	091-001	094	116	056	108	060	064	097	086	163			
98	125	099	129	123	127	063	032	068	075	035	007	072	114	041	107	079	177	190	024	080	167	158	062	184	
99	142	043	026	043-043-000	023	078	000	071	039	087-086	060	028	082	040	021	077	003	019	019-002	112					
100	106	008	034	041-039	025-037	075-005	016	060	079	041	073	057	065	068	044	034-042	047	022	075	096					
101	094	055	109	061	034	005-002	115	029	056	132	150	007	133	037	160	126	071	057	076	069	086	016	110		
102	085-002	004	080-022	014-021	029	006	047	022	074-019	075	008	053	183	054	015	003	072	074	085	090					
103	125-010	011	070	009-012-022-009-017	028	025-013	005	026	093	021-003	071	034	004	029-015-023	025										
104	140	025	065	030	011	025	018	151	087	067	074	081	051	058	004	142	072	067	087-005	087	054	000	080		
105	104	075	037	020	004	015-016	114	017	104	021	075-047	059	062	117	088	028	044-027	020	057-010	047					
106	087	059	078	035	040	048-056	019	061	000	045	086-021	009	034	024	147	069	032	010	005	093	009	056			
107	125	021	037	065	073	014	008	074	013	039	059	145	057	069	167	093	080	105	062	101	166	083	028	087	
108	035-018-038	005-029-004-095-057-032	022	061	095-036	024	008-002	063	032	034-008	049-031	024	031												
109	004	034	090	068	052-014	080	086	045	094	039	120	077	053	086	101	086	076	030	101	100	098	028	136		
110	111	024	060	056	024	044	002	115	076	074	061	078	019	063	028	120	078	127	085	009	051	091	033	097	

Table B-7 continued

	Item																							
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
84	092	009	041	023	080	027	138	086	105	087	056	075	089	152	029	065	056-027	026	073	030	062	132-020		
85	118	041	131-003	253	026		044	302	277	063	068	091	106	092	122	020	122	105-003	041	105	035	063	125	
86	037	028	054	116	019	068	124	006	137	079-013	079	064	067	020	125	-035	061	100	111-027	160	058	004		
87	141-065	083	027	103	073		148	114	067	111	221	091	138	253	095	088	052	057	048	109	014	111	121	039
88	033	063	090	013	287	058	102	252	114	086	060	130	034	063	073	022	063	035	116	105	098	016	074	069
89	050-066	100	154	079	127		105	094	215	150	049	098	415	140	068	103	068	040	076	100	018	344	051	041
90	130	033	090	009	135	008	094	102	082	101	108	001	040	155	078	050	118	054	066	120	027	024	142	006
91	109	050	048	037	199	051	085	187	097	108	081	190	049	053	146	042	006	141	050	032	102	086	035	129
92	166	070	092	091	116	086	107	133	134	147	124	056	152	085	046	131	033	112	093	094	050	131	103-037	
93	021	094	043	028	114-052		118	063	084	078-061	110	005	003	031	045	050	112	035	088-017	104	120-014			
94	140-028	171	021	091	040		090	095	081	117	062	068	058	065	084	079	036	113	015	079	021	117	102	026
95	030	017-011	064	090	031		049	030	110	056-050	090	068	026	054	037	006	059	102	061-035	094	058-101			
96	060	011	087	028	254	153	107	279	064	063	073	095	079	144	126	078	060	046	090	069	110	092	074	075
97	068	052	103	077	092	134	163	121	145	117	152	020	074	086	104	113	019	051	066	146	006	088	150	021
98	111	004	119	020	243	130	076	296	048	100	138	038	072	136	151-011	060	039	070	063	077	107	089-005		
99	035	059	008	037	094	059	071	050	128	130	037	047	020	062	012	108	009	037	112	006-004	069	053-034		
100	029	034-009	050	135	062		164	010	126	078-037	046	032	100-036	023	-011	078	048	124	008	068	125-003			
101	128	040	096	043	076	114	136	044	169	090	067	038	138	121	107	101	-034	104	145	112	051	168	154	021
102	083	051	090	110	088	073	156	055	144	145	036	098	185	129	044	100	006	052	073	126	005	145	137-027	
103	013-071	070	013	025-033			076	036	035	011-064	052	050	037-012	048	-015	051	048	062-025	040	059	015			
104	152-007	137	045	099	113		117	077	171	114	115	042	101	082	063	122	-024	158	113	064-052	099	098-003		
105	050	055	070	105	082	016	123	033	131	091	022	025	038	060	120	008	-012	061	056	032-034	041	063-017		
106	082	046	050	047	029	016	096	025	037	066	054	091	045	053	053	048	-037	097	044	083-049	066	066-065		
107	088	000	062	010	151	095	087	129	134	115	065	079	066	110	051	068	003	098	105	086	052	058	088	071
108	-021-027	000	001	004	010		127	038	105	100-007	077	055	014-039	044	001	061	051	057-042	072	035-016				
109	059	078	057	065	149	045	019	163	072-022	071	105-002	044	176-021	009	075	032	046	112	061	048	130			
110	180	051	081-006	124	036		114	117	153	071	044	110	091	077	064	048	-003	132	144	005-012	064	087	029	

Table B-7 continued

		Item																							
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
84	100	127	047	019	023	037	120	124	002	089	082	053	304	233	233	307	244	177	147	369	331	205	356	436	
85	091	126	224-012	075	203	052	144	090	091	262	029	167	381	111	055	073	120	226	205	257	305	238	241		
86	098-003	010	183	006	053	117	069	113	032-018	072	222	074	282	322	258	250	231	277	162	089	235	253			
87	123	080	159	075	256	066	174	221	124	028	102	094	261	247	298	199	164	130	139	231	206	176	322	309	
88	022	140	258	030-031	301	094	076	148	089	131	106	290	384	192	209	241	228	295	293	204	412	222	297		
89	174	072	089	148	088	043	178	230	087	071	033	086	232	164	406	201	251	117	159	269	241	166	301	280	
90	076	182	147-015	136	044	140	147	077	086	108	037	225	175	160	177	150	108	095	196	221	071	209	291		
91	099	068	163	072	053	145	110	043	180	090	115	040	280	290	224	206	209	179	309	288	203	376	268	217	
92	196	146	099	077	070	044	193	187	100	039	063	065	248	240	278	189	239	150	145	277	238	156	345	408	
93	006	082	037	051-020	091	012	029	027	146	006-000	337	216	195	310	231	295	210	323	189	178	312	346			
94	143	103	112	038	004	029	163	093	099	085	067	001	204	200	193	204	229	178	168	273	204	202	343	370	
95	033	063	040	073-046	010	073	071	030	051-027	126	334	191	281	315	257	234	158	425	207	137	306	331			
96	143	123	177-046	056	236	173	116	190	065	124	103	233	409	198	204	207	143	211	293	189	296	293	275		
97	126	110	052	058	126	089	149	150	130	069	030	021	265	177	281	196	235	140	209	258	250	241	261	317	
98	101	106	174	002	111	143	233	185	163	028	162	123	281	352	222	176	220	161	257	347	280	306	384	329	
99	067-007	-009	082-060	032	111	036	148	080-007	021	375	171	296	337	307	334	204	307	219	191	258	314				
100	039	099	012	060-010	068	078	059	070	085-002	042	316	233	238	365	295	298	233	347	237	151	313	363			
101	216	033	088	097	083	045	151	109	081	089	013	094	243	109	204	221	243	197	181	210	143	160	264	262	
102	074	101	008	093	043	058	161	116	044	116	015	044	302	230	294	324	283	239	202	392	310	162	349	408	
103	062	050	-005	039-019	097	008	062-017	084-009	015	229	161	186	151	159	178	190	209	190	141	223	198				
104	110	127	129	049	026	101	082	121	096	077-005	055	222	202	285	265	310	243	200	259	158	183	263	311		
105	140	049	039	034	007	042	113	077	071	109	026-046	235	134	224	205	216	190	180	228	158	162	231	223		
106	087	040	068	028	067	027	078	129	043	026-000	023	284	129	268	236	180	232	120	242	213	186	221	275		
107	087	077	113	085	055	190	140	074	130	103	063	026	207	261	274	176	220	179	174	257	233	257	221	238	
108	004	035	027-006	023	053	011	083	017	009-012	029	370	169	305	293	205	262	151	393	265	214	317	325			
109	048	087	100	051	052	148	122	041	146	010	157	005	138	209	131	156	120	164	236	159	118	268	119	132	
110	154	072	100	057	030	085	126	124	098	059	065	055	279	187	215	226	313	264	223	277	211	229	253	348	

Table B-7 continued

		Item																							
Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	
84	247	375	100	282	317	332	394	184	447	318	228														
85	201	156	212	239	170	139	285	247	171	306	155	196													
86	163	366	038	265	238	331	302	140	346	215	168	215	061												
87	292	297	171	226	146	385	285	210	223	258	324	306	219	204											
88	196	299	110	302	296	275	413	238	316	555	154	335	333	233	281										
89	190	341	014	225	195	314	331	203	274	265	218	317	184	264	323	241									
90	197	133	137	225	197	206	157	110	261	188	207	308	177	082	293	185	207								
91	170	253	063	310	275	277	316	254	312	438	148	302	272	249	265	343	206	205							
92	195	332	101	228	226	315	303	210	342	251	210	405	255	273	292	245	308	324	274						
93	176	364	068	370	333	341	306	193	413	319	173	351	173	292	242	312	214	271	352	309					
94	183	332	134	352	268	290	304	170	321	290	229	354	301	204	251	237	275	250	246	369	356				
95	213	368	021	306	300	376	396	210	416	301	239	384	155	288	210	351	323	193	245	305	390	315			
96	195	252	102	243	213	235	328	256	267	411	168	321	280	151	233	390	259	203	371	335	295	271	327		
97	195	278	126	280	213	306	215	279	275	293	257	312	162	240	248	221	268	247	274	283	291	230	245	243	
98	234	320	038	260	244	336	418	269	329	371	211	340	290	244	316	382	232	246	334	386	267	332	270	418	
99	308	364	076	340	368	421	387	239	379	241	180	375	160	345	271	298	294	179	255	294	359	316	381	225	
100	201	409	094	352	359	399	343	189	471	303	250	400	149	358	266	337	295	238	283	309	459	282	416	304	
101	197	293	025	257	222	317	227	119	282	239	179	244	120	211	253	221	250	206	231	265	256	240	261	189	
102	191	448	005	339	273	343	355	214	447	245	225	429	166	305	300	286	313	200	264	343	375	326	390	263	
103	130	228	017	169	166	218	277	141	157	224	092	202	109	160	155	243	168	093	105	180	237	174	189	161	
104	159	333	009	281	218	296	243	143	356	288	201	279	123	219	259	273	258	223	241	347	321	272	339	281	
105	254	251	093	261	218	257	213	154	289	148	205	185	149	209	122	206	199	114	199	208	215	206	240	151	
106	188	292	102	256	160	316	289	128	288	228	137	269	120	227	307	254	206	200	234	255	280	192	271	182	
107	232	296	060	196	267	254	262	419	257	250	146	279	234	181	236	316	167	178	316	260	218	197	213	296	
108	170	448	033	333	293	395	381	188	401	295	196	422	161	306	288	313	348	200	291	298	357	327	397	252	
109	218	108	101	129	199	130	086	206	143	149	088	150	164	104	110	172	074	110	219	117	126	083	082	148	
110	198	318	082	290	289	280	262	134	296	281	253	318	199	209	246	260	246	182	293	309	305	303	293	267	

Table B-7 continued

		Item												
Item	97	98	99	100	101	102	103	104	105	106	107	108	109	110
84														
85														
86														
87														
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93														
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96														
97														
98	242													
99	284	296												
100	285	336	398											
101	242	224	289	236										
102	275	316	340	476	254									
103	138	222	202	221	135	180								
104	339	220	306	317	373	359	190							
105	248	168	309	258	290	240	204	270						
106	233	219	213	339	216	311	183	246	207					
107	269	290	278	303	137	264	197	279	137	192				
108	267	248	393	401	290	441	221	309	189	313	257			
109	168	173	133	145	109	121	110	090	169	129	178	017		
110	304	264	326	325	354	351	182	437	333	254	268	318	155	

Table B-8

Correlations Between 110 Most Reliable MLC Items, Females Only

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1																								
2	110																							
3	099	154																						
4	104	143	044																					
5	014-014	201	025																					
6	037	021	104	107	100																			
7	023	135	110	059	063	076																		
8	179	171	168	119	047	073	063																	
9	078	133	071	148	060	110	116	113																
10	064	064	009	194	099	162	026	156	114															
11	061	245	163	073	072-013	151	186	063	145															
12	181	181	304	150	121	089	020	229	157	080	149													
13	062	148	133	090	126	100	057	060	161	132	112	110												
14	052	123	109	075-016	075	062	218	136	092	209	145	082												
15	091	067	106	132	018	027	063	188	102	136	070	168	003	202										
16	117	120	049	246	035	106	080	100	110	125	131	120	078	041	087									
17	133	227	137-032	047	084	078	237	098	082	193	127	090	159	117	100									
18	080	039	154	089	076	088	033	115	124	045	075	162	084	167	183	081	111							
19	136	089	083	230	098	106	105	100	164	135	140	057	188	055	084	282	004	216						
20	124	072	113	119	113	043	085	251	119	121	137	203	075	098	120	085	142	186	094					
21	004	047	301	081	185	068	063	145	040	040	154	144	125	071	083	046	155	215	051	166				
22	135	120	064	264	102	102	106	093	167	122	139	152	147	089	085	357	008	111	486	153	036			
23	132	229	315	056	080	060	162	181	062	114	153	183	159	118	135	048	192	148	138	118	157	126		
24	063	026	043	075	094	105	050	088	126	068	046	064	136	096	105	037	066	049	198	109	032	185	095	
25	043	133	078	183	079-002	117	055	059	188	101	113	117	109	072	157	094	032	141	079	070	234	125	139	

Table B-8 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26	191	076	242	053	182	130	046	301	145	070	169	144	165	159	169	034	317	159	130	194	175	067	159	176	
27	149	072	068	100-004	012-019	225	103	154	048	128	045	116	226	014	137	110	026	213	036	007	014	081			
28	164	148	094	144	033	070	147	181	134	120	060	138	218	150	162	069	163	141	198	102	068	146	208	190	
29	085	151	047	077	064	022	128	149	151	056	165	096	081	154	077	058	165	053	121	093	039	129	072	113	
30	012	084	197	064	044	005	059	177	082	105	128	232	072	093	165	065	048	205	020	138	166	073	132	038	
31	036	097	103	232	132	098	096	063	122	127	137	054	177	044	068	347	024	119	402	068	079	396	074	154	
32	114	051	185	002-003	026	066	153-024	065	090	099	058	052	135	027	062	021	016	014	141	004	227	044			
33	139	056	066	139-027	025	059	146	135	120	174	149	014	118	292	086	072	142	058	184	043	061	068	132		
34	055	167	168	149	125	124	152	114	133	167	135	105	206	101	028	297	059	128	381	053	113	339	178	140	
35	165	103	087	116	036-007	050	341	111	226	219	172	091	181	143	054	141	110	048	203	083	083	127	093		
36	071	099	007	208	021	076-001	108	137	176	129	056	084	102	110	194	016	112	179	027	037	218	094	064		
37	069	132	131	081	100-005	026	245	097	082	074	153	084	120	106	069	144	159	058	132	051	114	191	171		
38	045	166	399	045	193	112	085	204	096	054	090	283	148	120	151	065	106	248	107	116	243	069	332	088	
39	091-009-054	168-022	022-002	118	066	212	077	049	028	113	062	085	018	040	074	134	-054	114-022	035						
40	045	217	145	035	054	018	079	171	172	042	200	120	121	334	134	144	209	155	149-018	080	156	172	103		
41	079	051	194	110	115	069	028	162	128	059	128	213	148	117	109	070	111	326	123	235	269	098	230	076	
42	085	281	153	184	103	070	163	139	116	114	173	118	203	180	085	090	147	119	160	067	133	152	251	061	
43	071	097	089	147-010	002	080	205	147	087	155	076	038	228	138	063	146	146	056	071	127	056	098	051		
44	026	068-001	090-015	075	006	053	035-033	002	112	113	052	045	093	116-015	070	027	041	067	073	134					
45	147	078	105	055-019-001	039	260	105	159	180	124	049	149	138	068	111	043	047	174	067	096	105	020			
46	102	095	106	146	071	083	032	178	129	088	048	205	079	151	168	024	070	209	097	115	162	110	136	066	
47	087	091	134	135	074	044	100	124	076	073	120	064	159	051	065	113	147	065	212	074	087	180	136	119	
48	072	188	088	109	008	068	092	221	120	037	180	081	126	376	096	080	192	154	116	071	041	134	155	038	
49	141	022	099	116	081	039	056	271	131	107	032	188	049	071	220	099	167	160	117	214	134	081	059	162	
50	023	011	056	098	065	057	001	135-055	094	125	087	127	012	059	204	057	054	155	076	074	175	078	091		
51	120	161	187	089	084	073	069	293	091	113	090	172	125	139	128	124	196	109	214	086	100	140	253	159	
52	089	064	098	166	044	132	040	120	181	148	013	074	160	094	192	111	050	147	245	120	044	151	111	211	
53	058	066	064	123	074	098	110	101	133	159	081	052	174	105	102	131	079	097	278	045	044	257	110	097	
54	121	165	059	110-037	042	083	186	152	065	128	079	000	269	115	053	194	132	026	139	050	130	088	072		

Table B-8 continued

Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
26	090																							
27	047	218																						
28	086	260	116																					
29	088	138	162	134																				
30	097	127	116	002	105																			
31	202	099	012	151	097	117																		
32	032	074-024	067	024	152	005																		
33	095	140	226	108	157	187	075	063																
34	251	125	024	168	051	117	406	070	087															
35	108	240	232	108	148	082	038	069	154	044														
36	122	096	107	126	152	070	101	053	165	179	138													
37	041	176	183	115	214	100	068	043	110	092	219	178												
38	082	200	076	165	064	212	095	160	035	108	094	076	143											
39	156	005	106	114	072	000	060-001	094	061	135	157	124	013											
40	083	101	071	132	201	078	100	073	100	128	163	154	187	230	055									
41	054	198	166	145	119	216	116	039	116	134	130	117	243	246	126	138								
42	262	173	040	222	119	070	168	064	009	315	079	086	153	145	072	199	120							
43	032	139	131	138	172	073	090	079	129	055	239	126	155	047	074	225	132	035						
44	005	034	023	066	079-008		103	020	066	066-008	019	076	048	052	081		086	067	013					
45	057	113	168	142	075	161	091	126	126	061	272	107	227	068	132	088	076	052	145	010				
46	017	170	181	170	163	184	086	072	209	097	104	131	144	162	087	144	230	097	081-014	167				
47	169	092	060	150	048	066	269	073	057	283	040	077	118	145	070	127	083	274	096	150	119	050		
48	080	152	096	144	224	037	067	018	033	112	212	098	216	157	076	549	096	135	248	044	124	150	100	
49	095	240	258	168	149	168	045	082	327	076	178	141	209	093	084	077	206	053	131	005	150	150	096	120
50	158	088	013	055	055	052	172	098	052	147	068	087	047	075	014	003	077	128	010	078	049-014	184	056	
51	109	290	123	224	263	113	122	211	144	142	209	113	179	189	011	257	187	109	204	020	146	164	126	229
52	069	205	112	260	155	062	144	016	204	147	040	164	151	140	121	128	191	051	115	070	072	175	155	112
53	156	161-011	202	086	026		249	037	065	318	065	141	068	099	070	178	098	193	058	067	047	085	268	126
54	078	168	216	092	297	048	027	082	236	038	158	137	180	073	080	188	156	069	211	085	153	181	051	343

Table B-8 continued

Item

Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
26																								
27																								
28																								
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48																								
49																								
50		106																						
51		214	046																					
52		209	081	200																				
53		087	124	190	167																			
54		156	028	146	056	064																		

Table B-8 continued

	Item																									
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
55	-028-031	129-002	152	117	002	074-018	033	053	076	067	084	040	082	060	218	072	105	274	071	098	115					
56	113	084	147	203	046	073	104	116	108	149	130	124	186	091	136	345	045	122	333	095	101	382	134	118		
57	101	118	172	066	080	070	116	246	098	042	100	260	115	165	161	153	128	162	111	153	095	123	235	077		
58	067	060	229	067	126	141	042	219	168	150	144	206	142	099	151	094	192	259	199	147	195	099	211	172		
59	077	116	091	159	022	008	053	099	107	168	092	100	162	079	069	214	067	084	188	073	042	210	141	063		
60	161	144	084	134	118	054	013	236	087	049	088	112	067	212	144	133	210	171	077	139	111	109	126	119		
61	035	041-004	057-025-007-005	065-011	064			128	030	052	034	044	107	014	052	066	038	-001	097	042	044					
62	063	043	121	079	091	106	079	099	090	169	083	044	229	046	033	147	126	079	276	061	070	224	136	144		
63	071	123	115	172	084	146	134	063	131	092	070	091	244	077	037	259	065	127	369	068	035	378	160	122		
64	112	157	145	107	082	083	048	198	063	093	163	090	111	269	157	097	168	111	095	082	148	084	101	078		
65	109	106	060	060-047	015-018	143	057	118	139	110	002	098	160	076	095	124	052	122	086	077	072	056				
66	095	143	097	152	074	116	070	163	154	052	025	109	127	050	082	110	101	168	204	177	136	224	183	135		
67	137	095	064	069-010-012	037	234	121	181	152	064	033	164	119	039	151	057	014	127	067	118	096	040				
68	077	029-002	037-024	008	005	135	002	112	173	018	001	039	035	068	089	034	028	051	074	031	019-026					
69	085	051	095	161	121	047	045	169	100	227	086	120	110	040	070	234	062	027	283	107	060	293	084	044		
70	058	105	112	101	039	008	028	197	035	047	027	100	102	034	129	104	166	046	113	111	058	086	172	091		
71	088	108	085	074	120	055	081	060	100	031	-006	082	118	063	105	107	009	036	160	047	084	141	154	077		
72	116	113	131	246	046	048	094	159	059	102	150	111	085	051	035	239	055	065	300	091	054	290	123	135		
73	008	084	124	018	140	038	030	142	047	054	024	055	081	068	092	063	101	051	073	076	116	116	190	037		
74	049	106	134	041	067	116	049	149	112	011	062	132	053	074	152	086	138	101	078	124	037	049	132	158		
75	049	181	126	050	046	074	033	102	062	064	015	049	174	025	063	063	106	107	089	055	069	105	236	071		
76	138	022	009	044-011	031	034	109-053	120	057-013	101	014	076	023	097-010	053	097	045	021	103	083						
77	029	094	100	024	100	073	126	079	175	024	001	088	105-033	018	061	037	055	036	051	039	076	116	085			
78	077	125	080	075	032	050	077	138	039	090	180	096	099	035	046	047	143-016	020	075	051	069	131	013			
79	019	062	053	215	117	072	070	088	096	137	025	091	127	132	071	155-015	087	145	107	039	224	037	089			
80	048	054	137	067	036	087	039	170	073	118	138	121	160	076	117	127	048	079	077	062	193	175	131	084		
81	123	049	104	139-009	107	024	106	153	103	092	112	031	119	220	094	035	068	067	142	055	092	070	104			
82	076	122	109	268	063	087	055	071	127	159	091	078	135	133	082	311	054	131	325	051	021	378	099	084		
83	069	051	040	007	079	103	067	136	042	082	086	004	119	051	030	032	145	074	166	027	039	097	144	162		

Table B-8 continued

		Item																																															
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48																									
55	059	110-037	019	025	062	111	038	039	155	027	023	030	232-049	094	193	058-016	046	013	127	039	041																												
56	217	101	042	156	110	033	360	053	084	334	101	135	042	143	123	136	103	150	082	066	072	088	271	113																									
57	144	129	070	121	134	230	122	165	098	127	129	101	315	219	050	177	161	183	152	114	113	184	126	165																									
58	055	308	192	201	237	207	130	079	195	138	146	134	209	302	022	134	272	103	137	084	113	141	099	099																									
59	245	055	073	126	041	094	190	032	009	220	049	235	120	096	174	146	088	227	081	076	096	120	141	153																									
60	085	296	175	176	213	125	102	069	138	115	178	120	199	151	076	259	196	100	147	039	108	271	106	240																									
61	028-036	092-028	046	017	051	051	057	080	052	075	070-023	037	002	062-012	048	075	048-025	036	038																														
62	097	112	048	217	087-012	227	037	037	038	047	157	111	075	071	103	126	174	007	096	075	027	207	130																										
63	156	086-009	183	052	067	403	007	039	461	015	135	071	073	068	123	148	230	069	151	076	069	279	096																										
64	093	169	093	134	125	067	056	113	058	100	173	061	109	142	015	272	058	182	164	023	067	149	102	239																									
65	047	133	231	060	086	209	086	104	171	022	213	110	034	091-003	035	108	017	130	059	179	071	094	105																										
66	069	151	149	201	155	116	160	021	111	205	130	109	137	162	062	076	210	113	098	090	076	206	101	105																									
67	127	178	152	103	151	110	066	100	175	035	249	106	162	041	081	090	060	072	136-007	273	116	080	147																										
68	059	102	172	016	025	073	073	076	044	005	172	014	030	032	031-006	047	000	126	065	198-016	066	074																											
69	235	096	033	120-001	024	228	047	069	261	072	144	096	061	149	027	055	113	007-031	114	058	141	064																											
70	075	085	135	124	105	048	112	076	062	109	117	119	137	147	015	141	136	078	088	054	111	137	069	107																									
71	041	016	033	119	062	040	096	060	017	153	061	038	127	134	004	092	093	146	018	029-004	071	105	071																										
72	245	111	102	168	054	127	229	087	033	327	098	075	104	068	134	047	103	233	018	082	066	072	286	082																									
73	037	077	028	064	076	079	061	086	037	092	091	026	112	129-035	082	084	117	017-014	086	099	012	072																											
74	058	173	164	167	207	148	088	020	128	133	056	040	087	177-031	107	123	107	082	105	106	104	117	056																										
75	083	112	047	135	080	051	136	041	049	150	031	040	142	150	016	081	098	275	058	112	110-001	197	032																										
76	062	141	072	057	060	068	060	108	163	066	097	123	043-005	035	006	046	022	034	050	126	052	040	012																										
77	064	028-017	093	021	035	103	057	034	083	018-036	006	114-021	041	054	046	024	095	045	051	159	018																												
78	083	050	132	057	030	060	081	071	040	034	149	029	159	053	120	132	056	117	056	036	202	047	078	142																									
79	125	143	050	121	061	081	189-008	081	190	078	213	115	023	119	033	088	149	068	016	109	101	130	000																										
80	116	128	084	099-019	180	223	131	056	174	130	064	047	140	022	078	149	089	036	081	126	045	131	104																										
81	038	116	124	028	042	133	097	071	205	061	072	118	048	106-003	071	087	069	069	098	082	102	080	077																										
82	202	111	050	106	132	100	254-021	096	355	086	198	051	081	098	167	049	216	107	019	090	115	139	142																										
83	077	178	028	149	086	003	081	056	056	184	099	106	075	055	000	143	-028	159	065-001	047	005	119	078																										

Table B-8 continued

		Item																						
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
55	027	033	053	085	103-026																			
56	107	269	110	166	251	021	063																	
57	200	067	212	050	087	110	107	138																
58	259	080	293	268	120	110	199	104	163															
59	079	127	082	163	171	045	076	240	160	080														
60	170	008	284	142	065	297	142	106	226	115	143													
61	-003	093	037	119-040	034-024	069	037	033	035-049															
62	056	108	115	187	300	017	069	293	093	148	156	043	115											
63	018	215	111	162	354	051	086	326	094	099	185	031	049	333										
64	107	039	188	094	114	148	021	122	181	165	078	162	032	097	079									
65	129	074	073	062	052	189	064	125	142	136	092	098	108	088	031	150								
66	118-021	148	158	134	137	107	140	182	210	176	193	075	174	195	173	166								
67	165	094	139	079	070	216	024	124	097	128	177	195	093	110	030	159	250	158						
68	047	120	-032	096-034	083-024	071	009	062	079-010	150	063	028	119	313	066	229								
69	075	170	086	111	201	077	057	271	118	081	208	109	062	257	267	158	149	160	165	074				
70	109	018	186	149	067	086	044	096	241	136	091	203	055	171	155	118	153	276	173	070	223			
71	-001	053	090	154	119-010	075	124	077	129	140	092	035	132	148	130	041	189	093	013	151	194			
72	113	188	103	107	280	053	062	313	083	111	180	063	069	294	332	173	193	205	075	071	339	174	130	
73	073	010	138	049	055	017	116	047	144	116	011	118	028	062	112	200	061	240	108-032	075	204	167	062	
74	177	047	143	257	037	140	054	083	147	262	027	210	074	094	145	148	139	241	172	095	106	118	167	119
75	023	078	103	129	110	008	054	125	105	157	141	029	077	160	179	096	098	213	062	057	074	214	154	109
76	064-023	142	064	066	073	006	088	108	057	138	134	062	162	064	105	167	158	226	134	137	202	018	137	
77	043	081	085	152	064-021	032	135	046	086	017	020	031	081	151	070	035	025	031	051	026	071	151	068	
78	101	118	080	060-007	087-028	131	109	060	134	090	082	132	089	127	196	067	219	200	166	225	019	133		
79	105	082	081	177	156	030	010	155	042	135	145	111	037	203	238	102	150	180	166	044	236	181	134	205
80	103	153	128	081	117	004	123	208	110	145	110	028	098	165	188	155	173	113	155	123	168	156	149	187
81	152	048	041	145	056	150-014	082	053	106	153	068	065	113	098	181	220	232	189	126	127	127	189	125	
82	038	117	180	244	197	101-006	310	054	085	221	125	075	222	281	141	074	159	130	001	266	160	201	354	
83	068	051	158	173	182-007	054	078	054	101	064	056	-006	122	196	088	052	104	104	034	027	088	088	094	

Table B-8 continued

	Item																							
Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
55																								
56																								
57																								
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70																								
71																								
72																								
73																								
74	159																							
75	183	117																						
76	100	061	038																					
77	066	121	121-016																					
78	086	097	136	117	099																			
79	112	218	095	158	016	107																		
80	131	150	145	161	155	200	171																	
81	113	174	091	180	066	150	190	189																
82	100	205	104	082	061	075	311	147	151															
83	132	134	148	099	091-002	067	064	076	102															

Table B-8 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
84	102	042	124	134	065	117	012	144	143	033	045	170	120	094	162	120	074	167	153	115	108	141	096	170	
85	105	039	135	187	109	081	054	068	175	128	031	106	150-021	078	201	023	111	367	060	049	354	129	110		
86	069	111	026	083-003	006	033	150	046	071	131	012	030	166	084	062	003	041	057-036	-044	045	085-003				
87	055	059	193-028	167	108	078	132	033-015	043	179	113	062	051	023	058	215	057	119	260	024	139	109			
88	086	131	083	306	080	085	058	093	120	166	113	112	157	038	088	331	015	056	298	106	065	391	092	125	
89	085	209	133	080	125	073	089	203	137	059	162	137	125	315	131	125	169	124	105-008	074	071	159	093		
90	035	079	079	115	050	108	037	156	139	087	025	018	158	106	121	125	161	151	100	101	107	106	154	131	
91	125	022	094	210	050	066-017	081	115	106	120	101	118	108	086	248	021	110	262	026	029	298	063	083		
92	104	127	097	096	062	076	028	132	125	131	093	055	146	102	089	083	207	192	173	145	116	151	107	164	
93	099	064-000	067	028-021-051	069	078	068	043	027	052	011	134	011	042	057	110	094	006	092	053	085				
94	133	106	114	045	088	035-008	151	049	070	042	106	043	064	090	055	187	095	111	131	037	073	060	115		
95	058	113	084	102	017	070	016	082	086	085	057	096	106	061	092	053	095-002	076	102	034	068	103	103		
96	108	073	123	088	097	143	052	091	123	074	078	121	206	049	071	278	019	066	358	073	043	284	147	153	
97	044	123	299	038	063	058	068	147	093	041	070	230	045	103	153	049	112	113	090	060	169	102	294	072	
98	117	052	060	130	015	060-030	136	078	038	049	138	005	083	166	044	031	050	046	122	061	030-021	028			
99	107	166	182	140	115	101	120	110	168	089	118	172	208	071	101	176	106	076	213	096	152	246	178	121	
100	064	083	017	078	037	040-002	119	051	097	051	083-027	059	105	012	002	031	007	101	084	065	051	025			
101	082	048	056	106	045	065-001	182	089	110	117	095	074	145	243	065	104	089	062	191	070	060	031	155		
102	039	040	112	071	022	052-007	102	033	089	126	078	039	089	056	073	097	084	030	041	083	044	050-009			
103	051	011	046	087	070	090	039	024	017	095	064	093	056	050	048	063	037	090	143	082	025	163	094	021	
104	175	068	061	063	052	052-020	213	095	151	110	119	041	126	112	063	168	097	067	152	088	041	089	093		
105	098-003	119	028	079	121	076	164	090	098	107	066	068	046	020	091	136	070	105	069	098	111	102	105		
106	052	068	105	067	094	047-018	083	103	096	098	155	091	103	082	032	119	134	062	123	126	052	109	088		
107	092	033	141	072	087	137	006	186	040	078	115	166	200	110	096	197	100	170	131	164	174	200	143	072	
108	090	002	119-005	048	108-007	021	025	049	044	134	067	027	090	015	004-014	050	054	039	071	100	064				
109	058	053	126	091	077	118	109	096	075	168	092	110	105	024	030	145	093	065	143	061	109	176	102	081	
110	207	104	114	057	047	106	019	253	138	144	171	136	082	102	089	067	154	143	133	129	115	093	152	132	

Table B-8 continued

	Item																							
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
84	074	164	072	126	067	116	151	001	149	103	120	071	139	169	054	145	160	118	061	084	041	081	062	036
85	111	134	016	158-014	073		330	038	073	353	064	136	079	148	081	074	119	176	080	109	072	053	233	053
86	113-016	033	057	097	039		023	106	015	024	164	055	046	052	070	181	008	040	154-034	130	058-012	195		
87	040	154	071	033-012	207		039	106	059	131	077-021	074	287-029	080			197	070	034	059	038	150	045	011
88	219	039	078	163	079	109	355	066	048	362	058	154	088	063	099	082	085	187	063	022	064	109	194	096
89	096	122	119	127	181	081	052	107	055	132	176	094	166	183	013	579	087	152	217	034	094	153	134	470
90	012	182	113	174	073	093	122	075	120	127	066	105	156	134	067	108	191	119	149	150	095	057	073	087
91	263	118	081	122	010	071	207	050	081	242	104	200	054	063	155	081	096	144	075	053	075	058	159	053
92	052	204	130	228	151	111	180	027	118	138	141	147	223	086	009	195	099	149	133	062	158	163	072	102
93	067	056	166	094	035	042	061	060	168	071	070	104	102	034	019-004		074	019	064	045	065	035	024-026	
94	122	194	153	208	097	070	087	040	084-003	090	062	138	103	043	098		126	100	089	032	169	089	110	079
95	093	118	132	155	143	041	103	033	044	089	128	121	160	095	074	117	100	102	048	043	108	109	061	074
96	144	140	010	179	055	104	314-017	099	312	059	141	063	094	058	096		116	172	052	155	110	075	238	026
97	121	146	084	123	102	217	071	213	107	150	189	087	204	309-013	128		169	143	084	007	141	200	085	141
98	011	096	076	107	088	153	032	049	251-022	053	023	019	088	048	014		120-005	055	044	072	104-006-014			
99	163	158	071	176	066	096	229	080	131	280	112	106	137	128	010	143	130	231	138	095	097	115	226	115
100	085-000	074	097-025	048			-016	038	094	008	091	096	074	026	099	051	065	128	047-003	131	072	065	055	
101	010	155	203	078	127	097	083	028	126	011	147	093	119	063	072	133	131-023	119	017	129	027	057	110	
102	021	105	075	078-021	054		046	085	066	069	059	054	090	119	039	037	082	026	043-015	126	077	072	088	
103	062	066	064	032	037	033	065-013-030	067	059	098	010	095	078	078			003	016	031-029	064	079	042	052	
104	051	264	134	121	101	127	054	086	118	029	195	070	116	094	063	113	138	078	122	045	145	088	030	120
105	099	189	071	135	105	071	116	140	109	072	157	073	096	104	017	090	033	058	141	021	116	008	040	064
106	108	151	126	070	027	127	032	044	021	072	049	130	095	167	070	072	146	069	028-063	062	156	076	032	
107	099	161	054	059	037	151	196	087	101	176	179	056	099	209	040	118	185	070	064	076	121	101	135	144
108	-012	109	079	040	014	125	058	114	138	053	083	107	004	142	041	015	061-014-012	039	058	107	026-053			
109	211	079	013	121	051	049	150	122-031	219	085	064	035	114-014	063			021	226-000	013	096	057	220	078	
110	036	271	149	099	152	142	074	114	188	034	254	121	109	123	047	101	106	050	114	001	170	197-005	113	

Table B-8 continued

	Item																							
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
84	126	013	092	240	105-004	102	134	104	153	148	118	033	122	155	122	098	304	097	024	065	234	179	110	
85	065	139	112	218	319-007	074	336	100	172	150	088	-011	297	418	089	062	220	068	035	227	132	163	289	
86	021-007	086	035	040	154-077	030	019	024	026	071	059	034	073	125	127	114	166	094	068	135	045	121		
87	127-002	095	037	100	047	251	084	172	162	055	107	024	058	096	120	133	206	059	048	035	115	112	120	
88	062	142	085	146	217	040	033	311	126	126	240	072	082	227	367	142	125	206	177	062	340	213	138	388
89	084	021	245	119	145	161	036	152	185	139	125	199	032	085	160	349	133	161	180	031	075	201	181	133
90	145	038	113	232	154	033	080	087	125	207	073	142	044	194	192	093	090	191	152	102	066	206	177	117
91	118	161	122	132	234	056-019	295	113	126	225	172	073	199	228	123	139	146	149	082	314	223	091	337	
92	071	042	221	135	117	066	083	125	117	212	132	271	035	217	176	206	099	223	216	041	191	265	159	149
93	105-008	090	134	023	012-062	096	068	069	033	072	143	056	042	081	100	144	126	088	080	113	102	116		
94	141	025	175	095	120	095	030	059	092	177	099	145	042	150	081	133	140	161	106	061	144	207	098	128
95	114-033	123	107	072	162-003	050	115	139	086	176	-005	162	088	080	109	285	148	027	096	270	101	106		
96	099	095	125	209	257-014	048	347	127	138	157	078	053	268	431	095	075	251	048	046	201	177	135	274	
97	086	054	209	113	084	081	099	141	243	173	113	143	005	101	141	210	093	239	151	086	142	255	130	123
98	120	034	097	133	033	128-002	035	051	100	029	079	025	052	043	097	169	218	141	022	115	122	175	084	
99	060	057	180	147	213	099	068	193	121	161	198	178	029	199	323	113	113	312	118	030	194	174	175	215
100	048	060	-006	004	036	091-026	032-014	042	155	078	039-007	044	097	207	104	169	112	121	124	117	071			
101	092	080	083	146	016	066	039	095	090	128	075	133	106	111	063	093	212	124	154	131	086	161	055	078
102	108	070	070-004	088	068	032	089	094	065	051	022	035	093	064	175	108	082	059	102	149	078	002	103	
103	031	089	026	138	105-017	013	177	089	069	070	122	109	078	079	070	070	093	023	029	169	134	084	085	
104	137	072	202	103	044	095	025	013	058	153	059	161	106	126	046	130	190	096	242	170	154	114	073	129
105	139	083	132	094	102	078-005	155	083	127	121	062	049	131	071	134	154	027	190	156	146	046	059	129	
106	077	055	070	092	057	057	117	065	044	119	152	142	026-010	043	095	093	164	123	011	062	092	070	070	
107	104	191	123	054	133	090	170	229	153	099	121	092	105	206	243	165	175	164	161	129	207	189	118	175
108	036	061	087	029	047	019	043	078	057	089	040	047	041	078	066	105	078	138	082-019	109	101	115	028	
109	005	163	086	075	155-002	052	254	106	076	172	090	021	191	243	122	081	097	082	064	185	149	121	281	
110	180-009	281	085	098	181	041	090	114	194	090	255	049	129	064	161	198	118	279	081	175	190	071	113	

Table B-8 continued

		Item																						
Item	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
84	220	254	103	139	082	095	260	105	242	163	164													
85	115	147	191	109	143	057	220	190	159	279	179	240												
86	114	147	061	115	036	091	114	092	105	143	115	096	057											
87	122	184	086	092	073	043	115	200	103	069	142	142	084	050										
88	114	147	082	142	094	115	319	220	188	390	143	210	310	185	084									
89	169	193	087	116	070	148	085	157	147	160	178	176	081	315	187	176								
90	120	197	179	129	138	079	183	118	195	214	143	246	229	051	172	132	135							
91	020	114	063	148	044	050	255	223	098	317	097	142	289	119	050	352	097	138						
92	146	190	150	247	080	111	184	144	101	232	187	203	197	092	140	234	228	262	186					
93	089	116	060	092	045	041	060	043	150	152	140	166	129	181	058	189	122	118	149	204				
94	164	186	121	123	064	058	203	132	109	124	154	142	136	116	080	146	133	155	157	279	162			
95	157	256	170	157	063	141	147	097	226	120	118	242	162	127	120	135	161	212	142	249	135	185		
96	133	210	116	117	104	062	251	134	124	328	216	245	321	076	138	324	126	161	257	190	132	119	150	
97	212	198	171	132	091	113	105	220	135	119	089	156	205	085	242	170	217	150	164	186	085	152	163	151
98	113	251	063	090	020	040	132	080	260	157	062	196	069	154	051	100	100	118	139	145	252	209	230	148
99	181	249	189	106	095	083	286	159	191	272	156	248	262	098	168	301	202	191	170	251	134	257	172	389
100	071	160	225	073	031	173	166	089	179	131	063	097	018	127	049	139	111	090	107	141	109	143	148	097
101	091	219	057	194	052	097	215	210	211	151	110	194	088	112	058	147	177	137	130	216	217	153	214	123
102	020	017	097	066	068	115	061	147	090	062	059	045	088	063	058	083	084	054	104	079	081	087	017	052
103	099	076	050	023	060	062	123	109	025	208	055	066	099	023	025	111	131	095	125	075	082	020	080	100
104	060	192	089	202	075	155	123	114	151	099	145	069	140	071	106	101	227	176	104	307	141	203	184	059
105	076	086	048	133	096	179	034	103	105	077	137	148	117	083	054	090	141	129	159	174	086	101	099	083
106	115	098	092	084	056	046	068	101	112	129	109	102	045	055	200	101	154	018	129	150	126	178	117	059
107	107	149	128	111	103	137	127	414	156	130	089	129	207	024	209	175	168	129	216	171	068	090	102	198
108	183	114	073	119	010	023	097	134	193	087	074	145	070	140	107	092	085	049	107	109	109	207	176	107
109	040	148	205	057	117	149	057	152	044	197	103	112	228	074	070	216	107	087	186	108	060	064	092	118
110	130	131	036	286	000	155	109	166	216	159	145	056	145	204	138	136	197	138	153	256	166	210	151	069

Table B-8 continued

Item

Item	97	98	99	100	101	102	103	104	105	106	107	108	109	110
84														
85														
86														
87														
88														
89														
90														
91														
92														
93														
94														
95														
96														
97														
98	166													
99	213	209												
100	130	270	202											
101	148	303	177	108										
102	167	079	065	076	073									
103	138	039	053	020	117	076								
104	195	166	145	130	226	096	065							
105	134	115	099	078	092	095	108	281						
106	196	205	157	147	174	048	090	205	137					
107	218	136	207	095	182	180	113	170	174	153				
108	228	340	063	165	196	075	085	139	071	206	110			
109	156	040	152	077	021	131	113	128	196	069	238	043		
110	195	176	118	114	170	120	101	406	267	197	201	255	140	

Table 8-9

Relation Between Original and Revised MLC Items

Content of Control	Origin of Control					
	Luck		Skill		Others	
	I	They	I	They	I	They
Political Systems	1 (1)	10 (10)	22 (22)	4 (4)	16 (16)	25 (25)
	37 (37)	46	58 (78)	40	52	61
	73	82	94 (58)	76 (40)	88 (52)	97 (61)
	109	115 (46)			113	119
	19 (19)	28 (28)	31 (75)		34 (34)	7
	55	64 (64)	67 (31)	49 (13)	70	43 (7)
External	91 (55)	100 (73)	103 (67)	85 (49)	106 (70)	79 (43)
	8 (8)	35 (35)	20 (20)	11	14 (14)	32
	44 (74)	71	56 (56)	47 (11)	50 (50)	68 (32)
Internal	80 (79)	107 (81)	92	83 (47)	86	104 (68)
	114 (44)	120 (71)			117 (80)	111
	26 (77)	17 (17)	29 (29)	2	5	23
External	62 (26)	53 (53)	65	38 (2)	41 (5)	59 (23)
	98 (62)	89	101 (65)	74 (38)	77 (41)	95 (59)
	15	33 (33)	27 (27)	36	30 (30)	12 (76)
Internal	51 (15)	69	63	72 (36)	66 (66)	48 (12)
	87 (51)	105	99 (63)	108 (72)	102	84 (48)
	112	118 (69)			116	110
Social Acceptance	6	24	18 (18)	9 (9)	21 (21)	3 (3)
	42 (6)	60 (24)	54	45	57	39 (39)
	78 (42)	96 (60)	90 (54)	81 (45)	93 (57)	75

Note. Original MLC items are outside parentheses while revised MLC items are in parentheses. Original and revised scale items that are the same are adjacent within a subcell.

Table B-10
 Test-retest Reliabilities of MLC Categories
 Based on 72 Items Chosen from Reliability
 and Intercorrelation Criteria, Total Sample

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.463	19	.366	1	.655	1	.655
2	.339	20	.502	2	.733	2	.685
3	.637	21	.401	3	.722	3	.684
4	.511	22	.408	4	.656	4	.641
5	.507	23	.478	5	.588	5	.654
6	.521	24	.494	6	.696	6	.726
7	.600	25	.326	7	.626	Rows	
8	.431	26	.396	8	.539	1	.817
9	.529	27	.410	9	.629	2	.754
10	.448	28	.495	Subrows		3	.725
11	.564	29	.281	1	.738	Columns	
12	.553	30	.363	2	.765	1	.764
13	.464	31	.420	3	.703	2	.737
14	.488	32	.467	4	.673	3	.767
15	.427	33	.430	5	.613	Total	
16	.455	34	.500	6	.693	1	.837
17	.497	35	.479				
18	.524	36	.565				

Note. Category labels are explained in Table B-9 and pages 78-79.

Table B-11
 Test-retest Reliabilities of MLC Categories
 Based on 72 Items Chosen from Reliability
 and Intercorrelation Criteria, Males Only

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.436	19	.272	1	.622	1	.611
2	.266	20	.484	2	.723	2	.672
3	.640	21	.371	3	.718	3	.664
4	.500	22	.496	4	.606	4	.632
5	.522	23	.518	5	.605	5	.661
6	.485	24	.491	6	.679	6	.706
7	.582	25	.289	7	.616	Rows	
8	.433	26	.451	8	.522	1	.797
9	.514	27	.424	9	.607	2	.743
10	.454	28	.459	Subrows		3	.705
11	.600	29	.257	1	.718	Columns	
12	.525	30	.353	2	.754	1	.743
13	.449	31	.382	3	.649	2	.726
14	.441	32	.442	4	.701	3	.756
15	.366	33	.392	5	.605	Total	
16	.434	34	.464	6	.677	1	.826
17	.457	35	.475				
18	.492	36	.560				

Note. Category labels are explained in Table B-9 and pages 78-79.

Table B-12

Test-retest Reliabilities of MLC Categories
Based on 72 Items Chosen from Reliability
and Intercorrelation Criteria, Females Only

Subcells	r	Subcells	r	Cells	r	Subcolumns	r
1	.489	19	.461	1	.681	1	.702
2	.411	20	.518	2	.745	2	.693
3	.633	21	.431	3	.726	3	.705
4	.526	22	.311	4	.702	4	.658
5	.491	23	.428	5	.571	5	.648
6	.546	24	.497	6	.712	6	.747
7	.615	25	.381	7	.635	Rows	
8	.430	26	.297	8	.549	1	.834
9	.538	27	.377	9	.646	2	.765
10	.448	28	.538	Subrows		3	.740
11	.533	29	.298	1	.755	Columns	
12	.579	30	.351	2	.778	1	.783
13	.475	31	.460	3	.755	2	.752
14	.530	32	.487	4	.642	3	.780
15	.501	33	.460	5	.619	Total	
16	.478	34	.531	6	.703	1	.851
17	.528	35	.481				
18	.552	36	.570				

Note. Category labels are explained in Table B-9 and pages 78-79.

Table B-13

Three-factor Varimax Rotation of Original MLC Subcells
Based on Principal Components Analysis, Total Sample

Subcell ^a	Factor			Subcell	Factor		
	I	II	III		I	II	III
1	.463	-.387	.123	19	.342	-.123	.503
2	.504	-.303	.066	20	.300	-.091	.493
3	.191	-.773	.080	21	.329	-.080	.282
4	.278	-.630	.004	22	.315	-.147	.416
5	.184	-.652	.004	23	.078	-.125	.585
6	.271	-.594	.153	24	.223	-.121	.621
7	.005	-.731	.260	25	.557	-.080	.274
8	.131	-.440	.359	26	.636	-.063	.139
9	.033	-.744	.222	27	.490	-.148	-.057
10	.049	-.543	.274	28	.620	-.089	-.003
11	.085	-.585	.434	29	.461	-.042	.296
12	.024	-.331	.412	30	.428	-.060	.405
13	.613	-.065	.310	31	.136	-.155	.535
14	.693	-.100	.182	32	.159	-.193	.545
15	.559	-.020	.106	33	.203	-.222	.501
16	.555	-.156	.101	34	.001	-.265	.289
17	.365	-.263	.343	35	-.021	-.040	.603
18	.328	-.069	.418	36	.057	-.132	.656

^aSubcell labels may be determined from Table 5 and pages 78-79.

Table B-14

Two-factor Varimax Rotation of Revised MLC Subcells

Based on Principal Axes Analysis, Total Sample

Subcell ^a	Factor I	Factor II	Subcell	Factor I	Factor II
1	.225	-.377	19	.491	-.199
2	.291	-.204	20	.498	-.145
3	.111	-.707	21	.421	-.097
4	.135	-.596	22	.475	-.196
5	.092	-.626	23	.488	-.149
6	.190	-.498	24	.541	-.175
7	.090	-.672	25	.460	-.149
8	.221	-.441	26	.395	-.094
9	.100	-.664	27	.338	-.105
10	.167	-.465	28	.327	-.096
11	.208	-.653	29	.400	-.084
12	.251	-.347	30	.497	-.104
13	.539	-.117	31	.488	-.205
14	.533	-.123	32	.438	-.222
15	.428	-.052	33	.422	-.229
16	.409	-.139	34	.138	-.217
17	.459	-.067	35	.320	-.147
18	.489	-.161	36	.375	-.207

^aSubcell labels may be determined from Table B-9 and pages 78-79.

Table B-15
Correlations Between Original MLC Cells, Total Sample

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.633								
3	.612	.719							
4	.538	.320	.388						
5	.397	.346	.388	.578					
6	.427	.382	.473	.537	.487				
7	.471	.364	.383	.555	.449	.442			
8	.428	.398	.366	.439	.403	.322	.592		
9	.360	.317	.406	.451	.372	.563	.525	.376	

^aCell labels are given in footnote on p. 85.

Table B-16
Correlations Between Original MLC Cells, Males Only

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.630								
3	.626	.711							
4	.548	.357	.417						
5	.391	.358	.386	.583					
6	.431	.394	.485	.547	.475				
7	.493	.398	.418	.584	.478	.451			
8	.459	.436	.390	.461	.423	.306	.620		
9	.419	.362	.460	.491	.373	.562	.542	.409	

^aCell labels are given in footnote on p. 85.

Table B-17
Correlation Between Original MLC Cells, Females Only

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.644								
3	.604	.724							
4	.529	.298	.368						
5	.403	.344	.397	.571					
6	.424	.373	.464	.530	.502				
7	.453	.356	.364	.521	.411	.439			
8	.399	.380	.353	.410	.377	.341	.553		
9	.304	.288	.365	.407	.366	.566	.499	.333	

^aCell labels are given in footnote on p. 85.

Table B-18
 Unrotated Factor Loadings of Original MLC
 Cells for Total Sample, Males, and Females

Cell ^a	Total Sample		Males		Females	
	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
1	.731	-.235	.738	-.222	.728	-.249
2	.674	-.465	.685	-.430	.679	-.477
3	.715	-.386	.726	-.373	.712	-.379
4	.713	.263	.732	.263	.693	.262
5	.630	.183	.626	.201	.632	.174
6	.674	.141	.665	.117	.686	.190
7	.703	.243	.729	.237	.675	.225
8	.614	.110	.639	.102	.585	.094
9	.623	.201	.656	.145	.588	.249

^aCell labels are given in footnote on p. 85.

Table B-19
Correlations Between Revised MLC Cells, Total Sample

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.588								
3	.580	.702							
4	.434	.275	.330						
5	.325	.298	.327	.526					
6	.288	.276	.361	.496	.434				
7	.367	.312	.346	.483	.429	.395			
8	.357	.316	.319	.401	.397	.277	.491		
9	.268	.268	.330	.394	.304	.421	.495	.365	

^aCell labels are given in footnote on p. 85.

Table B-20
Correlations Between Revised MLC Cells, Males Only

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.561								
3	.602	.703							
4	.438	.329	.376						
5	.310	.314	.366	.520					
6	.288	.285	.374	.506	.458				
7	.370	.326	.386	.508	.442	.455			
8	.354	.340	.362	.399	.410	.240	.483		
9	.325	.327	.411	.418	.317	.437	.510	.378	

^aCell labels are given in footnote on p. 85.

Table B-21
Correlations Between Revised MLC Cells, Females Only

Cell ^a	Cell								
	1	2	3	4	5	6	7	8	9
1									
2	.610								
3	.564	.699							
4	.435	.233	.300						
5	.343	.287	.296	.531					
6	.288	.270	.353	.487	.411				
7	.374	.310	.326	.450	.413	.333			
8	.366	.305	.297	.395	.380	.313	.490		
9	.221	.225	.271	.359	.287	.407	.467	.336	

^aCell labels are given in footnote on p. 85.

Table B-22

Correlations Between Revised MLC Categories
and Marlowe-Crowne and Edwards SD Scores

	First Session MLC				Second Session MLC			
	Crowne-Marlowe		Edwards		Crowne-Marlowe		Edwards	
	Male	Female	Male	Female	Male	Female	Male	Female
Subrows								
1	.113	.073	.253	.270	.102	.085	.229	.279
2	.096	.061	.273	.330	.081	.057	.247	.323
3	.101	.167	.194	.307	.086	.227	.224	.313
4	-.005	.005	.173	.276	-.018	.043	.190	.323
5	.047	.147	.196	.230	.044	.114	.135	.228
6	.172	.192	.222	.415	.155	.201	.256	.421
Subcolumns								
1	.080	.161	.309	.401	.106	.116	.252	.408
2	.064	.099	.245	.332	.055	.108	.237	.343
3	.090	.088	.297	.344	.065	.076	.266	.365
4	.108	.131	.133	.280	.128	.212	.217	.293
5	.089	.084	.240	.344	.031	.120	.245	.359
6	.147	.117	.213	.328	.126	.149	.224	.361
Rows								
1	.118	.075	.297	.341	.099	.077	.260	.330
2	.057	.100	.205	.325	.035	.148	.224	.352
3	.139	.208	.253	.405	.123	.194	.238	.402
Columns								
1	.081	.146	.309	.412	.087	.121	.266	.405
2	.114	.125	.245	.353	.107	.160	.266	.369
3	.133	.115	.250	.381	.088	.146	.255	.389
Total								
1	.127	.150	.310	.447	.103	.159	.288	.434

APPENDIX C

TEST-RETEST STUDY SOCIAL DESIRABILITY DATA

Table C-1

Correlations Between Edwards SD Scale Items, Total Sample

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1																									
2	164																								
3	052	101																							
4	031	048	362																						
5	020	071	114	069																					
6	136	030	163	121	085																				
7	066	132	046	105	040	102																			
8	150	115	230	165	149	241	311																		
9	233	072	067	118	023	096	049	137																	
10	072	026	129	088	012	072	047	118	110																
11	-029	042	120	104	039	032	011	015	-063	048															
12	219	034	009	042	021	030	-019	035	318	-034	-083														
13	168	071	165	135	096	065	015	073	156	024	001	169													
14	007	113	077	035	026	132	015	091	014	008	038	042	086												
15	116	-001	080	087	022	077	004	121	129	101	-007	106	128	016											
16	059	030	170	215	051	143	112	130	061	021	127	116	151	058	167										
17	-027	094	015	011	-006	009	080	051	-043	064	-019	-061	-078	033	005	006									
18	-005	054	115	159	044	072	018	041	037	024	078	-013	053	012	002	095	-036								
19	057	-008	129	092	137	084	033	137	064	069	064	-001	-004	-012	073	050	028	061							
20	-011	087	193	158	083	093	075	140	012	090	042	038	044	034	095	105	040	117	129						
21	038	144	121	113	084	133	154	266	072	123	067	-041	026	081	042	046	147	093	210	073					
22	053	102	162	174	096	105	191	252	107	073	022	047	132	144	106	136	012	013	105	119	120				
23	000	003	073	035	054	084	030	034	-017	-003	035	-009	034	-013	049	090	-036	012	034	039	041	079			
24	052	029	179	153	014	056	049	145	140	101	038	054	093	041	191	174	021	112	043	117	092	118	102		
25	-030	044	021	054	069	031	100	042	-018	026	065	-090	-042	011	-029	053	201	056	034	109	089	010	019	-022	

Note. Decimal points have been omitted to conserve space.

Table C-1 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26	063	079	061	134	034	088	080	038	031	002	115-056	004	005	074	056	099	076	017	025	173	015	010	079		
27	019	075	246	245	031	224	220	367	177	073	076	054	127	027	103	188	019	107	135	150	161	184	070	200	
28	133	024	095	100	004	085	041	042	278	053	-097	271	144	068	244	149-049	043	097	114	004	037	036	212		
29	038	085	519	338	076	118	093	168	069	022	182-007	139	101	059	174	030	194	106	164	082	169	019	110		
30	083	089	242	230	081	156	061	192	111	026	114	101	128	051	080	148	069	107	120	145	119	118	039	176	
31	035	046	133	069	053	066	015	049	069	004	112	099	100	147	098	125	022	076	091	103	099	048	020	118	
32	104	035	080	058	017	077	036	068	092-007	-064	137	205	053	143	114	000	029	008	087	034	069	031	208		
33	-008	016	160	151	074	054	102	092	031	129	114-010-004	008	069	101	021	200	140	126	166	039	070	067			
34	030-019	178	103	086	056	007	013	040	052	056	047	002	054-005	083-065	049	055	032	-026	040	097	050				
35	041	042	089	092	006	139	051	071	129	100	063	085	089	100	050	094-031	141	048	052	049	009	032	155		
36	084	020	115	029	052	108	053	074	237	149	130	134	109	059	139	134	007	089	029	086	047	106	062	157	
37	056	043-005	128	028	118	054	003	112	055	-026	112	107	092	076	035	030	034-013	025	043	060	025	099			
38	119	074	212	144	066	079	072	096	211	181	051	076	190	088	150	127	028	080	084	097	091	174	018	180	
39	168	010	146	115	079	106	032	168	197	059	038	211	166	086	113	206-006	063	135	074	136	079	062	064		

Table C-1 continued

Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
26	154														
27	058	119													
28	-052	006	125												
29	-001	060	268	086											
30	054	051	269	168	227										
31	050	048	111	158	084	121									
32	-052-023	105	255	074	168	089									
33	040	129	163	039	183	139	148	001							
34	001-003	061	060	146	065	120-011	080								
35	029-008	151	208	098	269	130	153	168	066						
36	032	016	187	203	093	168	158	099	143	107	231				
37	-001	026	048	232	015	088	084	166	016	042	087	076			
38	-020	029	200	170	181	135	178	103	087	131	137	161	150		
39	-008	044	310	346	112	230	209	156	128	070	197	201	084	230	

Table C-2

Correlations Between Crowne-Marlowe SD Scale Items, Total Sample

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1																									
2	177																								
3	032	101																							
4	004	102	078																						
5	069	050	131	037																					
6	064	078	137	065	183																				
7	079	119	005	067	039	015																			
8	058	027	054	088	035	133	186																		
9	107	076	092	112	043	100	119	112																	
10	056	048	076	029	165	076	075	091	022																
11	064	050	116	099	054	111	053	066	018	093															
12	-018	-066	-129	-072	-092	-108	-082	-088	-077	-120	-123														
13	146	186	103	139	140	130	131	139	060	111	103	095													
14	055	088	111	118	099	085	055	135	169	129	066	120	091												
15	-013	106	196	126	048	222	121	107	175	046	091	159	175	154											
16	031	222	121	121	046	144	055	077	008	107	082	167	182	050	135										
17	092	088	064	064	057	063	131	109	100	034	-007	124	145	066	091	182									
18	-012	076	058	150	017	081	076	049	075	050	-007	-025	133	067	040	080	-011								
19	037	087	048	167	104	176	036	062	175	111	005	090	244	067	197	127	127	097							
20	026	128	044	056	001	082	028	103	-028	111	011	098	195	042	067	273	079	073	090						
21	030	155	035	168	053	115	152	158	141	041	051	057	285	062	129	102	118	165	242	119					
22	-021	114	087	125	071	212	-046	041	073	035	130	116	064	075	181	115	088	037	133	-005	061				
23	117	056	067	073	154	100	037	086	137	157	119	117	153	099	078	024	099	102	160	027	170	134			
24	062	150	025	072	033	072	132	104	200	050	-013	139	128	045	108	124	221	-003	167	086	105	009	060		
25	072	166	034	114	055	024	106	050	076	049	046	147	118	058	079	170	155	060	107	182	104	059	062	150	

Note. Decimal points have been omitted to conserve space.

Table C-2 continued

		Item																							
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26	043	162	107	141	037	118	116	112	074	158	137	085	219	056	150	137-005	141	087	139	166	100	121	099		
27	150	128	027	010	052	025	162	069-013	063	083	123	105-039	024	090	069-040	040	100	028-014	031	084					
28	024	110	126	114	104	180	042	127	148	151	154	084	091	067	138	155	039	056	149	096	087	182	202	057	
29	003	016	151	202	024	064	014	077	116	018	061	014	019	081-007	010-018	121-026-039				111	061	126-029			
30	086	155	087	132	067	199	057	134	101	124	078	134	176	067	170	147	092	074	171	129	129	145	112	099	
31	026	019	052	164	029	114	160	181	108	041	-003	123	105	094	132	101	054	056	077	049	118	074-099	052		
32	022	019	004	100-047	032	087	045	088	093	069	100	028	024	093	014	025	044	091	073	100	050	088	047		
33	008	099	016	198	050	114	100	136	055	067	082	076	144	056	208	132	111	099	174	100	202	109	169	089	

		Item										
Item	25	26	27	28	29	30	31	32	33			
26	180											
27	140	050										
28	080	105	037									
29	003	119	035	106								
30	215	181	090	180-002								
31	087	139	042	055	119	079						
32	087	101-018	032-005	155	067							
33	155	158	077	167	173	156	108	043				

APPENDIX D

HIGH SCHOOL STUDY APPLICATION MATERIALS



THE UNIVERSITY OF MANITOBA

DEPARTMENT OF PSYCHOLOGY

WINNIPEG, CANADA
R3T 2N2

Dear

This is an application for permission to do research in your school system. Accompanying this letter is an abstract of my dissertation proposal submitted earlier this year to the Department of Psychology of the University of Manitoba. It provides some detail regarding the theoretical and methodological bases behind this research. In addition, I have provided a reprint of some published research on one of the topics in the present study and a copy of my resume or curriculum vita should you wish to know more of my background and credentials for such work. In this letter I will try to clarify aspects of the research relevant to the functions of this school system.

An essential interest in my recent graduate training in Developmental Psychology has been in the area commonly labelled parent-child interactions. This means that any arena in which parent influences on the child or child influences on the parent are plausible becomes a viable arena for my research interests. Actual assessments of parent-child interactions, of situations in which parents and children exchange influences, are expensive, time-consuming and difficult to obtain. As a consequence, many researchers have turned to questionnaires in which either or both the parents and child report on the nature of parent-child interactions. These questionnaires have gone through serious evaluations in research in an attempt to clarify just what such measures indicate of parent-child interactions. A questionnaire developed in the 1960's has demonstrated some initially desirable qualities for research in Winnipeg. Furthermore, it has undergone study by Drs. Eduard and Shirin Schludermann of the University of Manitoba. This is the Children's Reports of Parent Behavior Inventory (CRPBI), developed by E. Schaefer. The CRPBI is a lengthy questionnaire meant to assess an adolescent's or young adult's perceptions of parent behavior relevant to the respondent. The importance of this questionnaire is that it invariably dimensionalizes parent behavior into three meaningful categories.

Parent behavior is seen by the respondent as varying in acceptance or rejection, as varying in frequency or degree of dependence on psychological or indirect control techniques, and as varying in the frequency or degree of direct control techniques. Inasmuch as these three categories are seen as individually coherent parent influences by respondents on the CRPBI, one would expect that such influences would appear in the behavior of the respondent.

In the proposal two variables have been chosen as plausible and important correlates of perceived parent behavior. The first variable is viewed as an attitude in the psychological literature. It is called the "locus of control" belief. The second variable is academic achievement. The first variable essentially refers to an individual's beliefs regarding the source (or locus) of control of rewards. That is, people are seen as varying in placement of control over rewards or events important to them. Some people express fatalistic perspectives in that they seem to suggest that they perceive the control of rewards important to them as outside themselves and based on some such factor as chance, luck or unknowable fate. Others express such an "external" locus of control belief by attributing the control to other people who control their income, their employment, or any important aspect of their lives. At the other end of this attitudinal dimension are people who perceive the locus of control as residing within themselves. That is, they attribute control over rewards or events important to themselves as residing "internally" in personal qualities such as ability, skill and effort. Few respondents report a totally external perspective or a totally internal perspective. Most individuals answer questions regarding locus of control beliefs in a manner that, on the surface would suggest that their mood, the situation within which locus of control is questioned and other factors affect respondents' attitudes regarding locus of control. At the same time, analyses of respondents' reports suggest that there is a substantial consistency to an individual's locus of control beliefs. Respondents who take an internal position on a question relevant to locus of control beliefs can be expected in the long run to take an internal position on another question referring to another situation. While such consistency is important to the usefulness of this variable, a more important criterion of the usefulness of this variable has been its ability to distinguish between groups who differ in participation and involvement with their environment and who differ in motivation to achieve in some particular aspect of social life. Reviews of research with this variable have suggested that subjects with internal attitudes show greater motivation for academic achievement and appear to be more cognitively active than those with external attitudes.

Two control variables are also in the research design. Socio-economic status is a variable that has demonstrated clearly a relationship with academic achievement. Its relevance as a variable which would clarify the relationships between perceived parental behaviors, respondent locus of control beliefs and respondent academic achievement is clear. Research has already indicated that the first two variables also have socio-economic correlates. Social desirability

is the second control variable. Many measures which require a respondent to answer questions having social content are confounded by the respondent's answering in a manner that would on the surface appear to look socially acceptable or good. Some questionnaires are initially constructed to eliminate this problem and assess only the respondent's views or performance on conceptual dimensions (e. g., locus of control beliefs). In this study, an additional assessment of social desirability responses by the respondents is needed to correct the potential confounding of social desirability with the questionnaires involved.

In summary, the research in question involves obtaining information from junior high and high school students on five variables: perceived parent behavior, locus of control beliefs, academic achievement over the past one-and-one-half years, socio-economic status (father's employment), and social desirability performance. Excepting academic achievement, information relevant to these variables may be obtained from questionnaires. Questionnaires relevant to this yield a total of approximately 370 questions for each respondent who takes every questionnaire. However, approximately two-thirds of the respondents need not take the social desirability assessments, and, therefore, each would answer a total of 300 questions. From previous experience I would expect grade seven students to complete the 300 questions within a two-hour period. The majority of grade seven students should be able to respond adequately to the materials within one-and-one-half hours. All of the materials are designed to allow for group administration and can be given to audiences of any size. Furthermore, our study design allows the materials to be broken up so that the questionnaires can be given in more than one session for situations in which lengthy time periods are not acceptable.

Inasmuch as one of the questionnaires, the CRPBI, involves an assessment of the home life situation, an interest that may be interpreted as threatening to some parents, I have spent some time considering the potential problems involved here. I would be more than willing to inform parents of the general intent of the study and request permission to obtain the information from their children. However, in previous research of this kind in Fort Garry and Portage La Prairie, in which measures of reported parental attitudes and/or behavior were obtained from elementary and junior high age students, this sort of permission was not required nor did the students appear to be stressed by such questionnaires. The CRPBI has had broad use as a research instrument in both the United States and Canada, and in the late 1960's was used in an extensive dissertation study in schools in Calgary. Parental concern about privacy may also be allayed by an understanding of our intended use of the information obtainable from such a study. In all such studies in which I have participated in Winnipeg, a large effort has been made to protect the identification of the respondent. The questionnaires used in this study have not been intended for assessment of individual family problems or a respondent's personality, nor would it appear appropriate to apply them to these uses without substantial corroboration from instruments

designed explicitly for such purposes. Information taken from a respondent for identification purposes has always and only been used to provide a label for recognizing what questionnaires go together when administrations of materials have taken more than one session or when data from other records were required. It is important to recognize that the CRPBI requires the student to report his impressions about his parents' behavior and, while it would seem fair to expect that most reports overlap what is objectively true of parental behavior, our concern is not necessarily that the student report the truth, whether it be bad or good, but that we establish the degree to which their perceptions of family life correlate with their attitudes and behavior in nonfamily situations. In addition to dealing with parental fears a consistent concern in research of this sort has been that the student feel free to express his views without worry over a subsequent loss of privacy and stigmatization for variant or unacceptable attitudes. With most children and young adolescents I have in the past pointed out that the information requested will not be given to their parents, and that the information will not be used in any way that reflects on them as individuals. An assumption entrenched in this research has always been that applications of the findings to individuals can only take place after a thorough understanding is attained of the range and correlates of the variables in the population of respondents.

In order to avoid an excessive demand for subjects in this division, I am applying for a sample of 150 respondents. I would hope to obtain equal numbers of boys and girls. Also, because the study focuses on developmental changes, it would be desirable to have the overall sample composed of three subsamples in which age was a variable. That is, it would be important to the study to obtain subsamples of grades seven and eight students, of grades nine and ten and of grades eleven and twelve students. As with other aspects of the study design, I do not feel I can afford to be extremely firm about the limits of the sample size. I would be willing to discuss any adaptations you might feel are warranted by the demands of your division.

In conclusion, the importance of this study for educators is primarily found in its potential for clarifying some of the presumed correlates of academic achievement. Other values for the educator may be found in the ability of this study design to assess the combined contributions of correlates of academic achievement as opposed to single variable correlations of such achievement. In addition, this study could contribute much to an understanding of adolescent attitudes towards the control they feel they have in an educational environment or in related situations. A knowledge of the variation in such an attitude may contribute to later studies on other correlates of academic achievement such as participation in school activities, student-teacher relationships and peer relationships, and to other variables important in a student's academic growth. Lastly, the breadth of the assessment of reported parent behaviors can provide the educator with a greater appreciation of the activities of his predecessors (parents)

in contributing to the development of the child. Certainly such an understanding is a prerequisite to maximizing the contribution of school environments to a student's development.

If you are interested in more specific information not contained in this letter on this study nor contained in the accompanying abstract, I would be more than happy to provide it. I will probably stop by to inquire regarding your response to this application. If you wished me on more immediate notice, a message can be left for me by phone with the secretaries in the Department of Psychology of the University of Manitoba. I thank you for any attention you can give this application.

Sincerely yours,

David S. Abrahamson

SCHOOL LETTERHEAD
Date

Dear Parents:

Mr. David Abrahamson of the Department of Psychology, University of Manitoba, would appreciate using your child as a subject in a study beginning within the next several weeks. He intends to ask your child questions about family life and the student's attitudes. In every case, it is the intention of the researchers to keep the student's report anonymous and confidential. The goal of this study is to evaluate the relationship between a student's family life and his academic attitudes and behavior. No one is concerned with identifying individual student needs or problems. Instead, the focus is on the relationship within broad groups of students. This project has the sanction of the Department of Psychology, University of Manitoba as well as your School Division.

At present, arrangements have been made to include students of your child's age in the study. Should you feel hesitant about his (or her) participation in the study, please send a letter excusing your child from participating.

We welcome the participation of all students in the study. Mr. Abrahamson would be most grateful for your cooperation.

Sincerely yours,

PRINCIPAL'S SIGNATURE

APPENDIX E

HIGH SCHOOL STUDY ADMINISTRATION MATERIALS

HIGH SCHOOL STUDY DIRECTIONS

INTRODUCTION - Introduce yourself and your assistants.

Names _____

We are doctoral students in the Department of Psychology at the U. of Manitoba. We are doing developmental research in several school divisions in the city. Psychologists are generally interested in the attitudes and viewpoints of people around them and Developmental psychologists are interested in age changes in these viewpoints.

In the study in which you are participating we are interested in two things:

- 1) How you see your family situation;
- 2) Your attitudes (views) about how the world operates.

We intend to compare the information you give us with that given by students from other schools - junior high schools, high schools and students at the U. of Manitoba.

RIGHT TO PRIVACY - Before you begin the questionnaires we are obliged to state that if you feel the information asked for attacks your personal desire for privacy you may leave the questions unanswered. If you do feel this alternative is necessary I assume you have alternative work to do. However, if you decide to answer the questionnaires, please answer all questions. The kind of statistical analyses we do requires that all questions be answered.

DIRECTIONS - The materials should be out by now - First Package, Second Package, three IBM answer sheets, pencil and one blank sheet. Have the students check their materials.

Also ask students to make sure the questionnaires are complete with no missing or extra pages. In order, Questionnaire for Teenagers and Young Adults has eight pages (printed on one side); Attitude Action Series has four pages (printed on both sides of sheet); Personal Reaction Inventory has one page; Ideal Feelings Assessment has two pages.

If any student is concerned, the last two questionnaires are control measures. They allow us to eliminate standard biases in questionnaires and have no other use.

OK, let's start filling out the first page of the First Package. We ask for your name because if the two packages of questions are separated

we can relate which First Package goes with which Second Package. Also we hope to relate this information to some other future information on you. At the same time, the information you give us as individuals will not be shown either to your parents or to your teachers. In fact this information will quickly be changed to numbers for analysis of group trends. At that point only one person will be able to say what any individual did.

Notice that we also ask you to tell us what your father's job is on the first page. In other schools we have found that a simple title is not enough. For example, a student who tells us that his father is a line-man may mean that his father works for the telephone company, for the electric company or works on an assembly. If you feel a simple title is not clear, please tell us more about the job. The company he works for, the kinds of tasks he does would be helpful to us in understanding his job.

When the students hand in their materials make sure they have described their father's job as clearly as possible.

On the first page of the Second Package all you really need to put is your name and indicate your present grade.

Next let's fill out the three IBM answer sheets. Where it says STUDENT NAME please put your full name. Do so on all three answer sheets. Then on the second line just above where it says EXAMINATION CENTRE put MOTHER on the first answer sheet, FATHER on the second answer sheet and ATTITUDE on the third answer sheet.

You are to use the first two IBM answer sheets, labelled MOTHER and FATHER, to answer the questionnaire in the First Package. The instructions filling the answer sheet are written at the bottom of the first page of the package.

Students may need verbal guidance here.

The third IBM answer sheet, labelled ATTITUDES, is to be used for answering all the questions in the Second Package.

Put all your answers on the IBM answer sheets. We reuse the questionnaires and ones that are marked up have to be thrown away. If you have criticisms or suggestions regarding the study or specific questions put them on the blank paper. Don't put any stray marks on the IBM answer sheets. A machine at the University which puts all this data on data cards will attempt to read any stray marks and this introduces error if

[we don't catch the problem.

Some students will realize that many questions are outside their experience. Ask them to answer any such questions as if they were responding to issue raised in reality. Some students will not be able to answer for both parents because of death, divorce or separation. If the separation is too far back to answer for that parent or if they respond too emotionally to answering for the parent let them leave that section blank.

[Any questions? Thank you.

HIGH SCHOOL STUDY

First Package

To the student:

This page covers a questionnaire made to help us understand what students' family experiences have been like. We are interested in this because it will help to make clear why students show the interests and goals they usually have. This questionnaire, and later ones, are not made to evaluate a single student. They are too inaccurate for that. Instead we hope to understand the problems we have set for ourselves by looking at the answers of groups of students.

To keep our information straight and to help organize it we need some information which will help us to classify you later. Please give all the information we ask for in the spaces provided.

What is your name? _____
 First Middle Last

What is your age? _____ What is today's date? _____
 Years Day Month Year

What is your birthdate? _____
 Day Month (spell it out) Year

Are you male or female? _____
 Male/Female

What is your father's job? _____

What is your homeroom teacher's name? _____

When you have answered all the questions above you can go on to the questionnaire. Read its instructions carefully. But don't answer its questions on the questionnaire itself. First check that all eight pages of the questionnaire are in the package. Next put your name on the accompanying IBM answer sheet. Then, in answering the questions, put your answers on the IBM answer sheet in this way. If you feel that a question should be answered by the word "Like," then fill in the space under the A 1 label on the answer sheet. If you think a question should be answered by "Somewhat Like," then fill in the space under the B 2 label on the answer sheet. "Not Like," of course, is indicated by filling in the space under C 3.

If you understand everything up to here, you can go ahead and answer the questionnaire. Answer all the questions no matter how you feel about them. No questionnaire can be scored unless all of its questions are answered.

QUESTIONNAIRE FOR TEEN-AGERS AND YOUNG ADULTS

Instructions

As children grow up to be teen-agers and young adults, they learn more and more about their parents and how their parents are bringing up (or brought up) the sons and daughters. Grown-up sons and daughters can well describe some of their experiences in their parental families. We would like you to describe some of these different experiences. Please read each statement on the following pages and circle the answer that most closely describes the way each of your parents acts toward you. BE SURE TO MARK EACH ANSWER FOR EACH PARENT.

If you think the statement is LIKE your parent, circle L.

If you think the statement is SOMEWHAT LIKE your parent, circle SL.

If you think the statement is NOT LIKE your parent, circle NL.

FORM FOR MOTHER

	<u>Like</u>	Some- what <u>Like</u>	Not <u>Like</u>
1. Makes me feel better after talking over my worries with her.	L	SL	NL
2. Isn't very patient with me.	L	SL	NL
3. Sees to it that I know exactly what I may or may not do.	L	SL	NL
4. Wants to know exactly where I am and what I am doing.	L	SL	NL
5. Soon forgets a rule she has made.	L	SL	NL
6. Is easy with me.	L	SL	NL
7. Doesn't talk with me very much.	L	SL	NL
8. Will not talk to me when I displease her.	L	SL	NL
9. Is very strict with me.	L	SL	NL

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| 10. Feels hurt when I don't follow advice. | L | SL | NL |
| 11. Is always telling me how I should behave. | L | SL | NL |
| 12. Usually doesn't find out about my misbehavior. | L | SL | NL |
| 13. Spends very little time with me. | L | SL | NL |
| 14. Almost always speaks to me with a warm and friendly voice. | L | SL | NL |
| 15. Is always thinking of things that will please me. | L | SL | NL |
| 16. Believes in having a lot of rules and sticking to them. | L | SL | NL |
| 17. Tells me how much she loves me. | L | SL | NL |
| 18. Is always checking on what I've been doing at school or at play. | L | SL | NL |
| 19. Punishes me for doing something one day, but ignores it the next. | L | SL | NL |
| 20. Allows me to tell her if I think my ideas are better than hers. | L | SL | NL |
| 21. Lets me off easy when I do something wrong. | L | SL | NL |
| 22. Sometimes when she disapproves, doesn't say anything but is cold and distant for awhile. | L | SL | NL |
| 23. Forgets to help me when I need it. | L | SL | NL |
| 24. Sticks to a rule instead of allowing a lot of exceptions. | L | SL | NL |
| 25. Tells me exactly how to do my work. | L | SL | NL |
| 26. Doesn't pay much attention to my misbehavior. | L | SL | NL |
| 27. Likes me to choose my own way of doing things. | L | SL | NL |
| 28. If I break a promise, doesn't trust me again for a long time. | L | SL | NL |
| 29. Doesn't seem to think of me very often. | L | SL | NL |
| 30. Doesn't tell me what time to be home when I go out. | L | SL | NL |

31. Gives me a lot of care and attention.	L	SL	NL
32. Believes that all my bad behavior should be punished in some way.	L	SL	NL
33. Asks me to tell everything that happens when I'm away from home.	L	SL	NL
34. Doesn't forget very quickly the things I do wrong.	L	SL	NL
35. Wants me to tell her about it if I don't like the way she treats me.	L	SL	NL
36. Worries about me when I'm away.	L	SL	NL
37. Gives hard punishments.	L	SL	NL
38. Believes in showing her love for me.	L	SL	NL
39. Feels hurt by the things I do.	L	SL	NL
40. Lets me help to decide how to do things we're working on.	L	SL	NL
41. Says some day I'll be punished for my bad behavior.	L	SL	NL
42. Gives me as much freedom as I want.	L	SL	NL
43. Smiles at me very often.	L	SL	NL
44. Is always getting after me.	L	SL	NL
45. Keeps a careful check on me to make sure I have the right kind of friends.	L	SL	NL
46. Depends upon her mood whether a rule is enforced or not.	L	SL	NL
47. Excuses my bad conduct.	L	SL	NL
48. Doesn't show that she loves me.	L	SL	NL
49. Is less friendly with me if I don't see things her way.	L	SL	NL
50. Is able to make me feel better when I am upset.	L	SL	NL
51. Becomes very involved in my life.	L	SL	NL

52. Almost always complains about what I do.	L	SL	NL
53. Always listens to my ideas and opinions.	L	SL	NL
54. Would like to be able to tell me what to do all the time.	L	SL	NL
55. Doesn't check up to see whether I have done what she told me.	L	SL	NL
56. Thinks and talks about my misbehavior long after it's over.	L	SL	NL
57. Doesn't share many activities with me.	L	SL	NL
58. Lets me go any place I please without asking.	L	SL	NL
59. Enjoys doing things with me.	L	SL	NL
60. Makes me feel like the most important person in her life.	L	SL	NL
61. Gets cross and angry about little things I do.	L	SL	NL
62. Only keeps rules when it suits her.	L	SL	NL
63. Really wants me to tell her just how I feel about things.	L	SL	NL
64. Will avoid looking at me when I've disappointed her.	L	SL	NL
65. Usually makes me the center of her attention at home.	L	SL	NL
66. Often praises me.	L	SL	NL
67. Says if I loved her, I'd do what she wants me to do.	L	SL	NL
68. Seldom insists that I do anything.	L	SL	NL
69. Tries to understand how I see things.	L	SL	NL
70. Complains that I get on her nerves.	L	SL	NL
71. Doesn't work with me.	L	SL	NL
72. Insists that I must do exactly as I'm told.	L	SL	NL
73. Asks other people what I do away from home.	L	SL	NL

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| 74. Loses her temper with me when I don't help around the house. | L | SL | NL |
| 75. Does not insist I obey if I complain or protest. | L | SL | NL |
| 76. Cheers me up when I am sad. | L | SL | NL |
| 77. Sees to it that I obey when she tells me something. | L | SL | NL |
| 78. Tells me of all the things she has done for me. | L | SL | NL |
| 79. Wants to control whatever I do. | L | SL | NL |
| 80. Does not bother to enforce rules. | L | SL | NL |
| 81. Thinks that any misbehavior is very serious and will have future consequences. | L | SL | NL |
| 82. Is always finding fault with me. | L | SL | NL |
| 83. Often speaks of the good things I do. | L | SL | NL |
| 84. Makes her whole life center about her children. | L | SL | NL |
| 85. Doesn't seem to know what I need or want. | L | SL | NL |
| 86. Is happy to see me when I come home from school or play. | L | SL | NL |
| 87. Gives me the choice of what to do whenever possible. | L | SL | NL |
| 88. If I've hurt her feelings, stops talking to me until I please her again. | L | SL | NL |
| 89. Worries that I can't take care of myself unless she is around. | L | SL | NL |
| 90. Hugged or kissed me goodnight when I was small. | L | SL | NL |
| 91. Says if I really cared for her, I would not do things that cause her to worry. | L | SL | NL |
| 92. Is always trying to change me. | L | SL | NL |
| 93. Is easy to talk to. | L | SL | NL |
| 94. Wishes I were a different kind of person. | L | SL | NL |
| 95. Lets me go out any evening I want. | L | SL | NL |

96.	Seems proud of the things I do.	L	SL	NL
97.	Spends almost all of her free time with her children.	L	SL	NL
98.	I have certain jobs to do and am not allowed to do anything else until they are done.	L	SL	NL
99.	Is very interested in what I am learning at school.	L	SL	NL
100.	Doesn't like the way I act at home.	L	SL	NL
101.	Changes her mind to make things easier for herself.	L	SL	NL
102.	Can be talked into things easily.	L	SL	NL
103.	Wishes I would stay at home where she could take care of me.	L	SL	NL
104.	Makes me feel I'm not loved.	L	SL	NL
105.	Has more rules than I can remember, so is often punishing me.	L	SL	NL
106.	Says I make her happy.	L	SL	NL
107.	Will talk to me again and again about anything bad I do.	L	SL	NL
108.	Lets me do anything I like to do.	L	SL	NL

FORM FOR FATHER

1.	Makes me feel better after talking over my worries with him.	L	SL	NL
2.	Isn't very patient with me.	L	SL	NL
3.	Sees to it that I know exactly what I may or may not do.	L	SL	NL
4.	Wants to know exactly where I am and what I am doing.	L	SL	NL
5.	Soon forgets a rule he has made.	L	SL	NL

6. Is easy with me.	L	SL	NL
7. Doesn't talk with me very much.	L	SL	NL
8. Will not talk to me when I displease him.	L	SL	NL
9. Is very strict with me.	L	SL	NL
10. Feels hurt when I don't follow advice.	L	SL	NL
11. Is always telling me how I should behave.	L	SL	NL
12. Usually doesn't find out about my misbehavior.	L	SL	NL
13. Spends very little time with me.	L	SL	NL
14. Almost always speaks to me with a warm and friendly voice.	L	SL	NL
15. Is always thinking of things that will please me.	L	SL	NL
16. Believes in having a lot of rules and sticking to them.	L	SL	NL
17. Tells me how much he loves me.	L	SL	NL
18. Is always checking on what I've been doing at school or at play.	L	SL	NL
19. Punishes me for doing something one day, but ignores it the next.	L	SL	NL
20. Allows me to tell him if I think my ideas are better than his.	L	SL	NL
21. Lets me off easy when I do something wrong.	L	SL	NL
22. Sometimes when he disapproves, doesn't say anything but is cold and distant for awhile.	L	SL	NL
23. Forgets to help me when I need it.	L	SL	NL
24. Sticks to a rule instead of allowing a lot of exceptions.	L	SL	NL
25. Tells me exactly how to do my work.	L	SL	NL
26. Doesn't pay much attention to my misbehavior.	L	SL	NL
27. Likes me to choose my own way of doing things.	L	SL	NL

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| 28. If I break a promise, doesn't trust me again for a long time. | L | SL | NL |
| 29. Doesn't seem to think of me very often. | L | SL | NL |
| 30. Doesn't tell me what time to be home when I go out. | L | SL | NL |
| 31. Gives me a lot of care and attention. | L | SL | NL |
| 32. Believes that all my bad behavior should be punished in some way. | L | SL | NL |
| 33. Asks me to tell everything that happens when I'm away from home. | L | SL | NL |
| 34. Doesn't forget very quickly the things I do wrong. | L | SL | NL |
| 35. Wants me to tell him about it if I don't like the way he treats me. | L | SL | NL |
| 36. Worries about me when I'm away. | L | SL | NL |
| 37. Gives hard punishment. | L | SL | NL |
| 38. Believes in showing his love for me. | L | SL | NL |
| 39. Feels hurt by the things I do. | L | SL | NL |
| 40. Lets me help to decide how to do things we're working on. | L | SL | NL |
| 41. Says some day I'll be punished for my bad behavior. | L | SL | NL |
| 42. Gives me as much freedom as I want. | L | SL | NL |
| 43. Smiles at me very often. | L | SL | NL |
| 44. Is always getting after me. | L | SL | NL |
| 45. Keeps a careful check on me to make sure I have the right kind of friends. | L | SL | NL |
| 46. Depends upon his mood whether a rule is enforced or not. | L | SL | NL |
| 47. Excuses my bad conduct. | L | SL | NL |
| 48. Doesn't show that he loves me. | L | SL | NL |

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| 49. Is less friendly with me if I don't see things his way. | L | SL | NL |
| 50. Is able to make me feel better when I am upset. | L | SL | NL |
| 51. Becomes very involved in my life. | L | SL | NL |
| 52. Almost always complains about what I do. | L | SL | NL |
| 53. Always listens to my ideas and opinions. | L | SL | NL |
| 54. Would like to be able to tell me what to do all the time. | L | SL | NL |
| 55. Doesn't check up to see whether I have done what he told me. | L | SL | NL |
| 56. Thinks and talks about my misbehavior long after it's over. | L | SL | NL |
| 57. Doesn't share many activities with me. | L | SL | NL |
| 58. Lets me go any place I please without asking. | L | SL | NL |
| 59. Enjoys doing things with me. | L | SL | NL |
| 60. Makes me feel like the most important person in his life. | L | SL | NL |
| 61. Gets cross and angry about little things I do. | L | SL | NL |
| 62. Only keeps rules when it suits him. | L | SL | NL |
| 63. Really wants me to tell him just how I feel about things. | L | SL | NL |
| 64. Will avoid looking at me when I've disappointed him. | L | SL | NL |
| 65. Usually makes me the center of his attention at home. | L | SL | NL |
| 66. Often praises me. | L | SL | NL |
| 67. Says if I loved him, I'd do what he wants me to do. | L | SL | NL |
| 68. Seldom insists that I do anything. | L | SL | NL |
| 69. Tries to understand how I see things. | L | SL | NL |
| 70. Complains that I get on his nerves. | L | SL | NL |

71. Doesn't work with me.	L	SL	NL
72. Insists that I must do exactly as I'm told.	L	SL	NL
73. Asks other people what I do away from home.	L	SL	NL
74. Loses his temper with me when I don't help around the house.	L	SL	NL
75. Does not insist I obey if I complain or protest.	L	SL	NL
76. Cheers me up when I am sad.	L	SL	NL
77. Sees to it that I obey when he tells me something.	L	SL	NL
78. Tells me of all the things he has done for me.	L	SL	NL
79. Wants to control whatever I do.	L	SL	NL
80. Does not bother to enforce rules.	L	SL	NL
81. Thinks that any misbehavior is very serious and will have future consequences.	L	SL	NL
82. Is always finding fault with me.	L	SL	NL
83. Often speaks of the good things I do.	L	SL	NL
84. Makes his whole life center about his children.	L	SL	NL
85. Doesn't seem to know what I need or want.	L	SL	NL
86. Is happy to see me when I come home from school or play.	L	SL	NL
87. Gives me the choice of what to do whenever possible.	L	SL	NL
88. If I've hurt his feelings, stops talking to me until I please him again.	L	SL	NL
89. Worries that I can't take care of myself unless he is around.	L	SL	NL
90. Hugged or kissed me goodnight when I was small.	L	SL	NL
91. Says if I really cared for him, I would not do things that cause him to worry.	L	SL	NL
92. Is always trying to change me.	L	SL	NL

93. Is easy to talk to.	L	SL	NL
94. Wishes I were a different kind of person.	L	SL	NL
95. Lets me go out any evening I want.	L	SL	NL
96. Seems proud of the things I do.	L	SL	NL
97. Spends almost all of his free time with his children.	L	SL	NL
98. I have certain jobs to do and am not allowed to do anything else until they are done.	L	SL	NL
99. Is very interested in what I am learning at school.	L	SL	NL
100. Doesn't like the way I act at home.	L	SL	NL
101. Changes his mind to make things easier for himself.	L	SL	NL
102. Can be talked into things easily.	L	SL	NL
103. Wishes I would stay at home where he could take care of me.	L	SL	NL
104. Makes me feel I'm not loved.	L	SL	NL
105. Has more rules than I can remember, so is often punishing me.	L	SL	NL
106. Says I make him happy.	L	SL	NL
107. Will talk to me again and again about anything bad I do.	L	SL	NL
108. Lets me do anything I like to do.	L	SL	NL

ATTITUDE ACTION SERIES

This questionnaire is a series of attitude statements. Each shows an opinion held by some people. In the development of the questionnaire no attempt was made to create statements which had right or wrong answers. We expect you to disagree with some items and agree with others. Our interest is in the amount to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate whether you agree or disagree by checking the correct space on the answer sheet. First impressions are usually best so you needn't think long about any question. You may feel that some statements need more information before an answer can be given. In such cases choose the best answer based on your understanding of the statement. In any case, give an answer to each statement.

-
1. If I ever got elected to any office in this community it would be due more to my effective campaigning than to lucky circumstances.
 2. The idea that people get ahead in life by doing good work is an illusion.
 3. Public acceptance or rejection depends to an important degree on the important people a person knows.
 4. By taking an active part in political and social affairs people can improve the quality of life in their community.
 5. I think that my chances of getting high grades depend primarily on who my teacher is.
 6. If I am not as popular as I would like to be, it is because my chances of getting into the right crowd were always small.
 7. The democratic system of government is an illusion because much of the decision-making power lies in the hands of a powerful few.
 8. In the future, how much money I make will depend primarily on how hard I work and how competent I am and much less on the lucky breaks I might get.
 9. Not everybody can learn to get along with others.
 10. If people are dissatisfied with their society they should blame themselves more than the past history of their country or bad luck.
 11. Capable people who fail to succeed have not made maximum use of their abilities.

12. If one wants to avoid social rejection it is more important to know how to get along with other people than to have one or two influential friends.
13. It is difficult for people to change anything through the political processes.
14. Whether I obtain good marks or poor marks depends not so much on the teachers but on what I do or do not do.
15. I have found that social success is not so much a matter of good or bad luck as it is of the social skills I have developed.
16. If I made a determined effort I could help to improve the local conditions in our community, even though my efforts would probably meet with strong local opposition.
17. Many grades obtained by students on exams are influenced significantly by accidental happenings.
18. The number of friends I have depends more on the crowd I am with than on what I am like or what I do.
19. Each country has its own historical destiny and I don't think I could influence developments in our country one way or the other.
20. When I set out on a task I usually expect to accomplish the goals implied in it.
21. In school I found that my social success or failure was very much dependent on whether I was in or out of tune with the social leaders of the class.
22. I feel that if I really wanted to I could contribute to making this country a better place to live in.
23. Entrance into high paying occupations depends primarily on knowing the right people and little on your abilities.
24. Social rejection is primarily a matter of luck and depends on the kind of crowd the person happens to be with.
25. The leaders of this community are not as all-powerful as many people think; if their policies are not liked, the people can get rid of them.
26. In the past I found that my educational successes and failures were primarily a matter of chance.
27. How many friends I have depends on how nice a person I am.

28. The kind of government we get depends primarily on chance factors because political developments are impossible to predict and to control.
29. Usually there is no direct connection between how hard I study and the grades I get.
30. In the past I found that it was not necessary to have influential friends in order to be accepted by the social group as long as I held the right attitudes toward other people.
31. In our mass society I think that as an individual there is very little that I can do which would contribute to the solutions of any social problem.
32. Students do not have to depend on a teacher's whims in order to get high grades.
33. Popularity is not so much a matter of good or bad luck but something which one can do much about by developing social skills that appeal to others.
34. I can do little to improve things in my city because all the important decisions are made by a small but powerful group of people.
35. If people do not succeed in their careers they should blame themselves rather than chance causes.
36. People are lonely because they don't try to be friendly.
37. I cannot blame history, fate, or anything else if I do not like some things in our society because I can change the present if not the past.
38. People today have little chance to advance in their jobs by doing good hard work.
39. Knowing influential people is an extremely important way of being socially acceptable.
40. The average citizen can have an influence in government decisions.
41. If I studied to become a teacher, scientist, or doctor and failed, it would probably be because I needed some help and important people did not give it to me.
42. There is not much use in trying to please people. If I am lucky they like me; if I am out of luck then they don't.
43. The poor people in this society cannot have a better deal simply because the people at the top keep them down.
44. Luck doesn't influence very much the outcome of tasks I do.

45. No matter how hard a person tries, some people just never will like that individual.
46. Uncontrollable or fateful causes seldom determine social changes for people.
47. If people worked harder they would get better jobs and would make more money.
48. The popularity or unpopularity one experiences is primarily a matter of one's personality and not a matter of whether one knows important people.
49. There is very little that parents can do to improve the quality of life for their children in their community.
50. Getting good marks primarily depends on how hard I work rather than what kind of a teacher I have.
51. I do not think that I was born with the characteristics which people like or dislike in me, so I can improve them.
52. If I do not accept unquestioningly the programs laid down by politicians in office but work for improvement in my community and district, I can influence these programs and their outcome.
53. Attaining success in studies or in a profession is primarily a matter of the lucky breaks people get at the right time.
54. If I ever run into a situation where I have very few friends, I think there is little that can be done.
55. I do not think that I can do anything about war or peace in the world but I have to live with whatever chance might bring.
56. I think that success in school primarily depends on how well I study.
57. If I am accepted by my social group, it is primarily because the group leaders like me.
58. If I made an effort, there are many things I could do in order to improve the life in my community.
59. Getting good marks depends primarily on what kind of teachers the students get.
60. Good friends are hard to come by; a person has to wait largely for chance to bring them along.
61. If people are sufficiently eager to exercise their political rights, they can get rid of many strong political leaders they do not like.

62. The career I end up in probably will be chosen more from uncontrollable events in my background than from anything else.
63. I can pretty well influence the number of people who like me or dislike me by the things I do.
64. Society's structure today is primarily the result of historical and economic processes which are beyond the control of any individual or small group of citizens.
65. I found that hard work usually does not pay off.
66. Whether I am liked or disliked depends more on how friendly I am toward others than on how I get along with the important people in my group.
67. Even if I devoted all my time and energy to political and social goals there is little chance that my efforts could make any impact.
68. People do not need to have influential connections in order to get ahead in life.
69. People who have an unattractive personality need not resign themselves to an unpleasant fate.
70. I do not hope for any improvement in our community because powerful people with vested interests resist any change.
71. Successes of any sort are seldom the result of fate.
72. People who want to know why others like or dislike them need only make the effort.
73. The political activities of the last twenty years have convinced me that luck more than anything has determined government solutions to pressing societal and economic problems.
74. If I fail on a test I tend to blame myself rather than unfortunate circumstances beyond my control.
75. When I look at the problems of my community, I usually feel that I cannot do anything to improve the situation.
76. If one wants to be a social success it is more important to develop social skills than to have pull with influential people.
77. Personal achievements of mine are often heavily influenced by chance factors.
78. With enough effort I could wipe out some of the political corruption in this city.

79. When making decisions about my future I found that making a decision to take a definite course of action turned out better than trusting fate.
80. I can usually succeed in a task even if important people work against me.
81. Many poor people would be better off if they stopped blaming their unfortunate circumstances and showed a willingness to improve their situation.

PERSONAL REACTION INVENTORY

Instructions

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally. Indicate a "true" answer on your answer sheet by filling in the space marked T for the question. You can indicate a "false" answer by filling in the space marked F for each question.

82. Before voting I thoroughly investigate the qualification of all the candidates.
83. I never hesitate to go out of my way to help someone in trouble.
84. It is sometimes hard for me to go on with my work if I am not encouraged.
85. I have never intensely disliked anyone.
86. On occasion I have had doubts about my ability to succeed in life.
87. I sometimes feel resentful when I don't get my way.
88. I am always careful about my manner of dress.
89. My table manners at home are as good as when I eat out in a restaurant.
90. If I could get into a movie without paying and be sure I was not seen I would probably do it.
91. On a few occasions, I have given up doing something because I thought too little of my ability.
92. I like to gossip at times.
93. There have been times when I felt like rebelling against people in authority even though I knew they were right.
94. No matter who I'm talking to, I'm always a good listener.
95. I can remember "playing sick" to get out of something.
96. There have been occasions when I took advantage of someone.
97. I'm always willing to admit it when I make a mistake.

98. I always try to practice what I preach.
99. I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.
100. I sometimes try to get even, rather than forgive and forget.
101. When I don't know something I don't at all mind admitting it.
102. I am always courteous, even to people who are disagreeable.
103. At times I have really insisted on having things my own way.
104. There have been occasions when I felt like smashing things.
105. I would never think of letting someone else be punished for my wrongdoings.
106. I never resent being asked to return a favor.
107. I have never been irked when people expressed ideas very different from my own.
108. I never make a long trip without checking the safety of my car.
109. There have been times when I was quite jealous of the good fortune of others.
110. I have almost never felt the urge to tell someone off.
111. I am sometimes irritated by people who ask favors of me.
112. I have never felt that I was punished without cause.
113. I sometimes think when people have a misfortune they only got what they deserved.
114. I have never deliberately said something that hurt someone's feelings.

IDEAL FEELINGS ASSESSMENT

Instructions

This inventory consists of statements dealing with a variety of personal experiences and impressions. Read each statement and decide whether it is true as applied to you or false as applied to you. Mark your answers on the IBM answer sheet. If a statement is TRUE or MOSTLY TRUE, as applied to you, answer true in the space indicated as T. If a statement is FALSE or NOT USUALLY TRUE, as applied to you, answer false in the space indicated as F. Remember to give your own opinion of yourself. Do not leave any blank spaces if you can avoid it.

115. My hands and feet are usually warm enough.
116. I am very seldom troubled by constipation.
117. I find it hard to keep my mind on a task or job.
118. Most any time I would rather sit and daydream than do anything else.
119. My family does not like the work I have chosen (or the work I intend to choose for my life work).
120. My sleep is fitful and disturbed.
121. I am liked by most people who know me.
122. I am happy most of the time.
123. Criticism or scolding hurts me terribly.
124. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
125. I have had periods in which I carried on activities without knowing later what I had been doing.
126. I cry easily.
127. I do not tire quickly.
128. I am not afraid to handle money.
129. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.
130. I frequently notice my hand shakes when I try to do something.

131. It does not bother me particularly to see animals suffer.
132. I dream frequently about things that are best kept to myself.
133. My parents and family find more fault with me than they should.
134. I have reason for feeling jealous of one or more members of my family.
135. No one cares much what happens to you.
136. I usually expect to succeed in things I do.
137. I sweat very easily even on cool days.
138. When in a group of people I have trouble thinking of the right things to talk about.
139. I can easily make other people afraid of me, and sometimes do for the fun of it.
140. I am never happier than when alone.
141. Life is a strain for me much of the time.
142. I am easily embarrassed.
143. I cannot keep my mind on one thing.
144. I feel anxiety about something or someone almost all the time.
145. I have been afraid of things or people that I knew could not hurt me.
146. I am not unusually self-conscious.
147. People often disappoint me.
148. I feel hungry almost all the time.
149. I worry quite a bit over possible misfortunes.
150. It makes me nervous to have to wait.
151. I blush no more often than others.
152. I shrink from facing a crisis or difficulty.
153. I sometimes feel that I am about to go to pieces.

APPENDIX F

THE DEVELOPMENT OF LARGE SAMPLE SIGNIFICANCE TABLES
FOR THE PEARSON r AND HIGHER ORDER CORRELATIONS

Rationale for Significance Tables

Much of the work of this thesis involves multiple comparisons. One solution to the problems presented in multiple comparison, in view of the enlargement of the error rate, is to analyze data solely within a multivariate framework. This appears to be an increasing trend in much of psychological research. At the same time much of psychological theory has not been formulated within a multivariate framework and the attention of researchers often remains on univariate comparisons. A need exists, therefore, for an appropriate evaluation of univariate comparisons derived from multivariate data.

The obvious adjustment for the enlarged error rate of multiple comparisons is to require higher α levels of univariate comparisons before ascribing significance to them. For small or average size samples this requirement can eliminate from further consideration all comparisons below those which account for much more variance than usually demonstrated for social and personality variables. Coincident with the above requirement, the research leading up to and including this dissertation, utilizes larger samples than are common in this area in order to minimize sampling error. One of the drawbacks to large sample research is that most statistical tables proceed with increments of 50 or 100 above a sample size of 100. To avoid inefficient use of large samples, tabled N 's need to be as close as possible to the sample's size. Thus, the dimensions of the problem emerge as follows: To develop a significance table for either t or z distributions which has both a broader range of N and smaller increments of N in the larger values, and which reviews α values from .10 to .000001.

All applications using the \underline{z} distribution are based on estimates of the standard error unless one uses a very complex formula for deriving \underline{z} . Thus Guilford's (1965) $1/\sqrt{N}$ and Pearson's (1954) $1/\sqrt{N-1}$ are approximations of the standard error of \underline{z} . The standard error of Fisher's \underline{r} to \underline{z} transformation, $1/\sqrt{N-3}$, is also an approximation. However, because this reversible transformation maximizes normalization of \underline{r} independent of \underline{N} , it appears to be the best of approximations for deriving probability values relative to \underline{r} . The testing of correlations by \underline{t} ratios is even better in that the standard error is not an approximation, but is correct by theory. Unfortunately, no available texts derive \underline{t} values for a sufficient range of \underline{N} with small increments throughout the range or for the extreme α levels desired. Furthermore, calculation of these probabilities depends on an equation for the distribution in which \underline{N} is raised to a power. An \underline{N} of 300, for example, would involve some tedious calculations and substantial roundoff error. Another alternative, that of approximating the \underline{t} distribution for larger sample sizes with the probability values of the \underline{z} distribution, is unacceptable for other reasons. Matching of these distributions decreases for decreasing \underline{N} or for increased α levels. Comparisons indicate the two distributions are not sufficiently equivalent to be considered congruent for the problem at hand.

The preceding considerations indicate Fisher's \underline{r} to \underline{z} transformation is the most accessible of appropriate solutions to the problem described. The new significance tables are obtained as follows. Kelley (1938) provides normal distribution tables in which the standardized deviate, \underline{Z} , is given for extreme probability levels. Given

N , the standard error of Fisher's z , $1/\sqrt{N-3}$, is known. This information allows the calculation of z from $z = Z/\sqrt{N-3}$ and, thereby, allows the determination of the correlation necessary for significance at the designated α level and N . Transformation from z to r is made via Table V of Hays (1963).

The significance testing of partial correlations is achieved by using the usual table of r values derived from their relationship to unique t values. Therefore, such tables are based on the t distribution. The significance of the partial correlation is determined simply by an adjustment in the degrees of freedom. For a partial correlation the degrees of freedom (df) are equal to $df - k$, where k is the number of variables held constant, and df represents the zero-order correlation. A tentative but reasonable adjustment for a partial correlation interpreted by the z distribution would be to alter the df . The standard error of the z transformation of a first-order partial correlation becomes $1/\sqrt{N-4}$. The implied general formula for z scores based on partial correlations is $1/\sqrt{N-k-3}$.

Table F-1

Significant Zero-order Correlation and First-order Partial
Correlation Coefficients for Total Sample, Males, and Females

level	Males		Females		Total		Z-score
	N = 278		N = 297		N = 575		
1-tail	N - 4	N - 3	N - 4	N - 3	N - 4	N - 3	
.00,000,000,1	.347	.347	.337	.336	.246	.246	5.99781
.00,000,000,5	.333	.332	.323	.322	.235	.235	5.73073
.00,000,001	.327	.326	.317	.316	.231	.230	5.61200
.00,000,005	.311	.311	.302	.301	.219	.219	5.32672
.00,000,01	.304	.304	.295	.294	.214	.214	5.19934
.00,000,05	.287	.287	.278	.278	.202	.202	4.89164
.00,000,1	.280	.279	.271	.270	.196	.196	4.75342
.00,000,5	.261	.260	.253	.252	.183	.183	4.41717
.00,001	.252	.252	.244	.244	.177	.176	4.26489
.00,005	.231	.230	.223	.223	.161	.161	3.89059
.00,01	.221	.221	.214	.214	.154	.154	3.71902
.00,05	.196	.196	.190	.190	.137	.137	3.29053
.00,10	.185	.184	.179	.178	.129	.129	3.09023
.00,25	.168	.168	.163	.162	.117	.117	2.80703
.00,50	.154	.154	.149	.149	.107	.107	2.57583
.00,75	.146	.146	.141	.141	.101	.101	2.43238
.01,0	.140	.139	.135	.135	.097	.097	2.32635
.02,5	.118	.118	.114	.114	.082	.082	1.95996
.05	.099	.099	.096	.096	.069	.069	1.64485

Table F-2

Significant Zero-order Correlation and First-order Partial Correlation Coefficients for Grades 7 and 8, Grades 9 and 10, and Grades 11 and 12

level	Grades 7-8		Grades 9-10		Grades 11-12		Z-score
	N = 150		N = 220		N = 205		
1-tail	N - 4	N - 3	N - 4	N - 3	N - 4	N - 3	
.00,000,000,1	.459	.458	.387	.386	.400	.399	5.99781
.00,000,000,5	.442	.440	.371	.371	.384	.383	5.73073
.00,000,001	.434	.432	.364	.364	.377	.376	5.61200
.00,000,005	.414	.413	.347	.347	.359	.358	5.32672
.00,000,01	.406	.404	.340	.339	.351	.350	5.19934
.00,000,05	.384	.383	.321	.320	.332	.331	4.89164
.00,000,1	.374	.373	.313	.312	.323	.322	4.75342
.00,000,5	.350	.349	.292	.291	.302	.301	4.41717
.00,001	.339	.338	.282	.282	.292	.291	4.26489
.00,005	.311	.310	.259	.258	.268	.267	3.89059
.00,01	.298	.297	.248	.247	.256	.256	3.71902
.00,05	.266	.265	.220	.220	.228	.227	3.29053
.00,10	.250	.250	.207	.207	.215	.214	3.09023
.00,25	.228	.227	.189	.188	.195	.195	2.80703
.00,50	.210	.209	.173	.173	.180	.179	2.57583
.00,75	.199	.198	.164	.164	.170	.169	2.43238
.01,0	.190	.190	.157	.157	.163	.162	2.32635
.02,5	.161	.160	.133	.132	.137	.137	1.95996
.05	.135	.135	.111	.111	.116	.115	1.64485

APPENDIX G

HIGH SCHOOL STUDY DATA

Ancillary Information on the Academic Achievement Criterion

The choice of students' grades as an indicant of the criterion variable, academic achievement, was a necessary compromise. The administration of a standardized measure for academic achievement to all students of the sample is a more desirable approach. However, Manitoba no longer offers a standard battery of achievement measures to its students and certainly would not have an equivalent measure for the age range of this sample. Such an achievement measure would have increased greatly administration time in the present study and administrators were found to be very concerned about the time lost from a student's regular activities.

In an effort to improve measurement of the criterion variable, schools which were clearly impressionistic in their evaluation were avoided and as large an amount of information as could be obtained on a student's school performance went into the construction of his GPA score. The deletion of schools on the basis of their grading system involved only one school. At present, a defense of the adequacy of the measure can only be made in terms of its reliability and the agreement it demonstrates with predictions regarding academic achievement relations with other variables in the last study.

Table G-1

Correlations Between 81 Revised MLC Items, Total Sample

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1																									
2	129																								
3	042	006																							
4	075	060-012																							
5	136	115	033-020																						
6	029	027	115-032	075																					
7	-016	002	026-035-005	044																					
8	031	141	034	165	005	049	037																		
9	055-054-000-027	068	077	064-043																					
10	032	051-062	038	065	037-020	015	084																		
11	049	077-034	065	077	038	032	122-006-004																		
12	038	050	097	165-013	064-047	118-045	026	050																	
13	011	027	082	108	024-005	124	041-023-079	-051	070																
14	107	080-047	102	247	046-056	091	014	098	132	103	021														
15	105	122-007	172	071	119-036	114-036	052	106	234	006	143														
16	022	023	033	133-032-027-033	050	019	053	062	093	032	086	014													
17	101	128	005-037	078-032	051	094	051	046	057	113	004	124	109-018												
18	103	109-011	023	113	111	004	099-007	098	-021	121-031	165	110	013	077											
19	053	035	151	016	038	154	124	005	118	031	-013-006	071	021-003	047	027	029									
20	121	161	029	128	017	077-016	164-027	064	086	239-019	125	213	005	048	140	080									
21	027	015	113	011	075	183	030	010-038-042	070-058	012-019	037-085-028	104	089	076											
22	117	035-015	059	014	002	088	055	034	075	071	088	057	006	017	140-057	029	218	094	-024						
23	029	172	114	050	112	075	058	123	051	061	011	086	013	115	212	070	167	210	086	128	027	131			
24	050	089	164-009	076	230	016	104	006	047	057	088	031	051	057-021	047	190	158	136	132	124	051				
25	061	042	008	081	071	100	015	048-028	126	100	058-005	106	174	137	067	092	033	128	002	066	191	058			

Note. Decimal points have been omitted to conserve space.

Table G-1 continued

Item																								
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
26	089	068	021	077	181	144-001	076	017	020	126	136-039	132	158	011	140	150	051	187	089	064	236	111		
27	022	022	051	135-011	075	040	124	024	110	029	073	025	106	144	084	014	119	008	162	-036	113	200	072	
28	010	043	061-051	139	100	144-022	132	073	101	008	072-011	029-008	070	064	092	002	005	114	130	101				
29	061	066	024	017	091	086	012	108	058	001	-011	053	073	119	153-032	134	165	073	122	024	028	195	111	
30	044	036	070	081	013	015-078	108	059	061	074	160-055	049	122	144	116	185-086	092	068	023	098	091			
31	035	045	090-045	012	107	067	050	041-003	007-043	048-029-022	092	028	034	028	002	064	162	098	207					
32	040	047	045	107	081	048	014	025	001	042	037	106-043	140	104	021	087	062	085	163	-021-050	177	059		
33	170	096-065	119	039	063-011	120-068	086	089	144-032	150	194	008	061	172-005	222	-027	126	110	104					
34	091-007	057	029	030	159	187	027	103	037	-033	009	114	068-001	069	046	068	303	038	091	196	109	109		
35	042	021-041	062	033	030	036	096-007	133	161	140-019	122	114	051-025	047	041	154	-078-004	062	051					
36	007-118-033-009-041	052	021-024-068	063	053	002	070-010	025	009-028-001-086	039	-035	059-022-023												
37	034	053-026	128-030	041-014	189-085	084	083	079	037	053	136	149	012	103	074	019	-021	118	061-010					
38	076	123	012	070	117	054	021	088-045-005	062	065-081	119	123	012	094	133	036	112	-044	103	199	046			
39	003	100	249-012	054	142	051	115	007	069	-078	031-004-030	018-004	030	155	087	037	147	043	094	180				
40	-020-058	037	120-059	013	091	037-010	044	064	051	116	019	033	095	041-011	046	033	008	106	083	007				
41	017	137	025	047	131	175-010	070	074	100	040	124-038	131	148-032	010	067	042	089	072	050	203	153			
42	080	140	078	068	024	187	017	005	057	065	-009	063	016	067	052	017	040	155	039	130	061-014	152	167	
43	076	049	061	006	037	086	063	013	031	000	-009-015	005-044-024-072	001	077	089-012	094	063	078	044					
44	078	072-007	071	104	025	010	049	111	087	064	086	005	094	131	096	096	045-003	128	027	038	106-022			
45	-081-063	081-124	054-032	060-026	134-024	-065-073	033-127-134-084	023-057	041-193	036	070-066-014													
46	066-012	115	041-006-017-080	034-066	068	-056	034	019	074	089	066	010	012-058	042	-014-003	003-028								
47	065	073-108	088-081-045	001	055-042	114	034	031	055	008	052	058	006	097-046	020	-102	116	089-067						
48	053	149	063	074	092	132	017	127-055	023	092	111-038	057	106	031	097	180	052	144	-040	060	125	135		
49	060	139	072	146	007	084	076	050	011	048	063	056	010	063	098	074	122	069	152	127	072	091	118	119
50	052	125	029	108	262-001	076	095-026	027	100	102	016	292	164	112	123	115	024	152	-002	029	108	089		
51	171	103	030	135	043-035-074	027	029	103	132	107-006	116	214	068	065	112-006	202	-089	071	120-004					
52	085	044-086	116	062	056	035-022	050	052	077	051	061	066	082	124-052	023	132	079	-058	189	050-015				
53	047	119	092	009	116	013	004	096	050	020	051	128-010	038	167	014	108	102	105	207	066	095	215	169	
54	112	107	005	050-005	179	008	048-062	045	000	065	014	091	175	037	084	159	061	175	060	039	197	139		

Table G-1 continued

Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
26	252																								
27	099	092																							
28	083	126	123																						
29	103	139	132	113																					
30	166	133	135-010	083																					
31	023	028	030	035	061	110																			
32	108	126	095	016	098	095	024																		
33	112	190	186	069	196	145	069	157																	
34	117	139	049	161	148	057	280	071	079																
35	100	071	198	173	044	081	016	157	129	085															
36	034-036	063	050-053	001	-066	065	098-070	104																	
37	210	003	059	016	057	108	028	047	107	058	107	006													
38	114	217	037	094	121	087	058	076	125	055	079	018	124												
39	024	018-018	048	059	157	113	105	068	125-004-114	083	038														
40	076	047	109	028	005	137	159	031-008	100	036	013	139	056	017											
41	049	180	077	118	129	081	031	105	157	091	132-011	044	193	095	016										
42	036	116	108	160	101	144	070	081	143	098	018-025	072	140	127	013	029									
43	-018	052-007	039	000-043	045-027-007	075-004-029	013	088	051	055	039	005													
44	121	124	114	041-005	142	025	047	069	011	062-030	086	029	037	003	027	107	127								
45	-134-092-090	059-020-081	128-103-112	051-031-062-076-009	060-010	-008	002	023-037																	
46	070-053	071	008	009	078	014	086	037-029	131	044	047-023	013	034	-073	084-081	003	029								
47	119	034	172	051	084	093	-078	090	133	035	133	171	104	166-051	091	069	017	114	089-081	021					
48	107	123	141	053	040	136	076	094	263-006	118	052	126	129	133-002	118	227	029	115-054-039-001							
49	134	099	099	113	122	079	147	096	140	126-009-031	162	136	154	075	111	124	056-001-071	001	019	128					
50	095	135	097	070	069	116	086	108	155-002	129	009	094	173	001	015	134	099	024	154-106	017	055	174			
51	075	118	078	012	118	184	019	132	226	067	120	036	111	051	059	047	136	167	020	176-117	037	103	128		
52	150	085	001	095	081	095	120	022	046	114	039-081	202	049-004	058	140-010	034	107-119-013	045-009							
53	059	163	085	029	085	092	096	062	132	031	032	005	019	182	162	007	134	187	070	110	014-020	069	193		
54	038	197	162	070	137	111	057	101	249	058	146	070	044	159	071-031	157	218	060	016-097	021	051	236			

Table G-1 continued

	Item																							
Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
26																								
27																								
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47																								
48																								
49																								
50		173																						
51		132	131																					
52		128	080	075																				
53		039	128	116	130																			
54		285	189	166	125	139																		

Table G-1 continued

Item																								
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
55	057	060-006-130	066	047	020-011	006	029	-030-058	041-032-031	068-042-058	168-064	039	225-029-012											
56	058	097	019	147	082	065	046	102	004	055	094	151-031	097	105	072	041	114-014	121	-017	093	141	086		
57	018	109	073	026-008	121	073-027	012-045	000-050	057-030	014-018	020	123	071	019	193	025	076	068						
58	075	106	089	122	028	109	040	069-033	043	067	162	052	143	172	210-007	105	170	128	022	310	021	084		
59	100	030	014	003	331	127-039	073-010	001	066	100-036	233	149	050	093	137	029	128	037	049	207	124			
60	032	065	072-016	078	117	026-006	060	026	-044	063	101	093	026	070	063	108	073	097	063	067	108	142		
61	059-007-011	099	032	023	011	082-021	159	119	043-035	086	084	127	005	033	150	062	-104	154	093	045				
62	097	141	068-027	129	091	027	026	062	030	045	128-008	088	043	041	071	088	093	157	007	056	132	167		
63	071	117	033	110	047	102-024	055-029	064	050	147-027	080	076	089	081	083	061	124	-013	015	046	052			
64	017	018-013	020	022	049	164	036-001	037	007-020	092-004-020	017-013	092	099	073	062	070	097	042						
65	047	063	076	026	067	109-019	080-038	084	056	162-083	127	134	110	060	110	041	151	047	043	133	106			
66	099	079	067	033	061	093-003	097-032	078	095	080	016	206	118	173	082	122-009	199	-011	037	118	040			
67	066	042	006	033	121	173	035-002	051	040	025	045	078	101	054	142	053	106	268	150	080	132	090	112	
68	022	139	060	105	053	068	038	111	031	116	088	092-012	129	112	087	047	113	056	171	018	143	230	133	
69	013	055	005	131-046	046-026	077-036	125	096	170-042	159	132	078	068	066	090	162	019	070	083	062				
70	032	128	025	075	070	063	172	145	005-028	-008	076	028	066	058	097	002	059	122	126	064	103	102	030	
71	-012	002	025-004	090	039-035	030	065	082	064-046-072	066	030	009-056	037	067	126	016	008	091	055					
72	049	104	062	052-029	112-019	104-080	048	040	088	042	138	102	099-009	048	115	130	008	177	090	128				
73	055	043	022	056-022	074	031	100	032-006	089	094	051	013	127	004	058	087	043	101	073	074	072	078		
74	-006	095-028	066	043-008	049	111-020	052	119	183	032	192	188	087	076	020	007	162	-056-035	060	091				
75	010	018	054	028	020	077	092	071	076-046	-020-003	117-023-003	154-002	006	195-009	066	267	034	099						
76	025	092	078	109	024	083	009	167-017	016	076	221-008	107	228	107	100	122	000	200	046	108	152	121		
77	-010	161	094-054	048	132	082	122	059	033	047	051-012-012	063	021	162	168	141	131	047	074	184	171			
78	154	058	047-013	008	057	042-005	036	030	-025-025	019-035-024	157	001-007	173-057	-005	269-019	051								
79	076	101	026	068	057	030	003	121-011	040	075	116-002	103	150	074	053	074	031	221	-004	178	079	033		
80	072	095	022	021	085	021	027	047-004	124	011	078-044	084	058	033	102-004	076	136	068	135	030	068			
81	032	074	002	142	071	078-020	095-080	003	068	130	030	188	221	117	079	107-017	167	053	034	052	098			

Table G-1 continued

		Item																										
Item	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48				
55	013-007	001	051	052-032		208-041	014	217	026-056	085	006	132	046	081	009	014-013	074	034	025	070								
56	085	040	086	056	171	147	034	135	113	046	116-020	127	111	067	042	190	053	007	102-066	033	053	119						
57	-017-029-055	085	051	073		139-062	014	151-051-047-013	042	155	041	044	157	036	019	064-037-072-032												
58	166	099	112	054	054	181	220	049	150	193	119	040	187	081	059	121	104	078	052	090-034	104	095	103					
59	127	160	075	101	132	052	052	137	141	083	070	056	087	164	040-022	197	136	060	058	010	016	033	149					
60	029	112	060	084	145	105	132	051	048	112-011	022-039	148	107-003	143	167	068	067	072	008	036	105							
61	175	013	045	091	020	058	074	047	121	118	132	044	153-044-022	005	011	064-034	109-028	069-008	110									
62	093	142-005	140	182	182	117	087	180	179	030-034-057	182	103-035	154	122-018	082-064-030	066	122	018	082-064-030	066	122							
63	124	109	033	009-010	163	042	033	158	011	064	012	088	068	005	035	071	102-012	064-156-037	102	148								
64	043	013	021	050	041	012	113	011	033	120-011-017	079	074	013	080	009	038	066	024-013-083	046-059									
65	143	141	159	024	159	181	-029	086	186	008	154-021	067	092	064	010	179	163	052	104-120-020	126	209							
66	146	087	183	040	089	184	-003	132	171	015	112	122	164	123-002	092	104	075	026	146-192	097	121	194						
67	141	118	087	090	165	082	203	036	082	297	088-021	064	147	051	060	103	135	041	049-053-012	049	059							
68	143	126	148	060	066	163	023	154	184	043	050	071	075	052	122	148	033-040	135-148-007	125	147								
69	181	136	083	000	121	138	-020	059	165	102	104-061	180	091	054	048	097	088	025	146-083	017	114	138						
70	010	154	042	111	096	017	118	058	092	178	063-033-017	129	009	038	081	085	032	069-068-044	061	084								
71	074	083	046	001-004	097	035	060	148	095	082	027	079	015	046	059	057	020	022	167-089	046	069	071						
72	116	098	155	013	070	074	029	111	217-025	091	031	165	157-007	112	106	155	107	118-126-010	164	165								
73	060	159	060	113	111	082	036	063	057	110	030	057	083	244	095	069	069	134	058	132-017	009	061	068					
74	100	126	083-024	053	097	-012	132	209-018	176	096	106	175-031-004	134	031-049	129-114	072	097	176										
75	032-010-003	074	044	062	206	008	014	230	016-009	092	045	052	097	023	017	078	026	077-011	049	000								
76	103	143	117	028	119	170	016	123	263	012	060	038	121	123	181	037	222	103-003	161-099	084	094	145						
77	017	095	040	172	111	056	084	058	014	132	063	006	059	184	150-010	060	117	088	059-083-049	028	124							
78	012-014	002	025	047-035	116-027-043	146-026-015	087-061	037	139	-077-018	078-003-002	054	052	013														
79	107	087	076	024	087	127	073	024	151	005	152	074	125	211	111	010	091	100	056	089-066	066	100	154					
80	155	156	105-066	051	115	093	100	091	099	028	060	098-025	052	039	077	121	017	090	055	020	022	007						
81	155	156	105-066	051	115	034-019	145-022	075	033	122	104-054	051	041	102	057	171-116	008	060	176									

Table G-1 continued

Item	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
55	-058-002		-031	158	080-015																			
56	127	290	045	071	115	077	007																	
57	106	033	028	039-009	134	017	005																	
58	219	182	157	230	074	157	090	082	065															
59	139	303	042	069	159	160-029	189-005	194																
60	146	039	047-017	074	087	136	094	100	081	089														
61	139	042	094	166-085	119	076	064-009	203	086	014														
62	083	114	039	066	186	153	118	115	057	024	106	172	120											
63	058	066	124	051	052	164	119	088	053	118	043	075	110	125										
64	066	074	072	025	002	046	059	052	063	082	016	029	008-019	071										
65	164	154	194	068	185	171-016	197	004	130	219	068	121	132	242	063									
66	047	120	131	028	097	128-050	151-003	150	144	051	096	125	141-005	231										
67	062	111	109	165	084	082	156	101	077	203	118	195	097	139	163	209	128	129						
68	114	126	194	111	080	119	022	126-004	164	079	096	067	130	085	021	130	124	110						
69	118	137	151	159	114	124	045	111-029	221	068	078	114	117	104	042	239	068	131	144					
70	119	175	069	045	165	108	117	094	110	127	093	070	040	199	063	089	162	079	183	179	113			
71	-006	115	098	083	055	073-016	087	030-009	033	070	071	062	084	007	132	091	136	064	088	095				
72	112	185	150	111	130	227-016	154-043	204	153	047	088	110	123	028	193	187	110	077	256	081	035			
73	134	046	105	075	193	081-024	047	074	017	076	125	-050	128	015	021	182	115	115	034	129	085	135	092	
74	163	151	131	110	121	122-109	180-034	133	090	098	043	068	095-029	204	248	079	168	156	116	057	121			
75	061	084	-001	182	113	080	213	061	092	176-013	039	051	031	065	165	006	030	238	048	061	124	085	054	
76	098	126	212	109	171	095-054	156	047	128	065	074	024	074	083-017	145	194	104	166	218	118	117	191		
77	118	041	016	061	204	172-009	073	105-026	146	139	-010	215	094	073	083	076	142	101	047	164	118	037		
78	-007-032		-013	162	024-051	241-019-014	097-040-030	045	084	005	024-090-007	154	073	025	032	-015	010							
79	092	268	158	105	201	126	006	191-000	300	130	116	024	154	112	001	172	157	097	112	166	082	095	157	
80	086	124	045	100	093	016	123	072	055	157	062	066	110	083	059	040	042	027	143	070	116	108	065	093
81	118	271	149	111	134	168-013	105-036	195	064	100	103	063	113	025	205	090	131	128	259	118	077	205		

Table G-1 continued

Item	73	74	75	76	77	78	79	80	81
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72									
73									
74	160								
75	055	073							
76	118	229	119						
77	161	070-009	133						
78	-068-134	177-010	044						
79	119	218	085	209	122-050				
80	020	060	149	080	023	084	033		
81	021	261	024	195	046-073	245	074		

Table G-2
 First Two Unrotated Factors of Revised MLC Subcells
 Based on Principal Axes Analysis, Total Sample

Subcell ^a	Factor I	Factor II	Subcell	Factor I	Factor II
1	.341	.098	19	.481	-.096
2	.163	.147	20	.355	-.028
3	.409	-.131	21	.474	.018
4	.227	.078	22	.397	-.026
5	.296	.005	23	.379	-.101
6	.376	.104	24	.503	-.024
7	.210	-.452	25	.447	.233
8	.237	-.260	26	.510	.189
9	.373	-.416	27	.414	.149
10	.254	-.183	28	.266	.211
11	.378	-.400	29	.461	.212
12	.106	-.259	30	.461	.155
13	.354	.131	31	.367	-.217
14	.315	.151	32	.364	-.283
15	.496	.141	33	.482	.001
16	.279	.241	34	-.097	-.286
17	.448	.135	35	.113	-.335
18	.411	.114	36	.193	-.253

^aSubcell labels may be determined from Table B-9 and pages 78-79.

Table G-3

First Two Unrotated Factors of Revised MLC Subcells
Based on Principal Axes Analysis, Males Only

Subcell ^a	Factor I	Factor II	Subcell	Factor I	Factor II
1	.292	.145	19	.503	-.124
2	.172	.172	20	.328	-.089
3	.369	-.201	21	.472	-.009
4	.232	.045	22	.363	.034
5	.280	.013	23	.344	-.196
6	.406	.031	24	.456	-.069
7	.137	-.407	25	.434	.199
8	.164	-.289	26	.509	.201
9	.366	-.396	27	.444	.184
10	.195	-.196	28	.248	.148
11	.407	-.421	29	.472	.217
12	.130	-.247	30	.492	.151
13	.283	.036	31	.349	-.220
14	.365	.186	32	.342	-.292
15	.499	.169	33	.450	-.043
16	.355	.267	34	-.174	-.268
17	.401	.168	35	.125	-.320
18	.419	.125	36	.102	-.228

^aSubcell labels may be determined from Table B-9 and pages 78-79.

Table G-4
 First Two Unrotated Factors of Revised MLC Subcells
 Based on Principal Axes Analysis, Females Only

Subcell ^a	Factor I	Factor II	Subcell	Factor I	Factor II
1	.405	.089	19	.447	-.102
2	.185	.151	20	.337	.025
3	.441	-.054	21	.418	.017
4	.236	.145	22	.426	-.078
5	.336	.023	23	.394	-.006
6	.359	.177	24	.540	.024
7	.314	-.451	25	.412	.279
8	.282	-.257	26	.497	.190
9	.415	-.434	27	.330	.095
10	.281	-.169	28	.243	.300
11	.364	-.390	29	.412	.206
12	.142	-.276	30	.352	.155
13	.396	.264	31	.348	-.223
14	.291	.122	32	.331	-.311
15	.457	.111	33	.468	.012
16	.197	.201	34	-.034	-.302
17	.503	.133	35	.117	-.375
18	.408	.135	36	.260	-.262

^aSubcell labels may be determined from Table B-9 and pages 78-79.

Table G-5
Correlations Between High School Study Variables, Total Sample

	CRPBI									MLC			Total				
	SES ^a	SD ^b	SD ^c	Mother			Father			Rows				Columns			
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA	1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ		
SD ^b	.030																
SD ^c	.037	.200															
Mo. R-A	-.058	-.169	-.150														
Mo. FC-LC	.047	.072	.109	-.073													
Mo. PC-PA	.008	-.367	-.073	.076	.014												
Fa. R-A	-.076	-.148	-.221	.554	-.118	-.068											
Fa. FC-LC	.067	.045	.130	-.057	.589	-.027	.036										
Fa. PC-PA	-.011	-.314	-.095	.071	-.043	.661	-.008	.005									
Row 1 ^d	.166	.245	.152	-.213	.136	-.048	-.223	.129	-.104								
Row 2 ^e	.110	.371	.029	-.112	.158	-.296	-.051	.151	-.311	.383							
Row 3 ^f	.150	.356	.067	-.104	.014	-.253	-.088	.040	-.290	.404	.563						
Column 1 ^g	.111	.389	.108	-.143	.098	-.219	-.122	.108	-.265	.641	.717	.728					
Column 2 ^h	.177	.336	.104	-.213	.129	-.193	-.184	.116	-.208	.684	.669	.690	.632				
Column 3 ⁱ	.175	.330	.061	-.119	.120	-.232	-.093	.132	-.288	.640	.743	.686	.633	.607			
MLC Total	.178	.407	.104	-.181	.133	-.248	-.152	.137	-.294	.756	.821	.810	.873	.856	.868		
GPA	.120	.167	.045	-.141	.153	-.201	-.097	.098	-.174	.279	.374	.283	.330	.385	.311	.394	

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-6
Correlations Between High School Study Variables, Males Only

	CRPBI									Rows			MLC			Total
	SES ^a	SD ^b	SD ^c	Mother			Father			1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ	
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA							
SD ^b	.084															
SD ^c	.035	.062														
Mo. R-A	-.074	.023	-.044													
Mo. FC-LC	.111	.036	.005	-.026												
Mo. PC-PA	-.013	-.319	-.001	-.095	.055											
Fa. R-A	-.091	-.046	-.191	.520	-.184	-.157										
Fa. FC-LC	.076	.037	.080	-.065	.649	-.005	.016									
Fa. PC-PA	.011	-.345	-.015	-.039	.030	.694	-.118	-.032								
Row 1 ^d	.097	.236	.172	-.185	.127	.004	-.242	.179	-.058							
Row 2 ^e	.073	.440	-.088	-.041	.101	-.310	.029	.100	-.327	.361						
Row 3 ^f	.105	.437	.034	.062	.041	-.314	-.020	.085	-.296	.388	.608					
Column 1 ^g	.072	.482	.071	-.029	.063	-.245	-.060	.110	-.259	.607	.722	.719				
Column 2 ^h	.105	.378	.047	-.105	.117	-.187	-.152	.140	-.191	.673	.668	.699	.605			
Column 3 ⁱ	.117	.337	.005	-.055	.115	-.229	-.045	.145	-.278	.615	.749	.697	.600	.606		
MLC Total	.114	.464	.047	-.073	.115	-.257	-.098	.153	-.284	.736	.832	.822	.857	.853	.864	
GPA	.134	.204	-.021	-.064	.138	-.217	-.037	.106	-.136	.245	.395	.268	.317	.390	.283	.383

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-7
Correlations Between High School Study Variables, Females Only

	CRPBI									MLC			Total					
	SES ^a	SD ^b	SD ^c	Mother			Father			Rows				Columns				
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA	1 ^d	2 ^e	3 ^f		1 ^g	2 ^h	3 ⁱ		
SD ^b	-.014																	
SD ^c	.035	.312																
Mo. R-A	-.041	-.319	-.222															
Mo. FC-LC	-.017	.110	.184	-.089														
Mo. PC-PA	.041	-.441	-.131	.226	.010													
Fa. R-A	-.062	-.225	-.239	.576	-.054	.000												
Fa. FC-LC	.056	.056	.169	-.038	.526	-.034	.060											
Fa. PC-PA	-.027	-.308	-.167	.163	-.085	.594	.088	.078										
Row 1 ^d	.224	.256	.129	-.229	.133	-.089	-.204	.078	-.144									
Row 2 ^e	.139	.336	.108	-.141	.170	-.236	-.100	.182	-.244	.399								
Row 3 ^f	.188	.329	.063	-.201	-.084	-.120	-.121	-.041	-.218	.423	.470							
Column 1 ^g	.141	.336	.117	-.208	.084	-.142	-.158	.084	-.223	.678	.689	.710						
Column 2 ^h	.242	.330	.129	-.276	.088	-.143	-.197	.066	-.164	.708	.640	.641	.624					
Column 3 ⁱ	.226	.339	.092	-.150	.092	-.202	-.121	.104	-.267	.662	.725	.663	.646	.586				
MLC Total	.234	.388	.130	-.242	.102	-.189	-.182	.099	-.255	.789	.794	.778	.878	.844	.869			
GPA	.098	.155	.081	-.180	.117	-.119	-.134	.062	-.155	.308	.289	.199	.279	.309	.297	.341		

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-8
Correlations Between High School Study Variables, Grades 7 and 8

	CRPBI									MLC						
	SES ^a	SD ^b	SD ^c	Mother			Father			Rows			Columns			Total
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA	1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ	
SD ^b	.214															
SD ^c	.106	.098														
Mo. R-A	-.083	-.325	-.139													
Mo. FC-LC	.062	.247	-.069	-.071												
Mo. PC-PA	-.143	-.395	-.062	.248	-.111											
Fa. R-A	-.215	-.270	-.291	.669	-.065	.085										
Fa. FC-LC	.029	.186	-.012	-.134	.512	-.094	.075									
Fa. PC-PA	-.094	-.318	-.088	.219	-.137	.723	.117	-.051								
Row 1 ^d	.283	.442	.177	-.233	.095	-.186	-.223	.144	-.164							
Row 2 ^e	.242	.528	.110	-.280	.177	-.312	-.207	.176	-.337	.470						
Row 3 ^f	.265	.430	.212	-.145	.100	-.235	-.202	.127	-.276	.524	.539					
Column 1 ^g	.241	.484	.140	-.280	.164	-.180	-.214	.193	-.255	.706	.688	.739				
Column 2 ^h	.296	.504	.204	-.260	.114	-.270	-.296	.119	-.247	.722	.719	.726	.630			
Column 3 ⁱ	.303	.512	.178	-.171	.123	-.342	-.164	.168	-.331	.695	.774	.687	.629	.682		
MLC Total	.320	.572	.199	-.272	.153	-.300	-.257	.183	-.317	.809	.831	.821	.865	.880	.878	
GPA	.216	.341	.026	-.257	.169	-.194	-.191	.121	-.243	.260	.542	.426	.459	.482	.374	.502

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-9
Correlations Between High School Study Variables, Grades 9 and 10

	CRPBI									MLC							
	SES ^a	SD ^b	SD ^c	Mother			Father			Rows			Columns			Total	
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA	1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ		
SD ^b	-.018																
SD ^c	-.038	.207															
Mo. R-A	-.002	-.200	-.195														
Mo. FC-LC	.014	-.026	.168	-.118													
Mo. PC-PA	.058	-.394	-.033	.007	.098												
Fa. R-A	.038	-.237	-.238	.599	-.104	-.100											
Fa. FC-LC	.030	-.117	.146	-.094	.562	.065	.039										
Fa. PC-PA	-.017	-.403	-.095	.034	-.023	.642	-.031	.022									
Row 1 ^d	.073	.257	.120	-.210	.087	.069	-.301	.027	-.067								
Row 2 ^e	.170	.293	-.019	-.067	.117	-.253	-.039	.127	-.326	.419							
Row 3 ^f	.181	.407	.060	-.181	-.050	-.258	-.149	.003	-.298	.470	.565						
Column 1 ^g	.103	.383	.075	-.132	-.015	-.192	-.156	-.017	-.280	.670	.721	.735					
Column 2 ^h	.124	.361	.086	-.247	.086	-.181	-.223	.092	-.216	.685	.679	.744	.651				
Column 3 ⁱ	.223	.288	.014	-.116	.101	-.108	-.148	.097	-.251	.684	.758	.699	.653	.638			
MLC Total	.174	.391	.065	-.187	.067	-.181	-.199	.067	-.285	.777	.824	.829	.874	.866	.882		
GPA	.164	.160	-.007	-.068	.149	-.208	-.002	.106	-.245	.307	.414	.361	.415	.374	.383	.446	

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-10
Correlations Between High School Study Variables, Grades 11 and 12

	CRPBI									MLC								
	SES ^a	SD ^b	SD ^c	Mother			Father			Rows			Columns			Total		
				R-A	FC-LC	PC-PA	R-A	FC-LC	PC-PA	1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ			
SD ^b	-.068																	
SD ^c	.057	.283																
Mo. R-A	-.071	-.046	-.091															
Mo. FC-LC	.040	.132	.132	.064														
Mo. PC-PA	.069	-.312	-.129	.056	-.029													
Fa. R-A	-.042	-.012	-.141	.399	-.046	-.113												
Fa. FC-LC	.121	.150	.196	.082	.646	-.089	.077											
Fa. PC-PA	.055	-.187	-.119	.047	-.078	.637	-.023	-.008										
Row 1 ^d	.164	.118	.160	-.190	.179	-.074	-.129	.196	-.122									
Row 2 ^e	-.050	.320	.042	-.079	.294	-.314	-.009	.205	-.253	.315								
Row 3 ^f	.043	.222	.001	-.028	.128	-.247	-.016	.067	-.263	.297	.561							
Column 1 ^g	.020	.305	.143	-.098	.274	-.259	-.091	.217	-.229	.609	.724	.700						
Column 2 ^h	.141	.181	.045	-.138	.188	-.150	-.063	.134	-.179	.660	.638	.631	.638					
Column 3 ⁱ	.030	.234	.050	-.111	.211	-.276	-.028	.179	-.283	.586	.700	.663	.608	.531				
MLC Total	.072	.283	.094	-.135	.263	-.270	-.071	.208	-.272	.723	.807	.780	.879	.838	.843			
GPA	.013	.116	.081	-.106	.040	-.238	-.053	.020	-.120	.249	.306	.206	.252	.342	.261	.332		

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

Table G-11
CRPBI Scale Scores by Grade

Grades 7-8				Grades 9-10				Grades 11-12			
Mother		Father		Mother		Father		Mother		Father	
Scale	<u>M</u>	Scale	<u>M</u>	Scale	<u>M</u>	Scale	<u>M</u>	Scale	<u>M</u>	Scale	<u>M</u>
1	23.71	1	23.03	1	23.00	1	21.10	1	22.55	1	20.94
2	21.28	2	20.77	2	20.13	2	19.21	2	19.96	2	18.33
3	18.53	3	17.48	3	18.02	3	16.67	3	17.79	3	15.86
4	16.11	4	15.83	4	16.07	4	17.10	4	16.05	4	16.76
5	20.32	5	20.69	5	18.89	5	19.45	5	17.18	5	18.13
6	16.67	6	18.23	6	15.47	6	17.49	6	14.57	6	16.94
7	23.23	7	21.81	7	21.84	7	20.07	7	21.49	7	19.55
8	19.35	8	17.23	8	17.25	8	16.17	8	16.92	8	15.30
9	17.71	9	16.05	9	17.67	9	15.65	9	18.25	9	15.75
10	17.70	10	17.40	10	17.60	10	17.06	10	16.64	10	16.66
11	17.44	11	16.92	11	17.11	11	16.92	11	17.05	11	16.29
12	16.03	12	16.73	12	17.14	12	17.79	12	17.68	12	17.83
13	23.22	13	22.61	13	22.63	13	21.08	13	23.44	13	22.02
14	18.39	14	18.37	14	19.26	14	18.12	14	19.89	14	18.44
15	16.15	15	15.37	15	15.75	15	15.25	15	14.95	15	14.50
16	15.23	16	15.77	16	15.87	16	16.80	16	15.43	16	16.80
17	15.87	17	15.04	17	16.07	17	15.80	17	17.08	17	16.33
18	15.69	18	17.28	18	18.15	18	18.05	18	18.67	18	18.76

Notes. Values under each M are group means.

Table G-12

SES, Edwards SD Scale Score, Crowne-Marlowe SD Scale Score, MLC Row Sums,
Column Sums and Total, and GPA, and Their Standard Deviations by Grade

		AAS										Total	GPA
		Rows					Columns						
		SES ^a	SD ^b	SD ^c	1 ^d	2 ^e	3 ^f	1 ^g	2 ^h	3 ⁱ			
Grades 7-8	<u>M</u>	46.64	23.13	15.57	14.21	16.73	14.85	14.99	15.91	14.90	45.79	7.82	
	<u>SD</u>	15.69	5.79	4.21	3.84	4.13	3.48	3.67	3.57	3.52	9.40	1.84	
Grades 9-10	<u>M</u>	41.78	23.65	15.29	13.81	17.23	15.35	15.40	15.97	15.02	46.39	7.41	
	<u>SD</u>	13.34	5.98	4.43	3.86	4.02	3.67	3.47	3.41	3.81	9.36	1.97	
Grades 11-12	<u>M</u>	45.08	24.38	14.91	13.55	17.87	16.08	16.12	15.74	15.64	47.50	6.87	
	<u>SD</u>	14.23	5.57	4.42	4.22	3.95	3.57	3.58	3.34	3.65	9.02	2.13	

Note. Values to right of each M and SD are group means and standard deviations, respectively.

^aBlishen Scale; ^bEdwards Scale; ^cMarlowe-Crowne Scale; ^dPolitical, Systems items; ^eEducation, Achievement items; ^fSocial Acceptance items; ^gLuck items; ^hSkill items; ⁱOthers items.

APPENDIX H
SUPPLEMENTARY CRITICISMS OR ISSUES
AND THEIR RESPONSES

Unidimensional versus Multidimensional
Interpretations of Locus of Control Beliefs

Question

You show a bias for unidimensional interpretations regarding locus of control beliefs. Can you integrate this attitude with research suggesting multidimensional interpretations?

Answer

My view regarding the dimensionality of locus of control beliefs is more complex than the above observation indicates. The analyses of the I-E scale by Mirels (1970) and later by others seems to have been a foundation for the development of alternate measures of locus of control beliefs purporting to assess fundamentally multidimensional aspects of locus of control beliefs. In short order, Levenson (1972) and Reid and Ware (1973a) developed measures which separated internal and external control beliefs from one into two dimensions and which elaborated the external aspects of locus of control beliefs. While a more careful test of Rotter's assumption of unidimensionality of locus of control beliefs was warranted on the evidence available, research on these new scales also could not directly address the question of unidimensionality. They could assess whether a more specific measure improved the prediction of other attitudes or behaviors. However, the scales did not contain an equal sampling of content (as defined on pp. 35-37) or failed to eliminate the possibility of response set biases affecting factor analytic results. A recognition of these limitations on the existing instruments led to the construction of the MLC. In spite of the critical evidence on the unidimensionality assumption, Lefcourt

(1972, pp. 14-15) concluded that (although the I-E scale ought only to be weak predictor without considering other variables) the reliability of its predictions is certainly remarkable. Rotter (1975) has continued to assume that unidimensionality operated at least for the early locus of control literature (although an important early factor analysis does not stand up to more careful scrutiny as shown in the reanalysis of Franklin's (1963) data, pp. 31-33). We are led to assume that a unidimensional assumption regarding locus of control beliefs is not yet completely discarded by major theorists or reviewers in this area. In addition, first factor analyses of the MLC based on the university sample did little to discredit the idea of unidimensionality. Given the disparity which presently appears to exist between carefully conceived and developed factor analytic research on self-report data and recent behavioral studies which indicate that different aspects of locus of control beliefs are differentially tied to behavior (e.g., Levenson, 1974), it appears to be necessary to develop a model of locus of control beliefs which simultaneously handles unidimensional and multidimensional perspectives.

Perhaps the contradiction is most easily answered by asserting that generalized self-report measures really do not indicate what people will do to any great extent. For some researchers this may mean that what self-reports tell us is not very important information. On the contrary, the information may suggest that, to the degree that respondents are allowed to distinguish between conceptually different factors of locus of control beliefs and choose not to do so (that is, to the degree that respondents generalize locus of control beliefs),

other variables may be required to enhance the prediction of behaviors in limited contexts. Rotter (1975), for example, has noted that reinforcement value as defined in his social learning theory is rarely combined with the expectancy construct in behavioral research. In this light it is important in research to distinguish whether limits in predictions from locus of control expectancies are due to factors conceptually within the domain of the construct or are modified by variables conceptually separate from expectancy notions. Future hypotheses may propose that interactions between the expectancy construct and other variables are substantially predictive of other attitudes or behavior. Both future theory and research may benefit from a retention of the unidimensional construct.

Attitudes. A tentative and functional model for handling both unidimensional and multidimensional constructs at the same time can be represented mathematically much like the equation for multiple correlation. A self-report score would take the form

$$Y = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \dots + b_kX_k + \text{unpredicted variation in } Y$$

where X_1 is the unidimensional, generalized factor proposed by Rotter and X_2 through X_k are progressively more specific and less generalized dimensions of locus of control beliefs. The development of other measures of locus of control beliefs modeled on the matrix formulation used in the making of the MLC could allow one to assess subject distinctions on effort versus ability and responsibility for success versus responsibility for failure as other potential and less generalized dimensions of locus of control beliefs.

Among the factors assessed in the present study, subject reports

are most represented by a unidimensional factor. This may not have been the case had other content been selected in item construction. For example, questioning respondents about their control beliefs in athletic endeavors may have yielded a kind of psychomotor factor. As previously noted, the selection of content categories was based on that existing in prior measures. A suggestion that these content areas are inadequate samples for estimating the dimensionality of locus of control beliefs in general would be a criticism of much of the item construction of earlier measures. It may be that one of the reasons for the original selection of such content was that these categories represented areas of general cultural or social experience. In addition, there is a heavy emphasis in most prior research on subject samples that share experience common to a broad spectrum of western culture (e.g., middle class school children and college students). From these observations and the factor analytic results in this work, a tentative hypothesis can be built. If we develop a measure of locus of control beliefs with equal numerical representation of items across major conceptual dimensions of locus of control beliefs and with content representing areas of general social experience, and apply these measures to adolescent or adult samples representing major cultural groups, we subsequently should obtain factor analytic support for a first factor which is represented by loadings from almost every major category of the locus of control measure (in general, the first factor should represent the substance of the measure). On the other hand, factor analytic solutions are more likely to be multidimensional for content that is not a common part of the cultural experience of the group being sam-

pled or for samples representing minority groups that do not or cannot participate in the experiences of society at large. (We might also add that areas increasingly distant from day-to-day experiences of control --e.g., religion, national politics--could also be expected to separate from single factors.)

Present evidence suggests that any one of the factors derived from such research may not account for much of the total scale variance. Inasmuch as the largest proportion of scale variance may not be tied to any particular factor, it may be concluded that subjects' control expectancies are highly conditional. If we have assured ourselves that conceptual dimensions of locus of control beliefs have been accounted for in a measure's construction, the implication then is that other variables are affecting respondents' perceptions.

Behavior. In making behavioral predictions from locus of control measures, the variation in the behavioral criterion appears even more likely to be explained by independent variables. Even the weights (b's) in the prior formula for the self-report data may vary when a restricted behavioral setting is considered. For example, Levenson's (1974) finding that males who were activists were less likely to believe that chance (C scale, defined p. 38) controlled their lives than non-activist males, while the activist dimension did not account for variation in her I and P scales, is evidence that would alter the b coefficients when the criterion is activism rather than self-report on locus of control beliefs. If the dissertation results are acceptable, they suggest that distinctions between origins of control (defined on pp. 36-37) are not made in self-reports on control.

In summary, unidimensional versus multidimensional conceptions are not, in my view, entirely contradictory hypotheses and their respective utility may depend more on whether we are using them to characterize the dimensional character of locus of control beliefs or to predict other variables. The value of multidimensional conceptions are also going to be more demonstrable when we have better theoretical bases for explaining these distinctions in locus of control beliefs.

The Use of Multiple Regression and Correlation

Question

You have chosen multiple regression and correlation procedures as a basic tool for statistical analyses. Why have you chosen these procedures over against analysis of variance especially when, as a developmental project, you then could have applied trend analysis to the data?

Answer

Much of the answer to this question is contained in a review and comparison of multiple regression and analysis of variance by Jacob Cohen (1968). In developing my ideas of the kind of statistical tool appropriate for the data of this study, it seemed desirable to utilize techniques which fairly directly presented the magnitude of relationships between the variables under study. The review of the literature and my earlier research had suggested that several of the variables had very low relationships in college samples and that, while it was expected that these relationships would be stronger for the high school sample, the possibility of continued evidence for weak but significant relationships emphasized the need to look at methods which indicated

the level of relationships. Although there has been a growing awareness in publications on analysis of variance designs of the utility of estimates of variance (e.g., Vaughan and Corballis, 1969), few computer programs exist which offer the additional calculations. On the other hand, such information is inherent to multiple regression.

Additional comparisons of the two approaches to data analysis indicate that classical fixed-model analysis of variance is most efficient for the analysis of data from experimental studies where independence between dimensions (otherwise labelled variables or factors according to the jargon of the analysis being used) and equal-sized samples are under the control of the experimenter. The assumption of orthogonality simplifies the computations in analysis of variance, but in computer applications this advantage is of limited value. In research on naturally occurring quantitative variables, orthogonality is unlikely to be a fair assumption and, to the degree that it cannot be assumed, calculations in either method become more demanding. With such variables we generally have graduated distinctions between subjects over a wide range and to reduce these distinctions to the coarser separations on a factor in analysis of variance squanders much of the information in the variables and reduces statistical power. We might force orthogonality by deleting subjects from over-sized samples. Unfortunately, in creating equal samples across the levels of the variables our statistical results then apply to the newly constructed sample and not to the original sample. Such a construction also ignores the actual relationship found between variables.

These arguments appear to apply to significant extensions of the

analysis of variance. For example, the formula for trend analysis (see Myers, 1966, p. 352) is the same general form of polynomial function generated for the multiple regression test of hypothesis 8 (p. 72, pp. 113-114) which predicted a quadratic relationship between perceived parental acceptance and adolescent academic achievement. Analysis of covariance designs similarly are equivalent to entering control variables first in the multiple regression equation (Cohen, 1968, p. 442) and assessments in this research of hypotheses 1 to 6 (p. 71, p. 106) which predicted a linear relation between CRPBI factors and adolescent locus of control beliefs and of hypotheses 9 to 11 (p. 73, pp. 114-116) show such a use of control variables.

In sum, the two modes of data analysis are fundamentally related and the assets of multiple regression make it more applicable to the present data. If there is any limitation in the present application, it is largely the failure to make more effective use of the comparisons possible through multiple regression. This will be shown in the answer to a subsequent question.

The Age or Grade Variable in the High School Study

Comment

The age or grade variable in the high school study has not been evaluated effectively. First, the CRPBI scales appear to show changes in means and variances by grade (Table G-11, p. 317). Although no evidence is presented on factor score changes with age nor on variation in factor solutions with age, it is possible that such changes in factor solutions may occur and that factor scores ought to be derived by age groups. Second, MLC scores show a moderate increase with age

and age group variances suggest a small decrease with grade level. The mean changes are consistent with the general finding of an increase in internality with age. CRPBI and MLC relationships may change purely as a function of the above variations with age. Third, one of the control variables, Edwards SD, varies in its relation with the CRPBI, MLC and GPA as a function of age (p. 110, p. 127). Relationships between the above variables are certain to be affected if we review them according to age groups.

Answer

CRPBI. Other evidence regarding age effects on CRPBI scale values have not recognized the existence of important age changes. Comments based on Spencier's (1971) thesis work with Grade 7 and Grade 9 students indicate no age changes ought to be expected. Other unpublished data on 364 13-, 15- and 17-year-old high school students indicated that scales summed according to their loading on the Acceptance-versus-Rejection factor failed to show a difference from the mean performance of 500 college respondents. Scales summed for the other two factors suggest that high school students attribute more firm control to both parents and more psychological control to mothers than do college students. These differences were interpreted as more attributable to living at versus away from home than to age in that age differences were not marked.

As a first response to your comment on the dissertation data, bivariate correlations were computed between respondent grade levels and the other variables of the study. Age related changes do seem to be suggested in a number of the measures and these correlations provide

evidence of the variance shared by the variables. CRPBI scales do show age related changes in that 25 of 36 scales are significantly correlated with student grade levels. Although these t tests are based on correlations in which at least one of the variables (grade level) is not normally distributed, the distribution is fairly symmetric, samples sizes for each variable are of necessity equal and, consequently, Boneau's (1960) paper suggests that the t test is robust under these conditions. Comparisons across age levels on the CRPBI scales, however, are not especially informative without reference to their factors. Factor correlates of grade level are given in Table H-1. The MLC correlation with grade level is .076 ($p < .034$). GPA also shows a grade-related change ($-.185, p < .001$). It drops with increasing age. While no statistical comparisons of variances in these variables were made across grade levels we may assume a number of them similarly show such age changes. In either case, these variations in means and standard deviations across age do not in themselves require either the absence or existence of correlational changes between the variables with age.

On the other hand, factor solutions of the CRPBI may show changes with age in spite of the evidence given on page 97. A three-factor solution was expected on the basis of results obtained in Spencier's (1971) thesis work. At the same time, principal component analyses of the scales in this dissertation research were run for three age levels --Grades 7 and 8, Grades 9 and 10, Grades 11 and 12--and by sex of respondent separately (i.e., six analyses) prior to the writing of the dissertation. They were not included in the results because no varia-

Table H-1
 Zero-order Correlations between CRPBI
 Factor Scores and Grade Level

	CRPBI					
	Father			Mother		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}	F _{R-A}	F _{FC-LC}	F _{PC-PA}
Grade	.205**	-.123*	-.101*	.138	-.241**	-.052

* $p < .001$

** $p < .007$

tion from a three-factor solution (other than the indicated shared loading of scales between F_{PC-PA} and the other two factors) was obtained. In order to demonstrate this consistency of factor solutions most efficiently, the factor loadings of the two most questionable solutions are presented in Tables H-2 and H-3. The first analysis is of the CRPBI scale scores of Grade 7 and 8 females. Eigenvalues for the first four factors are 7.51, 2.96, 1.81 and .92. The variances accountable to the unrotated factors are .417, .164, .101 and .051 (obtainable by dividing the eigenvalues by 18, the number of variables). A comparison of Tables 13 (p. 98) and H-2 indicate that the highest factor loadings for each scale are in agreement in the two analyses in every case except for the fifteenth scale, Instilling Persistent Anxiety. The second analysis of scale scores of Grade 9 and 10 females yielded eigenvalues for the first four factors of 6.91, 3.29, 1.78 and .79. The variances accounted for by the unrotated factors are .584, .183, .099 and .044. In Table H-3 every one of the highest loadings are on the same factor as in the overall analysis in Table 13. Although no mathematical or statistical tests of factorial invariance have been made, the factor solutions across grade levels are clearly three-factor in nature and each solution identifies factors that are effectively equivalent in terms of their loadings. As a consequence we may expect that factor scores derived on the total sample will adequately represent mean and variance changes in the scales. Such grade-related changes will produce only simple linear transformations in the factor scores.

MLC. As indicated on page 97, factor analyses of the MLC cells by

Table H-2

Varimax Rotated Factor Loadings of CRPBI
 (Mother and Father) Scales for Grade 7 and 8
 Females

Scale	Factor Loadings		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}
1. Acceptance	-.888	-.109	-.019
2. Childcenteredness	-.883	-.142	.023
3. Possessiveness	-.352	.256	.553
4. Rejection	.803	.146	.418
5. Control	.212	.643	.343
6. Enforcement	.443	.589	.328
7. Positive Involvement	-.914	.018	.020
8. Intrusiveness	-.003	.513	.530
9. Control through Guilt	.124	-.112	.666
10. Hostile Control	.608	.305	.610
11. Inconsistent Discipline	.393	-.320	.492
12. Nonenforcement	.140	-.791	.104
13. Acceptance of Individuation	-.818	-.078	-.081
14. Lax Discipline	-.211	-.775	.105
15. Instilling Persistent Anxiety	.657	.343	.475
16. Hostile Detachment	.877	.081	.317
17. Withdrawal of Relations	.535	-.081	.600
18. Extreme Autonomy	-.093	-.783	.022

Table H-3
 Varimax Rotated Factor Loadings of CRPBI
 (Mother and Father) Scales for Grade 9 and 10
 Females

Scale	Factor Loadings		
	F _{R-A}	F _{FC-LC}	F _{PC-PA}
1. Acceptance	-.917	-.093	-.038
2. Childcenteredness	-.869	-.046	.024
3. Possessiveness	-.473	.172	.513
4. Rejection	.791	.115	.400
5. Control	.087	.725	.328
6. Enforcement	.290	.713	.234
7. Positive Involvement	-.913	-.010	-.061
8. Intrusiveness	-.094	.503	.503
9. Control through Guilt	-.017	.079	.766
10. Hostile Control	.488	.345	.643
11. Inconsistent Discipline	.369	-.260	.463
12. Nonenforcement	.180	-.716	-.010
13. Acceptance of Individuation	-.765	-.331	-.167
14. Lax Discipline	-.178	-.795	.016
15. Instilling Persistent Anxiety	.364	.313	.632
16. Hostile Detachment	.851	.057	.288
17. Withdrawal of Relations	.442	.099	.673
18. Extreme Autonomy	-.132	-.766	-.061

grade and sex of respondent corroborated the single factor solution obtained for the total sample. Two of the six analyses may suggest a multifactor solution to some readers, but in my experience are more satisfactorily interpreted as single factors. Principal component analysis of the MLC cells of Grade 9 and 10 females yielded eigenvalues of 3.240, 1.203, 1.118 and .787 for the first four factors. These factors accounted for the following amount of variance: .360, .134, .124 and .087. As is always the case the last factor with the eigenvalue less than unity accounted for less variance than would be expected from one of the nine cells merely by chance. By chance we might expect .111 of the variance to be attributed to a given cell. The second and third factors account for slightly more variance. If one plots these variances for the factors (the ordinate being variance accounted for by the factor and the abscissa being factors as obtained progressing from left to right) and connects the points by lines, the slope of the lines is broken most obviously at the second factor. The conclusion is that a single factor interpretation is most appropriate. Principal axes analysis of this data corroborates the single factor solution for readers who factor analyze from a common factor model. Eigenvalues for the first two factors are 2.55 and .51. Principal axes analysis of the cells of Grade 11 and 12 females yielded eigenvalues of 2.28 and .75. The first component analyses for each of these two samples are presented in Table H-4. Results from the component analyses rather than the principal axes analyses are presented because they inflate factor loadings and, thereby, ought to support conclusions more critical of single factor interpretations. Note, for example, the

Table H-4
 Unrotated Factor Loadings of Revised MLC
 Cells for Two Female Subsamples

Cell ^a	Grades 9 and 10		Grades 11 and 12	
	Factor I	Factor II	Factor I	Factor II
1	.649	.228	.636	-.537
2	.635	.352	.681	-.356
3	.616	-.036	.602	-.512
4	.529	-.659	.698	.320
5	.588	-.495	.447	-.091
6	.645	-.298	.571	.132
7	.647	.431	.639	.455
8	.557	.194	.352	.377
9	.517	.183	.406	.518

^aCell labels are given in footnote on p. 85.

tendency of loadings to separate out by content of control. In spite of high loadings on the second factor, in both analyses the predominant result is a higher loading on the first factor. As with the CRPBI, factor solutions do not appear to vary as a function of age. Therefore, we do not expect age to contribute to a nonlinear transformation of scores from these measures and mean and standard deviation changes with age or grade ought to be reflected in analyses based on the total sample.

Hypotheses. A more serious challenge to analyses based on the total sample is the finding of a variation in Edwards SD relationships with other study variables according to grade level. This finding was unexpected and original analyses did not take this possibility into account because the variation was discovered after the analyses were made. Interaction effects were not hypothesized and a considerable number of degrees of freedom could have been wasted on their individual assessment given the number of control and predictor variables in this research. As noted on page 128, extension of the multiple regression analyses used in this research would have been the most effective solution. It seems the new regression formula predicting GPA, for example, could have been written in two ways. First,

$$Y_{GPA} = b_{SD}X_{SD} + b_{SES}X_{SES} + b_{SD \times G}X_{SD}X_G + b_{FF_1}X_{FF_1} + \dots + b_{MF_3}X_{MF_3} + b_{MLC}X_{MLC}$$

If we delete the term representing the interaction of Edwards SD and grade level ($X_{SD}X_G$) and its regression weight, we have the formula for the regression analysis in Table 25 (p. 118) in which the CRPBI Father factors may be assumed to have regression weights equal to zero. The

variance due to the interaction of Edwards SD with grade level is removed from the variance contributed to the prediction of GPA by the other predictors. This is the approach recommended on page 128. It may not be sufficiently conservative in that the interactions of CRPBI F_{R-A} and MLC with grade level are not included. The interaction terms for these could also be entered in the above formula for testing. This represents the second alternative to handling the interaction problem. This second formula would help us to decide whether one or several interaction terms are needed to explain the appearance of correlational changes with age.

Unfortunately, other variables may have shown less marked changes in relationships with other variables as a function of age. These interactions may not have been individually significant, but their cumulative effect may have been significant. For this reason, the analyses shown in Tables 19 to 25 were repeated for Grades 7 to 9 and Grades 10 to 12 separately. This approach plays the originally strong emphasis on statistical power against the possibility of unspecified interactions with age (i.e., smaller samples against testing all variables by grade interactions). Table H-5 presents the partial correlations with MLC for these two subsamples. The results are similar to those shown in Table 19 (p. 107). Even the nonsignificant correlation of mother F_{PC-PA} with MLC is in the correct direction and not radically different from the other correlations. Father F_{R-A} for both age groups fails to correlate at the previously established minimum significance level. At the same time, neither of the correlations are dramatically different from that obtained in Table 19. Before partialing out the

Table H-5
 Second-order Partial Correlations between
 CRPBI Factor Scores and MLC Total
 (Edwards SD and Blishen SES Variances Removed)

Predictors	Grades 7-9	Grades 10-12
	Partial r	Partial r
Father		
F_{R-A}	-.099*	-.083*
F_{FC-LC}	.171***	.094**
F_{PC-PA}	-.136***	-.225****
Mother		
F_{R-A}	-.145***	-.094**
F_{FC-LC}	.112**	.119***
F_{PC-PA}	-.066	-.159****

* $p < .10$

** $p < .05$

*** $p < .025$

**** $p < .0025$

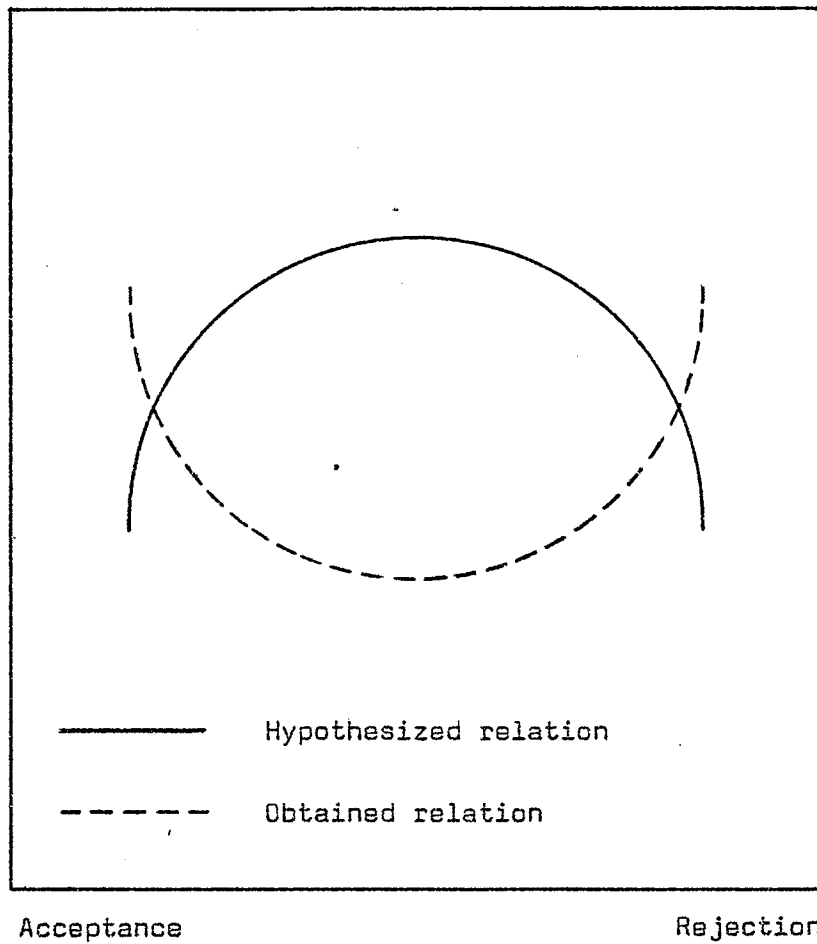
control variables' variance, all factors are significantly correlated with MLC. Hypotheses 1 to 6, as stated on page 71, appear to be supported by the analyses of the separate age groups as well as by the overall analysis. The exhibited strength of these relationships remains weak.

Hypothesis 8, the prediction of a curvilinear relation between perceived parental acceptance and adolescent achievement, was not supported in the analyses of the total sample. The partial correlations for perceived father and mother squared Rejection-vs.-Acceptance factor scores with GPA (with the unsquared factor score variances removed) are .015 and .112, respectively. When the total sample is separated into subsamples these partial correlations become .099 and .172 for Grades 7 to 9 respondents. For Grades 10 to 12 students they are -.064 and .049. Only the perceived maternal behavior correlate for Grades 7 to 9 is significant ($p < .005$). As in the overall analysis, the significant relationship is in the wrong direction. It indicates that, rather than an inverted U serving as the best description of the quadratic aspect of the relation between the two variables, a complete or partial U is more applicable to the data (see Figure H-1).

Table H-6 presents the second-order partial correlations with GPA for the two subsamples. While all the correlations show the directions of relations predicted in Hypotheses 9 and 10 (p. 73), there is a presently inexplicable pattern (from a theoretical viewpoint) of non-significance among the CRPBI predictors. Even the zero-order correlations of reported parental firm control with GPA for Grades 10 to 12 are nonsignificant. On the other hand, the failure of perceived

Figure H-1

Hypothesized and Obtained Relations
between CRPBI F_{R-A} and GPA



Note. The obtained relation represents the type rather than the actual form of correspondence between these two variables.

Table H-6
 Second-order Partial Correlations between
 CRPBI Factor Scores and GPA
 (Edwards SD and SES Variances Removed)

Predictors	Grades 7-9	Grades 10-12
	Partial r	Partial r
Father		
F_{R-A}	-.078	.001
F_{FC-LC}	.106*	.039
F_{PC-PA}	-.141**	-.141***
Mother		
F_{R-A}	-.155***	-.044
F_{FC-LC}	.183***	.047
F_{PC-PA}	-.064	-.221****
MLC Total	.402*****	.320*****

* $p < .05$

** $p < .025$

*** $p < .00,75$

**** $p < .00,005$

***** $p < .00,000,000,5$

maternal psychological control to predict GPA in the Grades 7 to 9 sample is due to the deletion of Edwards SD variance from the relationship. The original zero-order correlation is somewhat lower than for Grades 10 to 12. At the same time, the zero-order correlations of these variables for Grades 7 to 8 and Grades 9 to 10 are closer to that for the Grades 10-12 subsample. The analyses by age samples suggest that perceptions of parental firm control contribute to achievement predominantly in early adolescence. Hypothesis 10, the prediction of an increase in GPA with a perception of parental psychological autonomy appears to have more general support in that CRPBI F_{PC-PA} is significantly related to GPA at both age ranges.

Hypothesis 11, which proposes that adolescent achievement increases with the degree of internality in locus of control beliefs, is retested by the stepwise regression analyses similar to that shown in Table 25 (p. 118). Each of the two age variant subsamples is analyzed and a more conservative test of MLC prediction of GPA is made through forcing all CRPBI factors into the prediction equation. For Grades 7 to 9 adolescents, even though both control variables and the six CRPBI factor scores have entered the regression equation, the relationship between MLC and GPA remains significant, $F(1, 244) = 38.692, p < .001$. The eighth-order partial correlation describing this relationship is .370. The factor scores for perceived maternal F_{FC-LC} remain the only other significant predictor of GPA, $F(1, 244) = 6.707, p < .025$. SES and maternal F_{R-A} factor scores are the only other variables which approach significance in predicting GPA ($p < .10$). The beta weight for maternal F_{R-A} is negative, as it should be.

For Grades 10 to 12 adolescents, with the other eight variables also entered, MLC significantly predicts GPA, $F(1, 311) = 29.494$, $p < .001$. The eighth-order partial correlation describing this relationship is approximately .29. Only the factor scores for perceived maternal F_{PC-PA} remain as other significant sources of covariation with GPA, $F(1, 311) = 9.404$, $p < .005$. The beta weight for maternal F_{PC-PA} is negative, again as it should be.

In summary, the evidence presented here suggests that only the conclusions regarding hypothesis 9, which predicts that perceived parental firm control contributes to adolescent achievement, require reevaluation. It would appear that this relationship is more demonstrable in early than in late adolescence. None of the other hypotheses appear to require interpretation beyond that already given. However, the evidence does suggest that GPA may be better predicted by parental acceptance in early than in late adolescence and that perceptions of parental psychological control in late adolescence may be more detrimental to achievement than such perceptions in early adolescence. These latter conclusions reflect interactions separate from the evidence regarding the other original hypotheses relevant to GPA.

Issues Pertinent to MLC Dimensionality

Comment

In addition to the limitations you recognize in the MLC, there are four further issues that require answering before conclusions about the dimensionality of locus of control beliefs can be tentatively determined for general social situations. First, the selection of items for the revised MLC by the number of substantial item correlations rather

than by subscale correlations means that unidimensional solutions are going to be enhanced. Items which correlate only within their subscale are likely to be eliminated for not showing a sufficient number of correlations. Second, factor analyses of item sums rather than items is unfair. Summing hides the unreliability of a single item and reduces the effect of the item's unique or error variance on the factor solution. While the variance accountable to the first MLC factor is not dramatically large at present, it is likely to be much lower when based on factor analyses of item scores. Third, factor analyses of item sums of the MLC as presented have not taken two dimensions, for which there are a balanced number of items, into account (see Table 5, p. 77). The I-They and internal versus external wording distinctions may contribute to multidimensional solutions if they are entered into the analyses. Fourth, the general view of the social desirability measures you use is that the Crowne-Marlowe SD scale is to be preferred because it more directly assesses a willingness to misrepresent oneself on statistically improbable alternatives, while the Edwards SD scale appears in its use of MMPI items to assess some condition or conditions of psychopathology. Deleting the variance due to Crowne-Marlowe social desirability from MLC item or scale correlations may contribute to a multidimensional solution.

Answer

The item correlation criterion. While one would expect that item sums making up the subcell and cell values of the MLC would contain items that would correlate more highly, in the long run within the particular sum than outside that sum with other MLC items, the opposi-

tion of within-sum correlates to outside-sum correlates such that high within-sum correlations are emphasized to the neglect of outside-sum correlations could contribute to inappropriate multidimensional solutions. This would be most likely to occur when outside-sum correlations are required to be low at the same time.

The original intention in the construction of the MLC was not to create subscales in which the items by other than their content, were to be more closely related to one another than to outside items. Instead it was intended that the matrix of item sums represent carefully defined situational components which could be evaluated for the degree to which they broke apart the dimensional character of reported locus of control beliefs. Initially it was felt that emphasis on individual subscale construction would, without careful attention to item correlations between scales, contribute to unwarranted multidimensional conclusions. The criterion for item selection was chosen because of its simplicity relative to other methods and because it did not appear to emphasize either within-scale or outside-scale correlations.

In the beginning of MLC construction, subscale sums of any general importance were felt to be the cells or sums of several cells. If one derives the number of possible substantial correlations that may be located in an eight-item revised MLC cell, it is found that 28 substantial correlations may be identified. Furthermore, when one asks how many items correlating over .20 with a given item are on the average found for those items saved for the revised MLC versus those deleted by this intercorrelation criterion, we find that 24.22 substantial corre-

lations are found on the average in the 81 items retained for the revised MLC while 9.41 items correlating over .20 are found as the mean for the 29 deleted items. The implication is that all substantial item correlations even on those items that have been retained, could have been based entirely on within-cell correlations in the long run. On the average, we need not assume that item selection has simply led to the retention of items which correlate more generally over against items which correlate primarily within a cell.

This is an argument based on expectations and it remains somewhat probable that item selection has enhanced between-cell item relationships relative to within-cell relations. In order to assess the magnitude of this selection, three subcells were chosen by throws of a die and their average within-subcell item correlations were calculated and compared to their outside-subcell item correlations. Subcells rather than cells were chosen because they contain fewer items and the counting operations are extremely tedious. The results obtained are given in Table H-7. Identification of the subcells is made here by counting from left to right and from top to bottom of the MLC matrix (see Table 5, p. 77). For example, in the original MLC for the subcell in subcolumn 3 and subrow 5 (see pp. 78-79 for the explanation of these labels) the average correlation between items 22, 58 and 94 is .37, while the average correlation of these items with all other items is .15. Selection of items within the university sample does appear to have a small effect on the within-subcell versus outside-subcell difference. However, this effect is less marked than the general effect of replication. Considering that the average within-subcell correlations

Table H-7
 Comparison of Average Within-subcell Item Correlations to
 Correlations with Items Outside the Subcell for
 Three Randomly Chosen Subcells

Item Sample	Subcell					
	Subcolumn Subrow		Subcolumn Subrow		Subcolumn Subrow	
	3	1	5	6	2	5
University Sample						
Original MLC						
Within Subcell	.37		.27		.16	
Outside Subcell	.15		.11		.13	
Revised MLC						
Within Subcell	.38		.28		.13	
Outside Subcell	.19		.14		.17	
High School Sample						
Revised MLC						
Within Subcell	.31		.19		.17	
Outside Subcell	.09		.03		.10	

for the two samples of revised MLC subcells are based on a single correlation, the results are remarkably stable. When we also consider that the effects of selection may be more obvious on subcell than on cell comparisons in that items with few substantial correlations are more probably substantially correlated within their subcells than with items outside their subcells, these results suggest that the effect on within- versus outside-cell correlations is minimal at worst and unlikely to affect the factor solution to more than .01 or .02 of the total scale variance.

Factor analyses of item sums. The first aspect of the comment against factor analyzing item sums argues against this approach generally. However, even the research literature shows disagreement on this issue. Several major measures in personality, developmental and other areas of psychological research have been subjected to factor analyses of item sums (e.g., the MMPI and the CRPBI). Even the concept of second-order or higher-order factors implies analyses on item sums. It is admitted that item sums provide variables for analysis that are more reliable and offer the advantage of more than a simple dichotomy of subject differences. This is not at all undesirable. Instead it provides a temporary means of bypassing the lengthy problem of developing items which would show an equivalent ability to separate subjects on the dimension of interest. Researchers often emphasize the triviality of a single item distinction in questionnaire development and, in personality research especially, we need to be careful that our measures represent in a singular fashion the dimensions of interest to the researcher. (Note the problems in relating the two measures of social

desirability used in this research in this regard.) Any one item contains not only the issue(s) for which it is designed but is also the carrier of grammatical expressions and word selections unique to the writer of the item. We may surmise further that the reader of the item responds to situational characteristics of the item that are not dimensionalized in the overall measure and that do not reflect general variations in social experience. When we sum such items and compare or correlate these sums we are minimizing the unique aspects of individual item variance which have not been introduced as a dimensional component in the measure. If the measure did not deliberately attempt to dimensionalize situational components, other methods of assessing situational contributions would have to be used. Randomly generated item sums would only tell us whether the measure assessed dimensions coherent enough to warrant use of the scale in subsequent research. For example, randomly generated sums of five or six Crowne-Marlowe items undistinguished for their content ought at least to represent some degree of stable variation in individual social desirability responses. Factor analysis of the six item sums from the scale would indicate the degree to which the scale reliably assessed the dimension called social desirability. Inadvertent coupling of some items might contribute to multidimensional solutions and now classic methods of item reliability assessment appropriate to domain sampling or generalizability theory would be better suited to this effort.

In any case, the development of the MLC contains a deliberate introduction of situational dimensions that may contribute to multidimensional solutions. In this context, the use of item sums seems both

valuable and acceptable. Factor analysis has not been used in this research as an extension of item analyses, but as a method of asking specific questions relevant to the conceptual character of locus of control beliefs.

In order to provide the reader with an idea of the effect of factor analyzing item scores, the 72 item scores of the revised MLC as answered by the 575 high school respondents were evaluated by both principal components and principal axes analyses. In the principal components analysis the first four factors yielded eigenvalues of 6.64, 2.89, 2.30 and 1.79 which accounted for .092, .040, .032 and .025 of the total scale variance. The number of items loading over .35 on the unrotated factors was 27, 6, 5 and 3. The number of items loading over .40 on the unrotated factors was 11, 3, 1 and 1. In the principal axes analysis the first four factors yielded eigenvalues of 5.78, 2.01, 1.41 and 0.89 which accounted for .080, .028, .020 and .012 of the total scale variance. The number of items loading over .35 on the first three unrotated factors was 19, 3 and 0. Plotting the proportion of total scale variance accounted for by the successive factors against the order of their derivation indicates that the major break in the slope of the line connecting the points is at the second factor and that the greatest separation is between the first and the remaining factors. The viability of the second and third factors may be questioned in that a two-factor solution is sustained by high loadings on the second factor from only three Political, Systems items and by a differentiation of externally worded items from predominantly internally worded items. It is informative that a multifactor solution must be

maintained partly by what may be essentially a response set. The reduction in variance accountable to the first factor indicates that items contain a great deal of variance that is not tied to locus of control beliefs but which may be unique to the item for a number of unspecified reasons.

Factor analysis of the item scores of subsamples structured by sex or age of respondent are not done with this data because the number of respondents is too small. However, the factor analyses of the revised MLC subcells referred to on page 97 indicate that at least division of the total sample into male and female subsamples still supports a single factor solution. Only the female sample showed a tendency to separate into multiple factors characterized largely by a separation of externally worded subcells into a second factor.

The internal-vs.-external wording and personal-vs.-general reference dichotomies. Analyses of items and subcells of the MLC, as noted in the previous section, have suggested that internal versus external wording may contribute to multidimensional solutions. In order to answer both this possibility and the criticism that personal versus general referral in items may be a basis for multidimensionality, item sums were created for the four item conditions represented by the crossing of I versus They and internal versus external wording dichotomies in the high school data. Principal component analyses of the total sample, males only, females only and subsamples divided into four groups representing Grades 7 to 9 versus Grades 10 to 12 crossed by sex of respondent yielded essentially single factor solutions in which the first factor accounted for between .518 and .573 of the total variance.

The older adolescents tended to distinguish between internal and external wording with the two external wording sums loading on the second factor. Principal axes analyses of the older adolescent responses yielded a single factor solution in which the first factor accounted for as little as .361 of the total variance.

It should be noted that these results regarding the I-They distinction are in agreement with the findings of Reid and Ware (Note 9) who provided the basis for the original decision not to review this dichotomy. They conclude that university students do not distinguish between the self and others in regard to control. This means that the findings of Gurin, et al. (1969) and Mirels (1970) in which this distinction obtains support have confounded the I-They distinction with other dimensional characteristics existing in their item samples. Also noted by Reid and Ware is the importance of this finding for person perception and attribution theory research. By failing to distinguish between one's own attitudes and those of others, a respondent essentially assigns his own concepts of responsibility for outcomes to others.

Crowne-Marlowe SD variance in the MLC. Much of the argument regarding the relative acceptability of the two measures of social desirability has already been made in the text of the dissertation. Whatever the two measures assess, it seemed clear that the Edwards SD scale correlated more with the MLC than did the Crowne-Marlowe SD scale. This is obvious also for the MLC cells as shown in Table H-8. Principal axes analysis of the first-order partial correlation matrix of MLC cells after removal of Crowne-Marlowe SD variance yields the single factor

Table H-8
 Correlations Between Two Social Desirability Measures
 and Revised MLC in the High School Sample

SD Measure	MLC Cells	Total	Sample			
			Males	Females	Grades 7-9	Grades 10-12
Crowne-Marlowe	1	.160	.195	.130	.154	.166
	2	.116	.101	.120	.103	.114
	3	.083	.112	.057	.078	.087
	4	.042	-.018	.077	.094	.010
	5	.014	-.117	.116	.031	.005
	6	.015	-.073	.073	.040	.001
	7	.037	-.008	.048	.101	.006
	8	.090	.126	.032	.145	.047
	9	.033	-.024	.061	.049	.030
Edwards	1	.207	.167	.238	.201	.211
	2	.186	.165	.210	.290	.123
	3	.185	.213	.162	.257	.129
	4	.299	.396	.228	.415	.207
	5	.350	.393	.339	.379	.326
	6	.251	.263	.251	.331	.186
	7	.348	.474	.272	.418	.292
	8	.193	.251	.165	.248	.148
	9	.261	.239	.294	.327	.215

solution obtained in previous analyses of partial correlations. This analysis of the total sample gave eigenvalues for the first two factors of 2.81 and .51. These factors accounted for .312 and .057 of the total scale variance. The unrotated factor loadings for the first two factors are shown in Table H-9. Just as in Table 10 (p. 89) on the university sample and in Table 14 (p. 100) on the high school sample after partialing out Edwards SD variance, the second factor suggests a tendency for Political, Systems cells to separate from the other MLC contents of control.

Additional Review of the Literature

Comment

Your review of parental antecedents appears to be outdated. You have not dealt with two major topics relevant to the dissertation: learned helplessness and causal attribution theory. Perhaps for this reason your scale appears to represent essentially a skill, but not an effort, aspect.

Answer

Parental antecedents. A good many articles regarding parental contributions to children's behavior or attitudes have not been included in this work. My own personal file contains about 90 references to research or review articles on parent behavior or attitudes alone. Most of the research articles have not been included because their results are based on projective measures or because the categories of parent behavior measured do not allow a reasonable generalization to the dimensions inherent in the present study.

Table H-9
 Unrotated Factor Loadings of the First Order
 Partial Correlation Matrix of Revised MLC Cells
 (Crowne-Marlowe SD Variance Removed) for the
 Total High School Sample

Cell ^a	Factor I	Factor II
1	.449	-.306
2	.525	-.378
3	.511	-.368
4	.619	.208
5	.629	.180
6	.588	.175
7	.672	.125
8	.502	.097
9	.491	.096

^aCell labels are given in footnote on p. 85.

Learned helplessness. Seligman's (1975) work on learned helplessness suggests that this concept and external locus of control beliefs are synonymous or highly related. The concept of learned helplessness is more detailed in that it ties its occurrence to specific experiences which teach an individual that outcomes are independent of responding and in that it identifies emotionality (e.g., fear, anxiety and depression) as symptoms of learned helplessness. In contrast to Rotter's theory, Seligman appears to propose that the development of learned helplessness or expectations of controllability affects learning rate. In Rotter's view, locus of control beliefs affect one's perception of reinforcement and, consequently, the probability of responding. The ability to learn is not affected. Seligman also elaborates on the motivational causes for controlling behavior. He proposes that the anxiety and depression characteristic of learned helplessness are aversive states which drive the individual to avoid them. As a result they produce a drive for competence.

Regarding developmental aspects, Seligman proposes that learned helplessness is the major consequence of maternal deprivation and institutional childrearing. He also suggests that parents who are helpless may attempt in a number of ways to pass this influence on to those they control. The work by Loeb (1975) may corroborate this in that he noted a general low but positive relationship between parental locus of control beliefs and their children's locus of control beliefs. This corroboration presumes an overlap in the dimensions of learned helplessness and locus of control beliefs. Seligman finds that learned helplessness is developed more quickly in external than internal subjects.

Seligman proposes that responsive mothering is the key to a child's learning mastery of his environment. Perhaps this means that parental nurturance is most effective when it is adapted to the child's needs rather than provided as a part of the daily regimen. It may also mean that parental control which interferes with the child's sense of control is most likely to contribute to learned helplessness, while parental control which aids in the development of mastery ought to produce a growing resistance to learned helplessness. For the data of this research, such proposals may mean that parental acceptance in the CRPBI represents both appropriate and inappropriate parental nurturance and that enhanced prediction of children's locus of control beliefs requires that the child indicate the degree to which parental acceptance has been required or not desired. On the other hand the parental control and psychological control dimensions may not only represent different phenomenological dimensions to the respondent, but may also contribute to different outcomes in attitudes and behavior.

Attribution theory. Attribution theory, as appropriate to the present research, is well described in the work by Weiner, Heckhausen, Meyer and Cook (1972). Locus of control beliefs are specified according to the causes individuals may perceive as responsible for their success or failure. Two of the four elements so specified are seen as internal determinants, while the remaining two are viewed as external determinants. Ability and effort are the internal elements, while task difficulty and luck are the external elements in that, to the degree that they are seen as operating in a given situation, they imply or direct responsibility for an outcome to external sources. These elements are

also said to represent a dimension of stability in that attitudes regarding one's ability or task difficulty are generally to be thought of as constants over time, while effort and luck are seen as variable or changing from moment to moment. As a result, in opposition to the model for scale development in this dissertation which assigns only the external attitude to the alternative causes of luck versus other, both internal and external causes are elaborated. With the exception of luck the causes are essentially different from those of this work and it is informative to find out whether these causes or the two dimensions they imply are distinguished in the responses of subjects to questions designed to assess these dimensions. Collins (1974) has proposed that these two dimensions along which observers may vary in their causal attributions are to be labelled "situational versus dispositional attributions" and "predictability and lawfulness versus chance." In other words, observers are to allocate causes in the first dimension to cues existing either in the individual or in the situation. It should be mentioned parenthetically that this distinction does not necessarily assign overall or final control to the actor or situation, but asks a respondent to identify the source of the cues to outcomes. This is not Rotter's internal versus external locus of control distinction. Collin interprets the second dimension to represent variation in the degree to which causes may be based on regularities as opposed to essentially random events. In an attempt to substantiate the phenomenological character of these dimensions, Collins administered the 46 I-E scale statements in a Likert format together with 42 new items to 300 university undergraduates. The article presents results from a

principal axes analysis in which the first four factors have been rotated by varimax criterion and their factor scores correlated with the new items. Collins puts labels on the first three factors which appear to place them in the task difficulty, effort, and luck categories of the two-dimensional causal attribution matrix. However, a closer look at the statements which load on the factors suggests that the first three factors may be better labelled ascription to luck, personal responsibility and negation of luck (listed in the order of their solution). There is no distinction in the factor solution recommended by Collins which represents either the elements or the stability dimension referred to by Weiner, et al. (1972). The correlations of the new items with the factor scores also would be better labelled as above than by those labels assigned by Collins. Furthermore, correlations between item sums of the I-E statements loading on a given factor, together with the I-E statement loadings on the first, unrotated factor, suggest that Collins has overfactored. The first three factors may represent a differentiation partly due to response set biases coupled with an unbalanced sampling between luck versus personal responsibility items. The result seems more likely to be a one- or two-factor solution, in which the second factor would represent partly the Political, Systems statements in Rotter's scale. While these results are not to be taken as a final criticism of phenomenological reports with regard to attribution theory (in that Collins would have made a more effective test of the two-dimensional model had he created his own balanced sampling of items based on the model and factor analyzed them), they affected the present study by suggesting

that attribution theory distinctions do not describe what happens in phenomenological reports of locus of control beliefs. This meant that, for example, the distinction between skill or ability and effort was not a major phenomenological dichotomy. As a result, the Skill column of the MLC matrix of items contains statements which reflect control through either ability or effort or both.

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