SOCIAL INTERACTION AND ACADEMIC PERFORMANCE

TERENCE A. SHEPPARD

A thesis submitted for the degree of

DOCTOR OF PHILOSOPHY

in the

AUSTRALIAN NATIONAL UNIVERSITY

November 1978
This thesis describes original research carried out by the author during the tenure of an Australian National University Research Scholarship in the Education Research Unit, Research School of Social Sciences, A.N.U., from March 1974 to May 1977.

Terence A. Sheppard
I wish to acknowledge with gratitude the assistance which I have received from my supervisors: Professor D.G. Beswick and Dr. T. Williams. Other colleagues in the Research School of Social Sciences who contributed to this thesis by way of advice and helpful criticism were Drs. M.D. Ballock, E. Davis and P. McDonnell.

I would also like to thank my mother Mrs. T.M. Sheppard who gave up a considerable amount of free time to code the questionnaires, Mrs. H. Pyner who read and checked the final draft of the thesis, Vivien Read who typed the manuscript, and Dr. M. Kummerow who assisted with proof reading.

To the South Australian Education Department and the principals and teachers of the schools involved in the study also go my thanks for their co-operation and organization. Finally, I acknowledge with gratitude the willing and intelligent co-operation of the students themselves who provided the data on which this study is based.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>(iii)</td>
<td></td>
</tr>
<tr>
<td>List of Tables</td>
<td>(x)</td>
<td></td>
</tr>
<tr>
<td>List of Figures</td>
<td>(xv)</td>
<td></td>
</tr>
<tr>
<td>Abstract</td>
<td>(xvi)</td>
<td></td>
</tr>
<tr>
<td><strong>CHAPTER ONE</strong> - THE ADOLESCENT'S EXPERIENCE OF SOCIAL INTERACTION WITH TEACHERS AND PEERS</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>I STUDENT-PEER INTERACTION</strong></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Compatibility of Perceptions and Attitudes</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Student Behaviour and Teacher Behaviour</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>(a) <em>Interaction Analysis</em></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>(b) <em>The Teacher's Role</em></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td><strong>II STUDENT-PEER INTERACTION</strong></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Peer Group Status</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>The Adolescent Subculture</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td><strong>III THE PRESENT STUDY</strong></td>
<td></td>
<td>28</td>
</tr>
<tr>
<td><strong>CHAPTER TWO</strong> - AN INTERACTIVE APPROACH TO EDUCATIONAL RESEARCH</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td></td>
<td>33</td>
</tr>
<tr>
<td><strong>I THE INTERACTIVE PARADIGM</strong></td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>The Traits vs Situations Controversy</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>The Interactive Paradigm in Educational Research</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Sources of Resistance to the Interactive Paradigm in Educational Research</td>
<td></td>
<td>41</td>
</tr>
<tr>
<td>Characteristics of the B-P-E Paradigm</td>
<td></td>
<td>43</td>
</tr>
<tr>
<td>The Present Study</td>
<td></td>
<td>47</td>
</tr>
<tr>
<td><strong>II MURRAY'S NEED-PRESS MODEL</strong></td>
<td></td>
<td>49</td>
</tr>
<tr>
<td><strong>III APPLICATION OF THE NEEDS-PRESS MODEL IN EDUCATIONAL RESEARCH</strong></td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>The Stem Scales</td>
<td></td>
<td>53</td>
</tr>
<tr>
<td>Use of the Stem Scales in Earlier Research</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Reasons for the Lack of Success in Need-Press Constructs as Predictors of Academic Performance</td>
<td></td>
<td>64</td>
</tr>
<tr>
<td>CHAPTER THREE - SOCIAL NEEDS AND THE SOCIAL CLIMATE PERSPECTIVE</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>I SOCIAL INTERACTION AND SECONDARY NEEDS</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Student-Peer Interaction</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Conclusions Drawn from the Literature on Student-Peer Interaction</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Student-Teacher Interaction</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Conclusions Drawn from the Literature on Student-Teacher Interaction</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>II SOCIAL CLIMATE AND ACADEMIC PERFORMANCE</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>State Anxiety and Academic Performance</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>The Yerkes-Dodson Law</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Hypothesized Relationships Between Academic Performance and Need-Press Dissonance</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Differential Emotion Theory</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>SUMMARY OF CHAPTER THREE</td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER FOUR - THE EXTRINSIC TENDENCY PERSPECTIVE</th>
<th>114</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>114</td>
</tr>
<tr>
<td>I THE EXPECTANCY-VALUE THEORY OF ACHIEVEMENT MOTIVATION</td>
<td>116</td>
</tr>
<tr>
<td>Tendencies to Achieve Success and Avoid Failure</td>
<td>117</td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>120</td>
</tr>
<tr>
<td>Strength of Motivation and Efficiency of Performance</td>
<td>121</td>
</tr>
<tr>
<td>Implications of the Curvilinear Hypothesis</td>
<td>127</td>
</tr>
<tr>
<td>II NEED-PRESS DISSONANCE AND EXTRINSIC MOTIVATION</td>
<td>129</td>
</tr>
<tr>
<td>Social Interaction and Academic Performance</td>
<td>135</td>
</tr>
<tr>
<td>SUMMARY OF CHAPTER FOUR</td>
<td>138</td>
</tr>
<tr>
<td>SUMMARY OF HYPOTHESES TESTED IN THE STUDY</td>
<td>140</td>
</tr>
<tr>
<td>Hypotheses Derived from the Social Climate Perspective Discussed in Chapter Three</td>
<td>140</td>
</tr>
<tr>
<td>Hypotheses Derived from the Extrinsic Tendency Perspective Discussed in Chapter Four</td>
<td>142</td>
</tr>
</tbody>
</table>
## CHAPTER FIVE - MEASURES AND SAMPLE

### INTRODUCTION

### I DESCRIPTION OF SAMPLE AND DATA COLLECTION PROCEDURES
- The Sample
- Data Collection Procedures

### II MEASUREMENT OF VARIABLES
- The Measurement of Needs
- The Measurement of Environmental Press
  - (a) Classroom Press
  - (b) School Press
- The Measurement of Need-Press Congruence
- The Measurement of IQ
- The Measurement of Academic Performance
- The Measurement of State Anxiety and Emotional Response to School
- Construction of Emotion Factor Subscales

### SUMMARY OF CHAPTER FIVE

## CHAPTER SIX - PRELIMINARY ANALYSIS: BIVARIATE RELATIONSHIPS AND SCHOOL EFFECTS

### INTRODUCTION

### Levels of Analysis

### School Means for IQ, Needs and Environmental Press

### I SEX DIFFERENCES AND BIVARIATE RELATIONSHIPS
- Sex Differences
- Bivariate Relationships

### II SCHOOL EFFECTS
- Analysis of Variance
- Multiple Regression Analysis
  - (a) Dummy Variables
  - (b) Additive and Multiplicative School Effects
  - (c) Interpreting Product Term Coefficients
  - (d) Curvilinear Effects
- Regression Analysis of School Effects

### SUMMARY OF CHAPTER SIX
CHAPTER SEVEN - MAIN DATA ANALYSIS: TESTS OF THE HYPOTHESIS

INTRODUCTION

I: THE APPROACH TO DATA ANALYSIS ADOPTED IN THIS STUDY

Hypotheses
Analysis of Covariance
Multiple Regression Analysis
Multiple Classification Analysis
The Approach to Data Analysis Adopted in this Study

II: STATISTICAL TESTS OF HYPOTHESES DERIVED FROM THE SOCIAL CLIMATE PERSPECTIVE

Results of Tests for Linear Inverse Relationships Between Measures of Need-Press Dissonance and Academic Performance
Summary of the Results of Tests for Linear Inverse Relationships Between Academic Performance and Measures of Need-Press Dissonance
Results of Tests for Linear Relationships Between Academic Performance and Needs and Press
Results of Tests for Inverse Curvilinear Relationships Between Need-Press Dissonance and Academic Performance
Results of Tests for Interactions Between IQ and Need-Press Dissonance and Between Need for Achievement and Need-Press Dissonance
Results of Tests for Relationships Between Need-Press Dissonance and Emotional Response to School
Summary of Results of Tests for Relationships Between Need-Press Dissonance and Emotional Response to School
Results of Tests for Relationships Between Need-Press Dissonance, Anxiety and Academic Performance

III: STATISTICAL TESTS OF HYPOTHESES DERIVED FROM THE EXTRINSIC TENDENCY PERSPECTIVE

Results of Tests of Atkinson's (1974b) Curvilinear Hypothesis
Relationships Between Academic Performance, Need for Achievement, Anxiety and Need-Press Dissonance
CHAPTER SEVEN - (cont'd)

Summary and Discussion of Results of Tests of Hypotheses Derived from the Extrinsic Tendency Perspective  295

SUMMARY OF CHAPTER SEVEN  297

Summary of Results of Tests of Hypotheses Derived from the Social Climate Perspective  297

Summary of Results of Tests of Hypotheses Derived from the Extrinsic Tendency Perspective  299

CHAPTER EIGHT - SOCIAL INTERACTION AND ACADEMIC PERFORMANCE  301

INTRODUCTION  301

I SUMMARY OF THE STUDY AND ITS FINDINGS  301

Summary of the Study  301

Summary of Findings Concerning the Social Climate Perspective  305

Summary of Findings Concerning the Extrinsic Tendency Perspective  308

II DISCUSSION OF THE FINDINGS  310

Need-Press Dissonance and Academic Performance  310

Need-Press Dissonance and Emotional Response to School  318

Measuring Need-Press Dissonance  323

Assessing Human Experience  325

Concluding Remarks  327

APPENDIX AI - Definitions of Need and Press Constructs Used in the Study  328

APPENDIX AII - Need Scales: Administration Instructions and Scoring Procedure  330

APPENDIX AIII - Press Scales: Administration Instructions and Scoring Procedure  335

APPENDIX AIV - Emotional Response to School Scale (DES+A): Administration Instructions and Scoring Procedure  343
APPENDIX BI - Table 1: Total sample means ($\bar{X}$) and standard deviation scores (sd) for needs, environmental press, IQ, academic performance (English and science) and emotional response to school

Table 2: Total sample means and standard deviation scores for eight measures of need-press dissonance A

APPENDIX BII - Table 1: Increases in explained variance in English performance (RSQ) due to four basic additive models, dummy variables for school and product terms formed between the dummies and the continuous independent variables which made up the basic additive models

Table 2: Increases in explained variance in science performance (RSQ) due to four basic additive models, dummy variables for school, and product terms formed between the dummies and the continuous independent variables which made up the basic additive models

APPENDIX BIII - Table 1: Analysis of variance of the effects of IQ, school and teacher deference (science) dissonance A on science performance

Table 2: Analysis of variance of the effects of school, IQ, and sex and teacher affiliation (science) dissonance A on female science performance

Table 3: Analysis of variance of the effects of school, IQ and teacher supplication (English) dissonance C on male science performance

BIBLIOGRAPHY
LIST OF TABLES

Table 1.1 Conflict with Parents (from Connell et al., 1975; p.206)
Table 1.2 Status Amongst Male Peers (from Coleman 1961; p.148)
Table 2.1 Titles of Stern's (1970) thirty complementary need and press scales
Table 3.1 The motivational dimensions of classroom climate and their behavioural and value correlates (from Aschuler, 1968; pp.32-33)
Table 3.2 The Fundamental Emotions: A Priori Definitions (from Izard, 1972; p.84)
Table 5.1 Breakdown of student sample by sex and school
Table 5.2 Stern's Activities Index: Rotated Factor Loadings
Table 5.3 Reliability coefficients (K-R 20) of five need scales from Stern's (1970) Activities Index obtained from: (a) Stern's original work; (b) an Australian study of Year 11 high school students; and (c) the present study of Year 10 high school students
Table 5.4 Reliability coefficients (K-20) of two environmental press scales [from Gardner (1972)] obtained from: (a) Gardner's original study of Year 12 Australian high school students; and (b) the present study of Year 10 Australian high school students
Table 5.5 Reliability coefficients (K-R 20) for the affiliative press scale from Stern (1970), Choo (1973) and the present study and for the dominance press scale from the present study only
Table 5.6 Frequency count of need-press dissonance B and C scores
Table 5.7 Factor loadings of thirty emotional response scale (DES+A) items for varimax rotation
Table 5.8 Reliability coefficients of emotional response scales
| Table 6.1 | School mean and standard deviation scores for needs, environmental press and IQ |
| Table 6.2 | Comparison of male and female mean scores for science performance, and needs for affiliation, achievement and dominance |
| Table 6.3 | Coefficients of correlation between measures of emotional response to school |
| Table 6.4 | Coefficients of correlation between needs for achievement, affiliation, dominance, supplication and deference |
| Table 6.5 | Coefficients of correlations between measures of high school environmental press |
| Table 6.6 | Coefficients of correlation between psychological needs and student and teacher environmental press |
| Table 6.7 | Zero-order correlations between eight measures of need-press dissonance A |
| Table 6.8 | Multiple regression of science performance on IQ, need for achievement (nACH), anxiety (ANX), need for affiliation (nAFF), science teacher warmth press (WRMPRESS), dummy variables for four schools (SCHOOL A to SCHOOL D) and product terms formed between dummy variables and continuous variables |
| Table 6.9 | Multiple regression of English performance on IQ, need for achievement (nACH), anxiety (ANX), need for affiliation (nAFF), English teacher warmth press (WRMPRESS), dummy variables for four schools (SCHOOL A to SCHOOL D) and product terms formed between dummy variables and continuous variables |
| Table 7.1 | Stepwise regression of science performance on sex, school, IQ, student affiliation dissonance A squared (DAFF₂) and student affiliation dissonance A squared by sex (DAFF₂.SEX) |
| Table 7.2 | Mean male science performance scores for ten categories of student affiliation dissonance (DAFF), adjusted for IQ and school differences |
| Table 7.3 | Mean female science performance scores for ten categories of student affiliation dissonance (DAFF), unadjusted and adjusted for school differences and IQ |
Table 7.4 Stepwise regression of science performance on sex, school, IQ dissonance A squared and dissonance A squared by sex: partial regression coefficients and $R^2$ values for dissonance A (squared) and dissonance A (squared) by sex

Table 7.5 Stepwise regression of English performance on sex, school, IQ dissonance A squared and dissonance A squared by sex: partial regression coefficients and $R^2$ values for dissonance A (squared) and dissonance A (squared) by sex

Table 7.6 Mean science performance for ten categories of teacher supplication (science) dissonance A; unadjusted and adjusted for sex, school and IQ

Table 7.7 Mean science performance for ten categories of teacher deference (science) dissonance A; unadjusted and adjusted for sex, school and IQ

Table 7.8 Mean male science performance scores for ten categories of teacher affiliation (science) dissonance A; unadjusted and adjusted for school and IQ

Table 7.9 Mean female science performance scores for ten categories of teacher affiliation (science) dissonance A; unadjusted and adjusted for school and IQ

Table 7.10 Stepwise regression of science performance on sex, school, IQ, teacher affiliation (science) dissonance B (DAFSCI B) and DAFSCI B by sex

Table 7.11 Stepwise regression of science performance on sex, school, IQ, dissonance B and dissonance B by sex: partial regression coefficients for dissonance B and dissonance B by sex

Table 7.12 Stepwise regression of science performance on sex, school, IQ, teacher supplication (English) dissonance C (DSUPENG C) and DSUPENG C by sex

Table 7.13 Partial regression coefficients ($b$), increments to explained variance ($RSQ$) and simple correlation coefficients (simple $r$) for needs, environmental press and product terms formed between needs, press and sex from the regression of science performance on school, IQ, sex needs, press and product terms
Table 7.14 Partial regression coefficients (b), increments to explained variance (RSQ) and simple correlation coefficients (simple r) for needs and environmental press and product terms formed between needs, press and sex from the regression of English performance on school, IQ, sex, needs, press and product terms.

Table 7.15 Stepwise regression of science performance on sex, school, need for achievement (nACH), student affiliation dissonance A squared (DAFF^2) and the product formed between sex and DAFF^2.

Table 7.16 Stepwise regression of anxiety on sex, school, student affiliation dissonance A squared (DAFF^2) and the product term formed between sex and DAFF^2.

Table 7.17 Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (simple r) for measures of need-press dissonance A (squared) and the product terms formed between sex and need-press dissonance A (squared) and product terms.

Table 7.18 Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (simple r) for measures of need-press dissonance B and the product terms formed between sex and dissonance from regressions of four measures of emotional response to school on sex, school, need-press dissonance B and product terms.

Table 7.19 Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (simple r) for measures of need and press dissonance C and product terms formed between sex and dissonance from regressions of four measures of emotional response to school on sex, school, need-press dissonance C and sex by dissonance product terms.

Table 7.20 Stepwise regression of science performance on sex, school, IQ, anxiety and student affiliation dissonance A squared (DAFF^2).

Table 7.21 Partial regression coefficients and RSQ values for regression of need-press dissonance A squared on science performance adjusted for: (a) sex, IQ and school; and (b) sex, IQ, school and anxiety.
Table 7.22  Partial regression coefficients and RSQ values for regression of need-press dissonance A squared on English performance adjusted for: (a) sex, school and IQ; and (b) sex, school, IQ and anxiety

Table 7.23  Sixteen measures of the strength of final achievement tendency constructed from resultant achievement motivation (RESNACH) and sixteen measures of need-press dissonance

Table 7.24  Stepwise regression of science performance on sex, school, IQ, final achievement tendency ($T_A^1$), final achievement tendency squared ($T_A^2$), and the product terms formed between sex $T_A^1$, and sex and $T_A$

Table 7.25  Partial regression coefficients (b) and increments to explained variance (RSQ) for anxiety and need for achievement (nACH) adjusted for sex, school, IQ and each other. Simple correlation coefficients for each term are also reported (simple r)
LIST OF FIGURES

Fig. 3.1  Predicted relationships between academic performance and need-press dissonance.

Fig. 4.1  Assumption that efficiency of performance (level of performance when ability is held constant) increases monotonically as strength of motivation increases until some physical limit or ceiling is reached (from Atkinson, 1974b).

Fig. 4.2  Mean number correct arithmetic problems on a simple and more complex task by junior high school boys classified on resultant n Achievement and n Affiliation and performance with private versus public anticipated feedback (from Atkinson, 1974b).

Fig. 4.3  Assumption that efficiency of performance (level of performance when ability is held constant) increases up to some optimal level after which efficiency decreases as motivation increases still further (Atkinson, 1974b).

Fig. 7.1  Predicted relationship between academic performance and need-press dissonance A.

Fig. 7.2  Male and female science performance as a function of student affiliation dissonance A, adjusted for school and IQ.

Fig. 7.3  Mean science performance as a function of teacher supplication (science) dissonance A (DSUPSCI) adjusted for sex, school and IQ.

Fig. 7.5  Male and female science performance as a function of teacher affiliation (science) dissonance A adjusted for school and IQ.

Fig. 7.6  Male and female mean science scores as a function of teacher deference (science) dissonance B, adjusted for the effects of school and IQ.

Fig. 7.7  Male and female mean English performance scores as a function of teacher supplication (English) dissonance C adjusted for the effects of IQ and school.

Fig. 7.8  Predicted relationship between need-press dissonance A and enjoyment of school.

Fig. 7.9  Male and female mean anger response scores as a function of student dominance dissonance B (DDOM B) adjusted for the effects of school differences.

Fig. 7.10 Predicted relationship (Atkinson, 1974b) between performance efficiency and strength of achievement tendency.
ABSTRACT

In this thesis it was argued that, since almost all activities at school are carried on within a context of on-going social interaction, students' experience of social interaction with teachers and peers constitutes a major part of the high school experience and can be expected to be related to their academic performance and school-related feelings. A review of literature revealed a paucity of information concerning firstly, the adolescent's perspective of within-school social interaction and secondly, the influence which adolescents' experience of such interaction exerts on their academic performance. Accordingly, this study was designed to address the question 'How is adolescents' experience of social interaction with teachers and peers related to their academic performance?'

At a general level it was argued that human experience (and the behaviour based upon it) is an outcome of the interaction between personality (which reflects past experience) and current perceptions of the environment. In the light of this it was argued that adolescents' experience of within-school interaction can be conceptualized in terms of the degree of satisfaction they experience in association with needs aroused during interaction with peers and teachers. By their nature social needs are aroused by environmental cues present in interactive situations and are satisfied (or left unsatisfied) by the behavioural exchange which this interaction implies. This theoretical perspective meshed nicely with an available methodology [Stern's (1970) psychometric development of Murray's (1938) needs-press model] and four needs (affiliation, supplication, deference and dominance) were identified as characterizing adolescents' experience
of within-school social interaction with peers and teachers. The degree of dissatisfaction which students experience during school interaction with teachers and peers was then inferred from the degree of dissonance they reported in association with these four needs.

Two different theoretical perspectives concerning the relationship between need-press dissonance and academic performance were investigated. The first of these adopted a similar approach to earlier studies in this area and argued that need-press dissonance and academic performance would be inversely related. Specifically, it was suggested that perceptions of a high degree of dissonance would be accompanied by the arousal of debilitating state anxiety which would impair academic performance, while perceptions of a low degree of dissonance would not be accompanied by a similar arousal of anxiety and consequently performance would not be impaired. The second perspective attempted to place dissonance associated with social needs into the framework of the expectancy-value theory of achievement motivation and argued that the strength of students' extrinsic tendency to engage in achievement activities could be inferred from the degree of dissonance they perceived. From this perspective dissonance was viewed as a positive tendency which encourages students to engage in achievement activities i.e. it was argued that dissonance and performance would be positively related.

These hypotheses and others derived from them were tested using a variety of multivariate statistical techniques. The results of this data analysis provided limited support for the first of the two major hypotheses mentioned above and evidence was also found to support the prediction that perceptions of dissonance would be related to students' school-related feelings. In the discussion of these findings it was concluded that the Stern need and press scales are better suited for research into between-school rather than within-school effects and alternative methods of assessing adolescents' experience of social interaction with peers and teachers were suggested.
Chapter One

The Adolescent's Experience of Social Interaction with Teachers and Peers

INTRODUCTION

By virtue of its length alone the high school experience is a significant one for Australian adolescents. This experience is primarily social because almost all curricula and extra-curricula activities are pursued within the context of on-going student-peer interaction and/or student-teacher interaction. Each student's experience of this interaction will be to a certain extent unique, but in all cases it can be expected to exert a significant influence upon his behaviour, and in particular his academic performance. Thelen (1954) particularly has stressed the social nature of the classroom experience and the effect which this experience has on student performance. He argued that:

The most fundamental thing among classroom experience is that it is social; it is a continual set of interactions with other people. I call this the most fundamental thing because there is no escape; the demands are there, and they must be met. ... These interactions are most fundamental for another reason: they make a difference in the learning process ... social interactions set the conditions under which learning occurs (p.42)

Thelen conceptualised the relationship between classroom experience and behaviour in terms of students' social needs aroused through interaction with others in the social environment. The satisfaction of needs, he argued, takes precedence over all else,
including academic performance. He suggested that high achievement is rarely an end in itself but rather a means to achieving need gratification. His view was that:

The highest priority needs of students are to find their places in the group, to work through their anxieties, about their competence, to adjust to authority, to explore and define their growing social capacities. These needs determine much of the quality of classroom experience, and they colour the meanings of the subject matter learned. Good school achievement is usually the socially approved way of getting commendation from other people, or ... the victory one gets from successful competition ... It is part of a socially determined pattern, produced through interaction with other people in and out of the classroom. Most school learning is partly a means to some other end. (p.44)

Social environment then, does not end at the classroom door. Students' social interaction with their peers outside the classroom can also be expected to contribute to the nature of the social climate within which they approach their schoolwork, and as a consequence, to the quality of their actual performance. Thus to understand adolescent academic achievement it is first necessary to understand the nature of adolescents' experience of interpersonal relations with their teachers and peers.

Thelen was one of the first authors to attempt to explain the dynamics of the relationship between achievement and social interaction in educational settings. However, over twenty years later his approach still has only intuitive appeal because relatively little empirical research has been directed towards determining the validity of his suggestions. Thelen himself was concerned with the role of the teacher in the classroom and devoted his efforts to distinguishing a variety of teacher instructional models rather than to determining the nature of adolescents' experience of school.
Although a great deal of research in education has been concerned with teachers' relationships with their students and students' relationships with their peers, the literature reveals surprisingly little concerning the students' perspective of social interaction in the classroom and the wider school environment. Much of the research in this area has been concerned with the relationships between students' perceptions of their teachers, their own status or their status in the eyes of their friends, and a variety of educational outcomes such as academic performance and attitudes to school. Few if any of these studies can be regarded as research into the nature of students' experience of school social interaction. As a consequence, current knowledge in this area is not so much incomplete as non-existent.

Hargreaves' (1972) excellent review of interpersonal relations in the school is both comprehensive and recent. With regard to teacher-student interaction he concluded, 'it must be admitted that at this stage our knowledge of the pupils' perspective is extremely primitive' (p.176). The reason for this state of affairs is, he argued, because past research in teacher-student interaction has emphasised the role of the teacher to the almost total exclusion of the student. Thus while we know something of the effects of teacher behaviour and expectations on student performance, we know little of the students' perception and interpretation of this behaviour or how this experience mediates the cognitive activity associated with academic performance. This criticism is supported by Brophy and Good (1974) who suggested that 'Although individual differences have been discussed in education and psychology for a long time, studies analysing classroom interaction have seldom focused upon the individual student.' (p.4)
Hargreaves also criticised social psychological research for its failure to come to grips with the concepts of friendship, love and liking from the point of view of people's experience of them. This deficiency in social psychological research is reflected in the work which has been carried out concerning the interaction between students and their peers. Peer-student interaction has been generally studied in terms of the influence of the peer group on the behaviour of its members [for example, Asch's (1951) classic study of compliance] rather than in terms of individual students' perspectives of the variety of relationships they have with other students in the school environment.

If Thelen's analysis is correct we would not expect this type of research to increase our understanding of adolescent achievement a great deal, and this in fact is the case. Reviewing research concerning the relationship between social achievement and a variety of social factors, Morrison and McIntyre (1973) observed that 'Although it is well established that informal social groups influence the behaviours of their members, there is little evidence of the effects which they have upon attainment and educational success.' (p.68) One reason for this lack of evidence they suggested, is the problem of distinguishing between the influence of the peer group and that of other social factors in the students' environment. This distinction might be easier if social influence is examined from the students' point of view.
The Present Study

In the present study social interaction within the school is considered from the students' perspective and an attempt is made to describe the process whereby adolescents' experience of social interaction with their peers and teachers influences their scholastic achievement.

In the following two sections research concerned with the relationships between student-teacher interaction and performance (Section I) and student-peer interaction and performance (Section II) is reviewed. The studies reviewed are evaluated to determine the extent of their contribution to our understanding of students' experience of social interaction in the high school and the relationship between this experience and academic performance. A method of measuring adolescents' experience of social interaction was derived from the literature reviewed in these two sections. In Section III of this chapter, this method is described and defended. Section III also contains a statement of the major hypothesis of the present study and a brief description of the study itself.

I STUDENT-TEACHER INTERACTION

The bulk of research concerned with the relationship between student-teacher interaction and student academic performance can be placed in one of two categories. In the first category are studies concerned with the relationship between student performance and the degree of congruence or compatibility between teachers' and students' attitudes and perceptions concerning one another.
The second category covers the large body of literature devoted to the relationship between teacher behaviour and the behaviour of their students.

Compatibility of Perceptions and Attitudes

A great many studies have investigated the relationship between student performance and the degree of mutual warmth and trust exhibited in teacher-student relations. In an early study Bush (1954) found that personal liking of a pupil for his teacher was one of the most important factors in bringing about an effective learning relationship between teacher and pupil. Bush observed this relationship within a variety of schools and with samples of students from both secondary and primary levels. Davidson and Lang (1960) demonstrated that the performance of primary students was related to how well they felt they were regarded by their teacher. Davidson and Lang did not however control for the effects of scholastic aptitude on this relationship although they did control for the effects of social class.

From the teachers' point of view the situation is substantially the same. Studies by Hadley (1954) and Williams and Knecht (1962) confirm Bush's (1954) findings that students most liked by teachers tend to be high achievers. More recently Imber (1973) found that students' trustworthiness, as rated by their teacher, was positively related to their academic performance. Imber also demonstrated that the degree to which primary school students trusted their teachers was significantly related to their academic performance. Neither the students' nor teachers' evaluation of trustworthiness was related to student IQ.
These studies are inadequate in that they tell us little about the nature of students' school experience of social interaction or the relationship between this experience and performance. The constructs of liking and trust are too simplistic to provide information concerning the range of experiences which characterise different adolescents' interactions with significant others at school, or to indicate which aspects of those experiences exert most influence on their scholastic performance. Similarly a simple association between affect and performance says little about the dynamics of this relationship or the direction of its causation. For example, do students who like their teacher do so because they perform well at school, or do they become good scholars because they enjoy good relations with their teacher? Conventional analysis cannot solve this problem of causality, but if we can learn more about the antecedents of students' affective response to school and the nature of the process whereby this response interacts with cognitive activity, it may become possible to specify the direction of causal relationships of this kind.

Findings from studies of the relationship between social class and scholastic performance throw some light on the antecedents of students' relationships with their teachers and general attitudes to school.

A number of studies (Husen and Svenson, 1960; Douglas, 1964; Jackson, 1964; Goldberg, Passow and Justman, 1966; Barker Lunn, 1970) have demonstrated that children of lower socio-economic status tend to be placed in lower streams and children of higher status in higher streams than would be predicted by their measured
ability. These findings support earlier Australian and American studies which demonstrated the 'capable dropout' phenomenon to be more prevalent among adolescents from low socio-economic classes than those from the middle and upper classes (Hollingshead, 1949; Kaplan, 1963). The capable drop-out is a student who, although intellectually equipped to cope with school, gives up studying.

Elliot, Voss and Wendling (1966) suggested that this phenomenon could be accounted for by the greater incompatibility of values, attitudes and modes of expression between working class students and their middle class teachers than between middle class students and the same teachers. Such incompatibility they argued would lead to a lack of rapport between teacher and student which in turn would be associated with lowered academic performance. Hargreaves (1972) offered a similar explanation for the lower performance of working class students. He argued that, given that there is considerable overlap in the IQ scores of middle class and working class students (Douglas, 1964), these observed differences in performance between students of different social classes cannot be fully accounted for in terms of intelligence. This suggestion is supported by the findings of both Battle (1957) and Sumner and Warburton (1972).

Summer and Warburton (1972) found significant differences between working and middle class high school students in terms of their perceptions of and relationships with their teachers. Working class students had significantly poorer relations with their teachers; they were more critical of their teachers, less appreciative of their personal qualities and professional skills, and were less co-operative with regard to school work. To round
off the picture the findings of a study by Battle (1957) demonstrated that the degree to which the values and attitudes of American high school teachers and their students coincided with positively related to student achievement. The more congruent values and attitudes were between the two groups the better students performed.

This research is valuable because it demonstrates that the interaction between students' background and their perceptions of the school environment must be taken into account if we wish to understand their experience of school and in particular of teacher-student interaction. As a sociological construct however, social class takes us away from the individual and his experience of social interaction. To understand the influence of a particular student's past on his present experience we must consider the interaction between some aspect of his personality which will reflect his past development and the environment in which he learns. However as Naylor (1972) has pointed out, 'Interactions between personality characteristics and the demands of particular educational settings await detailed investigation' (p.63).

**Student Behaviour and Teacher Behaviour**

The literature in this area can be conveniently split into two further categories (a) interaction analysis and (b) research concerned with the teachers' role. This division of the literature follows Hargreaves (1972).

(a) **Interaction Analysis**

The original work on the effects of adult behaviour on social climate was carried out in a series of well-known studies by Lewin and his colleagues (Lewin and Lippitt, 1938; Lewin, Lippitt and White, 1939). Lewin, Lippitt and White studied the effects of three adult
leadership styles, authoritarian, democratic and laissez-faire, on the general behaviour of pre-adolescent boys and their task performance in craft work. The results indicated striking differences between the behaviour of boys in different groups, in particular between authoritarian and democratic groups. For example boys in authoritarian groups were generally more apathetic and submissive and more dependent upon their leaders than their peers in democratic groups. In a small number of authoritarian groups the boys displayed a remarkably high frequency of aggressive behaviour. In contrast boys in democratic groups were more friendly, co-operative and less hostile.

Overall these studies indicated that the behaviour of boys varied significantly as a function of the social climate created by adult behaviour and this finding has been replicated by Anderson and Brewer (1945) (cited in Hargreaves 1972) in more formal educational settings. The work of Lewin and his colleagues stimulated considerable research into the relation between teacher-student interaction and classroom climate. Interaction analysis, the rubric under which this type of research is generally discussed, has concentrated on verbal interactions between teachers and students. It has been useful, for example, to determine whether classroom climates are teacher-centred or learner-centred (Withall, 1949; Flanders, 1964) and more recently to evaluate teacher effectiveness in the classroom (Flanders, 1968).

Interaction analysis ostensibly involves the observation and coding of verbal interaction between a teacher and his students although the emphasis on this type of research has always been on
the behaviour of the teacher. It is assumed that the bulk of teacher
behaviour and pupil response is expressed through language as a series
of verbal events. Verbal events are categorized in terms of whether they
are teacher initiated or pupil initiated, task relevant or irrelevant
and so on. The extent to which a classroom is learner-centred for
example, is determined by assessing the extent to which a teacher's
verbal statements are directed towards facilitating student learning
rather than directing or reproving students or maintaining his own
status in their eyes. Apart from its inherent bias towards teacher
behaviour, interaction analysis has been subjected to two other
major criticisms. Firstly Mitchell (1969) has suggested that its
major constructs are too limited to properly represent the behavioural
complexity of the classroom. The second and related criticism is
Hargreaves' (1972), who suggested that the more one chops behaviour
into discrete categories, the further one gets from the reality of
on-going classroom activity. He went on to argue that

Because Interaction Analysis takes a "scientific"
approach to classroom behaviour, where teachers and
pupils are treated essentially as "objects" observed
from without, no account is taken of the meanings
which the participants give to their interactions.
The assumptions and perspectives of the teachers
and pupils, which are often covert and implicit,
are not explored. We discover little of the
overall teacher-pupil relationship as it is
experienced by the teacher or by the individual
pupils (p.135)
(b) **The Teacher's Role**

There is no doubt that as the dominant actor in the classroom, the teacher has the greatest power to determine how classroom tasks are performed and the conditions under which students engage in such tasks. Recognition of the teacher's power has led researchers to concentrate on the relationship between student performance and teacher behaviour and expectations.

Research in recent years has demonstrated that the classroom behaviour of teachers is a function of both students' behaviour and the teacher's expectations concerning those students. Hargreaves (1967) and Good (1970) both reported that high achieving students received more teacher praise and support than low achieving students. Brophy and Good (1970) confirmed this finding but concluded that teachers' reinforcement of student performance was attributable to their own expectations concerning their students' capabilities as well as students' actual performance. These authors asked teachers to rate their students in terms of how they generally performed at school. They then recorded the frequency of teacher demands for, and reinforcement of, quality performance directed at different students. By controlling for differences between students in actual performance Brophy and Good were able to demonstrate that teachers systematically discriminated in favour of students previously designated as high achievers over low achievers in demanding and reinforcing quality performance.

In two studies of Australian adolescents Rowell (1969, 1971) found evidence to support the notion that teachers entertained different expectations concerning the academic capabilities of
girls and boys in science. In his first study he noted a group of high ability girls who performed extremely well in a chemistry examination but particularly poorly in a similar physics examination. Both examinations were held within a period of a few days and there was no evidence to suggest that the chemistry studied was easier for the girls than physics. Rowell concluded that the attitude of the girls' physics teacher may have been related to their different performances in each subject. For the purposes of learning physics their (female) teacher equated girls with 'students of low intelligence'. In the second study Rowell constructed a scale to assess teachers' attitudes concerning the relative abilities of boys and girls to cope with science (physics and chemistry) and substantially confirmed the hypothesis derived from his earlier study. That is, that girls' poorer performance in science was related to their teachers holding negative opinions concerning girls' ability, relative to that of boys, to cope with science, rather than to an intrinsic inability on the part of girls to handle scientific concepts. Rosenthal and Jacobson (1968) also provided extensive evidence that teacher expectancy effects are conveyed to students and reflected in their performance. However their work has received both praise and criticism (Gephart and Antonopolos, 1969), and the case for or against the self-fulfilling prophecy in the classroom has yet to be decided.
Summary and Conclusions

From the evidence examined in this part of the review it can be seen that researchers concerned with teacher-student interaction have emphasised the part played by the teacher at the expense of the student. Because of this bias we know a considerable amount about the teachers' perspective of classroom interaction but very little about the students'. We have seen that teachers' student-related attitudes, expectations and behaviour are not only largely responsible for the type of social climate which prevails in the classroom but are also significantly related to student performance. However because of our lack of knowledge of the students' experience of teacher behaviour, the dynamics of the process by which teachers' attitudes and behaviour towards a group of students influence their performance remain unexplained.

The question before us then is: how does students' experience of social interaction with their teacher influence the essentially cognitive processes associated with scholastic task performance? Or, more simply, how is students' experience of social interaction with their teacher related to their academic performance? Until we know how students define and interpret this experience we cannot answer this question.

In the present study the assessment of student experience of interaction was attempted by a method implicit in Thelen's (1954) comments quoted at the beginning of this chapter. Thelen suggested that the nature of students' school experience was primarily determined by the needs they experienced when interacting with others in the school environment and that behaviour in school was
largely caused by students' attempts to gratify these needs. Even
academic achievement he argued was at least partially a means to
some other social end.

Thus if we wish to understand the nature of students' experience
of social interaction at school we must first determine the particular
types of needs they experience when interacting with others in the
school environment. Secondly, we must determine the extent to which
they achieve gratification of these needs in the course of on-going
interaction at school. From this perspective it is argued that each
student's experience of social interaction is determined by the outcome
(in terms of need satisfaction) of the unique interaction between his
particular social needs (characteristics of personality) and his
perception of the social behaviour of others during interaction
(aspects of the social environment). Later it will be argued that the
reluctance of educational researchers to adopt a personality x
environment interactive perspective is the major reason why educational
psychology is still at the stage of describing the teacher-learning
process rather than explaining it.

II STUDENT-PEER INTERACTION

As noted earlier the bulk of research concerned with student-
peer interaction has investigated the influence exerted by the peer
group on the behaviour and attitudes of individual members. This
research can be divided into two general categories, firstly studies
which have investigated the relationship between students' peer
group status and their behaviour, and secondly studies concerned
with the values, attitudes and behaviour of what has been described
as the adolescent subculture.
Peer Group Status

In these studies students' informal group status was assessed in terms of their popularity or sociometric status (Lippitt and Gold, 1959; Van Egmond, 1960; Schmuck, Luszki and Epperson, 1963; Schmuck 1963, 1966; Schmuck and Van Egmond, 1965) and in terms of their social power or influence (Gold, 1958; Lippitt, Polansky and Rosen, 1959; Van Egmond, 1960; Emerson, 1962; Schmuck, 1960). Popularity and social power were assessed by students' sociometric ratings of themselves or their peers (Schmuck and Van Egmond, 1965) or by students indicating which of their peers they would most like to work with or sit next to and so on (Fox, Luszki and Schmuck, 1966). In the latter case popularity was determined by calculating the number of choices each student received. It is the use of this general technique (the sociogram) which has enabled researchers to gain first hand information concerning students' perspectives of the school experience.

Once status is assessed the behavioural correlates of high and low status are examined. The results of such studies have generally indicated that students who perceive themselves as having high peer status tend to have higher self-esteem, more positive attitudes towards schoolwork and achievement, and in fact perform better than students who perceive themselves as having low peer status. Schmuck and Van Egmond (1965), for example, asked adolescent students to estimate their own quartile position in the class in terms of how well they felt they were liked by their peers (i.e. perceived popularity). They found that perceived popularity was positively associated with academic performance for both boys and girls. When the effects of social class were controlled, the relationship remained
among boys for all groups, but among girls only in the group classified as 'lower middle class'. Schmuck and Van Egmond did not however, control for IQ. Kiesler (1955) compared performance and popularity among groups of male and female adolescents matched for IQ. He found the most popular boys obtained average grades (the gentleman's 'C'?) while among girls popularity and performance were directly related i.e. the most popular girls obtained the higher grades.

This research will be examined in greater detail in Chapter Three but before we leave it two points should be made here with regard to its contribution to our understanding of students' experience of social interaction in school and the relationship between this experience and academic performance. Firstly, as Hargreaves (1972) pointed out, sociometric ratings are a good indicator of the informal group status of individual students but when combined they do not reflect the actual structure of liking and power relationships within the classroom. The major reason for this is because students with few friends when asked, for example, who they would like to sit next to in class, tend to choose students they admire rather than those with whom they actually mix. This is not to say that valuable information concerning classroom social structure cannot be obtained from the students themselves, in fact the need for research which included the student perspective has already been emphasised a number of times in this review. However the problems involved in asking people about themselves have vexed psychologists for a long time and must be taken into account when attempting to understand students' own view of the world.
The second weakness associated with research into peer group status is also inherent in much of psychological research and has been referred to earlier. Knowing that popularity is associated with academic performance does not tell us why this is so or, in other words, explain the causal relationship, if any, between popularity and performance. It is probably more realistic to think of factors such as popularity, self-esteem and behaviour as being linked in a circular fashion rather than in a straight causal chain. After all, any particular chain one chooses will simply be a number of links in a longer one.

However, it would still be useful to know the juxtaposition of these factors. Does self-esteem precede popularity (as suggested by Rosenberg, 1965) or does performance precede self-esteem and so on? As suggested earlier the best way of discovering the ordering of the links in the chain is firstly to examine each link more closely and secondly to consider the association of a greater number of links at any one time. If this is done the causality of influence may become more obvious theoretically, even if it cannot be demonstrated empirically.

As a rule the approach adopted by social psychologists to examine real world phenomena is too simplistic, both in terms of the number of factors considered simultaneously and the depth to which we explore these factors. There are practical reasons for this of course, but I suspect the major problem is the methodological paradigm generally employed [see for example Herbert's (1970) critique of the application of the scientific method to the study of individual behaviour]. Until a more sophisticated view of the social world is
adopted we are not likely to advance real understanding of the highly complex phenomena that compound human behaviour in social situations.

The Adolescent Subculture

There is no doubt that the informal social structure of the high school exerts a considerable influence upon the attitudes, values and behaviour of adolescent students; an influence which not only appears to run in a direction other than that of wider society but occasionally to be totally opposed to it. In some studies the peer group influence has been so marked as to lead authors to speak of a separate adolescent society or subculture which is cut off from mainstream adult society (Gordon, 1957; Coleman, 1961).

In support of such a claim Coleman cited evidence which indicated firstly, that very few adolescent boys wished to follow the same career as their father, and secondly, that just over 40 per cent of both male and female adolescents reported that 'breaking with a friend' would be harder for them to take than the disapproval of their parents or teachers. Furthermore, he found that while 54 per cent of all boys and 53 per cent of all girls indicated that their parents' disapproval would be hardest to take, only 50 per cent of the boys and 49 per cent of the girls, chosen by their peers as members of 'leading crowds', gave this response. In a sample of over five and a half thousand respondents these differences were significant and indicated, according to Coleman, that adolescents who are highly regarded by their peers and consequently lead the way in setting standards for the alternative culture, are less committed to their parents' culture than 'ordinary' adolescents.

As evidence on which to base the designation of a separate subculture however, these findings are less than conclusive.
Firstly as Hargreaves (1972) pointed out, the finding that few sons wish to follow the same careers as their fathers can be more easily interpreted as an indication of shifting patterns in America's educational and occupational structure. It certainly does not necessarily indicate that adolescent boys are cut off from their fathers. Secondly, Coleman's finding concerning the relative influence of parental, teacher and peer disapproval has been criticized because his question was biased in favour of obtaining the results he reported (Epperson, 1964; Connell, Stroobant, Sinclair, Connell and Rogers, 1975): he asked students to choose between parental and teacher disapproval and breaking with a friend rather than merely having to endure a friend's displeasure. Hardly a balanced question!

In an extensive study of Sydney adolescents Connell et al. (1975) re-worded Coleman's original question so that 'breaking with a friend' became 'your best friend's disapproval'. In response to this adjusted question approximately 80 per cent of adolescent students indicated that the disapproval of either a parent or teacher would be harder to take than the disapproval of a friend. In an English study Epperson (1964) obtained almost identical results using a similar question. Even allowing for cross-cultural differences Coleman's finding concerning the importance of peer relations would have to be replicated with the adjusted questions used by Epperson and Connell et al. before his claims concerning distinct adolescent and adult subculture could be seriously considered.
Connell *et al.* also questioned their sample in order to identify chosen issues which regularly provoked conflict between adolescents and their parents. Their question and the results obtained are presented in Table 1.1.

The consistently high disagreement between adolescent boys and their parents concerning personal appearance is accounted for by Connell *et al.* in terms of the male long hair phenomenon to which, they suggested, parents in 1969-70 (the years during which their data were collected) had yet to become accustomed. Significantly, in the light of the previous discussion concerning the existence of a separate peer culture, neither 'social issues' nor 'friends' ever became the subject of major disagreement between Australian parents and their adolescent children. Any conflict that does occur consistently appears to centre around rather trivial items such as personal appearance rather than more basic and longer term issues such as adolescents' futures. If the separate culture argument is to be sustained one might have expected more evidence of disagreement between adolescents and their parents than is revealed in Table 1.1. Connell *et al.* in fact emphasised that their respondents reported agreement much more often than disagreement and concluded:

The issue of teenager-parent relationships has been phrased in terms of conflict, and only a limited amount has been found. Even to phrase it in this way is to some extent misleading for it is clear that most teenagers value their family very highly and maintain a close relationship with their parents. (p.207)

This conclusion is consistent with that of Douvan and Adelson (1966) who also suggested that the difference between the generations was more apparent than real.
Table 1.1

Conflict with Parents (Data taken from W.F. Connell et al., 12 to 20: *Studies of City Youth*, Sydney, Hicks Smith, 1975, p.206)

<table>
<thead>
<tr>
<th>AGE GROUPS</th>
<th>In-School</th>
<th></th>
<th>Out-of-School</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11-12</td>
<td>13-14</td>
<td>15-16</td>
<td>17-18</td>
</tr>
<tr>
<td>BOYS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>63</td>
<td>56</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td>Social issues</td>
<td>41</td>
<td>50</td>
<td>58</td>
<td>63</td>
</tr>
<tr>
<td>Personal future</td>
<td>27</td>
<td>28</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>Friends</td>
<td>36</td>
<td>37</td>
<td>41</td>
<td>34</td>
</tr>
<tr>
<td>Freedom of movement</td>
<td>47</td>
<td>46</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>GIRLS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>48</td>
<td>49</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>Social issues</td>
<td>39</td>
<td>47</td>
<td>55</td>
<td>59</td>
</tr>
<tr>
<td>Personal future</td>
<td>25</td>
<td>26</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>Friends</td>
<td>30</td>
<td>30</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>Freedom of movement</td>
<td>43</td>
<td>47</td>
<td>49</td>
<td>42</td>
</tr>
</tbody>
</table>

Question: 'On some matters your parents may have the same opinion as you, on others they may have different opinions. To what extent do you and your parents agree or disagree on the following?' Answer alternatives: (a) Always agree; (b) Usually agree; (c) Agree as often as disagree; (d) Usually disagree; (e) Always disagree.

Note: In this table each row represents a separate question; the figures are the percentages in each case who gave answers (c), (d), or (e); i.e. responses for these three 'disagreement' categories were combined to produce a single percentage figure which is reported in the table to indicate the extent of disagreement with parents on any particular issue.
Coleman produced further evidence to support his notion of a separate adolescent culture by asking students what they would most wish to be remembered for at their school and the students' parents what they would most wish their children to be remembered for at school. Approximately 30 per cent of both boys and girls wished to be remembered as an outstanding scholar while the remaining 70 per cent of each wished to be remembered for their sporting prowess, popularity or as being a leader in student activities. Among parents, 80 per cent wished their sons to be remembered as outstanding scholars and 55 per cent their daughters. Significantly only 10 per cent wished their sons to be remembered as athletic stars. This evidence then suggests a wide divergence in the values of students and their parents.

However, conflicting evidence indicating that students of both sexes considered their parents would take greater pride in their non-academic rather than academic achievements led Coleman to ask whether parents were telling the truth when asked what they wanted for their children. To what extent is there a value conflict between adolescents and their parents?

In their Australian study Connell et al. asked students to indicate what they would most like to be remembered for and what they thought their parents would most like them to be remembered for. Their results were very similar to those obtained by Coleman when he put the same question to students and their peers. Connell et al. pointed out that these figures do not necessarily represent a value conflict. In both studies students were asked what they wanted for themselves, while the parents' response, either attributed
to them by their children (Connell et al.) or their own (Coleman), concerned what they wanted for their sons and daughters. Thus it is likely that parents wish their children to be academically successful because this is socially desirable even if they themselves are not academically orientated, and yet take greater pride in those achievements with which they can identify, often non-academic achievements.

A number of authors have pointed out that the majority of adults have non-academic leisure-orientated values similar to those of their adolescent children (Berger, 1963; Sherif and Sherif, 1964). These authors drew conclusions similar to Connell et al., who suggested:

There are indeed two sets of values in the picture but they are not an achievement-oriented adult culture and a socially-oriented adolescent culture. They are, rather, a leisure-centred popular culture shared by most adults and most teenagers, and the official culture of the school centred around formal academic achievement (p.218)

Although Coleman's evidence does not support the two subculture hypothesis, his findings leave no doubt as to the pervasive influence the peer group exerts on the behaviour and attitudes of individual members, and (of particular interest in this review) on achievement-orientated behaviour and attitudes. Once again however his interpretations of his own data appear to be somewhat astray.

Using four different measures of status among male peers only, Coleman assessed the relative status of scholars and athletes. His results are presented in Table 1.2.
Table 1.2


<table>
<thead>
<tr>
<th></th>
<th>Be Friends with and Be Like</th>
<th>Leading Crowd</th>
<th>Number of Friends</th>
<th>Total</th>
<th>Popular with Girls</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete-scholar</td>
<td>9.9</td>
<td>12.5</td>
<td>7.1</td>
<td>29.5</td>
<td>4.9</td>
<td>(54)</td>
</tr>
<tr>
<td>Athlete</td>
<td>4.6</td>
<td>6.6</td>
<td>5.9</td>
<td>17.1</td>
<td>2.5</td>
<td>(218)</td>
</tr>
<tr>
<td>Scholar</td>
<td>1.9</td>
<td>3.1</td>
<td>4.4</td>
<td>9.4</td>
<td>0.5</td>
<td>(224)</td>
</tr>
<tr>
<td>All other boys</td>
<td>0.4</td>
<td>0.8</td>
<td>2.9</td>
<td>4.1</td>
<td>0.2</td>
<td>(3,598)</td>
</tr>
</tbody>
</table>

As Coleman rightly points out these figures indicate the significantly greater status of athletes relative to that of scholars in the informal hierarchy of the student social system. Scholars, too, however, are high status students relative to their 'ordinary' peers. Coleman also notes that the all-rounder, the athlete-scholar, far outstrips the others in terms of status: certainly being a scholar as well as an athlete does not reduce a student's status. The status of this small group (1.3 per cent of the total sample), is doubled in three of the four measures of status. The significance of this finding escapes Coleman as he concentrates on making a case for the low esteem in which scholarship is held, relative to athletics and other extra-curricular activities in American high schools. Coleman was so concerned about the relative popularity of academic and non-academic pursuits that he suggested scholastic carnivals between schools as a means towards making schoolwork more popular.
Hargreaves (1972) however suggests that the hallowed position of the athlete-scholar in Coleman's study indicates that it is studiousness rather than academic brilliance which earns the disapproval of adolescents. In other words it is students who are seen by their peers to work hard at their studies rather than those who simply perform well, who contravene peer group norms and as a result are 'punished' with low status. This argument, Hargreaves pointed out, is reinforced by the finding that athlete-scholars spend a great deal of spare time involved in non-academic pursuits and therefore they can't achieve their superior grades by 'swotting'. Thus academic achievement by itself is associated positively with peer group status, it is hard work rather than good grades which is frowned upon.

Although Connell and his colleagues did not investigate the status rankings of different types of students in the way Coleman did, the similarity between other findings of both studies (in particular those concerning what students wished to be remembered for at school) suggests that the attitudes of Australian adolescents concerning the relative acceptability of studiousness and scholarship, may be similar to those found by Coleman in his American sample. Certainly, there is no doubt about the importance of their peer group in the lives of Australian adolescents. Connell et al. found that in all age groups (from 11 years to 20 years) within both sexes and among those both in and out of school, less than 10 per cent of respondents (and in many cases less than 5 per cent) indicated that they would break with their group for a while if they disapproved of a particular group decision; a maximum of 2 per cent in each category of age, sex and occupation.
(in and out of school) said they would join another group. Breaking with a group or joining another might be a rather drastic response to a single group decision, but over 60 per cent in every category said that they would always conform and participate if only under protest.

Summary and Conclusions

Studies such as Coleman's and the one by Connell et al. have told us a great deal about adolescents in Western society: their values and attitudes; their habits and pastimes; their relationships with each other and with their parents; and, of particular interest in the present review, the behavioural and attitudinal correlates of in-school peer group status. The findings reviewed in the last section represent only a small fraction of the wealth of information which can be obtained from both studies, but demonstrate beyond doubt the importance of the role played by relationships with peers in the life of every adolescent.

However, as Morrison and McIntyre (1973) pointed out in the passage quoted in the introduction to this chapter, we still know relatively little about the peer group's effects on the academic performance of its members. Why do adolescents seek out their peers so assiduously, and more importantly, how do students' social relations with their peers influence their academic performance? These questions remain unanswered.

It will be recalled that a similar question was posed at the conclusion of the review of research concerned with the student-teacher relationship. Specifically it was asked: 'How does students' experience of social interaction with their teacher
influence the essentially cognitive processes associated with scholastic task performance? At that point an alternative approach to the study of student-teacher interaction was proposed in order to answer this question: an approach which emphasized the students' perspective of teacher-student relations rather than the teachers'.

To answer this question with respect to student-peer interaction it is suggested that a similar approach be adopted. Connell et al. describe a variety of relationships which occur between Australian adolescents, but do so from the standpoint of an informed observer and make no attempt to find out what these relationships mean to students in terms of their own experience. If we are to understand the dynamics of the process whereby students' relationships with their peers influence their academic performance, we must first take a closer look at students' own experience of these relationships. Once this is done the relationship between peer-student interaction and academic performance may become easier to explain.

III THE PRESENT STUDY

In the summary of literature concerning teacher-student interaction it was suggested that students' experience of social interaction at school could be assessed in terms of the degree of satisfaction they experience in association with needs aroused during social interaction with teachers. There are strong theoretical and methodological arguments in favour of this approach to the measurement of students' experience of social interaction in school.
Firstly, the literature reviewed in this chapter suggested that students' experience of social interaction within the high school can be profitably viewed in terms of needs satisfaction. Peer group status, for example, obviously constitutes an important goal for adolescents and the need or desire for status (and the extent to which it is achieved) exerts a significant influence on their attitudes and behaviour. Lack of evidence concerning the student's perspective of teacher-student relations prevents a similar statement being made about social interaction between adolescents and their teachers. However comprehensive theoretical analysis (Thelen, 1954; Hargreaves, 1972) suggests that need gratification associated with social interaction at school is at the heart of students' school experience, and exerts a significant influence on academic performance as well as on students' attitudes to school.

Thus it would not be unreasonable to suggest that for a great many students, rapport with their teachers would constitute an important goal and that a desire for rapport (and the extent to which this desire is gratified) will exert a substantial influence on student behaviour. In fact, whether or not adolescents have desires for status and/or rapport, they will experience arousal of one or a pattern of social needs when interacting with their peers. By their nature social needs are aroused by environmental cues present in interactive situations and are satisfied (or left unsatisfied) by the behavioural exchange which this interaction implies. The specific nature of those needs and the extent to which they are satisfied will primarily determine adolescents' experience of high school and can be expected to be related to a variety of educational
outcomes. Specifically it is suggested that satisfaction (of needs aroused during social interaction with peers and teachers) will be positively related to their academic performance and to the favourability of their emotional response to school.

These comments imply that the social need or pattern of social needs aroused during social interaction will vary between individuals and foreshadows the second argument to be made in favour of considering the adolescent experience of interaction in terms of an experience of need arousal and satisfaction. On the basis of research reviewed concerning the relationship between teacher behaviour and student social class it was suggested that students' experience of teacher behaviour was determined by the interaction between their own background (or personality) and their perceptions of the immediate environment. At that point it was argued that social class is too broad a construct to be of use in a study of the psychology of individual behaviour. If experience (and the behaviour which follows from it) is the outcome of the interaction between personality and immediate perception of the environment, what is needed to assess the individual experience of social interaction is a measure of personality which can not only index fine differences between the backgrounds or personalities of individual students but which can also be meaningfully matched with a measure of individuals' perceptions of their immediate social environment.

Research into secondary needs is sufficiently far advanced to make readily available protocols which measure such differences between individuals. However there are only two theoretical models which incorporate psychological needs, corresponding environmental
factors and the interaction between these two, into a comprehensive explanation of human behaviour and its relation to experience; these are Murray's (1938) Needs-Press Model and Hunt's (1975) Conceptual Level Matching Model. Murray's model was considered to be more appropriate than Hunt's for a study of social interaction such as this one because Murray employed constructs from both the cognitive and affective domains whilst Hunt was primarily concerned with cognitive activity.

The major purpose of this study is to describe the relationship between academic performance and satisfaction associated with social needs aroused in adolescents in school. This relationship is examined in order to throw some light on the major question posed in this chapter: How is adolescents' experience of social interaction with peers and teachers related to their academic performance? The study involves a review of literature to identify firstly dominant social needs aroused in adolescents at school, and secondly the emotional responses associated with different types of need satisfaction and dissatisfaction. Students' emotional responses to different experiences of need satisfaction in the school environment are identified because, as argued earlier, psychological processes become more explicable if a greater number of the factors involved are considered simultaneously.

In order to clarify the relationship between need satisfaction and academic performance, in this study emotional response (and, in particular, state anxiety) is considered as a mediating variable in the relationship between need satisfaction and performance.
In the next chapter the personality-environment interaction approach to research in psychology and education is discussed and reasons for its limited use in research in education are suggested. The two interactive models mentioned above are then described in detail and the decision to use Murray's (1938) model to examine the relationship between students' experience of within-school social interaction and academic performance is defended. The application of Murray's model to educational questions is then reviewed and possible reasons for its limited success in throwing light on such questions are then discussed. On the basis of this discussion two different theoretical perspectives concerning the relationship between need satisfaction and academic performance are presented. Both of these were investigated in this study.
CHAPTER TWO

AN INTERACTIVE APPROACH TO EDUCATIONAL RESEARCH

INTRODUCTION

In Chapter One it was argued that students' experience of social relations with peers and teachers can be understood in terms of the degree of satisfaction they experience in association with social needs aroused in them during social interaction with these significant others. It was also argued that the degree of satisfaction experienced is firstly, determined by the interaction between the types of needs aroused and students' perceptions of their immediate social environment, and secondly, is related to their academic performance.

The relative importance of the contributions which person (in this case social needs) and situation (in this case social environment) variables make to an explanation of behaviour (in this case academic performance) has been a source of considerable controversy in social psychology. Only recently have some of the major protagonists ceased debating this issue from an additive point of view (i.e. whether personality or situations exert the greatest influence on behaviour) and adopted an interactive model of the type suggested above.¹ To date this perspective has had little impact on research in education and in Chapter One this was pointed to as a major reason why educational psychology has made so little progress in explaining the teacher-learning process. One aim of this study is to demonstrate the contribution which the interactive approach could make to this task.

¹ Mischel (1973) is probably the best example of this shift in perspective.
Before examining the reasons for the reluctance of educational psychologists to adopt the interactive paradigm the trait theorists versus situationists controversy will be briefly summarized. This will provide a statement of the interactionist argument and indicate the position of the present study within the wider social psychological literature.

I THE INTERACTIVE PARADIGM

The Traits vs Situations Controversy

The study of the relationship between personality and behaviour has a long history and a great many psychologists have argued that personality traits, inferred from cross-situational consistencies in subjects' responses, are the primary determinants of behaviour (Alker, 1972; Cattell, 1946, 1950; Guilford, 1959; McClelland, 1951). However, despite the amount of work which has been carried out in this area, there is little agreement concerning the nature and number of traits which constitute the basic antecedents of behaviour. As Endler (1975) pointed out 'If traits were really basic, then at the very best one would expect that different theorists derive the same kinds of traits or at least the same number of traits' (p.58). This comment is supported by Argyle and Little (1972) who noted that French (1953) identified over 950 different 'traits' referred to by different researchers in the psychology of personality literature.

Furthermore, recent reviews of this literature have revealed little evidence to indicate that people's personality and behavioural characteristics are consistent across situations, but rather have tended to suggest that these are situation specific (Mischel, 1968, 1969, 1971; Argyle and Little, 1972). Mischel (1968, 1969) found that while there was some evidence of cross-situational consistency of behaviour within the cognitive domain of personality (e.g. intelligence and field dependence), there was very little within the social domain, particularly with respect to such aspects of social behaviour as
dependence, attitudes to authority, rigidity, aggression and conformity. Mischel (1971) concluded that people respond the same way in different situations only when such situations have the same meanings for them i.e. when they expect that the same behaviour in each will lead to similar consequences. Argyle and Little (1972) also found little support for trait theory in a review of studies of social behaviour (leadership, persuasibility, conformity, popularity) person perception and responses to self-report inventories of behaviour in social situations.

The failure to demonstrate the enduring nature of personality traits across situations led some psychologists, and particularly the social learning theorists, to place emphasis on the situation rather than the person when looking for an explanation of behaviour (Bandura and Walters, 1963; Farber, 1964; Mischel, 1968, 1969; Skinner, 1953). It is important to note here that the social learning theorists did not dismiss individual differences entirely from an explanation of behaviour but considered their contribution to an explanation of behaviour to be relatively minor in comparison to that made by situations. Mischel (1968) pointed to the weak (although statistically significant) associations between measures of individual differences and behaviour and argued that 'These weak associations become understandable when the enormous variance due to situationally specific variables that determine the consequences for behaviour in any particular context is recognised' (p.83). However, the most radical exponents of situationism have suggested that behaviour is entirely determined by the social context in which it occurs. Weisttein (1973), for example, concluded that 'Compared to the influence of the social context within which a person lives, his or her history and "traits", as well as biological makeup, may
simply be random variations, "noise" superimposed on the true signal which can predict behaviour' (p.395).

In recent decades the stimulus-response (S-R) theories of situationism (or behaviourism) have gained popularity at the expense of the response-response (R-R) theories of trait psychologists. A major reason for this has been that S-R methodology, which allows the manipulation and control of the stimulus situation (which evokes the behavioural response), has appeared to follow the experimental method of the natural sciences more closely than the correlational approach of trait psychologists in which no such control is possible. This, as Endler (1975) pointed out, has led to the assumption that S-R theories are more 'scientific' than R-R theories. However, situationism, like trait psychology, has also been heavily criticized, in particular by Bowers (1973).

Bowers (1973) pointed out that situationism has, firstly, tended to wrongly identify S-R relationships with the independent-dependent variable relationships which characterize the experimental method, and secondly, assumed that demonstrating a reliable relationship between stimulus and response is the same as establishing a causal link between them. He argued that the situationist view of causality in human affairs in which stimulus and response are linked causally without reference to any other (intervening) factors, is analogous to one in physics in which a causal relationship between the act of dropping an apple and its falling to earth is established without any reference to the laws of gravitation. (The two events are linked to be sure, but they are not linked causally in the way the situationists
view of 'causality' would have us believe). Bowers went on to say:

In other words, causation derives from a theoretical understanding of empirical relationships, whether these relationships be S-R or R-R in nature. This is a much different understanding of causality than the widespread view which simply assumes that antecedents cause consequences. If causality depends upon a theoretical understanding of observable relationships of either the S-R or R-R variety, then the experimental method loses some of its mystique; one cannot simply conclude that antecedent conditions (stimuli) cause the consequent responses (p.311)

Bowers also criticised situationism on factual and methodological grounds. He quoted evidence from psycholinguistics and elsewhere which has demonstrated conclusively that not all types of behaviour can be accounted for in terms of reinforcement patterns and pointed out how situationists refer to cognitive events to hold their theories together but at the same time dismiss them as irrelevant to an explanation of behaviour. With regard to methodology, he argued that situationism is biased towards finding transituational differences in behaviour within subjects but minimal individual differences within situations, primarily because of its exclusive use of the experimental method. This, he suggested, tends to focus attention on changes in behaviour in such a way that behavioural stability across situations is ignored. In other words, negative findings are not published.

Other critics of situationism have argued that the very idea that the situation can influence behaviour independently of the person is patently absurd, given firstly that situations do not exist in a vacuum but have psychological meaning for people (Endler, 1975), and secondly, that people often, and particularly during inter-personal interaction, create the situations in which they act through their own behaviour (Wachtel, 1973).
In an effort to assess the comparative importance of person and situational factors in determining behaviour, Bowers (1973) examined 11 articles, published between 1959 and 1973, which evaluated the relative contribution of persons and situations to variance in behaviour.

These studies not only looked at main effects but also the variance attributable to person by situation interactions. Bowers found that over all these studies the mean percentage of variance attributable to either persons (\( \bar{X} = 12.71\% \)) or situations (\( \bar{X} = 10.17\% \)) was not sufficient to warrant advocacy or either the trait or situationist positions. However, in 14 of 18 possible comparisons the person by situation interaction accounted for a higher percentage of variance than either main effect, and in 8 cases the amount of variance attributable to the interaction was greater than the sum of the main effects.

The 14 studies examined by Bowers (1973) were of three different types; (a) those in which subjects were asked to describe their behaviour in hypothetical situations using a self-report inventory (e.g. Endler and Hunt, 1969; Argyle and Little, 1972); (b) those in which subjects reported their feelings in actual situations set up by the researcher (e.g. Moos, 1969, 1970); and (c) those in which subjects' behaviour was observed by the researcher (Raush, Dittman and Taylor, 1959; Raush, Farbman and Llewellyn, 1960; Nelsen, Grinder and Mutterer, 1969). Although these studies sampled different populations and employed a variety of research strategies, none of them provided evidence to support either side of the traits versus situations debate. In fact, they indicated that both personality and environmental factors, and in particular the interaction between
these two, must be taken into account if a fuller explanation of behaviour is to be achieved. Similar conclusions have been reached by Fiedler (1971) in his work on leader effectiveness and by Berkowitz (1973) and Moyer (1973) in their studies of human aggression.

Bowers' (1973) review led him to suggest a reformulation of the persons-situations issue which recognised the relatively large amounts of behavioural variance attributable to person by situation interactions. 'Obviously, and to some considerable extent', he argued, 'the person and the situation are codeterminants of behaviour and they need to be specified simultaneously if predictive accuracy is desired' (p.322).

Indeed Endler (1975, 1973) and Endler and Hunt (1966) have suggested that the whole controversy is a pseudo issue because of the way in which questions concerning the influence of persons and situations on behaviour have been asked. Endler (1975) pointed out:

Asking whether behavioural variance is due to either situations or to persons, or how much variation is contributed by persons and how much by situations (an additive approach) is analogous to asking whether air or blood is more essential to life or asking to define the area of a rectangle in terms of length or width. If we continue to ask inappropriate questions about this important personality issue, we will encounter the same difficulties as have been encountered with respect to intelligence and the nature-niture issue. The appropriate and logical question is 'How do individual differences and situations interact in evoking behaviour?' (p.63)

The Interactive Paradigm in Educational Research

The relationship between personality and academic performance has been a source of continuing interest to researchers in education for many years (e.g. Lavin, 1965; Naylor, 1972); and more recently the investigation of the relationship between students' perceptions of psycho-social aspects of the learning environment and their academic
performance has emerged as a systematic field of study (Walberg, 1971; Marjoribanks, 1974). This research has begun to fill a major gap, to which a number of reviewers have referred, in our knowledge of the determinants of academic performance (Bloom, 1964; Schulman, 1970).

However, as Naylor (1972) and Hunt (1975), among others, have pointed out, educationists have yet to face the challenge posed by a research paradigm which considers the interactive effect of personality and environment on behaviour. The reluctance of educational psychologists to adopt an approach of this kind in their study of achievement is surprising, given the long history of this paradigm in psychological and sociological theory. As long ago as 1935 Lewin argued for a model of behaviour which took account not only of individual characteristics and situational factors, but most importantly, the interaction between the two. Since then his proposal has been echoed and re-echoed by a great many authors (e.g. Murray, 1938; Fromm, 1941, 1955; Sullivan, 1953, 1956; Getzels and Thelen, 1960) but few attempts have been made to put them into practice. In a review of educational research Mitchell (1969) argued that the failure of researchers to adopt this paradigm is the major reason behind the failure of contemporary psychology to both predict and satisfactorily explain the social upheavals of the past decade. He concluded:

... if psychology cannot be more effective in contributing to the understanding and solution of the major educational and social problems of the day, it may be so subject to certain distortions and perversions of its fundamental intent that it loses any claim to objectivity as a science (p.697)

Lavin (1965) wrote in a similar, if somewhat less dramatic, manner with regard to research in education. After an extensive review of research on academic performance he concluded that the state of
knowledge in the field was such that it was not of any practical use to school and university teachers and administrators. He further suggested that if significant advances in our understanding of achievement were to be made, researchers would have to come to grips with the full range of personality and situational variables within an interactive model of the type described above. Similarly in this study it is suggested that if educational psychology is to move beyond description to explanation of the teaching-learning processes of interest in this study, researchers must be prepared to adopt the interactive approach.

In the next part of this section (I) the major reason why the interactive paradigm has been so little used in educational research is identified, and a proposed interactive model for the present study [Murray's (1938) needs-press model] is defended in the light of criteria suggested by Hunt (1975) to characterise true interactive research. In Section II Murray's needs-press model is discussed in detail and in Section III the application of this model to research in education is reviewed. Attempts to predict academic performance in terms of need-press constructs have met with limited success and possible reasons for this are also forwarded in this section. Section IV contains a summary of the work reviewed in this chapter and an outline of the contents of Chapter Three.

Sources of Resistance to the Interactive Paradigm in Educational Research

Hunt (1975) identified a number of sources of resistance to the interactive paradigm and suggested that the most important of these among educational psychologists 'has been an excessively restrictive definition of person-environment interaction' (p.209). Such interaction has generally
been defined as statistically significant disordinal interactions (accompanied by significantly different mean scores) between selected instructional methods and individual aptitudes, in other words as Aptitude-Treatment Interactions (ATI's) (Bracht and Glass, 1968; Bracht, 1969, 1970).

An example of this type of study can be found in Oliver and Shaver (1966). These authors studied the relationship between two different methods of teaching students' awareness of, and the factors involved in, policy decision-making, and a variety of personality characteristics including authoritarianism, need for structure and the ability to tolerate hostility of others. No main effects were observed in relation to instructional technique but Oliver and Shaver found significant interactions between the type of instruction method employed (Treatment) and particular student personality characteristics (Aptitude). A 'discussion debating' instructional method in which the teacher played only a minor part proved superior in promoting learning among students who had low scores on authoritarianism and need for structure but high scores in ability to handle hostility; in contrast students high in authoritarianism, high in the need for structure and low in ability to handle hostility fared better under an instructional method in which the teacher played a much more dominant role.

1 Disordinal interaction indicates that one treatment is specifically matched to one type of person and another treatment is specifically matched to another type of person.
However, the failure of the majority of ATI studies to reveal interaction effects of the type described above (Bracht, 1969, 1970) has led, Hunt (1975) argued, to the general conclusion among educational psychologists that behaviour does not vary as a function of the interaction between person and situation (Glass, 1970). Hunt concluded that the term ATI might have to be abandoned altogether because the effect of its restricted definition has been that the challenge of person-environment interaction to psychology, far from have been tested and found wanting, has yet to be met.

In order that the interactive approach be judged on its merits Hunt proposed Lewin's (1936) familiar statement that behaviour (B) is a function of individual difference (P) and environmental press (E), i.e. B=f(P.E). He identified four basic characteristics of the B-P-E paradigm and discussed them using examples from his own work on matching the conceptual level of students' cognitive functioning with the structural complexity of their classrooms (Harvey, Hunt and Schroder, 1961; Hunt, 1971). These four characteristics are outlined below and the contrasting deficiencies of ATI research indicated.

Characteristics of the B-P-E Paradigm

The first and most important characteristic of the B-P-E paradigm is that the study of behaviour is approached at the outset from an interactive point of view, so that personality and environment can be

1 More recently Cronbach and Snow (1976) have criticised this conclusion arguing firstly, that Bracht's definition of ATI was too restrictive (they regarded ordinal interactions as well as disordinal ones as evidence of ATII), and secondly, that in some cases he has misinterpreted the literature (see pp.492-496).
assessed in potentially compatible terms. In Hunt's own work this is done by describing people 'in terms of accessibility characteristics that are directly translatable into specific forms of educational environments likely to be effective for the person's learning or development' (Hunt, 1975; p.219).

In the Conceptual Level Matching Model, personality is considered in terms of conceptual level or the degree of cognitive complexity (differentiation, discrimination and integration) and interpersonal maturity with which students approach their schoolwork. The learning environment is considered in terms of the degree of structure inherent in educational programs offered to the student i.e. how much cognitive and social responsibility he is expected to assume for his own education.

Once environment and personality are assessed in a compatible manner, the two can be matched in such a way as to meet the particular needs of individual students. Hunt and Hardt (1967) (cited in Lesser, 1971) for example, found that structured programs were more effective in learning terms for low conceptual level students, while more flexible programs which allowed the student to partially direct his own learning were more effective with high conceptual level students. Thus the better a student is 'matched' to his learning environment the more successful he is likely to be. Hunt (1975) stressed the need for a language to describe person-environment interaction and cited Stern's (1970) congruence/dissonance nomenclature as one example of such a language.

In contrast, ATI research firstly concentrates purely upon student personality traits and teacher instructional methods (e.g. Oliver and Shaver, 1966) whereas the B-P-E paradigm is potentially
applicable to the study of human behaviour in a variety of situations: Secondly, in the ATI model no attempt is made to measure person and environment in comparable terms so that the students' strengths can be complemented by the environment and his weaknesses compensated for. Aptitude and instructional method are assessed independently of one another in whatever way is most convenient to the researcher. Thirdly, in the ATI studies no attempt is made to consider the degree of match or congruence between the person and his environment in the manner described above; interaction is defined in statistical terms and analysis of variance is employed to test for the existence of dis-ordinal interactions between aptitude and instructional treatment.

The second characteristic of Hunt's (1975) B-P-E paradigm is that it goes beyond contemporaneous matching of person and environment and considers this interaction from a developmental perspective. Personal development can be viewed as a function of the interaction between the person's particular stage of development (personality) and his environment. As the student grows, for example, he or she must experience a variety of environments to ensure that motor, cognitive and social skills develop correctly.

For development to be studied from an interactive point of view the personality measure employed must not only be potentially compatible with environmental measurement but also indicate different levels or stages of personal growth. Once the teacher has a development goal in mind (e.g. a high conceptual level) he can determine at what point of development each of his students are and adjust the degree of structure in his environment (see, for example, Hunt and Sullivan, 1974).
Within the ATI model no attempt is made to examine interaction from a developmental perspective and, given that personality and environment are not matched, this would not be possible in the manner described above.

The third characteristic of the B-P-E paradigm is that it is reciprocal: it takes into account not only the influence of the environment on the person but also the influence of the person upon the environment. This is of relevance to the present study because although, as we have seen, there is a great deal of research into the effects of the educational environment (e.g. teacher behaviour) on student behaviour, very few studies have considered 'student-pull', the effect of the student on the environment.

The Conceptual Matching Model has been used to explore the phenomenon of student-pull. Hunt and Joyce (1967), for example, found that teachers' instructional methods were influenced by the conceptual level of the students whom they were teaching. Other workers have investigated the relationship between the personality characteristics of tertiary students and their choice of learning environment (e.g. Pascal, 1973).

The effects of student personality on the instruction they receive or choose is not of immediate interest in this study; however, the influence of students' personality on their perceptions of the environment, the so-called 'projection effect', is of major interest. The ATI approach can take into account the effects of student aptitude on instructional method; but the lack of direct comparability between the measures employed would generally make interpretation of observed associations between aptitude and treatment somewhat difficult.
Finally, Hunt also emphasised that the practical implications of interactive research should be taken into account when the particular aspects of personality and environment to be studied are decided upon. If this is done, he suggested, the real world importance of any findings may become more obvious to the practitioner: for example, knowing that students who differ in authoritarianism react differently to the same teaching method (Oliver and Shaver, 1966), may be of little use to a school teacher. However, the knowledge provided by Hunt's model that students differ in their ability to cope with the degree of conceptual complexity of a set of instructional materials can be put to immediate and practical use in the classroom.

The Present Study

The relevance of Murray's (1938) needs-press model was discussed at the end of Chapter One. Murray was a clinician but the work of later authors, in particular that of Stern and his colleagues (Stern, Stein and Bloom, 1956; Pace and Stern, 1958; Stern, 1970) to put his constructs on a psychometric footing has provided us with a comprehensive methodology ideally suited to investigating the nature of adolescents' experience of social interaction in the school environment and the relationship between this experience and their academic performance.

Murray's needs-press model also meets all but one of the four criteria of interactive research proposed by Hunt (1975). Firstly, within the model behaviour is viewed as contemporaneous interaction between potentially compatible aspects of person and environment, which leads to a variety of behavioural outcomes. Secondly, the reciprocity of influences (and in particular projection effects) can be considered within the model and thirdly, knowledge gained from applying the model to a particular situation can be put to practical use.
Murray's needs-press theory, however, does not consider the differential effects of environment on human development, the second characteristic of the interactive paradigm described by Hunt (1975). In this study we are primarily concerned with students' contemporaneous experience of social interaction and the relationship of experience to performance, rather than the developmental influence of this experience. Accordingly the lack of a developmental perspective in Murray's needs-press model of behaviour does not present an obstacle to its application in the present study.

Educational psychologists now have sufficient knowledge of the major predictors of academic performance for interactive research to become part of the mainstream of research in education. When this occurs its potential contribution to a greater understanding of student behaviour can be fully explored. To ignore this capability and to concentrate on the relationship either between environment and student performance or between personality and performance is to miss the chance of contributing to the advances of which Lavin (1965) spoke.

An interactive perspective of this kind does more than simply check for statistical interactions between person and environmental factors. In any study conceptualised in terms of the interactive paradigm, person and environment are described and measured in a potentially compatible way. This permits later co-ordination so that the degree to which each individual 'meshes' with his or her environment can be determined.

An understanding of how well students feel they fit into the world of the school around them, and which particular aspects of this 'fit' are crucial to their happiness and well-being, will tell us a
a great deal more about students' behaviour in school and why they behave the way they do, than would merely attempting to account for variance in a particular behavioural index in terms of unrelated measures of aptitude and instructional treatment. 'Unrelated' is used in the sense that the measures are not selected and used such that it is possible to co-ordinate them into a picture of a person's experience or his or her world in the manner described above. Such pictures are necessary if researchers are to have the ability to predict events in the real world and to understand them when they occur; the criteria Mitchell (1969) prescribed as being the test of the usefulness and social relevance of research in psychology, particularly with regard to education.

II MURRAY'S NEED-PRESS MODEL

Murray spent part of his career in psychiatry. His subsequent work as a psychologist, particularly his conception of personality in terms of needs and personality development as an interactive process between person and environment, reflects his interest in psychoanalysis. Specifically he regarded behaviour as the outcome of the interaction between needs and environmental forces which reflects the close relationship between his work and Lewin's (1935).
Murray defined needs as hypothetical constructs (hypothetical in that they are inferred from behaviour) representing forces within the person, forces which organise 'perception, apperception, intellection, conation and action in such a way as to transform in a certain direction an existing, unsatisfying situation' (Murray, 1938, p.124). Needs are both dispositional in the sense that they are enduring personality traits within people, and motivational in that before they direct or redirect behaviour they must be triggered from within the person, or more frequently, by stimuli in the person's immediate environment. In Murray's nomenclature such environmental stimuli were referred to as press (singular and plural). Thus a particular need 'manifests itself by leading the organism to search for or avoid encountering or, when encountered, to attend and respond to certain kinds of press' (p.124). Although a majority of the needs identified by Murray are rarely seen in contemporary psychological writing his basic concept of needs as forces which energise and give direction to behaviour is fundamental to modern social psychology. His concept of need provided the theoretical underpinnings for the extensive research which Atkinson and his colleagues (Atkinson, 1958) have carried out into the achievement motive as well as subsequent research by others which their work has stimulated.

According to Murray environmental press can be positive or negative and mobile or immobile. A positive immobile press is a passive environmental situation which a person might actively seek
out (e.g. a park on a sunny day) while a mobile negative press is a situation in which a person is affected by undesirable (to him) external forces over which he has little or no control (e.g. a storm or an angry parent). Authors writing since Murray have generally simplified his conception of press to aspects of the environment which have significance for the person in the sense that they cause him to act. This appears reasonable because although Murray distinguished between alpha press ('the press which actually exists as far as scientific inquiry can determine it', p.122) and beta press ('the subject's own interpretation of the phenomena that he perceives', p.122) it is beta press Murray argued which interacts with the person's unique pattern of needs to determine his level of satisfaction in any given situation. Thus there is little point in labelling individual press positive or negative since what will appear negative to one person will be positive to another and indeed the relative attractiveness of a particular press may vary for one person over time. A press which corresponds to a particular need is one which supports and encourages the expression of that need and in a situation in which needs and press are complemented a person experiences need satisfaction or appeasement. In a later interpretation of Murray's theory, Stern (1970) called this type of complementary relationship, need-press congruence. A crucial aspect of Murray's theory is that needs and press are interrelated to the extent that if an individual does not experience a particular need, environmental objects or people which might be related to that need have no significance for that person in terms of constituting beta press. The individual is aware of those people or that behaviour but they do not affect his current level of need satisfaction or dis-satisfaction. Thus press depends upon needs. This point becomes
particularly important when the beta press which individuals perceive is inferred from their reported observations of situational events; a technique used universally in the measurement of environmental press. Although a particular individual might report a great deal of, for example, affiliative behaviour, if he is not experiencing some degree of arousal of need for affiliation such reported behaviour will not constitute beta press.

Murray's theory stated that human behaviour can be interpreted in terms of efforts to maximize need satisfaction and minimize dissatisfaction (need-press dissonance in Stern's nomenclature) within the constraints of a particular situation. Congruence between need and press is associated with satisfaction and fulfilment while 'discomfort and stress are the concomitants of dissonance' (Stern, 1970; p.8).

Murray was concerned with the broad range of human experience and behaviour, physiological, cognitive and emotional, and the fact that he identified forty needs and complementary press within each of these domains reflects the comprehensiveness of his theory. His model is therefore applicable to a wide range of behaviour in a variety of situations. Hunt's (1975) Conceptual Level Matching Model, on the other hand, considers the relationship between person and environment in terms of the degree of cognitive and social maturity required for successful adaptation to a particular learning environment; consequently his model is less applicable than Murray's to the study of affective aspects of person-environment interaction proposed in this study.
When conceptualised in terms of need-press theory, social interaction can be regarded as people relating to each other in order to satisfy particular types of needs (e.g. need for affiliation) aroused either spontaneously within each individual or by appropriate cues within the interactive situation (e.g. expressions of friendship by another). The outcome of interaction can be envisaged as a relatively congruent or a relatively dissonant relationship between the particular needs and press involved, both of which can result in a variety of behavioural outcomes. For example the mutual cessation of interaction between two individuals may be associated with temporary satisfaction of the need for affiliation within both participants, or the interaction may be broken off by one party and rejoined elsewhere, possibly at a later time, as he or she, dissatisfied by the course of the first interaction, continues to seek 'an end situation which stills (appeases or satisfies) the organism' (Murray, 1938, p.124). This comment and Stern's (quoted above) suggest that satisfaction or (congruence) as conceived by Murray and Stern, is associated with a reduced level of arousal and dissonance or dissatisfaction with an increased level of arousal. In other words as the degree of perceived dissonance increases so will the subjects' level of arousal.

III APPLICATION OF THE NEED-PRESS MODEL IN EDUCATIONAL RESEARCH

The Stern Scales

Stern and his colleagues (Stern, Stein and Bloom, 1956; Pace and Stern, 1958; Stern, 1962a, 1962b, 1963a, 1963b, 1970) developed paper and pencil instruments to measure thirty of Murray's original forty needs (The Activities Index of AI) and thirty parallel environmental press in a variety of situations (college, industrial, high school).
These measures represent the most extensive attempt in the literature to put Murray's model on a psychometric footing and the bulk of research concerned with the needs-press model has been carried out using these scales.

Stern (1970) defined needs as 'organisational tendencies that give unity and direction to a person's behaviour' (p.6) and argued that needs can be inferred from the preferences individuals express in response to descriptions of a variety of activities. Stern, however, stressed that these activities must be within the bounds of the person's real life space rather than merely expressed wishes elicited by fantasy material, the approach employed by TAT measures. For example, if subjects indicate that they like going to parties, meeting new people and going out with a group and such like activities we infer that they have a strong need for affiliation. If they indicate that they like taking on difficult tasks, striving to do their best etc. we infer that they have a strong need for achievement. Stern's rationale has been widely used in personality testing [e.g. Edwards's (1953) EPPS and Gough's (1958) CPI]. Stern acknowledged the problems of validation and reported a series of studies (Stern, Stein and Bloom, 1956) which demonstrated that needs, as measured by the AI, were unique configurations and that they were related in a predictable way to independent analysis of the TAT, Rorschach and Sentence Completion Test.

For each of the thirty ten-item need scales in the AI, Stern and his colleagues developed complementary press scales. Unlike needs which originate from within the person, environmental press is perforce situation specific and therefore separate measures were
developed for tertiary institutions (the College Characteristics Index or CCI) and high schools (the High School Characteristics Index or HSCI), as well as other measures of non-educational environments. The titles of the thirty need and press scales are given in Table 2.1.

Table 2.1

Titles of Stern's (1970) thirty complementary need and press scales*

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Achievement</td>
<td>17. Humanities-Social Science</td>
</tr>
<tr>
<td>3. Adaptability/Defensiveness</td>
<td>18. Impulsiveness/Deliberation</td>
</tr>
<tr>
<td>5. Aggression/Blame Avoidance</td>
<td>20. Nurturance</td>
</tr>
<tr>
<td>8. Counteraction</td>
<td>23. Play/Work</td>
</tr>
<tr>
<td>10. Dominance/Tolerance</td>
<td>25. Reflectiveness</td>
</tr>
<tr>
<td>11. Ego Achievement</td>
<td>26. Science</td>
</tr>
<tr>
<td>12. Emotionality/Placidity</td>
<td>27. Sensuality/Puritanism</td>
</tr>
<tr>
<td>13. Energy/Passivity</td>
<td>28. Sexuality/Prudishness</td>
</tr>
<tr>
<td>15. Fantasied Achievement</td>
<td>30. Understanding</td>
</tr>
</tbody>
</table>

*Stern (1970, Appendix, A)
Murray's distinction between alpha and beta press has already been noted. Stern drew a further distinction between two types of beta press. He argued that within a situation (e.g. a particular institution) individuals' perceptions of the environment (beta press) will at some point merge and they will begin to make common interpretations of events around them; this type of press, which is obtained by pooling individual beta press scores, he called consensual beta press. Whether alpha, beta or consensual beta press is employed in a study depends upon the question being researched. We shall return to this problem of measuring environmental press in Chapter Six.

For Stern, press refers to a taxonomy of situational variables (resources, expectancies and behaviour) which characterize a given situation and which constitute a stimulus configuration capable of facilitating or impeding the expression and satisfaction of a particular need or pattern of needs. Each individual's particular view of the world can be inferred from his perceptions concerning the presence or absence of particular situational variables in a given environment. The degree of congruence or dissonance experienced is then inferred from the extent to which the type of environment a person perceives is compatible with his needs. The following example of need-press congruence is taken from Pace and Stern (1958):

A high need for Energy is inferred from liking such activities as: 'taking up a very active sport. Having something to do every minute of the day. Giving all of my energy to whatever I happen to be doing.' The needs of such a person might be expected to find fulfilment and satisfaction in a college environment where: 'There is an extensive program of sports and informal athletic activities. Student gathering places are typically active and noisy. Class discussions are typically vigorous and intense'. (p.40)
A person with a low energy need on the other hand would experience a high degree of dissonance if they perceived their college environment in the same way (i.e. active and noisy). If, however, they perceived their college as a fairly quiet place with few extra-curricular activities they would experience congruence with respect to their energy need. The problem of measuring need-press dissonance will be taken up again later in this chapter.

Stern (1970) made the point that responses elicited by both need and press inventories 'involve judgements about the self as an object and should be regarded as components of cognitive structure, rather than as reflections of internal drive states' (p.11). In other words, these responses reflect subjects' perceptions of themselves as actors in a particular situation rather than their level of arousal at the time of testing. From a comparison of need and press scores we infer the degree of satisfaction (and level of arousal) which subjects' will generally experience in a given situation (in this case high school). For example, we would expect that adolescents who generally experience satisfaction of needs aroused during social interaction with peers and teachers (e.g. need for affiliation) will report a higher degree of congruence with respect to those needs (and experience lower levels of arousal) than adolescents who do not generally experience satisfaction of needs of this kind. Such social needs are aroused by cues present in the interactive situation and are satisfied or left unsatisfied by the behavioural exchange which this interaction implies. Students who experience satisfaction of social needs during interaction are also more likely to enjoy successful relations with peers and teachers than students who remain dissatisfied. This will be so firstly because they will be more content and relaxed in the
interactive situation which will encourage other participants to continue the interaction, and secondly, because they will not attempt to fundamentally change the social behaviour of other participants (and hence antagonise them) in order to increase their own sense of satisfaction. A dissatisfied student will be less content in the interactive situation which will serve to discourage other participants from continuing or even initiating interaction with them, and will be more likely to exert pressure on other participants to change their behaviour which will serve to antagonise them. This will be particularly true of a dissatisfied student interacting with his teachers. In order to gain more attention (and thereby satisfy his social needs) he may engage in disruptive behaviour in the classroom; this will force the teacher to turn his attention away from the work in hand which will annoy him and serve to make his relations with that pupil worse than they were before. A dissatisfied student may be caught in a vicious circle but this, as we shall see, is not necessarily the case.

In Chapter One it was suggested that the degree of satisfaction students experience during social interaction with peers and teachers will be positively related to their academic performance and to the favourability of their attitudes to school. We can now suggest that the degree of congruence they report in association with needs aroused during social interaction will be positively related to (or correlated with) their academic performance and the favourability of their school-related attitudes. In other words, the degree of dissonance they report will be inversely related to academic performance. This hypothesis which is similar to one proposed by both Pace and Stern (1958) and Pulvino and Hansen (1972) is tested in the present study.
But it is possible that dissonance and performance will not always be inversely related. We have suggested that the degree of congruence reported will be positively related to the degree of success students enjoy in their social relations with peers and teachers. It is possible that a dissatisfied student who is not enjoying successful relations with his teacher will work harder in order to gain approval and generally improve the state of his relations with his teacher; thus, students who report high levels of dissonance with respect to social needs may, as a result, perform better than those reporting congruence. Those reporting dissonance will work harder in order to gain the approval which those reporting congruence do not need (since they are already satisfied) and consequently, those reporting dissonance may in fact perform better than those reporting congruence. This argument is consistent with the evidence reviewed in Chapter One which suggested that students who performed well were better liked by their teachers than those who performed poorly (Williams and Knecht, 1962; Bush, 1954). Thus working hard and performing well is a realistic way for students to improve their relations with their teacher and provides dissatisfied students with a way out of the vicious circle referred to earlier. Thus, to the extent that students experiencing dissonance associated with needs aroused during interaction with their teachers attempt to improve their relations with their teacher by working hard and improving their performance, dissonance and performance will be positively related.

In Chapter One we also saw that academic brilliance and peer group status may be positively related. Consequently, students who do not experience satisfaction of status needs during interaction with peers may attempt to improve their status by performing better
at school. Thus, once again, dissonance associated with needs aroused during student-peer interaction may be positively related to academic performance and not, as suggested earlier, inversely related. Obviously there is a limit to which students can improve their performance at will but under some circumstances at least experiences of dissonance may act as an incentive to the student to engage in academic activities and result in improved performance e.g. for students in a low performing class.

Viewed in this way need-press dissonance is similar in concept to the idea of extrinsic motivation developed by Atkinson and his colleagues in their theory of achievement motivation (Atkinson, 1957, 1964; Atkinson and Feather, 1966; Atkinson, 1974a), in the sense that it is a positive tendency (other than tendency to succeed) which encourages students to engage in achievement activities.

We have now introduced two opposing hypotheses concerning relationships between need-press dissonance and academic performance. Before these are explored further, it will be useful to review the use of the Stern scales in earlier research and, in particular, relationships between dissonance/congruence and academic performance developed in these earlier studies. Such a review will provide a background to the ways in which this problem was approached in the present study.

Use of the Stern Scales in Earlier Research

Both need and press scales have been widely used by educational psychologists particularly in studies of tertiary students, although some research has been conducted at the secondary level. These scales have been used, for example, to describe a variety of learning
environments (Stern, 1963(b), 1965, 1970; Kight and Herr, 1966; Mitchell, 1968, Marks, 1970), to distinguish between groups of students in terms of their personality characteristics (Chilman, 1959; Cosby, 1962; Stern, 1962; McLaughlin, 1966; Vacchiano and Adrian, 1966), to examine the relationship between personality and academic performance (Stern, Stein and Bloom, 1956; Webb, 1967; Lachia, 1969) and the relationship between students' perceptions of their learning environments and academic performance (Thistlewaite, 1959; Herr, 1965; McKell, 1968; Weisberg, 1969; Meyers and Rigsby, 1967; Nasiadka, 1970). The results of studies in these two latter groups have generally indicated that both needs and press are significantly related to academic performance.

Of particular interest in this review are studies which have looked at the relationship between need satisfaction or need-press dissonance and academic performance. Some time ago Pace and Stern (1958) suggested that the degree of need-press congruence/dissonance reported by students might predict academic performance but relatively little research has been directed at this question at either the tertiary or secondary levels of education. Hayes (1974) studied the relationship between need-press dissonance and academic performance among negro college students. To do this he correlated students' scores for the thirty individual need and corresponding press scales and compared the resultant matrices of academically successful and unsuccessful students. Dissonance was indicated by significant negative correlations while congruence was indicated by significant positive correlations. The findings indicated that need-press dissonance was inversely related to academic performance among both males and females.
Froe (1962) — cited in Stern (1970) — on the other hand, found that students whose need patterns most closely matched those of their college environmental press were least likely to utilise their scholastic aptitude. Froe tried to account for his findings by arguing that there was no prevailing press for scholastic excellence in the particular college he studied.

In a study of Australian university students Genn (1970) confirmed Pace and Stern's (1958) hypothesis that performance is inversely related to need-press dissonance. Genn assessed congruence by firstly factoring all 300 items of the Activities Index (30 scales with 10 items in each) and a similar number of items of a modified version of the College Characteristics Index, Stern's measure of university environmental press; he then took the difference between the raw scores of corresponding need and press factors. Subjects were split into three groups in terms of their academic performance. Findings indicated that when low and medium performers were grouped together as a low performance group, low performance was related to dissonance between factors reflecting achievement striving, emotional expressiveness and sociability. However these findings were not confirmed when low and medium performers were considered separately: the low performers were more like high performers in terms of their patterns of need-press relationships than medium performers.

If support for Pace and Stern's (1958) hypothesis is not clearcut at the tertiary level, there is even less evidence in favour at the high school level. Pulvino and Hansen (1972) examined the relationship between need-press dissonance and indices of manifest anxiety, alienation from school and academic performance. Nine corresponding need and press scales were chosen 'that in the past
had shown a facility for indicating significant relationships between variables' (p.71). Scores on each need and press scale were divided into low, average and high categories and subtracted from each other, rendering a dissonance score of 0, 1 or 2. When the results of each subtraction for the nine scales were summed, the possible range of need-press dissonance scores was 0 to 18. They found a significant positive relationship between manifest anxiety and need-press dissonance but none between this construct and either academic performance or alienation from school.

In an Australian study Choo (1973) used four different measures of need-press dissonance derived from all thirty of Stern's need and press scales. Three of these he found to be unrelated to high school performance and one indicated that high achievers were more likely to experience need-press dissonance than low achievers; a finding opposite to the one predicted at the tertiary level by Pace and Stern (1958) and at the secondary level in this study. Choo however did not control for scholastic aptitude. Finally Gardner (1972) in another Australian study tested, at the high school level, Pace and Stern's (1958) second hypothesis, that need-press dissonance is associated with overall student satisfaction. Gardner assessed need-press dissonance by matching corresponding levels of eight need and complementary press scales. In two cases (need for achievement matched with teacher press for achievement and need for play matched with teacher press for pleasure) he found dissonance to be inversely related to enjoyment of high school. Overall these findings suggest that some combination of need and press scales of the type developed by Stern have the potential to predict behaviour and attitudes among secondary school
students, but the inconsistencies in the results of studies carried out
to date require further consideration if these scales are to become
useful research tools.

Reasons for the Lack of Success of Need-Press Constructs as Predictors
of Academic Performance

There appear to be three reasons for the lack of success of
tries to predict academic performance in terms of need-press relation-
ships noted above. These are firstly, the rationale used for selecting
particular relationships for study; secondly, the assessment of need-
press congruence or need satisfaction; and thirdly, the failure of
earlier researchers to fully explore theoretically the nature of the
relationship between perceptions of congruence/dissonance and academic
performance.

Literature reviewed in the previous chapter indicated the high
school experience was primarily a social one determined by the nature
of students' interaction with their teachers and peers. Furthermore
this experience was seen to be closely related to academic performance.
If this is the case, studies which attempt to demonstrate a relation-
ship between high school performance and measures of experience which
tap areas in addition to the social domain, might be expected to be
unsuccessful. This is in fact what occurred in the Choo (1973) study
reviewed earlier. Measuring need-press dissonance in terms of the
total set of Stern's need and press scales, which, as we have seen
sample a wide range of cognitive, physiological and other non-social
as well as social experience, may have made Choo's measures too
general to pick up a relationship between purely social experience
and performance, if one in fact exists.
For need-press dissonance to successfully predict academic performance at the high school level it may be necessary to use some subset of the total number of Stern's need and press scales which reflect purely social experience. Pulvino and Hansen (1972) selected a subset of nine need and corresponding press scales, but found no relationship between dissonance and performance. A closer look at the rationale they employed to select these scales seems to be in order.

These authors noted that Stern (1961) identified three major dimensions of need and press from a factor analysis of all the original AI and HSCI items. These factors were:

(a) Intellectual Need-Press
(b) Dependency Need-Press
(c) Emotional Expression Need-Press

Pulvino and Hansen then selected three corresponding need and press scales from each of these factors on the basis of their 'facility for indicating significant relationships between variables' (p.71). Not surprisingly this selection procedure produced a rather odd collection of need and press scales: namely, achievement, conjunctivity and science from factor (a), adaptability, nurturance and order from factor (b), and aggression, narcissism and sexuality from factor (c).

Research carried out in this way can hardly hope to further our understanding of student behaviour. Even if Pulvino and Hansen (1972) had found a significant relationship between congruence and performance, we would have been no more the wiser since they furnished no theoretical argument to support their hypothesis that these particular nine need-press constructs would predict high school academic performance.
If the relationship between performance and a particular subset of need-press constructs is to be studied, the selection of these constructs must be made on the basis of sound theoretical considerations. Otherwise research time and effort are likely to be wasted. In the present study the subset of need-press constructs chosen to predict academic performance were those considered to reflect the dominant motivational dimensions of students' social interaction with their peers and teachers. The theoretical rationale for this decision was provided by the literature reviewed in the previous chapter which indicated, as mentioned earlier, that the school experience is primarily a social one. If this is the case need-press constructs selected on the basis of the criteria described above should predict high school performance.

Another possible explanation for the failure of need-press congruence to consistently predict academic performance in the studies reviewed earlier, can be found in the methods used to calculate the discrepancy between need and press in these studies. Researchers have tended to lose sight of Murray's original comments concerning the relationship between need and press.

As was pointed out earlier, Murray emphasised that needs and press are related to the extent that environmental stimuli only constitute press for a particular need if the person or persons concerned experience some degree of arousal of that need, i.e. that press depends upon needs. Thus, an individual may report a great deal of affiliative behaviour in his immediate environment, but if he is not experiencing some degree of arousal of need for affiliation this reported behaviour will not constitute beta press. In such a case it would be wrong to conclude, as did Pulvino and Hansen (1972),
that such a person would be experiencing a large discrepancy between need and press or, in other words, a dissonant relationship between need and press.

In fact, it is possible that 'true' dissonance (i.e. dissonance of the type conceptualised by Murray) only occurs when needs exceed perceived press rather than when there is simply a discrepancy between needs and press. In other words, it is possible that a person whose numerical press score exceeds his corresponding need score does not perceive the environment as 'over affiliative' and hence dissonant with his needs in the manner suggested by earlier researchers. Such an individual may simply perceive the environment as sufficiently affiliative for his current needs (a congruent situation) and 'surplus' affiliation cues will not have status as beta press, i.e. they will not affect the extent to which he is satisfied or dissatisfied. If this is the case it may explain why Pulvino and Hansen, for example, failed to find a significant relationship between need-press 'dissonance' and academic performance using a simple discrepancy measure of dissonance. Also, if this suggestion is correct, we should find that measures of dissonance in which needs exceed press to be more closely related to academic performance than those in which press exceeds needs; the former measure will discriminate between students in terms of need satisfaction but the latter measure, in which press either equals or exceeds needs, will not because both these combinations of needs and press will constitute a situation of congruence. The possibility that only measures of dissonance in which needs exceed press are related to academic performance in the manner suggested by Pace and Stern (1958) was tested in the present study.
A third possible reason for the failure of need-press constructs to successfully predict academic performance in the studies reviewed earlier is the lack of thought given at the theoretical level to the nature of the relationship between the experiences of dissonance/congruence and behaviour. For example, in every study reviewed it was assumed that congruence and performance would be positively related (that is, perceptions of congruence would be associated with high performance and perceptions of dissonance with low performance) but no attempt was made to justify this prediction; to explain why it should occur or to identify any variables which might act as mediators. Pace and Stern's (1958) original hypothesis was simply picked up and tested without much thought being given as to why better performance stems from feelings of satisfaction rather than feelings of dissatisfaction. A second and related theoretical assumption which was made in a majority of these studies and which is also open to question is that the relationship between dissonance and performance will always be linear.

We have suggested that students' level of arousal (degree of need satisfaction) in a given situation can be inferred from the degree of need-press dissonance they report with respect to that situation. If that is the case we can expect the relationship between dissonance and performance to be similar to the one described by Yerkes and Dodson (1908). They suggested that increases in drive level or arousal up to some optimal level led to increases in performance but any increases in arousal above this level served to lower performance; below the optimal level subjects are insufficiently motivated to perform at their peak while above this level they become 'over motivated' which impairs their cognitive ability and which in turn lowers their performance. In other words,
we are suggesting that the relationship between dissonance and performance will be curvilinear and in the shape of an inverted U. Stern (1962) in fact foreshadowed this possibility when he speculated that an optimal learning environment might be one which stimulated rather than completely satisfied students, i.e. one in which they experienced some degree of dissonance between needs and press rather than complete congruence.

Another weakness of the studies reviewed earlier is the simplicity of the correlational approach employed in them. Relationships were sought which involved only dissonance and performance and little attempt was made to consider the role of dissonance in interaction with other important determinants of task performance, e.g. need for achievement. Some interactions between IQ and dissonance were examined but that was all. Dissonance and performance may be related, but the nature of this relationship may vary as a function of changes in one or more other variables of importance in the achievement process. If this is the case what is required is a more sophisticated model of the achievement process in which measures of need-press dissonance are viewed as one of a number of variables involved in academic achievement, different combinations of which will be associated with different levels of performance.

In order to incorporate all of these criticisms into the theoretical arguments of the present study, two different perspectives of the relationship between dissonance and performance based on the two opposing hypotheses discussed earlier, were developed and tested. The first of these adopted the correlational approach of earlier studies: measures of dissonance (associated with needs aroused during social interaction) were treated as an index of students' experiences of high school social climate and, in the manner of these

---

1 This is consistent with Thelen's argument that students' experience of high school is primarily an experience of social interaction with peers and teachers.
earlier studies, it was assumed that climatic conditions characterised by an experience of congruence would facilitate performance while conditions characterised by relatively high degrees of dissonance would inhibit performance, i.e. that performance and dissonance would be inversely correlated. However, unlike these earlier studies, in the present study this theoretical perspective is developed to explain why such a relationship is expected to hold. Briefly, it is argued that this relationship is an indirect one mediated by state anxiety; the experience of stress which, as pointed out earlier, Stern considered to be a concomitant of dissonance leads to the arousal of state anxiety which has been demonstrated in a number of studies to impair academic performance. The possibility that this indirect relationship was a curvilinear one of the type described earlier was also investigated. This perspective, which for the purposes of identification, will be called the 'social climate' perspective, is described in Chapter Three.

The second perspective, which is discussed in Chapter Four, attempts to place measures of dissonance associated with needs aroused during social interaction into the framework of the expectancy-value theory of achievement motivation (Atkinson, 1957, 1964; Atkinson and Feather, 1966; Atkinson, 1974a), and argues that the degree of dissonance which students report in association with needs aroused during social interaction with teachers reflects the strength of their extrinsic tendency to engage in achievement activities. Earlier in this chapter it was suggested that students who report high levels of dissonance will work hard and improve their performance in order to gain the approval of their teachers and peers. Consequently, they
may perform better than satisfied students who report low levels of dissonance, who have less need of teacher or peer approval and who do not work as hard as a result. If this is the case, the degree of dissonance which students report will be positively correlated with their academic performance, i.e. an experience of dissonance will encourage students to engage in academic activities. Obviously, there are other factors which contribute to students' overall level of academic performance and one of the strengths of achievement motivation theory is that it takes some of these other factors (students' need for achievement and test anxiety) into account when predicting performance outcomes. From this perspective the degree of dissonance reported is viewed as one of three components which contribute to the final strength of the tendency to engage in achievement activities which is directly related to academic performance. This 'extrinsic tendency' model contrasts sharply with the social climate approach described above and, not surprisingly, leads to a different set of hypotheses concerning the relationship between dissonance and performance. In particular, it suggests how this relationship may vary as a function of changes in the other two components (need for achievement and test anxiety) mentioned above.

**SUMMARY OF CHAPTER TWO**

The literature reviewed in this chapter emphasised the need to adopt an interactionist perspective in the study of human behaviour and suggested that Murray's (1938) needs-press model, as developed by Stern and his colleagues, could be a useful tool for research into relationships between academic performance and adolescents' experience of social interaction in high school. A review of the use of the
needs-press model in educational research suggested firstly that need-press constructs chosen for study must reflect salient aspects of adolescents' high school experience and secondly that more consideration needs to be given to the nature of the relationship between need-press dissonance and academic performance. This second suggestion led to the proposal of two different theoretical perspectives or models concerning this relationship. In the first measures of need-press dissonance are considered to reflect adolescents' experience of the social climate of the high school and to be indirectly related to academic performance. In the second, measures of need-press dissonance are viewed as indices of the strength of the extrinsic tendency to engage in achievement activities which is directly related to performance.

In Chapter Three the four social motives considered to characterise adolescents' experience of social interaction with peers and teachers are identified and the first theoretical perspective described above is discussed. In Chapter Four the second perspective is presented and the hypotheses arising from both perspectives are summarised.
INTRODUCTION

In Chapter One it was suggested that adolescents' experience of the social climate of their high school was primarily a reflection of the quality of their interpersonal relationships with peers and teachers. A review of existing literature suggested that students' perceptions of these relationships were related to their academic performance and emotional response to school. In order to take a closer look at these relationships it was suggested that social interaction could be understood in terms of the degree of satisfaction which adolescents experience in association with needs aroused during interaction (e.g. need for affiliation). By their nature social needs of this kind are aroused by cues present in interactive situations and are satisfied or left unsatisfied by the behavioural exchange which this interaction implies. In the previous chapter it was argued that the degree of need satisfaction experienced could be inferred from the degree of need-press dissonance which students reported in association with such needs.

If social need satisfaction of this kind can be measured using the Stern need and press scales, then the question posed earlier concerning the relationship between students' experience of social interaction and their academic performance can be answered by determining the nature of the relationship between dissonance and academic performance. In the last chapter two different theoretical
perspectives concerning this relationship were proposed. The first of
these perspectives proposed an indirect relationship between dissonance
and academic performance mediated by state anxiety; measures of
dissonance are considered to reflect the degree of satisfaction with
which students regard their social relationships with peers and
teachers. As satisfaction increases (and degree of reported dissonance
decreases) the level of anxiety experienced at school will decrease
and performance will improve. For the purposes of identification
this perspective was called the social climate perspective. The
second perspective places dissonance within a wider theoretical model
(Atkinson's theory of achievement motivation) and considers measures
of dissonance to reflect the strength of students' extrinsic tendency
to engage in achievement activities. Within this model dissonance
is viewed as one of a number of factors which contribute to the
final strength of the achievement tendency and which are directly
related to academic performance. This perspective was called
the extrinsic tendency perspective. Before discussing these two theoretical perspectives in detail
it is necessary to identify the particular social needs which
characterize adolescents' experience of social interaction with
peers and teachers. As was pointed out in the last chapter, one
of the weaknesses of earlier research using Stern's measures was
the failure to select the need-press constructs used on the basis
of sound theoretical considerations. In these earlier studies either
all thirty need and press scales were used or a subset of scales
which bore little or no relation at a theoretical level to the problem
being studied. In the first part of this chapter the motivation
literature is reviewed in order to identify the secondary needs most
likely to be aroused in adolescents during social interaction with their peers and teachers. In the second part of this chapter the social climate perspective is discussed, and in Chapter Four we take a closer look at the extrinsic tendency perspective.

I SOCIAL INTERACTION AND SECONDARY NEEDS

Student-Peer Interaction

Of the research reviewed in Chapter One, that concerned with the informal social structure of the high school and peer group status has come the closest to investigating students' experience of social interaction with their peers. Thus it is here we must look in order to identify the secondary needs which characterise this interaction.

Within the informal social structure of the high school, peer group status is manifested as sociometric status (popularity) or social power. Sociometric status is concerned with the distribution of liking within a group, while social power refers to a person's 'potentiality for inducing forces in other persons toward acting or changing in a given direction' (Lippitt, Polansky and Rosen, 1952, p.39). The measurement of peer group status was discussed in Chapter One.

Studies by Lippitt et al. (1952) and Sherif and Sherif (1964) indicate that sociometric status and social power status are quite closely related. (Their findings indicate correlations of between .60 and .80). The reason for this is that status of both kinds can originate from common resource characteristics. A resource is a particular property of an individual which is valued because it has the potential to contribute to the achievement of group goals. Persons possessing such properties are therefore high status group members.
Among children aged five to twelve Gold (1958) identified five general types of resource characteristics:

(a) 'expertness' (skills valued by the group);
(b) 'coerciveness' (agression and physical strength);
(c) 'social-emotional' (friendliness, tolerance);
(d) 'associational' (common interests and activities); and
(e) 'other' (good looks, valued possessions).

Gold found that the more a personal property is valued by the group (i.e. the more it is a resource), the more it is associated with high status members of the group.

Different types of resources will be associated to a greater or lesser extent with either types of peer group status. Friendliness will lead to popularity as well as social power, which explains the correlations reported above. However while coerciveness may be associated with social power it is unlikely to induce feelings of liking on the part of other group members.

There is some evidence that the sexes differ in terms of the type of status they aspire to. Males appear more concerned with exerting power over others while females tend to relate to others in a more affiliative manner. In an observational study of children aged three to eleven in six different cultures (Kenya, Japan, India, Philippines, Mexico, U.S.A.) Whiting and Pope (1964) distinguished between 'egoistic dominance' (dominance of another for one's own interests) and 'suggesting responsibility' (dominance of another in the interests of that person or for some social good). In each of the six cultures studied, girls were more likely to attempt to control the behaviour of another person in the interests of that other person's welfare. Boys, on the other hand, showed more egoistic
dominance in five of these six societies. Limited evidence also suggests younger boys make more attempts than girls of the same age to dominate adults in the sense of trying to dictate the direction a relationship will take (Bee, 1971; Berk, 1971; Emmerich, 1971 - cited in Maccoby and Jacklin, 1974). However, no studies of this nature have been carried out using adolescent subjects.

These observed sex differences in controlling behaviour agree with findings from studies of adolescent self-esteem, a construct which Schmuch (1963, 1966) has demonstrated to be closely related to students' perceptions of their sociometric status. Schmuch found that both primary and secondary students who perceived themselves as liked by their peers had greater self-esteem than students who considered themselves to be disliked.

Connell et al.'s (1975) Australian findings support Staines' (1963) conclusion that two general sources of self-esteem among adolescents are firstly experiences of success and personal achievement, and secondly experiences of social acceptance by peers coupled with feelings of personal attractiveness. However, Connell and his colleagues also reported that while boys derive self-esteem from only the former source, girls do so from both. Douvan and Golds' (1966) findings agree with those of Connell et al. concerning girls but indicate that boys may not only achieve positive feelings of self-worth from personal achievement but also from successful self-assertion in social situations.

After an extensive review of sex differences in self-esteem Maccoby and Jacklin (1974) concluded that although there is no difference between the sexes in terms of the level of their overall self-esteem, there is evidence to suggest that the sexes differ
with regard to the particular type of social interaction from which they derive self-esteem. Specifically Maccoby and Jacklin suggest that women invest themselves more heavily in affiliative relations with others while men are more concerned with dominating others and have a greater need for dominance or power. To support their suggestion, Maccoby and Jacklin cite a number of studies which indicate firstly that when both pre-adolescent and adolescent subjects are asked to rate their own power, dominance or strength, boys consistently rate themselves higher than do girls (Long, Henderson and Ziller, 1968; McDonald, 1968; Fleming and Anttonen, 1971) and secondly, that while women and adolescent girls rate themselves lower than men in terms of their personal influence on others, they consider themselves to be socially more competent, less shy, more attractive and more acceptable to others than men (Carlson, 1965, 1971; Carlson and Levy, 1968; Smart and Smart, 1970).

These findings are consistent with those reported earlier (concerned with sex differences in the sources of adolescent self-esteem) and lend further support to the suggestion that while males' interaction with their peers is characterised by concerns for personal status and dominance, females are less egocentric in their relationships with others and more concerned with affiliative aspects of interaction. The behavioural manifestations of need for affiliation are 'gregariousness and group-centred, friendly, participatory associations with others' (Stern, 1970; p.315) while need for dominance can be inferred from attempts to gain 'ascendancy over others by means of assertive or manipulative control' (Stern, 1970; p.316).

1 Needs for dominance and power are synonymous in the literature although the term 'power' is used more often than 'dominance'. Stern (1970) uses 'dominance' and because his 'need for dominance' scale was used in the present study this expression is generally adopted throughout.
If adolescents' desire for peer status is motivated by needs for dominance and affiliation, we would expect high status students to experience need satisfaction and therefore, if the predictions made in Chapters One and Two are correct, for status to be associated with superior academic performance and more positive attitudes towards school in general. The available evidence suggests that this is in fact the case. In general the findings of such studies indicate that students who perceive themselves as having high status (of both types) tend not only to have greater self-esteem but also to hold more positive attitudes towards their peers and their school and to exploit their intellectual abilities to a greater extent than students who perceive themselves as having low status (Gold, 1958; Lippett and Gold, 1959; Van Egmond, 1960; Schmuck, 1963, 1966, Schmuck, Luszki and Epperson, 1963; Rosenberg, 1965; Schmuck and Van Egmond, 1965).

Lippett and Gold (1959), for example, asked students to indicate how much they liked each of their classmates and found students low in friendship status of this nature expressed less positive attitudes towards their fellows than high status students in a study of social dominance status. Gold (1958) obtained substantially similar findings. His study indicated that high dominance status students were more friendly as a group, more likely to be helpful to their peers and more extroverted. In contrast low dominance status students were less friendly and helpful towards their peers and more likely to use physical force when attempting to influence their peers.

With regard to academic performance Schmuck et al. (1963) found that students who saw themselves as liked by their peers (sociometric status) were scholastically superior to those who thought of themselves as being disliked. In a more extensive study Van Egmond (1960) examined
the relationship between primary school students' utilisation of their scholastic aptitude (derived from discrepancies between measures of intellectual ability and academic performance) and both types of peer status. He also investigated differences between the sexes. Classroom social structure was measured using sociometric ratings of the type discussed in Chapter One, teachers' ratings and observations of student behaviour.

Van Egmond found that utilisation of intellectual ability among boys was related to their power status or success in influencing others, and among girls to sociometric status or popularity. He concluded: 'it appears that lack of influence ability is a more important disturbance for boys while lack of affectual relationships is the more important disturbance for girls with respect to achievement performance in the classroom' (Dissertation Abstract No. 2201).

The fact that these studies were not carried out using adolescent subjects means that the results reported cannot be directly applied to the behaviour of high school students. However, in a more recent study of Australian adolescents Sheppard (1972) found that academic performance and friendship success were positively related among females while among males the two were unrelated. That friendship success was assessed using student self-reports may have confounded the results of this study because boys may be more reluctant than girls to admit to having few friends. Nevertheless this finding supports those obtained by Van Egmond (1960) which suggests that it may be possible to replicate his other findings at the adolescent level as well.
Conclusions Drawn from the Literature on Student-Peer Interaction

Two initial conclusions can be drawn from the literature reviewed thus far. Firstly, needs for dominance and affiliation are the primary motives behind adolescents' efforts to achieve and maintain peer group status. Secondly, the desire for affiliative feedback from peers is more characteristic of females than males, while the reverse appears to be true of the need for social power or dominance. In other words we can expect females to report stronger affiliative needs than males and males to report stronger dominance needs than females. A third conclusion which can be drawn from the literature reviewed above is that the degree of dissatisfaction or dissonance reported by adolescents in association with needs for dominance and affiliation will be inversely related to academic performance and general attitude towards school. Among males this relationship can be expected to be stronger with regard to need for dominance, and among females need for affiliation. This general conclusion is consistent with suggestions made earlier in discussion of the social climate perspective that need-press dissonance and academic performance will be inversely related.

The strength of either need at any point in time is determined by the interaction between two different factors: these are latent drive strength (a characteristic of the individual) and the particular characteristics of the situation the individual is in (i.e. the presence or absence of relevant arousal cues). In a study of adolescent females Rosenfeld and Franklin (1966) concluded that

---

1 The terms need-press congruence and dissonance are, as pointed out in Chapter Two, used by Stern (1970) to indicate states of need satisfaction and dissatisfaction respectively and these two sets of expressions are also treated as synonymous in this study.
only those girls who experience rejection by others (in the present context, low peer status and low self-esteem) will experience a highly aroused need for affiliation (as measured by the TAT), and it is likely that the same is true of the need for dominance among males. Thus the status position a student perceives that he or she holds vis-à-vis his peers will partly determine the strength of adolescents' needs for affiliation and dominance at school.

Successful relations occur between adolescents and their peers when the needs of the former are met by the behaviour of the latter. Low status students (who receive little positive feedback from peers) are less likely to experience satisfaction of social needs during interaction with peers than high status students (who receive considerable positive feedback). In Chapter Two it was suggested that the degree of need satisfaction experienced in a given situation is reflected in the degree of need-press dissonance subjects report concerning that situation; thus we can expect low status students who do not have particularly successful relations with their peers to report higher levels of need-press dissonance than high status students who do enjoy successful relations with their peers.

Another situation factor which will influence need strength is the degree of desirability attached to peer group membership by the student body as a whole. This in turn is related to the quality of the relationships which individual students have with their parents and teachers (White and Lippitt, 1960; Hargreaves, 1967; Schmuck, 1971; Morrison and McIntyre, 1973).

Hargreaves, for example, found that the higher a pupil was 'streamed' in school on the basis of his past performance, the more likely were his values to coincide with those of his teachers, the more likely he was to seek approval from them rather than his peers,
and the more likely he was to be favoured and rewarded by his teachers at the expense of his peers in lower streams. The lower the stream, Hargreaves found, the less likely were the values of the peer sub-culture to coincide with those of the school and the more likely students were to seek support from their peers rather than their teachers. This last finding accords with that of Anderson (1975) who observed in an Australian study that when adolescents feel that their relationships with their teachers are unsatisfactory, peer relationships become the most satisfying aspect of school for them. Finally, Hargreaves also reported that academic performance is significantly influenced by the source from which a student derives approval, a finding consistent with those reported earlier.

Hargreaves' study is interesting because it raises the possibility that not only can school organisation and teacher relations influence the level of need strength among students, but also the type of need aroused. These possibilities are discussed in the following section.

Student-Teacher Interaction

In Chapter One it was suggested that students' experience of teacher-student interaction could also be conceptualised in terms of need satisfaction, and in this section an attempt is made to determine some of the dominant motives aroused in adolescent students during interaction with their teachers. However the paucity of literature concerning students' perspectives of this interaction noted in Chapter One has meant that the conclusions drawn on the basis of this review are of a tentative nature.
Using Lewin, Lippitt and White's (1939) original study of the social climate of boy's clubs as a guide, Aschuler (1968) isolated need for dominance, need for affiliation and need for achievement as the three most important dimensions of classroom motivational climate in U.S. high schools. Aschuler then took Litwin and Stringer's (1966) framework for studying organisational climate and applied it with these three needs to the classroom situation in order to demonstrate how variations in structure can produce different classroom motivational climates (see Table 3.1). Aschuler suggested that these 'thumbnail' sketches describe pure types of classroom climate and that the most frequently occurring classroom climate is a mixture of the three needs mentioned above, in which power motivation fused with need for achievement dominates, and need for affiliation is emphasised the least.

Although Aschuler was concerned with developing strategies for teachers who wish to effect changes in the motivational climate of their classrooms through structural re-organisation, his analysis has important implications for the present review.

From Table 3.1 it can be seen that the classroom climate is largely determined by the teacher's behaviour; a conclusion consistent with evidence reviewed in Chapter One. Because of the influence which teachers wield and the sanctions which they have at their disposal, students will, over a lifetime in school, learn to defer to and comply with their teacher's wishes, demands and expectations. This suggestion - that students are generally in a position of having to conform in class wether they like it or not - is reinforced by Aschuler's conclusion that power rather than affiliation is the dominant social dimension of classroom motivational climate.
<table>
<thead>
<tr>
<th>CORRELATED BEHAVIOURS AND VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLIMATE DIMENSIONS</strong></td>
</tr>
<tr>
<td>N-Power (Dominance)</td>
</tr>
<tr>
<td>N-Affiliation</td>
</tr>
<tr>
<td>N-Achievement</td>
</tr>
<tr>
<td><strong>Degrees of Structure</strong></td>
</tr>
<tr>
<td>Many rules and regulations</td>
</tr>
<tr>
<td>define specific behaviour</td>
</tr>
<tr>
<td>desired. Conformity is required.</td>
</tr>
<tr>
<td>Few rules and regulations.</td>
</tr>
<tr>
<td>Informality and spontaneity</td>
</tr>
<tr>
<td>are valued.</td>
</tr>
<tr>
<td>Rules designed to focus on</td>
</tr>
<tr>
<td>high performance goals.</td>
</tr>
<tr>
<td>Within the structure, the</td>
</tr>
<tr>
<td>individual is free to set</td>
</tr>
<tr>
<td>his own goals and to act</td>
</tr>
<tr>
<td>with initiative to attain</td>
</tr>
<tr>
<td>them.</td>
</tr>
<tr>
<td>**Emphasis on Individual</td>
</tr>
<tr>
<td>Responsibility**</td>
</tr>
<tr>
<td>Individual responsibility is</td>
</tr>
<tr>
<td>discouraged.</td>
</tr>
<tr>
<td>Permission from the</td>
</tr>
<tr>
<td>teacher is always required.</td>
</tr>
<tr>
<td>Individual responsibility is</td>
</tr>
<tr>
<td>highly encouraged for setting</td>
</tr>
<tr>
<td>goals and initiating action.</td>
</tr>
<tr>
<td>No constraints are placed on</td>
</tr>
<tr>
<td>the person by rules or the</td>
</tr>
<tr>
<td>teacher.</td>
</tr>
<tr>
<td>Individual responsibility is</td>
</tr>
<tr>
<td>encouraged, but within the</td>
</tr>
<tr>
<td>broad limits defined by the rules,</td>
</tr>
<tr>
<td>not by the teacher.</td>
</tr>
<tr>
<td><strong>Risk Taking</strong></td>
</tr>
<tr>
<td>Risk taking is discouraged.</td>
</tr>
<tr>
<td>The way to do well is to</td>
</tr>
<tr>
<td>play it safe, to do what is</td>
</tr>
<tr>
<td>required.</td>
</tr>
<tr>
<td>Few sanctions against failure,</td>
</tr>
<tr>
<td>thus risk taking is encouraged</td>
</tr>
<tr>
<td>and often is unrealistic.</td>
</tr>
<tr>
<td>Moderate risk taking based on</td>
</tr>
<tr>
<td>feedback from previous</td>
</tr>
<tr>
<td>performance is encouraged.</td>
</tr>
</tbody>
</table>

Continued...
<table>
<thead>
<tr>
<th>CLIMATE DIMENSIONS</th>
<th>CORRELATED BEHAVIOURS AND VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N-Power (Dominance)</td>
</tr>
<tr>
<td>Warmth and Support</td>
<td>The teacher is cool, distant and formal. All students are treated alike. Interaction between students is discouraged.</td>
</tr>
<tr>
<td>Emphasis on Rewards vs. Punishment</td>
<td>Rewards and punishments are emphasised equally and are based on what the teacher considers fair.</td>
</tr>
<tr>
<td>Tolerance for Conflict</td>
<td>Conflicts and arguments are resolved by decree. The teacher is right. Students comply.</td>
</tr>
</tbody>
</table>
On the basis of this analysis we might expect the needs which dominate students' experience of social interaction with their teachers will be those which characterise power and affiliation relations between persons of unequal status. From the point of view of the lower status person in any such interaction these will be needs for deference and supplication. It is also possible that, in classrooms in which the teacher places less emphasis on his dominant position, the affiliative motive will also be characteristic of students' experience of interaction with their teacher.

Need for deference, according to Stern, is manifested as 'respect for authority and submission to the opinions and preferences of others perceived as superior' (p.315), and need for supplication as 'dependence on others for love, assistance and protection' (p.317). Given that teachers provide assistance and to a lesser extent protection to their students, as well as demanding conformity and respect from them, both these needs (and to a lesser degree need for affiliation) can be expected to characterise the majority of adolescents' experience of social interaction with their teachers.

The bulk of studies which have compared adolescent boys and girls in terms of their compliance to adult demands have concluded that females are more obedient than males (see, for example, Bronfenbrenner, 1970; Bell, Weller and Waldrop, 1971; Minton, Kagan and Levine, 1971; Serbin, O'Leary, Kent and Tonick, 1975), and Gardner (1972) in an Australian study found that adolescent girls reported significantly higher levels of need for deference than adolescent boys. Consistent with this research are the results of a study by Hollander and Marcia (1970) who found boys to be more
peer-oriented than girls in the sense that they are more likely than girls to support peer interests and values when placed in a situation in which these are opposed to either their own interests and values, or to those of adults. This was found both with students' self-reports and their reports of each other. We have already concluded (in the previous section) that females have stronger affiliative needs than males, and if, as the studies reviewed above suggest, females are more obedient to adult demands and more adult oriented, we might also expect them to have stronger deference and supplicative needs than males. The first of these suggestions is supported by the results of Gardner's (1972) study, but the second must be considered speculative at best.

However, if teachers do dominate proceedings in the classroom to the extent suggested earlier, we would expect students with strong deference, supplicative and affiliative needs to enjoy more cordial relations with their teachers than students with weak needs of this kind. This is because students with strong needs for deference and supplication (and, to a lesser extent, affiliation) are more likely to display patterns of behaviour approved by teachers. For example, they are more likely to defer to their teachers' wishes and to seek their support and approval. Students whose needs for deference, affiliation and supplication are weak, on the other hand, are less likely to display behaviour of this kind and, consequently, to enjoy cordial relations with their teachers. Moreover, since the work reviewed in Chapter One indicated that generally the more cordial relations are between teachers and students, the better students perform (Bush, 1954; Williams and Knecht, 1962; Davidson and Long, 1960; Schmuck and Van Egmond, 1965; Hargreaves, 1967; Imber, 1973), we would also expect students with strong needs of this kind to
perform better than students with weak needs. Thus, if we can demonstrate that females enjoy better relations with their teachers than males and perform better academically in high school than males, it will provide strong support for the suggestions made above that females have stronger needs for deference and supplication than males. And the available evidence indicates that this is in fact the case.

Schmuck and Van Egmond (1965) studied student-teacher relationships with a group of adolescents and pre-adolescent students from a wide variety of backgrounds. They assessed students' satisfaction with their teachers by asking them to indicate how much change they would like to see each teacher make in terms of a number of classroom-related attitudes and activities, e.g. friendliness and discipline; degree of satisfaction was measured by the number of changes students desired and the amount of change they felt was necessary in each case. The results of this study indicated that in general, satisfied students outperformed students who were relatively less satisfied, and that females were significantly more satisfied and better performers than males even though there was no difference between the mean IQ scores of each sex group. This sex difference in performance is consistent with research reviewed in Chapter One which indicated that females' classroom-related attitudes are more congruent with those of their teachers than males'. There is also widespread evidence from both U.S. and Australian studies that females consistently outperform males throughout high school (Walberg, 1969; Rowlands, 1975; Beswick, 1975).

The results of the Schmuck and Van Egmond (1965) study as well as those of the other studies of student-teacher relations mentioned above, suggest that students who enjoy satisfactory relations with
their teachers perform better than those who are dissatisfied. Satisfaction occurs when the behaviour of the teacher meets the needs of the student, which suggests that students who experience satisfaction of needs for deference and supplication during interaction with their teachers will perform better than those experiencing dissatisfaction. Earlier we argued that the degree of need-satisfaction subjects experience in a particular situation is reflected in the degree of dissonance they report concerning that situation. Thus we can expect students who are enjoying successful relations with their teacher to report lower degrees of need-press dissonance and, given the evidence reviewed above, to perform better academically than students who are not enjoying successful relations with their teacher. In other words we can expect perceived dissonance between student needs for supplication, deference and affiliation, and corresponding teacher press will be inversely related to academic performance. Also, if females have stronger needs for affiliation, deference and supplication than males we can expect these needs to characterize their experience of social interaction with teachers to a greater extent than males' experience of this interaction, and consequently, for dissonance associated with three needs to be more closely related to female performance than male performance.
Conclusions Drawn from the Literature on Student-Teacher Interaction

The literature concerning student-teacher interaction reviewed above suggests firstly, that needs for deference, supplication and affiliation characterize the majority of adolescents' experience of social interaction with teachers; secondly, that females have stronger needs for affiliation, supplication, and deference than males, and thirdly, that dissonance associated with these three needs will be inversely related to academic performance. Also, since females appear to have stronger needs for affiliation, deference and supplication than males, it was suggested that these needs would characterize their experience of social interaction with teachers to a greater extent than males and consequently that dissonance associated with these three needs would be more closely related to female academic performance than male performance. However, given the present state of literature in this area these conclusions can only be considered as tentative. None of the studies cited, directly investigated the relationship between academic performance and teacher-student interaction assessed in terms of need satisfaction.
Morrison and McIntyre's (1973) comment, that it is difficult to separate the influence of the peer group on member behaviour from the influences of other social factors was noted in Chapter One. It was suggested then that this distinction would be easier if social influences were examined from the students' point of view. A review of literature from this perspective in this chapter has revealed that needs for affiliation and dominance tend to characterize students' experience of interaction with their peers, while needs for affiliation, supplication and deference tend to characterize their experience of interaction with their teachers.

Peers and teachers influence students through the needs they arouse in them (i.e. the needs adolescents experience during interaction with them), and the behavioural outcomes of these influences can be seen in students' responses to these needs and the degree of satisfaction they experience in association with them. With one exception the needs adolescents experience during interaction with teachers differ from those they experience during student-peer interaction. Thus it is possible to conclude, firstly that the influence which teachers exert on adolescents differs from the influence their peers have on them, and secondly, that the influences of different social factors on students can be separated if the needs which they experience when interacting with significant others both in and out of school can be identified.
II SOCIAL CLIMATE AND ACADEMIC PERFORMANCE

The social climate perspective of the dissonance-performance relationship argues that dissonance and performance will be inversely related; a view consistent with the evidence reviewed in the previous section. An assumption underlying this prediction is that this inverse relationship will hold even when the effects of IQ and differences between schools are controlled: in other words, we are suggesting that students' experience of social interaction with peers and teachers (as reflected in their dissonance scores) will account for a significant amount of variance in their academic performance, over and above that accounted for by IQ and school differences. What is not yet clear is whether this relationship is direct or indirect, i.e. whether perceived dissonance between social needs and corresponding press directly influence academic performance or whether this influence is mediated by one or more intervening variables.

It is important at this point to stress that such a relationship (if, in fact, one does exist) is not considered to occur in one direction only; it is quite likely that the degree of success students achieve in their school affects the state of their relations with peers and teachers and, ultimately, the degree of dissonance they perceive in association with social needs. In this study we are particularly interested in the effects which perceptions of need-press dissonance/congruence can have on academic performance, but the existence or otherwise of such effects does not preclude the possibility that changes in level of performance will also produce changes in perceived degrees of dissonance.
A second point which must also be made here concerns the nature of causation. It will be recalled from the discussion at the beginning of Chapter Two that Bowers (1973) argued that establishing a reliable empirical relationship between two events is not the same as demonstrating that a causal link exists between the two, even if one event (e.g. a report of perceived dissonance) is clearly seen to precede the other (e.g. performance of an academic task) in time. Bowers went on to suggest that causation derives from a theoretical understanding of empirical relationships whether these be S-R or R-R in nature. Thus in order to demonstrate a causal relationship between need-press dissonance and academic performance it is necessary that any empirical relationship which is established between the two be accompanied by a theoretical analysis of that relationship suggesting that it is causal; even then the existence of such a link could only be considered to be a strong possibility, open to theoretical refutation, rather than an established fact.

The social climate perspective considers measures of dissonance (associated with needs experienced during social interactions at school) to reflect students' experience of the high school social climate within which they approach their school work, and argues that different conditions (i.e. different

---

1 This suggestion is consistent with Thelen's (1954) argument that students' experience of high school is primarily determined by the nature of their social interaction with peers and teachers. (see Chapter One)
degrees (or types of dissonance) will be associated with different levels of academic performance; satisfactory conditions (reflected in a low degree of dissonance) will facilitate performance but unsatisfactory conditions (reflected in a high degree of dissonance) will inhibit performance (assuming other factors such as IQ and school effects are controlled). Conditions characterized by dissonance inhibit performance because dissonance will be associated with high levels of state anxiety which will impair academic task performance; in other words, the social climate perspective suggests that an indirect relationship exists between need-press dissonance and academic performance which is mediated by state anxiety (the experiential consequence of perceived dissonance).

**State Anxiety and Academic Performance**

Anxiety has traditionally been considered to be a psychological trait, that is a relatively stable predisposition in people to manifest anxiety reactions (e.g. increased heartbeat) in response to threatening situations (Taylor, 1951; Mandler and Sarason, 1952; Alpert and Haber, 1960). Substantial evidence indicates that high trait-anxious students tend to be self-disparaging and lacking in self-confidence (Lippsitt, 1958; Lighthall, 1963; Suinn and Hill, 1964; Hill and Sarason, 1966). Also after an extensive review of research with primary, secondary, and tertiary students, Gaudry and Spielberger (1971) concluded that high trait-anxious students were consistently less academically successful than low-trait students.
Spielberger, Gorsuch and Lushene (1970) have suggested a distinction be drawn between trait anxiety and state anxiety. They define trait and state anxiety as follows:

State anxiety (A-state) is conceptualised as a transitory emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehension and heightened autonomic system activity. A-states may vary in intensity and fluctuate over time.

Trait anxiety (A-trait) refers to relatively stable individual differences between people in the tendency to respond to situations perceived as threatening with elevations in A-state intensity (p.2).

Trait-State Anxiety Theory argues that state anxiety will fluctuate over time as a function of the interaction between the external situation and internal personality disposition; in a given situation a person's level of state anxiety will be determined by firstly, how threatening they perceive the situation to be and secondly, the extent to which they respond to the perceived level of threat with increases in arousal of state anxiety.

Given the importance which adolescents attach to successful social relations with peers and the dominant position which teachers hold in the classroom, it would not be unreasonable to expect students who report dissonance between social needs and press (i.e. those who are not enjoying successful social relations) to perceive interactive situations in the classroom as more threatening or stressful than those who report a relatively high degree of congruence in association with such needs (i.e. those who are enjoying successful relations). And since trait-state anxiety theory argues that perceptions of stress will be followed by arousal of state anxiety we can expect measures of need-press dissonance and state anxiety to be positively related. (This relationship of course
will be mediated by individual differences in trait anxiety; the strength of a person's state anxiety response to a given situation will increase as his level of trait anxiety increases). Thus differences in reported levels of need-press dissonance will be associated with differences in levels of state anxiety and since high levels of state anxiety impair performance on moderately complex tasks (Hodges and Spielberger, 1969; O’Neil, Spielberger and Hansen, 1969; Spielberger, O’Neil and Hansen, 1971) differences in need-press dissonance should also be associated with differences in academic performance.

State anxiety appears to impair academic performance by reducing the number of cues to which a student is able to respond (Oltman, 1964). This suggestion is supported by Landfield's (1971) finding that anxiety leads to a tightening and simplification of cognitive structure which reduces the range of task-relevant cues perceived by the student. An anxious student will simply have less cognitive 'hooks' on which to hang the information he is receiving. Penney (1965) and Levitt (1967) found persons high in trait anxiety to be less curious than low anxiety persons. Levitt concluded that high trait anxious persons were less interested in new ideas because the narrowing of cognitive structure, induced by state anxiety, inhibited their successful integration; a suggestion consistent with Landfield's finding.

To recapitulate: under conditions of high need-press dissonance students will perceive the high school environment as a stressful situation and experience arousal of state anxiety which will depress their academic performance. The actual level of state anxiety aroused in each student will depend upon their level of trait anxiety but all
students reporting high levels of dissonance can be expected to experience state anxiety sufficient to impair their academic performance. State anxiety appears to impair performance by reducing the range of task-relevant information cues which students perceive and by inhibiting the integration of new ideas into their existing cognitive structures. In contrast, under conditions of need-press congruence or relatively low levels of dissonance students will perceive the high school environment as supportive; they will be less likely to experience debilitating levels of state anxiety and consequently will be better able to exploit their scholastic potential. If this argument is correct we can expect, as has already been suggested, that measures of need-press dissonance will be inversely correlated with academic performance.

We have suggested that under conditions of congruence students will be in a better position to exploit their academic potential. This potential is determined partly by IQ level and partly by the strength of the achievement motive. Need for achievement was the third need identified by Aschuler (1968) as characterizing the motivational climate of the typical high school classroom and, according to Stern (1970), is manifested in behaviour which involves 'surmounting obstacles and attaining a successful conclusion in order to prove one's worth and striving for success through personal effort' (p.315). Need for achievement differs from the needs already discussed in that it is generally considered to be directly related to academic performance, although a number of authors have suggested that this relationship is relatively weak (e.g. Lavin, 1965; McKeachie, Isaacson, Milholland and Lin, 1968; Morrison and McIntyre, 1973).
After a review of research into the relationship between need for achievement and scholastic attainment, Morrison and McIntyre (1973) concluded that need for achievement can be conducive to educational success but the circumstances in which this occurs have yet to be identified. If, as suggested above, students are better able to exploit their academic potential (determined by their IQ and need for achievement) under conditions of low need-press dissonance (i.e. congruence), then the circumstances in which need for achievement is conducive to educational success are those characterized by congruence between social needs and environmental press, i.e. those in which they experience successful social relations with personal teachers. Need for achievement and academic performance then will be more strongly (positively) related under conditions of need-press congruence than dissonance. A similar interaction is expected to occur with respect to relationships between IQ, need-press dissonance and academic performance, i.e. IQ and academic performance are expected to be more strongly (positively) related under conditions of need-press congruence than dissonance.

The Yerkes-Dodson Law

Hebb (1958) concluded that optimal performance occurs at moderate rather than high levels of motivation. This relationship was first discussed by Yerkes and Dodson (1908) and has been formalised in what is known as the Yerkes-Dodson Law, which states that the relationship between motivation and learning is a curvilinear one in the shape of an inverted U. A related hypothesis is that as the task becomes more difficult, optimal drive level becomes
lower; sustained performance on simple tasks requires a relatively high level of motivation whereas performance on more difficult tasks would be impaired by a similar level of motivation.

In Chapter Two it was argued that students' level of motivation in the high school situation could be inferred from the degree of dissonance they report in association with needs aroused during social interaction. If this is the case we might expect reported dissonance and performance to be related in a manner suggested by the Yerkes-Dodson Law; optimal performance will occur at moderate levels of dissonance (which reflect moderate levels of motivation) rather than, as suggested in the previous section, at low levels of dissonance and motivation. This alternative hypothesis suggests that students perform best in an environment which provides a moderate level of stimulation or, in other words, one which only partially facilitates the expression of their personality. A similar suggestion was made by Stern (1962b) (discussed in Chapter Two) and tested by Pulvino and Hansen (1972). Pulvino and Hansen used multiple regression analysis techniques to examine linear, squared and cubed relationships between their measure of dissonance (described in Chapter Two) and academic performance. If dissonance and performance were cuvilinearly related in the manner suggested above the relationship between the squared (2nd order) dissonance term and performance would be statistically significant but Pulvino and Hansen found no significant relationships of any kind between dissonance and performance. Their study was criticised in Chapter Two because of the way in which they measured need-press dissonance (they drew no distinction between dissonance in which needs exceed press and that in which press exceeds needs),
and consequently this study cannot be considered a true test of the curvilinear hypothesis discussed above. This hypothesis was retested in the present study using measures of dissonance which took into account the relative strengths of needs and press.

Hypothesised Relationships Between Academic Performance and Need-Press Dissonance

In the preceding discussion we have proposed two different hypothesis concerning relationships between academic performance and need-press dissonance. The first of these is that this relationship will be an inverse linear one (Figure 3.1A) and the second that it will be an inverse curvilinear one (Figure 3.1B). In the absence of sufficient research evidence to indicate which of these hypothesis is most likely to be correct it was decided to test both in the present study.

A. 

B.

Fig. 3.1. Predicted relationships between academic performance and need-press dissonance.
These hypotheses, of course, do not necessarily conflict with one another as the predicted relationship in Figure 3.1A is incorporated into Figure 3.1B (i.e. the right-hand side of the curve). If an inverse relationship of the type described in Figure 3.1A is found it will not necessarily mean that the one described in Figure 3.1B is incorrect. This latter relationship suggests that when dissonance scores are low to moderate dissonance and academic performance will be positively related but when they are moderate to high these two will be inversely related. If this curvilinear relationship does in fact describe the dissonance-performance relationship but only moderate to high dissonance scores are collected, then only the inverse part of Figure 3.1B will be revealed (i.e. the right-hand side of the curve) which, of course, is the relationship predicted in Figure 3.1A.

**Differential Emotion Theory**

Students' emotional responses to social conditions in the high school will not only fluctuate in intensity in association with different levels of needs-press dissonance, but also in terms of quality depending upon the particular need-press construct with which dissonance is associated. In other words, it is being suggested here that the type of emotional response associated with a given level of dissonance for one need (e.g. need for affiliation) may differ from the type of response associated with the same level of dissonance for another need (e.g. need for dominance). Hitherto this possibility was not taken into account and in the discussion presented in the previous section concerning relationships between state anxiety and dissonance, no distinction was made between different types of need-press dissonance. However, an examination
of Izard's (1972) work, concerning the nature of the anxiety response, suggests that different types of need-press dissonance will be associated with different types of emotional response.

Izard's (1972) Differential Emotion Theory states that anxiety is not a uni-dimensional construct but rather 'an unstable and variable combination of interacting fundamental emotions.' (p.83) The combination of emotions is described as unstable and variable because it is susceptible to change in relation to time, persons and situation and because combinations may vary in quality and intensity. The nine fundamental emotions, different combinations of which (according to Izard) make up the anxiety response, are listed in Table 3.2. These he defined primarily on an a priori basis. The concept of fundamental emotions as labelled and defined

<table>
<thead>
<tr>
<th></th>
<th>The Fundamental Emotions: A Priori Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Interest-Excitement <em>(I-E)</em></td>
</tr>
<tr>
<td>2.</td>
<td>Enjoyment-Joy <em>(E-J)</em></td>
</tr>
<tr>
<td>3.</td>
<td>Surprise-Startle <em>(S-S)</em></td>
</tr>
<tr>
<td>4.</td>
<td>Distress-Anguish <em>(D-A)</em></td>
</tr>
<tr>
<td>5.</td>
<td>Disgust-Revulsion <em>(D-R)</em></td>
</tr>
<tr>
<td>6.</td>
<td>Anger-Rage <em>(A-R)</em></td>
</tr>
<tr>
<td>7.</td>
<td>Shame-Humiliation <em>(S-H)</em></td>
</tr>
<tr>
<td></td>
<td>a. Guilt: Blameworthy, repentant, guilty</td>
</tr>
<tr>
<td></td>
<td>b. Shyness: Bashful, sheepish, shy</td>
</tr>
<tr>
<td>8.</td>
<td>Fear-Terror <em>(F-T)</em></td>
</tr>
<tr>
<td>9.</td>
<td>Contempt-Scorn <em>(C-S)</em></td>
</tr>
</tbody>
</table>

* The dual terms represent relatively lower (left hand terms) and higher (right hand terms) levels of intensity for each emotion.
in Table 3.2 has been used in a number of field and laboratory studies of anxiety (Ekman, Sorenson, and Friesen, 1969; Izard, 1971; Sydner and Katahn, 1970).

Izard argued that both trait and state anxiety should be considered as a variable combination of interacting emotions, but from his comments concerning his attempts to put his theory on an empirical footing, it is clear that he is attempting to identify the emotional components of the anxiety experience or, in other words, state anxiety as it was defined in the previous section. For example, he suggested that "The central aim of the empirical studies was to delineate the components (discrete emotions) of anxiety at the phenomenological level. To accomplish this aim two things were necessary - a technique for measuring the emotions of subjective experience and an "anxiety situation"" [p.85: italics added].

To measure the subjective experience of anxiety, Izard developed an adjective checklist (The Differential Emotion Scale - DES) which enabled subjects to indicate the extent to which each fundamental emotion was present in their experience of an anxiety situation. Underlying the construction of the DES was the theoretical assumption that separate and discrete emotions with measurable experiential properties exist, and the primary purpose in constructing the scale was to develop relatively independent factor subscales corresponding to each of these fundamental emotions. Six or more adjectives were selected to represent each one of the nine emotions, and subjects were asked to indicate on a five-point scale the extent to which each of the 67 adjectives represented how they would feel in a variety of visualised stress situations.
After a number of administrations under varying conditions of emotional arousal (both real and imagined) and item refinements, the DES was found to contain eleven independent factors - one for each of the eight fundamental emotions of enjoyment, interest, surprise, distress, anger, disgust, contempt, and fear; two for shame (shyness and guilt); and one nonemotion factor (fatigue). Izard concluded that although some items did not factor as expected, these results tended to confirm his conceptual analysis of anxiety as a variable combination of interacting fundamental emotions.

The next step in the analysis of anxiety in terms of fundamental emotions was to combine the DES with a standard anxiety scale in order to determine whether items from the anxiety scale would load on different factors of DES. He combined a 33-item version of the DES (three items representing each of the 10 emotion factors and three representing the nonemotion factor of fatigue) with 18 items from the 20-item state anxiety subscale of Spielberger et al's (1970) State Trait Anxiety Inventory (STAI). He administered this new scale (the DES+A) to a sample of first year college students, who were asked to visualise a situation which made them anxious while filling it out. A factor analysis of item responses indicated that the factor content and structure of the DES+A (see Table 3.3) was quite similar to the original larger version of the DES and that the factor structures corresponded well with the a priori-defined fundamental emotions. Izard argued that minor differences between factor structures revealed in different studies can be explained in terms of the between-situation instability characteristic of any state measure.  

1 This comment provides further evidence that Izard was concerned with the components of state anxiety.
The one factor which differs radically from the \textit{a priori}-defined emotions is factor 5 (Anger/Disgust/Contempt), in which all the \textit{a priori} terms for the three emotions of anger, disgust and contempt combined into a single first-order factor. Izard contended that this was consistent with the results of earlier studies using the DES, and suggested that these three were the principal emotions involved in hostility and may not always be clearly differentiated experimentally.

As can be seen from Table 3.3 STAI items loaded on three separate emotion factors, and according to Izard did so in a manner consistent with the rationale behind the construction of the STAI. In their definition of anxiety Spielberger \textit{et al.} emphasised the presence of fear and the absence of security, confidence and joy etc. While acknowledging the STAI as one of the best measures of state anxiety available, Izard argued that items from a scale based on a more comprehensive definition of anxiety would have loaded on more of his fundamental emotion factors. However, the fact that 17 of the 18 STAI loaded meaningfully on three of the factors in Table 3.3 lends further support to the argument that state anxiety is a combination of interacting fundamental emotions.

Izard also demonstrated in a series of studies that whereas the STAI did not discriminate between groups of subjects visualising different types of arousal situations (distress, fear, guilt, shyness and anger), his own DES+A scale differentiated between the same situations at a significant level: highly significant interactions between situation and emotion variables (subjects' mean scores on each factor subscale) indicated that subjects in different arousal situations responded differentially to the several factor subscales.
### TABLE 3.3

Factor analysis of the DES + A† (From Izard, 1972)

<table>
<thead>
<tr>
<th>1. INTEREST</th>
<th>5. ANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>.75 alert</td>
<td>.86 mad</td>
</tr>
<tr>
<td>.75 attentive</td>
<td>.85 angry</td>
</tr>
<tr>
<td>.72 concentrating</td>
<td>.83 disgusted</td>
</tr>
<tr>
<td>.82 enraged</td>
<td>.81 scornful</td>
</tr>
<tr>
<td>.75 alert</td>
<td>.86 mad</td>
</tr>
<tr>
<td>.72 concentrating</td>
<td>.83 disgusted</td>
</tr>
<tr>
<td>.82 enraged</td>
<td>.81 scornful</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. ENJOYMENT</th>
<th>6. SHAME/SHYNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>.83 happy</td>
<td>.80 feeling of revulsion</td>
</tr>
<tr>
<td>*.81 pleasant</td>
<td>.80 feeling of distaste</td>
</tr>
<tr>
<td>*.79 joyful</td>
<td>.77 disdainful</td>
</tr>
<tr>
<td>*.78 content</td>
<td>.74 feeling of distaste</td>
</tr>
<tr>
<td>*.78 delighted</td>
<td>.77 disdainful</td>
</tr>
<tr>
<td>*.71 secure</td>
<td>.74 feeling of distaste</td>
</tr>
<tr>
<td>*.68 confident</td>
<td>.68 joyous</td>
</tr>
<tr>
<td>*.67 relaxed</td>
<td>.68 joyous</td>
</tr>
<tr>
<td>*.66 at ease</td>
<td>.63 sheepish</td>
</tr>
<tr>
<td>*.60 rested</td>
<td>.63 sheepish</td>
</tr>
<tr>
<td>*.43 comfortable</td>
<td>.63 sheepish</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. SURPRISE</th>
<th>7. FEAR/ANXIETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>.85 amazed</td>
<td>*.83 nervous</td>
</tr>
<tr>
<td>.84 astonished</td>
<td>*.82 tense</td>
</tr>
<tr>
<td>.79 surprised</td>
<td>*.81 jittery</td>
</tr>
<tr>
<td>.79 surprised</td>
<td>*.80 fearful</td>
</tr>
<tr>
<td>.78 afraid</td>
<td>*.77 worried</td>
</tr>
<tr>
<td>.77 scared</td>
<td>*.65 overexcited and rattled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. GUILT/ANXIETY</th>
<th>8. FATIGUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.84 regretful</td>
<td>.71 sleepy</td>
</tr>
<tr>
<td>*.84 blameworthy</td>
<td>.71 sleepy</td>
</tr>
<tr>
<td>*.84 guilty</td>
<td>.68 fatigued</td>
</tr>
<tr>
<td>*.71 repentant</td>
<td>.65 discouraged</td>
</tr>
<tr>
<td>*.71 downhearted</td>
<td>.63 sluggish</td>
</tr>
<tr>
<td>*.71 upset</td>
<td>.63 sluggish</td>
</tr>
<tr>
<td>.70 sad</td>
<td>.63 sluggish</td>
</tr>
<tr>
<td>.65 discouraged</td>
<td>.63 sluggish</td>
</tr>
</tbody>
</table>

9. CHANCE FACTOR

*-.55 calm

†Subjects were visualizing an anxiety situation of their own choosing (N = 297)

*STAI items
of the DES+A, thus confirming the notion that different arousal situations can be characterised by unique patterns of related emotions. (In other words, subjects' scores on each factor subscale differed significantly between the different situations visualised). Izard's findings also indicated that, typically, a given pattern of emotions has one emotion that is experienced more strongly and/or more frequently than others; this emotion he considered to be the key or dominant emotion of that particular pattern (i.e. subjects will score highest on the factor subscale representing this emotion).

On the basis of his findings Izard concluded that 'there is a wide variety of discriminable human experiences that can be distinguished in terms of their unique patterns of emotions' (p.123). This conclusion is consistent with the suggestion made earlier that dissonance associated with different social needs aroused by different interactive experiences will be associated with different types of emotional response. Given Izard's findings we can expect different measures of need-press dissonance (if they do in fact reflect qualitatively different experiences of high school social climate) to be associated with different patterns of fundamental emotions in which different individual emotions dominate. This suggestion is of course speculative, because to date no studies of this kind have been carried out.

In the absence of previous research it is difficult to predict how different measures of need-press dissonance will be related to the DES+A factor subscales. However, an attempt can be made to postulate which of the subscales will represent the dominant emotion present in the various experiences of social climate reflected by each need-press measure. It is suggested that (a) dissonance associated with needs for affiliation and supplication will be most
strongly related (positively) to the factor subscale 'fear-anxiety',
(b) dissonance associated with need for deference will be most
strongly related (positively) to the factor subscale 'guilt/anxiety',
and (c) dissonance associated with need for dominance will be most
strongly related (positively) to the factor subscale 'anger/disgust/
contempt'. A fourth and final proposition is that dissonance
associated with all four social needs identified in this chapter
will be inversely related to the factor subscale 'enjoyment'. These
four emotion factor subscales of the eight identified by Izard (1972)
are considered to represent the dominant emotional responses which
will be associated with each of the measures of need-press dissonance
used in this study. Each factor subscale will be associated, to a
certain extent with all four measures of need-press dissonance, but
it is suggested that the relationships predicted above will dominate
a matrix of correlations between the measures of dissonance and the
four emotion factor subscales of the DES+A mentioned above.

There is support in the literature for these last two predictions.
Research reviewed earlier in this study suggested that satisfied
students hold more positive attitudes towards their peers, teachers
and school work than dissatisfied students which is consistent with
the last prediction made above. The third hypothesis is that need-
press dissonance associated with the need for dominance will be
related to the factor subscale 'anger'. Izard considered these three
fundamental emotions to underly feelings of hostility, and the
suggestion that hostility is associated with a lack of satisfaction
of the power motive is consistent with Veroff and Veroff's (1971)
analysis of the need for power. However, apart from this limited
support the hypotheses presented above are made on the basis of intuition rather than a firm grounding in previous research. It is suggested that 'guilt/anxiety' will be related to dissonance associated with need for deference, because students with a strong need for deference are likely to feel guilty if their relations with their teacher (a superior person) are unsuccessful. Also students who do not experience satisfaction of needs for affiliation and supplication when interacting with peers and teachers will feel disliked and unwanted, and the fear/anxiety subscale most clearly reflects such feelings.

**SUMMARY OF CHAPTER THREE**

In the first part of this chapter discussion focussed upon adolescents' social interactions with their teachers and peers and, on the basis of a review of relevant literature, four secondary needs considered to characterise adolescents' experience of such interaction were identified. The needs considered to characterise adolescents' experience of interaction with peers are needs for dominance and affiliation and the needs considered to characterise student-teacher interaction are needs for deference, for supplication and, once again, for affiliation. The evidence reviewed also indicated that females have stronger needs for affiliation, deference and supplication than males, and that males have stronger needs for dominance than females. The evidence reviewed in this section also suggested firstly, that need-press dissonance and academic performance will be inversely related and secondly, that dissonance associated with needs for affiliation, deference and supplication will be more strongly (inversely) related to female performance than male performance,
while dissonance associated with need for dominance will be more strongly (inversely) related to male performance than female performance.

In the second section of the chapter the social climate perspective of the dissonance-performance relationship was described. It was suggested that dissonance and performance would be inversely related because under conditions of dissonance students experience debilitating levels of state anxiety which will impair their academic performance whereas under conditions of low dissonance (congruence) their performance will not be impaired in the same way. It was argued that under conditions of high dissonance performance is impaired in two ways: firstly, because students experiencing anxiety will perceive a reduced range of task-relevant information cues and be less able to integrate new ideas; and secondly, because they will be less able to exploit their scholastic potential. Accordingly, it was suggested that measures of need-press dissonance will be inversely correlated with academic performance, and that positive correlations between academic performance and both IQ and need for achievement will be stronger under conditions of congruence or low dissonance than high dissonance.

An alternative hypothesis concerning the relationship between academic performance and need-press dissonance was also proposed. The Yerkes-Dodson Law suggests that motivation (arousal) and performance are curvilinearly related. According to this law optimal performance occurs at moderate rather than high or low levels of motivation; in other words the relationship between motivation and task performance is in the shape of an inverted U. In Chapter Two it was argued that students' level of motivation could be inferred from the degree of dissonance they
report in association with social needs aroused during social interaction. Consequently, it was suggested that the relationship between dissonance and performance was an inverse *curvilinear* one rather than an inverse *linear* one.

The discussion of the mediating role of state anxiety in the relationship between academic performance and need-press dissonance led to a consideration of Izard's (1972) Differential Emotion Theory and, subsequently, to the suggestion that the pattern of fundamental emotions associated with measures of dissonance will vary according to the particular need with which dissonance is associated. Specifically it was suggested that the factor subscale 'enjoyment' will be inversely related to all dissonance measures; the factor subscale 'fear/anxiety' will be most strongly related to dissonance associated with needs for affiliation and supplication; the factor subscale 'guilt/anxiety' will be most strongly related to dissonance associated with need for deference; and the factor subscale 'anger/contempt/hostility' will be most strongly related to dissonance associated with need for dominance. Because of the lack of research in this area these hypotheses must be considered, for the time being, as highly tentative.

In the next chapter, the second theoretical perspective concerning the role of need-press dissonance in the achievement process is described. In contrast to the approach described in this chapter, in which the relationship between need-press dissonance is conceived as an indirect one mediated by state anxiety, this second perspective views need-press dissonance as one of a number of variables which together determine the final strength of students' tendency to engage in achievement activities. In other words, in this second perspective
the relationship between academic performance and dissonance is considered to be a direct one. Not surprisingly this alternative view leads to a different, and in some cases conflicting, set of hypotheses concerning relationships between variables of interest in this study. These are presented at the end of Chapter Four.
CHAPTER FOUR
THE EXTRINSIC TENDENCY PERSPECTIVE

INTRODUCTION

Literature reviewed in Chapter Two indicated that although Stern's need and press measures have the potential to contribute to an explanation of academic performance, inconsistencies in the results of earlier studies in which these scales were used have meant this potential has yet to be fully tapped.

One reason offered for the apparent failure of need-press constructs to predict academic performance was the particular type of constructs (i.e. the particular measures of needs and press) employed in these earlier studies. It was suggested that constructs selected to study the achievement process should be chosen on the basis of theoretical arguments which could be justified in terms of the findings of previous research, and in Chapter Three the need-press constructs selected for the present study were defended in these terms. A second reason suggested for why measures of need-press dissonance failed to consistently predict academic performance was the methods used to measure dissonance on these studies. In the light of Murray's (1938) comments concerning the relationship between needs and press it was suggested that 'true' dissonance only occurred when students' needs exceeded their perceived press, and the fact that this possibility was not taken into account when dissonance was measured in earlier
studies might explain their failure to consistently predict performance. The third reason offered for this failure was that the correlational methodology employed in these studies was too simplistic an approach to understanding the role of social motives in the achievement process. It was suggested that in order to fully understand how dissonance associated with social needs is related to academic performance, it may be necessary to consider how this relationship changes as a function of changes in other variables involved in the achievement process. In other words, it was argued that what was required was a more sophisticated theoretical perspective in which need-press dissonance is viewed as one of a number of variables involved in the achievement process, different combinations of which will be associated with different levels of academic performance.

In Chapter Two it was suggested that, contrary to what had been predicted in earlier studies, dissonance associated with needs aroused in adolescents during interaction with peers and teachers may be positively associated with academic performance. To support this suggestion it was argued that students who are not enjoying successful relations with their teachers and have low status in their peer group may attempt to improve their standing in the eyes of both their teachers and peers by performing better at school. Evidence reviewed in Chapter One indicated that teachers were more favourably disposed towards students who performed well than those who performed poorly, and that brilliance in academic activities was associated with high peer group status.
Conceived in this way it was argued that dissonance associated with needs aroused during social interaction is an example of an extrinsic achievement tendency (Atkinson, 1957, 1964; Atkinson and Feather, 1966; Atkinson, 1974a) in the sense that it is a positive tendency (other than tendency to succeed) which encourages engagement in achievement activities. In this chapter an attempt is made to place the concept of need-press dissonance within the framework of the expectancy-value theory of achievement motivation developed by Atkinson and his colleagues. As mentioned above dissonance is only one of a number of factors involved in the achievement process and one of the strengths of achievement motivation theory is that a number of such factors are considered simultaneously in an explanation of achievement behaviour. Placing dissonance within the framework of this theory allows us to develop a more sophisticated view of the role of dissonance associated with social needs in the achievement process and, at the same time, test the possibility that academic performance and dissonance of this kind may be positively related.

In the first part of this chapter the expectancy-value theory of achievement motivation is described and in the second part the role of need-press dissonance within the theory is discussed and hypotheses of relevance to the present study arising from this discussion are presented.

I  THE EXPECTANCY-VALUE THEORY OF ACHIEVEMENT MOTIVATION

Achievement motivation theory states that the final strength of tendency to engage in a particular activity ($T_A$) is determined by the algebraic summation of tendency to succeed ($T_S$), tendency to avoid failure ($-T_f$ which functions as resistance to achievement-oriented activity), and any extrinsic tendency to undertake the
activity ($T_{ext}$). This theory is represented in the following statement: $T_A = T_{S - T_f} + T_{ext}$.

**Tendencies to Achieve Success and Avoid Failure**

The strength of tendency to achieve success is conceived as a multiplicative function of the latent strength of the motive to achieve success ($M_s$), subjective probability or expectancy of success for the particular task ($P_s$), and the relative attractiveness or incentive value of success ($I_s$) at the task (i.e. $T_s = M_s \times P_s \times I_s$).

Set within this expectancy-value framework achievement motivation theory argues that the strength of a person's tendency to succeed at a task will vary as a function of his motive to achieve, his feelings concerning the likelihood of success (expectancy of success) and how attractive success at the task is to him (value of success). It is also assumed that as the difficulty of a task increased the attractiveness of succeeding at it also increases. This relationship is formalised in the statement $I_s = 1 - P_s$.

The theoretical implications of the two statements $T_s = M_s \times P_s \times I_s$ and $I_s = 1 - P_s$ are as follows: (a) Tendency to achieve ($T_A$) is more strongly aroused by tasks of intermediate difficulty (i.e. $P_s > .50$) than by tasks which are either very easy ($P_s > .90$) or very difficult ($P_s < .10$); (b) For a given task, tendency to achieve is more strongly aroused when the latent strength of the motive is great rather than small; and (c) Differences in the strength of tendency to achieve among individuals who differ in the latent strength of their achievement motive have the greatest effect on level of performance when the task is of intermediate difficulty.
The tendency to avoid failure (−T_f), which functions as a source of resistance to achievement-oriented behaviour and subtracts from the sum of positive tendencies to undertake an activity (T_A), is also thought of as a multiplicative function of a motive, an expectancy and an incentive: that is, the motive to avoid failure (M_AF), the expectancy of failure at a given activity (P_f: which is assumed to be proportionate to P_s i.e. P_f = 1-P_s) and the incentive value of failure at that activity (i.e. T_f = M_AF x P_f x I_f). The incentive value of failure is negative in the sense that it is something to be avoided and the repulsiveness of failure increases as the expectancy of failure at the task decreases; failure at a difficult task is obviously more embarrassing than failure at an easy task. This relationship between task difficulty and incentive value of failure is expressed in the statement I_f = -P_s. Once again these two statements (T_f = M_AF x P_f x I_f and I_f = -P_s) lead to a number of expectations concerning the behaviour of individuals in achievement situations: (a) The tendency to avoid failure, which inhibits achievement behaviour and reduces the overall level of performance, is most strongly aroused when the probability of success (and therefore of failure also) is intermediate; (b) For a given task, tendency to avoid failure is more strongly aroused, the stronger the motive to avoid failure (M_AF); and (c) Differences in the tendency to avoid failure will have the greatest effect on performance when the task at hand is of intermediate difficulty and less effect when it is either very easy or very difficult.

1 This concern with both personality and environmental factors places achievement motivation theory within the interactive paradigm discussed at the beginning of Chapter Two.
Both motives to succeed (M_S) and to avoid failure (M_AF) are aroused in achievement situations; that is, situations in which 'the individual knows that his performance is to be evaluated in terms of some external standard of excellence and that the consequences of his actions will either be a favourable evaluation (success) or an unfavourable evaluation (failure)' (Atkinson, 1964: pp.240-241).

Thus tendencies to engage in and to avoid achievement activities have aroused simultaneously and the resultant tendency to engage in the achievement activity will equal T_s - T_f. If the latent strength of the motive to succeed (M_S) is greater than that of the motive to avoid failure (M_AF) then the resultant tendency will be to engage in achievement activities; if, on the other hand, M_S is less than M_AF the resultant tendency is to avoid achievement activity, unless there are present in the situation extrinsic tendencies to engage in the activity which overcome this resistance.

This can be demonstrated by using Edwards' (1962) algebraic simplification of achievement motivation theory. If we remember that the sign of the tendency to avoid failure is negative we can present resultant achievement tendency as (T_s + T_f). Given the theory outlined above we can say that:

(A) T_s + T_f = (M_S x P_s x I_s) + (M_AF x P_f x I_f)

But I_s = 1 - P_s, and P_f is also assumed equal to 1 - P_s, and I_f = -P_s.

Making these substitutions in (A) we have

(B) T_s + T_f = [M_S x P_s x (1-P_s)] + [M_AF x (1-P_s) x -P_s]

(C) = (M_S x [P_s x (1-P_s)]) - (M_AF x [(1-P_s) x P_s])

(D) = (M_S - M_AF) x [P_s x (1-P_s)]
This indicates that when $M_S > M_{AF}$ resultant achievement tendency will be positive, but when $M_{AF} > M_S$ there will be no active impulse to engage in achievement activities unless there is an extrinsic tendency to engage in the activity which overcomes the resistance of the negative resultant tendency. Given this simplification an indication of the strength of resultant achievement tendency can be obtained by comparing subjects' need for achievement scores (which reflect the strength of the motive to succeed) and anxiety concerning achievement (which reflect the strength of the motive to avoid failure). Atkinson and O'Connor (1966) and Entin (1974) produced a single measure of resultant achievement motivation using this approach by converting raw scores for each of these measures to standard scores and subtracting anxiety from achievement.

**Extrinsic Motivation**

The final strength of tendency to engage in achievement activities is also, as mentioned above, influenced by an extrinsic motivation to engage in a particular activity: for example, a desire to please parents by performing well at school. In most achievement situations there will be a number of different extrinsic components in the tendency to engage in achievement activities. Atkinson (1974a) argued that when a person with a strong tendency to avoid failure (who ordinarily would avoid achievement activities) feels compelled to engage in such activities by extrinsic motivation of this type he will experience feelings of anxiety; this is the experiential consequence of his overcoming resistance to achievement-oriented activity, and the strength of anxiety experienced is assumed to be directly proportional to the strength of resistance, the inhibitory tendency that is overcome. Thus the degree of anxiety
experienced in an achievement situation reflects the strength of a person's tendency to avoid failure, from which can be inferred the strength of his motive to avoid failure. This in fact was the rationale used by Entin (1974) and Atkinson and O'Connor (1966) for employing self-report measures of test anxiety (i.e. anxiety in achievement situations) for measuring the strength of the motive to avoid failure in the studies mentioned above.

Strength of Motivation and Efficiency of Performance

Earlier work with achievement motivation theory assumed that the relationship between final strength of tendency to engage in an activity ($T_A$) and efficiency of performance (i.e. level of performance when ability is held constant) is an increasing monotonic function of the type described in Figure 4.1.

![Final strength of achievement tendency](graph)

$T_A = T_s - T_f + T_{ext}$

Fig. 4.1: Assumption that efficiency of performance (level of performance when ability is held constant) increases monotonically as strength of motivation increases until some physical limit or ceiling is reached (from Atkinson, 1974b).
Given this relationship it is possible to predict a positive relationship between the strength of the achievement motive (which reflects the strength of motive to succeed) and performance, and a negative relationship between performance and anxiety (which reflects the strength of motive to avoid failure) (Atkinson, 1974b). With respect to academic performance there is considerable evidence to support the second of these hypotheses [see for example Gaundry and Spielberger's (1971) review of research into anxiety and academic achievement], but relatively little to support the first. A number of authors have suggested that the relationship between need for achievement and academic performance is a relatively weak one (Lavin, 1965; McKeachie, Isaacson, Milholland and Lin, 1968; Morrison and McIntyre, 1973). As noted in Chapter Three Morrison and McIntyre (1973) concluded that although the research evidence indicated that need for achievement could be conducive to educational success, the circumstances in which this consistently occurred have yet to be identified.

Atkinson (1974b) was also concerned about what he called the 'now-you-see-it-now-you-don't' nature of relationship between need for achievement (n Achievement) and performance level, and has suggested an explanation for the inconsistent nature of this relationship based on the Yerkes-Dodson hypothesis concerning motivation and performance. Atkinson cited a study performed by himself and Reitman (Atkinson and Reitman, 1956) which indicated that college males generally performed better at simple arithmetic problems when working alone, than when they both worked in supervised groups and success at the problems carried with it a substantial monetary reward. Atkinson and Reitman
(1956) argued that the general decline in performance in the 'multi-incentive' condition (that in which students were both supervised and rewarded) was due to subjects' level of arousal being raised to the point where it impaired performance. In this condition, these authors argued, subjects experienced arousal of both achievement and affiliative needs as well as a desire for monetary reward, whereas in the 'working alone' condition subjects experienced the arousal of n Achievement only which was sufficient to facilitate performance but not so great as to impair it. Later studies (Atkinson and O'Connor, 1966; Smith, 1966; Entin, 1974; Horner, 1974) have also provided support for the hypothesis that performance could be impaired by excess levels of motivation or achievement tendency.

In a study by Entin (1974) a sample of high school boys were categorized as high or low on resultant achievement motivation (standardized n Achievement score minus standardized Test Anxiety score) and high or low on n Affiliation. The subjects were required to work on a simple and a more complex arithmetic task and were told they would receive either private feedback concerning their performance (no one else would know their mark) or public feedback (marks would be posted on a public notice board). Entin considered both conditions contained achievement incentives but that only the public condition contained an affiliative or approval incentive (i.e. T_{ext}). Thus Entin's subjects were categorised according to personality characteristics and the environmental conditions in which they worked.
He assigned a weight of 1 to below median scores for n Affiliation and resultant n Achievement, a weight of 2 to scores above the median, and weights of 1 and 2 to private and public conditions respectively. Combining weights for the various personality and environment combinations produced four groups which varied with respect to the strength of final tendency to engage in achievement activities (T_A). These were as follows:

I: Consisting of the group with subjects (Ss) high in resultant achievement motivation, high n Affiliation, that performed in the public condition (High-High-Public). This group was assumed to be highest in T_A.

II: Composed of the following groups: Ss high in resultant achievement motivation, high in n Affiliation, that performed in the private condition (the High-High-Private group); the High-Low-Public group, and the Low-High-Public group. This composite group was assumed to be the second highest in T_A.

III: Composed of the following groups: High-Low-Private, Low-High-Private, and Low-Low-Public. This composite group was assumed to be third highest (or next to lowest) in T_A.

IV: Composed of the Low-Low-Private group, assumed to be weakest in T_A.

Entin then compared the performance scores on the arithmetic tasks for each of the four motivation groups. His results are presented in Figure 4.2, where it can be seen that the level of performance for both the relatively simple and the more complex task was related to strength of motivation in a way that is consistent with the hypothesis that overmotivation may produce a loss of efficiency.

The results of these and the other studies cited earlier prompted Atkinson (1974b) to posit the relationship between efficiency of performance (i.e. performance when ability is held constant) and overall level of motivation described in Figure 4.3. This relationship is similar to the one between performance and arousal suggested by Yerkes and Dodson (1908) which was discussed in Chapter Three.
Fig. 4.2: Mean number correct arithmetic problems on a simple and more complex task by junior high school boys classified on resultant n Achievement and n Affiliation and performance with private versus public anticipated feedback (from Atkinson, 1974b).

\[ (T_A = T_S - T_{-f} + T_{ext}) \]

Fig. 4.3: Assumption that efficiency of performance (level of performance when ability is held constant) increases up to some optimal level after which efficiency decreases as motivation increases still further (from Atkinson, 1974b).
Atkinson argued that increases in the strength of the final achievement tendency will be associated with increases in performance level up to an optimum level (M) at which point efficiency of performance is maximized; any subsequent increases in the strength of achievement tendency will impair performance because subjects become 'over-motivated'. Since n Achievement reflects the strength of the motive to succeed increases in n Achievement will result in an increase in the strength of achievement tendency. When achievement tendency is in the weak to moderate range (category 1 in Figure 4.3) n Achievement \((a_1, b_1, c_1)\) will be positively related to performance because increases in n Achievement will raise the strength of the achievement tendency closer to the optimum level. If achievement tendency is in the middle range (2) n Achievement \((a_2, b_2, c_2)\) and performance will either weakly weakly related or there will be no relation between the two at all, while in the high range of achievement tendency (3) n Achievement \((a_3, b_3, c_3)\) and performance will be inversely related. This is because within this range of achievement tendency any increase in n Achievement will serve to raise the final strength of achievement tendency even further from the optimum level; subjects became 'over-motivated' and performance impaired.

Atkinson (1974b) also pointed out that these three hypotheses are paralleled by three others, concerning the effects of anxiety on performance. In this case however the hypotheses are in an opposite relationship to those predicted above since, as suggested earlier, anxiety reflects the strength of the motive to avoid failure, which reduces the overall tendency to engage in achievement-oriented activities. Thus, when the final tendency to undertake an activity is the Weak to Moderate range (1), anxiety will be inversely related to performance (since an increase in anxiety reduces overall level of
motivation and, consequently, performance); in the middle range (2) this relationship will be weak or non-existent, and in the high range (3) this relationship will be a positive one since an increase in anxiety will reduce overall level of motivation and, paradoxically, improve performance. As Atkinson suggested, a positive relationship of this kind implies the non-obvious hypothesis that persons who are most anxious actually perform better than those who are at least anxious under conditions of very high arousal. This relationship should hold according to Atkinson because the effect of anxiety in this situation is to decrease the subjects' overall level of motivation which otherwise will be so high as to impair performance. Atkinson continued the argument:

That is to say, specifically, that if a certain task is sensitive to performance achievement when a person is "over-motivated", and the person in question is both highly motivated to achieve and highly motivated for social approval (as might be inferred from personality tests), and both of these incentives are immediately attainable in the situation, then he should perform better if he is also high in anxiety than if he is low in anxiety (p.199).

This hypothesis is, of course, in direct opposition to the commonly accepted view (outlined in Chapter Three) that anxiety and performance are inversely related.

Implications of the Curvilinear Hypothesis

The notion that n Achievement and performance may be positively related, negatively related or non-related, depending upon the overall strength of tendency to engage in an activity and the nature of the task, is according to Atkinson one of the most plausible explanations of the 'now-you-see-it-now-you-don't' character of the relationship between n Achievement and performance observed in much of the earlier work in
this area. In order to determine what this relationship is likely to be in a particular situation it is necessary to take into account the nature of the conditions and requirements of the task in hand; only then can the final strength of the tendency to engage in an activity be ascertained. Earlier it was noted that Morrison and McIntryre (1973) concluded that n Achievement was conducive to educational success but the conditions under which this occurred had yet to be determined. Atkinson's (1974) suggestions concerning the relationship between the strength of motivation and efficiency of performance give an indication of what these conditions may be.

Atkinson (1974b) himself admitted that his suggestions were speculative and required further empirical support. The available evidence does support the hypothesis of a nonmonotonic relationship between strength of motivation and efficiency of performance, but whether this is a curvilinear relationship of the type described above is still open to conjecture. Entin (1974) for example concluded that 'The curvilinear assumption linking theory of achievement motivation to performance efficiency is only weakly supported, but far stronger is the implication that a simple positive monotonic relationship between strength of tendency \( T_A \) and level of performance is inadequate' (p.235).

The precise shape of this relationship is less important than the possibility that it may not be, as traditionally assumed, an increasing monotonic function of the type described earlier in Figure 4.1, but rather a non-monotonic function the nature of which varies according to the interaction of personality and environmental variables as demonstrated in the Entin (1974) study. This possibility may not only, as suggested by Atkinson, throw light on the relationship
between n Achievement and task performance, but also on the question of central concern in the present study: How is adolescents' experience of social interaction with peers and teachers related to their academic performance?

II NEED-PRESS DISSONANCE AND EXTRINSIC MOTIVATION

The contribution which extrinsic motivation \( T_{ext} \) makes to the strength of final tendency to engage in achievement activities \( T_A \) was discussed earlier in this chapter. It will be recalled that any tendency (other than the tendency to succeed) which compelled persons to engage in achievement activities was considered to fall under the general rubric of extrinsic motivation, e.g. interest in a task, tendency to seek approval from or comply with an authority.

In Chapter Two it was suggested that experiences of dissonance associated with needs aroused during interaction with peers and teachers might in fact encourage students to engage in academic achievement activities, i.e. experiences of dissonance may act as extrinsic sources of achievement tendency. It was suggested that students who had low status in the eyes of their peers and who had poor social relations with their teachers (both of these experiences will be reflected in large dissonance scores) may attempt to gain the approval of peers and teachers by performing better at school. No attempt is being made here to distinguish between different types of dissonance we are simply arguing that an experience of dissonance associated with any of the needs identified in Chapter Three will act as an incentive to students to engage in achievement activities. Unsuccessful teacher
relations or low peer status will not always lead students to work harder; dissatisfied students may, for example, do the opposite and 'drop out' of school. But certainly working harder is one possible response to poor teacher relations and low peer status and must be considered as one determinant of overall performance efficiency in high school.

Measuring extrinsic tendency using need-press dissonance scores is quite different from the method used in the studies reviewed earlier. In the Entin (1974) study the strength of students' extrinsic motivation was estimated from the strength of their affiliative motive and the arousal condition in which they performed the achievement task; for example, students with strong affiliative motives were considered to experience stronger extrinsic achievement tendencies when working in a supervised group situation than when working alone. The point here is that Entin manipulated the conditions under which students worked so that the degree of arousal different groups of students experienced when performing the tasks varied. Measuring extrinsic motivation in this way reflects Atkinson's view of motivation as accounting for the strength, direction and persistence of behaviour. Entin was concerned to determine the strength or vigour with which students pursued achievement goals and manipulated the achievement situation so that the degree of strength, vigour or arousal of goal-directed behaviour varied between students. The measurement of persistence was of less importance in this study because Entin was not interested in students' reactions to success or failure but simply their performance under a variety of arousal conditions. In the present study the degree of extrinsic motivation students experienced when performing academic
tasks was inferred from the degree of dissonance they reported and it was assumed that as the degree of reported dissonance increased, so did the degree of arousal or motivation experienced. Inferring the degree of extrinsic motivation or tendency experienced from the degree of need-press dissonance reported is consistent with the discussion of dissonance in Chapter Two. There it was argued that the degree of motivation or arousal subjects experienced in a given situation could be inferred from the degree of dissonance associated with social needs aroused in that situation which they reported. Murray and Stern used the term satisfaction and congruence/dissonance to refer to subjects' level of arousal in a particular situation; for example, Murray (1938) argued that a situation in which needs and press were complementary (or as Stern put it, congruent) was one 'which stills (appeases or satisfies) the organism' (p.124). In this view satisfaction or congruence is associated with a reduced level of arousal and dissonance with increased arousal, the level of arousal experienced being inferred from the degree of dissonance; as the degree of dissonance reported increases the level of arousal experienced is assumed to also increase.

What we are suggesting then is that the strength of extrinsic motivation (T_{ext}), and (if the strength of resultant achievement motivation is held constant) the strength of overall tendency to engage in achievement activities (T_A), will increase as the degree of dissonance perceived between social needs and environmental press increases. If this is the case it should be possible, on the basis of students' scores on resultant achievement motivation (n Achievement minus Test Anxiety) and need-press dissonance, to place them in different categories according to the strength of their tendency to engage in achievement activities (T_A) at school which will be associated with different levels
of academic performance. Resultant achievement motivation is determined by the respective levels of \( n \) Achievement and anxiety scores; resultant achievement motivation is high when \( n \) Achievement is high and anxiety is low, and is low when \( n \) Achievement is low and anxiety is high. On the basis of these and their dissonance scores students can be placed in high, moderate and low motivation (\( T^A \)) categories which correspond to three different motivational conditions. These are as follows:

I. Low \( T^A \): Students low on resultant achievement motivation and low on need-press dissonance.

II. Moderate \( T^A \): (a) Students high on resultant achievement motivation and low on need-press dissonance. (b) Students low on resultant achievement motivation and high on need-press dissonance.

III. High \( T^A \): Students high on resultant achievement and high on need-press dissonance.

If Atkinson's (1974b) curvilinear hypothesis is correct students in category II should perform better than those in either categories I or III; that is, students with a moderate achievement tendency will perform better (assuming the effect of IQ is controlled) than those with either a weak or strong achievement tendency.

The view of the role of need-press dissonance in the achievement process presented above is radically different from that presented in Chapter Three. There we suggested that a high degree of perceived dissonance reflected an experience of unsatisfactory working conditions within the school environment and would be associated (through the mediating influence of state anxiety) with low levels
of academic performance. In the theoretical model outlined in this chapter need-press dissonance is considered to reflect the strength of students' extrinsic tendency to engage in achievement activities which, under certain conditions of resultant need achievement, will be associated with high levels of academic performance. In order to determine what those conditions will be it is necessary to restate Atkinson's (1974b) predictions concerning relationships between task performance and both n Achievement and anxiety (which were discussed earlier), with reference to the concept of need-press dissonance which has been subsequently introduced.

Atkinson argued that for a task of moderate complexity the relationship between efficiency of performance (level of performance with ability controlled) and final strength of the achievement tendency is a curvilinear one in the shape of an inverted U. This relationship is described in Figure 4.3.

On the basis of earlier evidence Atkinson argued that increases in the achievement tendency will facilitate performance up to an optimum level (M) at which point efficiency of performance is maximized; any subsequent increases in the achievement tendency produce 'over-motivation' which impair performance. Given an overall relationship of this kind Atkinson argued that the direction of relationships between performance and n Achievement and anxiety will depend on the overall strength of the achievement tendency. For example, when the achievement tendency is low n Achievement (a1, b1, c1) and performance will be positively related because an increase in n Achievement will raise achievement tendency closer to the optimal level for that task (see Figure 4.3). In this situation anxiety,
according to Atkinson, will be inversely related to performance because any increase in anxiety will reduce the final strength of the achievement tendency and, by lowering it further from the optimal level, impair performance.

However, when the level of the achievement tendency is high these relationships should be reversed, because an increase in \( n_{\text{Achievement}} \) \((a_3, b_3, c_3)\) will raise achievement tendency even further above the optimal level and thereby impair performance, while an increase in anxiety will lower achievement tendency closer to the optimal level which will facilitate performance. In other words when the final strength of the achievement tendency is high, anxiety and performance will be positively related and \( n_{\text{Achievement}} \) and performance will be inversely related. The first of these is the 'nonobvious' hypothesis refered to in the previous section (i.e. that the inhibitory effect of anxiety - or any other inhibitory tendency - should enhance performance when positive motivation would otherwise lead to a greater than optimal level of intensity of motivation for the task), and is contrary to the relationship between anxiety and performance predicted in Chapter Three.

We have suggested that the strength of achievement tendency may be assessed using measures of need for achievement, test anxiety and need-press dissonance. When measured in this way the final strength of achievement tendency is least when resultant achievement motivation is low (i.e. \( n_{\text{Achievement}} \) is low and anxiety is high), and need-press dissonance (which reflects the strength of the positive extrinsic achievement tendency) is low. In the light of the suggestions made
above we can predict firstly, that n Achievement will be positively related to academic performance when anxiety is high and need-press dissonance is low, and secondly, that anxiety will be inversely related to academic performance when n Achievement is low and need-press dissonance is low. The final strength of achievement tendency will be greatest when resultant achievement motivation is high (i.e. n Achievement is high and anxiety is low) and need press dissonance is low. Thus we can expect firstly that n Achievement will be inversely related to academic performance when anxiety is low and need-press dissonance is high and secondly that anxiety will be positively related to academic performance when n Achievement is high and need-press dissonance is high.

Social Interaction and Academic Performance

In the previous section it was suggested that dissonance associated with extrinsic needs could be regarded as a positive tendency to engage in achievement activities and thus contribute to the final strength of tendency to engage in achievement activities. In this case, the direction of the relationship between dissonance and academic performance may be expected to vary depending on the final strength of tendency to engage in achievement activities, in the same way as the direction of relationships between performance and n Achievement and between performance and anxiety is expected to vary depending on the final strength of this tendency. As dissonance (like n Achievement) is considered to reflect the strength of a positive tendency to engage in achievement activities, it should be related to performance in the same way as is n Achievement at high and low levels of overall achievement tendency ($T_A$). Thus
we can expect, firstly, that dissonance will be positively related to academic performance when \( n \text{ Achievement} \) is low and anxiety is high (low levels of \( T_A \)), and secondly, that dissonance will be inversely related to academic performance when \( n \text{ Achievement} \) is high and anxiety is low (high levels of \( T_A \)). The second of these two hypotheses is consistent with the relationship between need-press dissonance and academic performance predicted in earlier chapters, but the first hypothesis presented above is in direct conflict with it and suggests how an experience of dissonance may serve to enhance academic performance.

If correct, these contrasting hypotheses indicate that the effect of adolescents' experience of social interaction with peers and teachers (as reflected in the degree of dissonance they perceive between social needs and prevailing press) on their academic performance will vary as a function of the strength of their resultant achievement motivation (i.e. \( n \text{ Achievement} - \text{anxiety} \)). Among students with strong resultant achievement motivation the high level of extrinsic motivation associated with perceptions of dissonance will impair performance by raising students' overall motivation beyond an optimal level. In contrast, the low level of extrinsic motivation associated with perceptions of congruence will ensure that overall motivation will remain at or near an optimum level and performance will be facilitated. Among students with weak resultant achievement motivation on the other hand, the high level of motivation associated with perceptions of dissonance will improve performance by raising overall level of motivation close to the optimum point, but the low level of motivation associated with the perceptions of congruence will ensure that overall level of motivation will remain below the optimum level and hence performance will be impaired. In other words, as suggested in the previous paragraphs, among
students with strong resultant achievement motivation dissonance and performance will be inversely related.

Heckhausen and Weiner (1972) criticized the expectancy-value theory of achievement motivation for its 'neglect of all mental events other than expectancy which might have motivational impact, such as information scanning and processing, causal judgements, self-evaluations etc.' (p.139). The refinements to Atkinson's (1974) theory suggested in this study take into account individual differences in information scanning and processing. Atkinson (1974b) suggested that the conditions under which students perform can influence the final strength of the achievement tendency. In the previous section it was argued that students' level of motivation within a given situation (in this study the high school environment) may vary depending upon the degree of dissonance they perceive between their social needs and environmental press, or in other words, the strength of their extrinsic motivation. Students with strong affiliative needs, for example, who perceive the high school as a cold and friendless place (perceived need-press dissonance) can be expected to be more strongly motivated (assuming a fixed level of resultant n Achievement) than those with strong needs who find high school warm and friendly (perceived need-press congruence). Thus the methods by which students scan and process environmental information can be expected to affect the overall level of their achievement tendency and, ultimately, their academic performance.
SUMMARY OF CHAPTER FOUR

In this chapter an attempt was made to place the concept of need-press dissonance within the framework of the expectancy-value theory of achievement motivation developed by Atkinson and his colleagues. This theory states that the final strength of a person's tendency to engage in achievement activities is determined by the sum of two positive tendencies (tendency to succeed \( T_S \) and extrinsic tendency to engage in the activity \( T_{\text{ext}} \)) which encourage the person to engage in the activity, and one negative tendency (tendency to avoid failure \( T_{-f} \)) which inhibits participation in the activity.

In earlier studies the strengths of \( T_S \) and \( T_{-f} \) have been inferred from subjects' scores on measures of \( n \) Achievement and test anxiety respectively, and the strength of \( T_{\text{ext}} \) from the combination of their scores for measures of the strength of extrinsic needs (e.g. \( n \) Affiliation) and the type of situation in which they engage in achievement activities (e.g. by themselves or in a group).

In this chapter a refinement to the measurement of extrinsic motivation was suggested. Earlier studies (e.g. Entin, 1974) assumed that all subjects perceived the achievement situation in the same way, and only distinguished between two groups of subjects in terms of the strength of their extrinsic motivation within a given achievement situation: subjects high in \( n \) Affiliation were considered to experience stronger extrinsic motivation in a particular situation than those low in \( n \) Affiliation. In this chapter it was suggested that finer distinctions between subjects (in terms of their extrinsic motivation) than those made by Entin could be made if measures of need-press dissonance were used to indicate the strength of subjects' extrinsic achievement tendency. If measures of dissonance are
used to assess the strength of extrinsic motivation it is no longer necessary to assume that all students perceive a given situation in the same way, i.e. that a situation perceived by the researcher as 'public' will be perceived as such by all subjects.

The conceptualisation of the extrinsic tendency to engage in achievement activities in terms of dissonance associated with social needs allowed Atkinson's (1974b) hypotheses concerning relationships between task performance, anxiety and n Achievement to be restated with reference to the strength of need-press dissonance. Of particular interest to the present study were the hypotheses concerning predicted relationships between need-press dissonance and academic performance: these were that dissonance and performance will be inversely related when n Achievement is high and anxiety is low (high resultant n Achievement), and positively related when n Achievement is low and anxiety is high (low resultant n Achievement). These contrasting relationships support the suggestion made at the beginning of this chapter: that in order to fully understand how dissonance associated with social needs is related to academic performance it may be necessary to consider how this relationship changes as a function of changes in other variables involved in the achievement process.

In the following section the hypotheses proposed in this chapter and in Chapter Three are summarised. In the next chapter the psychometric instruments used to measure the variables discussed in previous chapters, and the sample of students from whom data were collected are described. In Chapters Six and Seven the results of analysis of the survey data are presented, and in Chapter Eight these are discussed in relation to the hypotheses presented below.
SUMMARY OF HYPOTHESES TESTED IN THE STUDY

The variables of interest in the present study can be divided into three general groups: performance variables (academic performance scores in English and science); background variables (students' sex, school and IQ scores); and the intervening person and situation variables (measures of anxiety, needs for achievement, affiliation, dominance, supplication and deference, and measures of affiliation, dominance, deference and supplication press). Within the context of this multivariate model of achievement we are primarily concerned to determine firstly the nature of the relationship between need-press dissonance and academic performance when the effects of the other variables mentioned are controlled, and secondly how this relationship varies as a function of changes in these other variables.

In this chapter and in Chapter Three two different perspectives concerning the nature of the dissonance-performance relationship were discussed, and the hypotheses derived from these discussions are summarised below:

(A) Hypotheses Derived from the Social Climate Perspective Discussed in Chapter Three

The basic hypothesis derived from discussion of the social climate hypothesis was that:

1. Assuming the effects of sex, IQ and school differences are controlled, academic performance and need-press dissonance will be inversely related in a linear fashion.

An alternative hypothesis proposed concerning this relationship was that:

2. Assuming the effects of sex, IQ and school differences are controlled, academic performance and need-press dissonance will be inversely related in a curvilinear fashion, i.e. this relationship will be in the shape of an inverted U.
Other hypotheses derived from discussion of the social climate perspective are summarised below. (For hypotheses 3, 4 and 5 it is assumed that the effects of sex, IQ and school are controlled and for hypothesis 6 it is only assumed that the effect of school only is controlled).

3. The relationship between academic performance and need-press dissonance will be mediated by state anxiety.

4. (a) Dissonance associated with needs for affiliation, supplication and deference will be more strongly (inversely) related to females' academic performance than to males' performance.

(b) Dissonance associated with need for dominance will be more strongly (inversely) related to males' academic performance than to females' performance.

5. (a) The positive relationship between need for achievement and academic performance will be stronger under conditions of need-press congruence than dissonance.

(b) The positive relationship between IQ and academic performance will be stronger under conditions of need-press congruence than dissonance.

6. (a) The factor subscale 'enjoyment' will be inversely related to measures of need-press dissonance.

(b) The factor subscale 'fear/anxiety' will be most strongly (positively) related to measures of dissonance associated with needs for affiliation and supplication.

(c) The factor subscale 'guilt/anxiety' will be most strongly (positively) related to measures of dissonance associated with need for deference.

(d) The factor subscale 'anger' (i.e. 'anger/contempt/hostility') will be most strongly (positively) related to measures of dissonance associated with need for dominance.
(B) Hypotheses Derived from the Extrinsic Tendency Perspective

Discussed in Chapter Four

7. Students with a moderate achievement tendency will perform better on academic tasks than those with either a weak achievement tendency or a strong achievement tendency.

8. (a) n Achievement will be positively related to academic performance when anxiety is high and need-press dissonance is low.

(b) n Achievement will be inversely related to academic performance when anxiety is low and need-press dissonance is high.

9. (a) Anxiety will be inversely related to academic performance when n Achievement is low and need-press dissonance is low.

(b) Anxiety will be positively related to academic performance when n Achievement is high and need-press dissonance is high.

10. (a) Need-press dissonance will be inversely related to academic performance when n Achievement is high and anxiety is low.

(b) Need-press dissonance will be positively related to academic performance when n Achievement is low and anxiety is high.

It has already been noted that a number of hypotheses presented in Chapter Four conflict with those proposed earlier in Chapter Three and a major purpose of this study is to determine in each case which of the two conflicting hypotheses is supported by the data.

1 For all of these hypotheses it is assumed that the effects of sex, IQ and school differences are controlled.
Chapter Five

Measures and Sample

INTRODUCTION

Chapter Five is split into two major sections. The first section contains a description of the data collection procedures and the sample of students who participated in the study. In Section II the measurement of the variables of interest in this study (needs, press, IQ, academic performance, anxiety and emotional response to school) is described.

I DESCRIPTION OF SAMPLE AND DATA COLLECTION PROCEDURES

The Sample

The 390 students who participated in this study came from Year 10 classes in five Adelaide metropolitan high schools. The number of males and females in the sample were roughly equivalent (males: 190, females: 200) and their ages ranged from 14½ to 16 years. The minimum school leaving age in South Australia is 16 years and students begin to leave school during their fourth secondary year (Year 11). Thus a sample of students from Year 10 classes is more likely to be representative of the total population of South Australian high school students than a sample of students in Years 11 and 12, who come from a population which, to a certain extent will be self-selected.
The South Australian Education Department was asked to supply a list of high schools which were recognised to be 'traditional' in their organisation and teaching methods. No attempt was made to define precisely the term 'traditional'. The Department was simply asked to name schools in which classes were teacher-centred (the teacher is primarily responsible for the pace and direction of all students' learning) rather than pupil-centred (each pupil is primarily responsible for the pace and direction of his or own learning) and in which grades or marks were awarded as part of normal subject assessment.

From this list of ten schools five were selected on the basis of the socio-economic (SES) background of the majority of the students who attended them and the willingness of the principals concerned to co-operate in the study. The five schools selected were all co-educational and the majority of students who attended them came from similar socio-economic backgrounds. The SES background of most students in these schools could be classified in occupational terms as 'white collar clerical' but no systematic attempt was made to determine students' SES background.

Students were questioned concerning both their science and English school work and teachers. Both science and English are compulsory subjects in Year 10 which meant all students in this year were eligible to be included in each school sample. An attempt was made to select students so that a minimum number of teachers were involved in the study of each school i.e. so that most students within a particular school would answer questions concerning the same English teacher and the same science teacher. This criterion was met with varying degrees of success in each school. The size of within-school samples ranged from 59 to 88.
In Table 5.1 the student sample is broken down by sex and school.

Table 5.1

Breakdown of student sample by sex and school

<table>
<thead>
<tr>
<th>SCHOOLS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>22</td>
<td>34</td>
<td>32</td>
<td>47</td>
<td>55</td>
</tr>
<tr>
<td>Females</td>
<td>41</td>
<td>53</td>
<td>32</td>
<td>45</td>
<td>29</td>
</tr>
</tbody>
</table>

Data Collection Procedures

The scales described in the first section of this chapter were presented to students in the form of two questionnaires. In all cases these questionnaires were administered by the author himself in the students' own classrooms (teachers were free to remain or leave as they chose) in a single time period which varied between 60 and 90 minutes. The length of this period depended upon the amount of time allotted for testing by the different schools. With only a few exceptions all students were able to complete the questionnaires in the time available.

Testing was carried out during November and December of 1975. By the end of the school year students are familiar with their school environment and can answer quite detailed questions concerning it without any difficulty. Teachers too are familiar with their students and the grades they award will accurately reflect the academic standard of their students' school work.
II    MEASUREMENT OF VARIABLES

The Measurement of Needs

The five needs identified in Chapter Three namely need for achievement (nAch.), need for affiliation (nAff.), need for supplication (nSup.), need for dominance or power (nDom.) and need for deference (nDef.), were measured with the appropriate scales (2, 4, 9, 10, 29) from Stern's (1970) *Activities Index* (Al) discussed in Chapter Two. Stern's (1970) definitions of these needs and corresponding press can be found in Appendix A1. Individual items from the five need scales used in this study and their administration instructions are contained in Appendix A1.

Stern argued that the needs which characterise an individual's personality must be inferred from the behaviour patterns which reflect his 'life transactions'. Thus needs can be inferred from information concerning what people habitually like and dislike doing. Need for affiliation, for example, is measured by asking respondents whether they like or dislike meeting a lot of people or belonging to a social club and so on. From the extent to which students indicate that they like or dislike performing various affiliative activities the trait level of their need for affiliation is inferred. In a situation in which appropriate arousal cues are present persons with a high trait level of a particular need will experience greater arousal of that need than persons with a low trait level, and as a consequence that need can be expected to have a greater influence on their behaviour.
It is worth noting that although these five needs were selected for study of purely theoretical grounds, Choo (1973) found four of them (as measured by Stern's AI) to be independent of one another. Choo administered all thirty need scales of the AI to a sample of Australian high school students and then factor analysed the mean scores of each of the thirty scales. Varimax rotation of factors indicated that needs for achievement, deference and dominance loaded strongly on three independent factors while needs for affiliation and supplication loaded with similar strength on a fourth. Choo's findings are contained in Table 5.2.

**Table 5.2**

Stern's Activities Index: Rotated Factor Loadings

<table>
<thead>
<tr>
<th>NEED SCALES</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affiliation</td>
<td></td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deference</td>
<td></td>
<td>.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominance</td>
<td></td>
<td></td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td>Supplication</td>
<td></td>
<td></td>
<td></td>
<td>.65</td>
</tr>
</tbody>
</table>

(Source: Choo, 1973)

Choo only reported factor loadings of .35 and above and none of the five need scales in Table 5.2 loaded as strongly or more strongly than this on any but their main factor. Thus, using this figure a criterion for independence, each of the need scales of interest in the study loaded uniquely on a single factor. Choo's findings also
support the theoretical analysis of Chapter Three: firstly, because in that discussion it was suggested that needs for supplication and affiliation could both be aroused in affiliative-type interactions and in Table 5.2 they both load on the same factor; and secondly because in that discussion needs for achievement, deference and dominance were recognised as distinct constructs independent of one another and in Table 5.2 they all load on separate factors.

Stern's original scales were altered for the purposes of this study. Firstly, one item from each ten-item scale was deleted in order to shorten the questionnaire administered to the student sample; the final draft questionnaire was too long to be administered in the time made available by the schools involved (between 60 and 90 minutes). Items deleted were those with the lowest item total correlations in pilot study results. Items used are indicated in Appendix AII.

The second alteration made to Stern's need scales concerned the number of response categories. Stern's original two categories 'Like' and 'Dislike' were expanded to five in this study. These categories were: 'Strongly Like', 'Like', 'Uncertain', 'Dislike', and 'Strongly Dislike'. This alteration was made because, as Skager (in Buros, 1972; p.339) pointed out, Stern's original system can often force the respondent to make a difficult choice between two extreme categories, neither of which may be particularly applicable to him. Five response categories have been used successfully with Stern's Activities Index in other Australian studies (e.g. Bardsley, 1972), and the reliability coefficients reported in Table 5.3 indicate
that the alterations made to these scales did not adversely affect their internal consistency (need for deference being the only exception).

Table 5.3

Reliability coefficients (K-R 20) of five need scales from Stern's (1970) Activities Index obtained from: (a) Stern's original work, (b) an Australian study of Year 11 high school students; and (c) the present study of Year 10 high school students.

<table>
<thead>
<tr>
<th>Sample N</th>
<th>Number of Items</th>
<th>NEED SCALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Stern (1970)</td>
<td>1,076</td>
<td>10</td>
</tr>
<tr>
<td>(b) Choo (1973)</td>
<td>335</td>
<td>10</td>
</tr>
<tr>
<td>(c) Present research</td>
<td>390</td>
<td>9</td>
</tr>
</tbody>
</table>

Stern's (1970) K-R 20 values were obtained from a sample of 1,076 American college students while Choo's (1973) were reported in the study of 335 Australian high school students (Year 11) mentioned above. The reliability coefficients reported in this study were also obtained from a sample of Australian high school students (Year 10, N=390).

1 Means and standard deviations for these altered need scales are reported in Table 1 of Appendix BI.

2 The number of cases (N) used to calculate reliability coefficients for each need scale varied slightly according to the number of cases missing on each scale. The number of valid cases obtained for each scale is reported in Table 1 of Appendix BI.
A reliability coefficient of .38 for the need for deference scale was considered unacceptable and the two items with the lowest item total correlations were eliminated from the scale. (These two items are indicated in Appendix AII). The reliability of this reduced seven-item scale was .60 and this was used for all subsequent analyses. The other four need scales were used in their original nine-item form.

A weakness of the Activities Index is that it does not contain checks of any kind for response sets such as social desirability. Skager (in Buros: p.339) reported a study of 250 college students which found a correlation of .74 between mean AI scores (i.e. mean scores for each need scale), scored firstly for needs (subjects were asked to respond to the items in the ordinary manner) and secondly for social desirability (subjects were asked to give socially desirable responses to each item). However, he pointed out that this does not necessarily indicate that the AI is subject to social desirability response bias but rather that people may tend to see their own personal characteristics as desirable. Skager also reported a study which showed that students were unable to distort their AI profiles when role playing two different occupations. But a second group of students did produce different profiles when asked to respond, firstly as aggressive, and secondly as withdrawn personality types. This second group of findings suggest that the AI need scales may be susceptible to faking, although there is no reason to believe that the students who participated in the present study did, in fact, fake their responses. Skager concluded that if the researcher is interested in describing students "in terms of traditional personality variables like needs for achievement, aggression, reflectiveness, and
the like, then the SA1 (Stern Activities Index)* is a good or better choice than any other instrument measuring similar factors." (p.341 in Buros, 1972).

The Measurement of Environmental Press

Environmental press refers to an individual's perceptions of the extent to which the environment impedes or facilitates the expression and gratification of a particular need or pattern of needs. Need scales assess general dimensions of personality and are applicable in a wide variety of situations. However, as mentioned in Chapter Two, by its very nature environmental press is situation specific and therefore different measures are required to assess press in different situations. Stern (1970) makes this point when he argues that unlike need items:

... press items must be embedded in the context of a fairly circumscribed situation. Psychonomic niches are quite specialised, and tend to be further differentiated by specialised terminologies. What kind of item, for example, would encompass the diverse forms that a press for order might take in an academic, industrial and military setting? Taking attendance, punching the clock and bed-check are part of the jargon of each group and not necessarily well known enough by an outsider for him to be able to equate them readily with the comparable activity from his own institutional setting (p.12).

In this study the particular situations in which environmental press was assessed were those in which students were most likely to consistently interact with their teachers and peers while at school. For teacher-student interaction this is generally the classroom but student-peer interaction occurs both within and outside the classroom.

* Added by present author.
Accordingly, press measures concerned with teacher-student interaction referred to the within-class situation and those concerned with peer-student interaction referred to the whole school environment.

In each situation, the aspects of environmental press assessed were those considered to be potentially complementary to the dominant needs experienced by adolescents in that situation. Classroom specific measures therefore assessed the degree of compliance or discipline exerted by the teacher (compliance press — complementary to student need for deference) and the degree of warmth exhibited by the teacher (warmth press — complementary to needs for supplication and affiliation) in the classrooms of the student sample. School-wide measures assessed the degree of friendliness and warmth among students (affiliative press — complementary to student need for affiliation) and the degree of dominance exerted by students over their peers (dominance press — complementary to student need for dominance).

Environmental press however, will also differ within a given situation as a function of the type of person perceiving it, that is whether the person is an actor in the situation himself (e.g. a student) or a disinterested observer (e.g. school visitor). This distinction between alpha press, the situation as it actually is (or as the majority of onlookers would consider it to be) and beta press, the situation as it is perceived by each individual participant within it, was drawn by Murray (1938). Stern's (1970) further distinction, consensual beta press, was discussed in Chapter Three. There may be considerable disparity between these three types of press but all can be considered as 'real' for the people concerned.

Thus there are three ways of measuring environmental press: private beta press, consensual beta press and alpha press. Private beta press is obtained from individual participants' perceptions
of the situation, consensual beta press is obtained by averaging the perceptions obtained from all participants in the situation (e.g. in a particular class) and alpha press is obtained from trained observers' perceptions of the situation.

This is a study of the relationships between individual's experience of the high school social environment, their emotional response to this experience and their academic performance. Interest therefore is focussed upon the interaction between needs and beta-press and for this reason individual's perceptions of the school environment were not pooled (consensual beta press) but used as a measure of private beta press. The implications which this decision has for the type of research question which can be addressed are discussed in Chapter Six.

(a) Classroom Press

Teacher compliance and warmth press within science and English classrooms were measured using scales developed by Gardner (1972) in a study of Australian high school students (the reason for looking at science and English classrooms only will be explained when the measurement of academic performance is discussed). Gardner constructed his scales along lines similar to those used by Stern (1970) in the construction of his High School Characteristics Index (HSCI) described in Chapter Two. Stern's measure was designed to obtain global perceptions of the whole environment rather than being classroom-specific, which makes it unsuitable for measuring classroom environmental press. Gardner, however, was specifically interested in the environment of the high school physics classroom and developed eight scales to measure eight different aspects of the physics classroom environment. The two scales selected for use in this study
(Teacher Compliance and Teacher Warmth) were easily adapted for use in English and science classrooms by simply substituting the subject name in Gardner's original items. The items and administration instructions (and scoring procedure) for these two scales are presented in Appendix AIII.

The eight scales of Gardner's *Physics Classroom Index* were the result of lengthy construction procedures involving item construction and validation and factor analysis to produce the final scales. This procedure is described in detail in his study (Gardner, 1972). These scales, unlike Stern's HSCI scales, were designed to be directly comparable to appropriate need scales from the *Activities Index*. That Gardner's press scales can be directly compared with AI need scales is of considerable importance in the measurement of the degree of need satisfaction or need-press congruence experienced.

Gardner's Teacher Compliance press scale was designed to be directly comparable to the AI Need for Deference scale. His Teacher Warmth scale however was originally designed as complementary to the AI need for nurturance scale, a need which is not of interest in this study. For the present study the author considered teacher warmth to be complementary to student need for supplication rather than student need for nurturance and used this combination of need and press scales rather than Gardner's original combination.

An aroused need for supplication is reflected in a *dependence upon others* for assistance and protection, whereas need for nurturance is the desire to *support others* by providing them with love and assistance. Gardner's teacher warmth scale measures the degree of support and friendliness exhibited by a teacher rather than the degree to which he or she requires support and protection from others.
For this reason student need for supplication was considered to be a more appropriate complementary need scale to Gardner's teacher warmth scale than student need for nurturance. Gardner agreed via personal correspondence that this suggestion was a reasonable one.

The Stern approach adopted by Gardner measures environmental press using participants' own perceptions concerning the presence or absence of a taxonomy of situational variables (resources, expectancies and behaviours likely to be characteristic of particular situations). The extent to which an individual perceives certain variables to be present in the situation indicates whether or not environmental press is likely to facilitate or impede gratification of needs aroused in the person. Gardner's items are primarily concerned with teacher behaviour, for example 'My English teacher is a warm and friendly sort of person' (teacher warmth) and 'My science teacher demands that students offer proper respect' (teacher compliance). Once again an item was dropped from each press scale in order to shorten the questionnaire. This item was dropped at random because of insufficient time to run a pilot study using the scales, but the reliability coefficients (K-R 20) reported in Table 5.4 indicate that the two scales were relatively unaffected by this alteration. ¹

¹ Total sample means and standard deviations for these press scales are reported in Table 1 of Appendix B1.
Table 5.4

Reliability coefficients (K-R 20) of two environmental press scales [from Gardner (1972)] obtained from (a) Gardner's original study of Year 12 Australian high school students and (b) the present study of Year 10 Australian high school students

<table>
<thead>
<tr>
<th>Sample</th>
<th>No. of Items</th>
<th>PRESS SCALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td>Teacher Compliance</td>
</tr>
<tr>
<td>(a) Gardner, split half corrected</td>
<td>1,014</td>
<td>10</td>
</tr>
<tr>
<td>(b) Present research:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science (K-R 20)</td>
<td>390</td>
<td>9</td>
</tr>
<tr>
<td>English (K-R 20)</td>
<td>390*</td>
<td>9</td>
</tr>
</tbody>
</table>

* As with need scales the number of cases used to calculate these reliability coefficients varied slightly - see Table 1 of Appendix BI.

(b) School Press

Adolescents interact with their peers both in and outside their classrooms. Therefore affiliative press and dominance press were assessed for the school environment as a whole rather than for particular classes.

The results of a pilot study indicated that while affiliation congruence was, as predicted, positively related to academic performance amongst girls, contrary to prediction there was no relation between dominance congruence and academic performance amongst males. (The propositions that dominance congruence amongst males and affiliative congruence amongst females are both well related to academic performance, are tested in this study as well). These results were obtained using affiliation and dominance scales from Stern's HSCI and AI. However, the proposition that dominance congruence would be positively related
to performance was supported when a dominance press scale of two exploratory test items was used in conjunction with Stern's need for dominance scale to calculate dominance congruence. These two items were 'I am satisfied with my ability to get my friends to do what I want them to do' and 'I am respected by most of the kids in this school'.

This pattern of results led to the conclusion that Stern's HSCI dominance press scale did not tap the type of personal 'egoistic dominance' of interest in this study. Stern's press scales require students to report the frequency of a variety of situational variables in the environment. It is reasonable to argue that affiliative press, or students' perceptions of friendliness in the environment, can be tapped in this way and that a comparison between Stern's (1970) affiliation need and press scales will give some indication of the degree of affiliative need satisfaction being experienced by individual students. However perceptions of whether or not, for example, 'student leaders in this school expect you to go along with what they say' (HSCI dominance press scale item) will not indicate the extent to which individual students perceive themselves as being influential amongst their peers. An item such as 'I am a fairly influential person among my friends' is more likely to do this.

Nine items for an alternative dominance peers scales were constructed with this argument in mind. The two items which were included in the pilot study on intuitive grounds alone were used as the basis to construct a larger pool of items, which were administered to a selected pilot sample of students. (These items
The reliability of this scale was .50 (Table 5.5) but increased to .64 when two items were deleted from the scale. (The two deleted items are also indicated in Appendix AIII). This seven-item student dominance press scale was used in all subsequent statistical analysis.

All ten items of Stern's HSCI affiliative press scale were also administered and these items are also presented in Appendix AIII. Table 5.5 contains reliability coefficients (K-R 20) from the present research and from Stern (1970) and Choo (1973) for this affiliative press scale. This table indicates the 9-item affiliative press scale reached an acceptable level of reliability.

Table 5.5

Reliability coefficients (K-R 20) for the affiliative press scale from Stern (1970), Choo (1973) and the present study and for the dominance press scale from the present study only

<table>
<thead>
<tr>
<th></th>
<th>No. of Items</th>
<th>Present Research</th>
<th>Stern (1970)</th>
<th>Choo (1973)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Affiliation Press</td>
<td>10</td>
<td>.67</td>
<td>.72</td>
<td>.56</td>
</tr>
<tr>
<td>Student Dominance Press:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Original</td>
<td>9</td>
<td>.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Reduced</td>
<td>7</td>
<td>.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Total sample means and standard deviations for each of the student press scales are reported in Table 1 of Appendix BI.
The Measurement of Need-Press Dissonance

The measurement of need-press dissonance was acknowledged in Chapter Two as one of the obstacles to the need-press model becoming a productive research paradigm. In this study need-press dissonance was measured by converting need and press scale scores to standard (Z) scores and subtracting standardized press scores from standardized need scores. Need and press scores were standardized in order to make scores on those scales which had different numbers of items directly comparable. Since the mean of the original raw scores becomes zero when standardized, raw scores which were below the mean become negative Z scores and raw scores which were above the mean become positive Z scores. [see Runyon and Haber (1967) pp.70-73 for a discussion of the Z score and its uses].

When standard press scores were subtracted from standard need scores positive scores indicated the extent to which need exceeded press and negative scores indicated the extent to which press exceeded need. For example, if press equals -3 and need equals +3 (i.e. need exceeds press) the resultant dissonance score will be +6 and when press equals +1 and need equals -3 (i.e. press exceeds need) the resultant dissonance score will be -4. When need and press are numerically equal the resulting dissonance score will be zero which indicates that need and press are congruent with one another while the size of the discrepancy (positive or negative) indicates the degree of perceived dissonance.
The resulting dissonance scores were used both as a single index of dissonance (Dissonance A) which contained scores ranging from +5 to -5 (approximately) and divided to form two separate measures of dissonance: (a) Dissonance B which measured the extent to which need scores exceeded press scores and which ranged from 0 to +5 and; (b) Dissonance C which measured the extent to which press scores exceeded need scores and which ranged from 0 to -5. Zero scores were included in both of these measures in order to indicate need-press congruence. By performing similar analyses using each of these contrasting measures of dissonance (i.e. Band C) it was possible to test the prediction made at the end of Chapter Two that 'true' dissonance only occurs when needs exceed press. It will be recalled from Chapter Two that Murray (1938) considered that environmental stimuli only had status as press (complementary to a particular need) if a person was experiencing some degree of arousal of that need and it was suggested by the present author that a true experience of 'dissonance' may only occur when a person feels that the strength of his need exceeds the level of perceived press in his immediate environment.

Each students' standardized press scale score was subtracted from his standardized score for the corresponding need scale [i.e. student dominance press was subtracted from need for dominance, teacher compliance (science and English) press was subtracted from need for deference, student affiliation press was subtracted from need for affiliation, and teacher warmth (science and English) was subtracted from need for supplication]. Teacher warmth press (science and English) was also subtracted from need for affiliation because in Chapter Three it was argued that students could experience
affiliative as well as supplicative needs during social interaction with their teachers. The subtractions of press from need press scales produced eight different dissonance A scales which could be divided into corresponding B (needs exceeds press) and C (press exceeds need) scales. The eight dissonance A scales constructed were as follows:

1. Student Affiliation Dissonance A \( (n_{Affiliation} - \text{student affiliation press}) \)

2. Student Dominance A \( (n_{Dominance} - \text{student dominance press}) \)

3. Teacher Supplication (English) Dissonance A \( (n_{Supplication} - \text{teacher warmth (English) press}) \)

4. Teacher Supplication (Science) Dissonance A \( (n_{Supplication} - \text{teacher warmth (science) press}) \)

5. Teacher Affiliation (English) Dissonance A \( (n_{Affiliation} - \text{teacher warmth (English) press}) \)

6. Teacher Affiliation (Science) Dissonance A \( (n_{Affiliation} - \text{teacher warmth (science) press}) \)

7. Teacher Deference (English) Dissonance A \( (n_{Deference} - \text{teacher compliance (English) press}) \)

8. Teacher Deference (Science) Dissonance A \( (n_{Deference} - \text{teacher compliance (science) press}) \).

A comment which should be made in connection with measuring need-press dissonance concerns the comparison of individual need and press scales. Stern states that individual need and press scales from the AI and HSCI are not directly comparable. In this study the four social need scales (affiliation, supplication, deference and dominance) and their complementary press scales are compared individually. However, in three cases the press scales (teacher

\[1\] Means and standard deviations for each of these dissonance scales are reported in Table 2 of Appendix BI.
warmth, teacher compliance and student dominance) were designed by their authors to be directly comparable to specific need scales from Stern's AI, and the results of the pilot study mentioned earlier suggested that Stern's affiliation need and press scales could be directly compared in a meaningful way also. Thus it would appear that individual need and press scales used in this study can be directly compared.

As mentioned above these eight dissonance A measures could be divided into dissonance B (needs exceed press) and dissonance C (press exceeds needs). For both scales congruence occurs when there is only a small discrepancy between needs and press (positive or negative) and 'perfect' congruence occurs when needs and press are numerically equal i.e. when the dissonance score is 0. Therefore if either dissonance B or dissonance C measures are used individually, scores of 0 should be included in both measures. A frequency count was performed on the eight dissonance B scales and the eight dissonance C scales in order to determine whether there were any tendencies among the students to report higher need scores than press scores or vice versa, and scores of 0 were included in both dissonance B and dissonance C measures. Therefore students whose dissonance scores were 0 were represented in both measures and those whose scores were positive or negative were represented in the dissonance B and dissonance C measures respectively. The results of this frequency count are reported in Table 5.6.
Table 5.6

Frequency* count of need-press dissonance B and C scores

<table>
<thead>
<tr>
<th></th>
<th>Dissonance B</th>
<th>Dissonance C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Affiliation</td>
<td>178</td>
<td>194</td>
</tr>
<tr>
<td>2. Student Dominance</td>
<td>182</td>
<td>189</td>
</tr>
<tr>
<td>3. Teacher Affiliation (science)</td>
<td>181</td>
<td>192</td>
</tr>
<tr>
<td>4. Teacher Affiliation (English)</td>
<td>182</td>
<td>193</td>
</tr>
<tr>
<td>5. Teacher Supplication (science)</td>
<td>193</td>
<td>175</td>
</tr>
<tr>
<td>6. Teacher Supplication (English)</td>
<td>191</td>
<td>179</td>
</tr>
<tr>
<td>7. Teacher Deference (science)</td>
<td>173</td>
<td>202</td>
</tr>
<tr>
<td>8. Teacher Deference (English)</td>
<td>189</td>
<td>188</td>
</tr>
</tbody>
</table>

* The frequencies reported are the number of valid cases available for each measure. Dissonance scores were only calculated if both need and press scores were available for a particular case; if either were missing a dissonance score was not calculated.

Large differences between frequencies for dissonance B and dissonance C measures of each type would indicate that there was a general tendency among students to report either greater need scores than press scores (in this case the frequency of dissonance B scores would greatly exceed that of dissonance C scores) or greater press scores than need scores (in this case the frequency of dissonance C scores would greatly exceed that of dissonance B scores). From Table 5.6 it can be seen that the frequencies for B and C measures of each type were approximately the same, which indicates there were no tendencies among students of the type suggested above; approximately half of the students reported greater need scores than press scores and half greater press than need scores.
The Measurement of IQ

IQ scores were obtained from the schools participating in the study (see Section II). All schools used a test (ACER Intermediate D) provided by the South Australian Education Department, which is standardized with respect to the Australian high school population. In the majority of cases this test had been administered to students during their first year of high school and thus at the time of collection the scores were no more than two and half years old. In forty cases IQ scores were not available; the major reason for this was that students had transferred from interstate or overseas schools and had not been tested in their new school when they arrived. Total sample mean and standard deviation scores for IQ are reported in Table 1 of Appendix B.

The Measurement of Academic Performance

It was decided to use actual school grades to measure academic performance rather than administer an achievement test because the results of such a test would be unlikely to reflect the influence of students' on-going experience of social interaction within the high school environment. Because assessment in the first four years of high school is carried out independently within each school it was necessary to obtain measures of performance from teachers within each school. Since the focus of this study is the individual student rather than his class or school all data were pooled and the additive effect of school membership on academic performances was controlled in all analyses. This meant that the variance in performance attributable to variables of interest, over and above that accounted for by school membership, could be determined. Measures of academic performance in science and English were obtained from
the students' subject teachers in each school. Science and English
are located on either end of the spectrum of high school subjects
and because of this, subject-specific variation in the relationship
between social experience and scholastic achievement is more likely
to be observed for English and science than two subjects closer
together on this spectrum.

In all five schools science was taught using materials developed
by the Australian Science Education Project (ASEP). These materials
were taught in a programme which covered the first three years of
high school, and although individual teachers varied in the extent
to which they relied upon ASEP there was considerable consistency
across the schools both in teaching method and content. Assessment
of science in all schools was 'continuous' and included laboratory
work and a variety of tests of understanding and knowledge (e.g. short
answer tests, essay writing).

Teaching methods and materials were more varied in the English
classes observed than in the science ones. There is no English
equivalent of ASEP in South Australian high schools and the syllabus
provided by the Education Department was merely a list of recommended
but not compulsory reading. In each of the schools studied one or
another of two general approaches to teaching English was used.
Either teachers combined poetry, drama and literature into a thematic
approach or taught each separately at different times during the
week. However, State Education Department publications on English
teaching (e.g. *Ideas for Years 8, 9 and 10 English*) were conspicuous
in most of the schools which suggested teachers obtained their ideas
from similar sources. Essay writing at the primary method of
continuous assessment was common to all schools.
Measures of academic performance in English and science were provided by the subject teachers of the classes who participated in the study. These measures, which required teachers to rate their students in terms of their normal third term assessment in English and science, were obtained at the end of the 1975 academic year just after the main data collection was completed. Total sample mean and standard deviation scores for English and science performance are reported in Table 1 of Appendix BI.

The Measurement of State Anxiety and Emotional Response to School

In Chapter Three four subscales from Izard's (1972) Differential Emotions Scale were identified which were considered to reflect the dominant emotional responses associated with experience of satisfaction (congruence) or dissatisfaction (dissonance) of the four social needs (affiliation, supplication, dominance and deference). These subscales are enjoyment, guilt/anxiety, anger, and fear/anxiety.

The complete instrument is in the form of an adjective checklist and respondents were asked to indicate the extent to which (almost never, seldom, about as often as not, very often, almost always) each adjective would be true of them in a given situation. When Izard developed the scale he asked college students to envisage an anxiety situation of their own choosing. He also demonstrated that it could be used successfully when respondents were asked to envisage specific arousal situations. In the present study students were asked to indicate the extent to which each adjective described the way school generally made them feel. The author is not aware of any other studies
in which Izard's DES+A has been used in association with a particular physical situation; the results of the factor analysis of item responses however suggest that it can be used successfully in this way. Appendix AV contains the version of the DES+A scale used in this study, together with the administration instructions and scoring procedures used with it.

The fifty-one items in Izard's original scale are listed in Table 3.3 (Chapter Three). Twenty-one of these were omitted for the version of Izard's scale used in the present study, either because they came from subscales other than those of interest (mentioned above), or because when they were administered to a pilot group of Year 10 students they were identified as being too difficult for students in this age group to understand.

It will be recalled that Izard included nineteen items from the state anxiety subscale of Spielberger et al.'s (1970) State-Trait Anxiety Inventory (STAI). Fourteen of these items remained in the version of the DES+A used in this study. Thus items in the emotional response scale can be used in two different ways: firstly, as a state anxiety inventory, and secondly, in the form of independent factor subscales which tap different aspects of students' emotional response to the experience of school. Items from the State Anxiety subscale of the STAI included in the version of the DES+A employed in this study were used to measure both state anxiety (discussed in Chapter Three) and the strength of subjects' motive to avoid failure (discussed in Chapter Four). The state anxiety subscale of the STAI was designed to measure state anxiety, but its use to measure the strength of motive to avoid failure requires justification.
It will be recalled that, according to Atkinson (1974b), the
strength of subjects' motive to avoid failure can be inferred
from the strength of their test anxiety. Traditionally
test anxiety has been measured using Mandler and Sarason's (1952)
Test Anxiety Questionnaire (see for example, Atkinson and O'Connor,
1966) which was designed to measure the anxiety reactions of adults
taking course examinations and intelligence tests, i.e. anxiety in
test situations. Similar scales were constructed to measure the
anxiety aroused in high school students (the TAS-Mandler and Cowen,
1958) and younger children (the TASC-Sarason, Davidson, Lighthall,
Waite and Ruebush, 1960) by test and test-like situations (e.g. school).
In other words, these scales were designed to measure state anxiety
reactions to achievement situations. The STAI items used in this
study were employed to assess students' anxiety reactions to the
school situation which, in most students' minds, is predominantly
an achievement-type situation, which suggests that scores obtained
from these items can be satisfactorily used to measure the strength
of students' motive to avoid failure.

Construction of Emotion Factor Subscales

The thirty-item scores for the total student sample were factor
analysed in order to cross validate the location of each item in
Izard's four-factor subscales. An ideal pattern of factor loadings
would occur if each scale contained only items loading on the same
factor, and if all items loading on the one factor were associated
with only one scale. Principal components analysis revealed only
three factors with eigen values greater than one, the criterion
generally used to determine the number of factors to be rotated
(Edwards, 1970).
The matrix of factor loadings obtained from principal components analysis is generally rotated in order to further simplify the factor structure. Edwards (1970) suggests that 'the primary objective in rotating a factor loading matrix is to approximate a simple structure matrix' (p.86). A simple structure matrix is one in which

There are one or more zero loadings in each row and preferably more than one.

Each column of factor loadings will have some variables with high loadings and others with low and zero loadings.

For any given pair of factors, some variables will have low loadings on both factors.

For any given pair of factors, it will be the case that for both factors there are some variables with high loadings on one factor but not on the other factor (p.80)

The factors were rotated using Kaiser's (1958) Varimax procedure which Edwards argued is the method most commonly in use. Table 5.7 contains the varimax factor loadings of the thirty emotional response scale items. Items are grouped into the four subscales discussed above and loadings of .20 or less are omitted as insignificant (Fruchter, 1954). The last column $h^2$ is the communality or the sum of squares of all the loadings in the row. Communality is defined as the squared multiple correlation of each item with all the factors and indicates the amount of variance that the item has in common with other items in the scale.

Table 5.7 indicates that the pattern of factor loadings approximates the ideal for three of the four subscales under investigation. These are fear/anxiety, anger, and enjoyment. Items from the enjoyment subscale all load strongly on Factor III and on no other factor. Also no items from the other scales load strongly on Factor III. Items from the fear/anxiety and anger subscales all load strongly on Factors I and II respectively and
on no other factor. However, items from the guilt/anxiety subscale load with approximately equal strength on both Factors I and II.

This pattern suggests that the fear, anger and enjoyment subscales are measuring relatively discrete emotional experiences, but that the distress subscale is tapping aspects of the high school experience which are already being picked up by the fear/anxiety and anger subscales. In other words most of the variance in the distress subscale items can be explained by variance in items from the fear/anxiety and anger subscales. For this reason the guilt/anxiety subscale was omitted from further analysis with the exception of two items: these were 'upset' and 'repentant' which both loaded solidly on Factor I and relatively weakly on the other two factors, which suggested that they were primarily tapping the emotional domain of fear-anxiety represented by Factor I. These items were included in the fear/anxiety subscale for subsequent analysis. The item 'anxious' was also omitted from the fear/anxiety subscale because of its weak loading on Factor I. These changes resulted in a nine-item fear/anxiety subscale which was used in all subsequent analysis.

Izard (1972) stressed that the pattern of dominant emotions which characterize human experience will vary between situations. The factor structure in Table 3.2 was obtained when tertiary-level students were asked to visualize an anxiety situation of their own choosing. In this study high school students were asked to respond with regard to their experience of school and therefore it is not surprising that the factor pattern obtained from this administration of the DES+A will vary from the one in Table 3.2. The similarities between these two factor structures, however, are sufficient for the conclusion to be drawn that the DES+A can identify the pattern of emotional responses which dominate subjects' experience of a given physical situation as well as an imaginary experience of their own choosing.
TABLE 5.7

Factor loadings of thirty emotional response scale (DES+A) items for varimax rotation

<table>
<thead>
<tr>
<th>SCALES</th>
<th>FACTORS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>h²</td>
</tr>
<tr>
<td>Fear/Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Nervous</td>
<td>.70</td>
<td></td>
<td></td>
<td>.52</td>
</tr>
<tr>
<td>*Tense</td>
<td>.52</td>
<td>.24</td>
<td></td>
<td>.36</td>
</tr>
<tr>
<td>*Jittery</td>
<td>.67</td>
<td></td>
<td></td>
<td>.49</td>
</tr>
<tr>
<td>Fearful</td>
<td>.60</td>
<td>.21</td>
<td></td>
<td>.43</td>
</tr>
<tr>
<td>Afraid</td>
<td>.67</td>
<td></td>
<td></td>
<td>.48</td>
</tr>
<tr>
<td>*Worried</td>
<td>.60</td>
<td>.28</td>
<td></td>
<td>.48</td>
</tr>
<tr>
<td>Scared</td>
<td>.66</td>
<td></td>
<td></td>
<td>.46</td>
</tr>
<tr>
<td>*Anxious</td>
<td>.35</td>
<td></td>
<td>-.21</td>
<td>.18</td>
</tr>
<tr>
<td>Guilt/Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Regretful</td>
<td>.42</td>
<td>.35</td>
<td></td>
<td>.30</td>
</tr>
<tr>
<td>Guilty</td>
<td>.38</td>
<td>.28</td>
<td></td>
<td>.23</td>
</tr>
<tr>
<td>Repentant</td>
<td>.42</td>
<td></td>
<td>-.21</td>
<td>.22</td>
</tr>
<tr>
<td>Downhearted</td>
<td>.38</td>
<td>.49</td>
<td>.30</td>
<td>.48</td>
</tr>
<tr>
<td>*Upset</td>
<td>.55</td>
<td>.37</td>
<td></td>
<td>.48</td>
</tr>
<tr>
<td>Sad</td>
<td>.47</td>
<td>.45</td>
<td></td>
<td>.44</td>
</tr>
<tr>
<td>Discouraged</td>
<td>.40</td>
<td>.40</td>
<td>.23</td>
<td>.38</td>
</tr>
<tr>
<td>Anger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mad</td>
<td></td>
<td>.69</td>
<td>.23</td>
<td>.58</td>
</tr>
<tr>
<td>Angry</td>
<td></td>
<td>.67</td>
<td></td>
<td>.52</td>
</tr>
<tr>
<td>Disgusted</td>
<td></td>
<td>.47</td>
<td></td>
<td>.28</td>
</tr>
<tr>
<td>Enraged</td>
<td></td>
<td>.75</td>
<td></td>
<td>.60</td>
</tr>
<tr>
<td>Scornful</td>
<td></td>
<td>.21</td>
<td>.64</td>
<td>.49</td>
</tr>
<tr>
<td>Contemptuous (despising)</td>
<td></td>
<td>.25</td>
<td>.57</td>
<td>.40</td>
</tr>
<tr>
<td>Dislike</td>
<td></td>
<td>.25</td>
<td>.60</td>
<td>.47</td>
</tr>
<tr>
<td>Enjoyment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td></td>
<td></td>
<td></td>
<td>.48</td>
</tr>
<tr>
<td>*Pleasant</td>
<td></td>
<td></td>
<td></td>
<td>.68</td>
</tr>
<tr>
<td>*Joyful</td>
<td></td>
<td></td>
<td></td>
<td>.75</td>
</tr>
<tr>
<td>*Content</td>
<td></td>
<td></td>
<td></td>
<td>.69</td>
</tr>
<tr>
<td>*Secure</td>
<td></td>
<td></td>
<td></td>
<td>.64</td>
</tr>
<tr>
<td>*Confident</td>
<td></td>
<td></td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>*Relaxed</td>
<td></td>
<td></td>
<td></td>
<td>.69</td>
</tr>
<tr>
<td>*At Ease</td>
<td></td>
<td></td>
<td></td>
<td>.71</td>
</tr>
<tr>
<td>Proportion of total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>.29</td>
<td>.11</td>
<td>.05</td>
<td></td>
</tr>
</tbody>
</table>

*STAI items
The reliability (K-R 20) coefficients for the four emotional response measures are reported in Table 5.8 and indicate satisfactory reliabilities. The state anxiety measure included in Table 5.8 is the fourteen-item state anxiety composite scale which was also contained in the version of the DES+A administered in this study. These fourteen items are marked with an asterisk in Table 5.8.

Table 5.8

<table>
<thead>
<tr>
<th>Emotional Response Scales</th>
<th>K-R 20</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear/Anxiety</td>
<td>.86</td>
<td>9</td>
</tr>
<tr>
<td>Anger</td>
<td>.86</td>
<td>7</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.88</td>
<td>8</td>
</tr>
<tr>
<td>State anxiety (STAI)</td>
<td>.88</td>
<td>14</td>
</tr>
</tbody>
</table>

SUMMARY OF CHAPTER FIVE

All the psychometric scales used in the present study to measure the dependent and independent variables identified in the first three chapters, were described in Chapter Four and their respective reliability coefficients reported. The sample of high school students who participated in this study and their schools were also described and procedures of data collection outlined.

1 Total sample mean and standard deviation scores for each of the four emotional response scales are reported in Table 5.8.
The results reported in this chapter indicate that all the scales were sufficiently robust for inferential data analysis to proceed with confidence. The results of this analysis are reported in the next two chapters and discussed in Chapter Eight.
Chapter Six

Preliminary Analysis: Bivariate Relationships
and School Effects

INTRODUCTION

Chapter Six contains the results of preliminary analyses performed prior to the main data analysis, the results of which are presented in Chapter Seven. Three types of preliminary analyses were performed. First, a number of sex differences were examined in order to test predictions made in Chapter Three that males and females differ with regard to the strength of their social needs; second, bivariate relationships between the various measures of needs, press and dissonance used in the study were examined in order to determine the extent to which they were empirically independent of one another; and third, the possibility that differences between the schools in the study exerted a significant effect on students' academic performance was investigated. The results of analysis of sex differences and bivariate relationships are presented in Section I of this chapter and the results of the investigation of school effects are presented in Section II.

Levels of Analysis

Before commencing the first section of this chapter some comments should be made about the level (i.e. group or individual) at which the data were analyzed. Psychological needs are dimensions of personality and therefore the appropriate level of analysis for these constructs is the individual student. Measures of environmental press, however,
can be entered into the analysis as either individual scores (private beta press) or grouped in some way (e.g. averaged to obtain a measure of consensual beta press). How contextual scores of this kind are treated depends upon the type of effect being studied. A researcher interested in between-school effects would group contextual scores in such a way as to reflect such differences (e.g. school mean scores or mean scores for different groups of schools) while one interested in within-school effects would use individual scores or scores grouped in terms of individual differences. A more common alternative is mixed level analysis in which both school level and individual level variables are used; for example, studies of the effects of high school and college contexts on student aspirations as well as other educational outcomes (Davis, 1966; Werts and Watley, 1969; Drew and Astin, 1972; Meyer, 1970; Alwin and Otto, 1977). Davis (1966) studied the effects of college students' academic performance (an individual level variable) on their academic aspirations, i.e. whether they chose a 'high performance' career field or not. Davis found that among men choice of a high performance field was more strongly associated to academic performance (GPA) than school quality. On the basis of these findings he argued that students attending a high quality school will tend to lower their aspirations while those attending a low quality school will tend to raise their aspirations. This occurs because they will generally perform better relative to their peers in the less comparative atmosphere of a low quality school than in the more competitive atmosphere of a high quality school. Since students compare their performances with those in the same college rather than those in different colleges students performing well in a low quality college will have a higher opinion of themselves academically (and higher
aspirations) than those of similar ability who are performing comparatively worse in a high quality college. The implication of this argument is that students of average ability are better off in the less competitive environments of lower academic quality colleges than the more competitive atmosphere of higher quality colleges. This is Davis' (1966) well known 'frogpond' effect, i.e. it is better to be a big frog in a small pond that a small frog in a big pond. More recent studies have also noted the negative indirect effect of ability contexts on student aspirations at both the college (Werts and Watley, 1969; Drew and Astin, 1972) and high school levels (Meyer, 1970; Nelson, 1972). These studies are interesting because they indicate how between school or group effects can indirectly influence schooling outcomes via within-school processes.

Alwin and Otto (1977) were also interested in the factors operating within and between schools which produce variation in college plans and occupational aspirations. Within-school factors considered to be crucial were background variables such as sex, SES, academic ability and performance and social process variables such as the expectations and encouragement of teachers and parents, and friends' college plans. These within-school variables were included with three contextual between-school variables in a causal model of the development of students' college plans and occupational status aspirations. A variety of regression models incorporating these variables were estimated and the relative magnitude of within- and between-school effects were determined by comparing the magnitude of the partial regression coefficients calculated for individual level and school level variables respectively. The results indicated that both types of effects were statistically significant but overall the contribution of within-school
factors to student aspirations were greater than school contextual factors (i.e. between school effects).

In the present study we are concerned with the within-school process of social interaction and its relationship to academic performance rather than between-school contextual effects. Accordingly, need and press scores were obtained from each student and individually combined to provide an index of each student's experience of social interaction with peers and teachers. However, because the academic scores used in this study were based on grades awarded by different teachers from five different schools it is possible that some variance in students' performance will be due to differences between schools such as teachers' classroom methods and grading practices, the curriculum materials used and the school facilities available. If such between-school effects exist they must be controlled when the relationship between the within-school effect of social interaction (measured by need-press dissonance) is examined. The greater the differences between schools the more likely it is that such between-school effects will occur.

School Means for IQ, Needs and Environmental Press

Table 6.1 contains mean and standard deviation scores for each of the five schools in the study for measures of needs and environmental press administered to the student sample, and student IQ scores. The only mean scores which differ appreciably between the schools are those for IQ and the teacher classroom press scales. The size of the standard deviations of the teacher press scores indicates also that students within each school differed widely in their perceptions of English and science teachers. Neither of these findings with regard to teacher press is surprising given that the students were responding with regard to different teachers both within and across schools.
<table>
<thead>
<tr>
<th>SCALES</th>
<th>SCHOOL</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=63</td>
<td>N=87</td>
<td>N=64</td>
<td>N=92</td>
<td>N=84</td>
<td></td>
</tr>
<tr>
<td>Need</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Affiliation</td>
<td>35.0</td>
<td>32.3</td>
<td>33.8</td>
<td>33.1</td>
<td>32.9</td>
<td></td>
</tr>
<tr>
<td>b) Dominance</td>
<td>26.8</td>
<td>26.5</td>
<td>26.8</td>
<td>26.5</td>
<td>25.1</td>
<td></td>
</tr>
<tr>
<td>c) Supplication</td>
<td>29.5</td>
<td>30.3</td>
<td>31.0</td>
<td>29.6</td>
<td>30.8</td>
<td></td>
</tr>
<tr>
<td>d) Achievement</td>
<td>29.9</td>
<td>28.1</td>
<td>28.8</td>
<td>27.7</td>
<td>27.7</td>
<td></td>
</tr>
<tr>
<td>e) Deference</td>
<td>21.5</td>
<td>21.3</td>
<td>21.6</td>
<td>20.7</td>
<td>21.7</td>
<td></td>
</tr>
<tr>
<td>Press</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Student Affiliation</td>
<td>31.1</td>
<td>31.3</td>
<td>30.4</td>
<td>29.1</td>
<td>30.7</td>
<td></td>
</tr>
<tr>
<td>b) Student Dominance</td>
<td>20.7</td>
<td>20.7</td>
<td>20.0</td>
<td>19.3</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>c) Teacher Warmth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) English</td>
<td>19.0</td>
<td>28.7</td>
<td>17.5</td>
<td>26.9</td>
<td>29.5</td>
<td></td>
</tr>
<tr>
<td>ii) Science</td>
<td>33.0</td>
<td>30.8</td>
<td>30.5</td>
<td>24.4</td>
<td>28.8</td>
<td></td>
</tr>
<tr>
<td>d) Teacher Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) English</td>
<td>29.2</td>
<td>22.8</td>
<td>32.2</td>
<td>21.6</td>
<td>22.7</td>
<td></td>
</tr>
<tr>
<td>ii) Science</td>
<td>19.1</td>
<td>23.7</td>
<td>24.2</td>
<td>28.0</td>
<td>24.2</td>
<td></td>
</tr>
<tr>
<td>IQ</td>
<td>114.9</td>
<td>117.2</td>
<td>112.2</td>
<td>115.9</td>
<td>106.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.7</td>
<td>11.8</td>
<td>11.1</td>
<td>10.2</td>
<td>10.2</td>
<td></td>
</tr>
</tbody>
</table>
School E mean IQ differs considerably from those of the other four schools. This school was chosen last and only included in the study because of difficulties encountered by the author in gaining access to the other five schools on the original list of ten. School E was chosen last because it had been a technical high school up until two years before the survey data were collected and until then had only accepted students pursuing non-academic careers. This selection bias almost certainly produced the difference between the mean IQ of school E and those of the other schools observed in Table 6.1.

The differences between school means for IQ and teacher classroom press reported in Table 6.1 indicate the presence of differences between schools in terms of student selection procedures and teacher behaviour (or at least student perceptions of teacher behaviour) which can be expected to contribute to academic performance and possibly influence the relationship between within-school social interaction and academic performance in which we are interested. Therefore the magnitude of such school effects must be determined and, if necessary, controlled for in subsequent analyses of this relationship. An investigation of school effects is presented in Section II of this chapter. In the next section (Section I) sex differences and bivariate relationships within the data are examined.

I SEX DIFFERENCES AND BIVARIATE RELATIONSHIPS

Sex Differences

In Chapter Three it was predicted that females would report stronger affiliative needs than males and that males would report stronger dominance needs than females. Also in that chapter evidence was reviewed which indicated that females performed better academically
in high school than males. Tests of differences between male and female scores for each measure of psychological needs and both measures of academic performance used in this study revealed significant differences with respect to needs for affiliation, dominance and achievement and both English and science performance (see Table 6.2). Table 6.2 contains mean and standard deviation scores for males and females (columns headed $\bar{X}$ and sd) for each of these measures together with student t values, probability levels and degrees of freedom for the significance tests (columns headed t, p and df respectively).

Table 6.2

Comparison of male and female mean scores for science performance, and needs for affiliation, achievement and dominance

<table>
<thead>
<tr>
<th></th>
<th>$\bar{X}$</th>
<th>sd</th>
<th>t</th>
<th>p</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>5.5</td>
<td>2.7</td>
<td>2.59</td>
<td>.01</td>
<td>377</td>
</tr>
<tr>
<td>Males</td>
<td>4.7</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>5.7</td>
<td>2.2</td>
<td>4.42</td>
<td>.001</td>
<td>379</td>
</tr>
<tr>
<td>Males</td>
<td>4.7</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for Affiliation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>35.3</td>
<td>4.6</td>
<td>8.48</td>
<td>.001</td>
<td>374</td>
</tr>
<tr>
<td>Males</td>
<td>31.1</td>
<td>5.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for Achievement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>27.7</td>
<td>5.5</td>
<td>2.12</td>
<td>.05</td>
<td>374</td>
</tr>
<tr>
<td>Males</td>
<td>28.9</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for Dominance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>25.2</td>
<td>5.2</td>
<td>4.08</td>
<td>.001</td>
<td>376</td>
</tr>
<tr>
<td>Males</td>
<td>27.4</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From this table it can be seen that females performed better than males in English and science and scored higher on need for affiliation, and that males scored higher on need for achievement and need for dominance. The only unexpected finding in Table 6.2 is that males' mean need for achievement score was significantly greater than females' since most available evidence suggests that the sexes do not differ in terms of the strength of their achievement motives (Maccoby and Jacklin, 1974). However, none of the studies reported by Maccoby and Jacklin used the Stern need for achievement subscale to measure the strength of subjects' need for achievement.

**Bivariate Relationships**

Although the major purpose of this study was to examine the dissonance performance relationships within the context of a multivariate model of achievement it was necessary to look at a number of bivariate relationships first. Relationships examined were those between firstly, different measures of the same constructs (emotional response to school, needs, press and need-press dissonance) and secondly, measures of needs and environmental press. Relationships between different measures of similar constructs were examined in order to determine the extent to which they were capable of distinguishing empirically between different aspects of the same construct. (A strong relationship between two measures of need, for example, could indicate that they were measuring very similar aspects of personality). The degree of independence between similar types of measures was assessed by calculating a matrix of zero-order correlation coefficients (Pearson Product Moment) between them. This technique was also used to assess the strength of relationships between measures of needs and press. The strength of need-press relationships is considered to indicate
the degree to which 'projection' effects influenced students' questionnaire responses i.e. the degree to which personality differences between students (as measured by their need scores) produced different perceptions of the high school social environment (as reflected in their press scores). (Projection effects will be discussed in greater detail shortly).

For these analyses it was assumed that error due to non-response was random (and therefore would not significantly affect the results of analysis) and the coefficients were calculated using pairwise deletion of missing data. With this method cases are only deleted if they are missing on either of the two variables for which a particular coefficient is calculated rather than being deleted if they are missing on any of the variables involved in the matrix (listwise deletion). Consequently in a given matrix the Ns used to calculate individual coefficients vary. For this reason the N used to calculate each coefficient is reported in the upper half of the matrix in each table. The alternative method of deleting missing data mentioned above (listwise deletion) was used for statistical reasons in the regression analyses reported in the second part of this chapter and Chapter Seven and is discussed in greater detail later in this chapter.

Zero-order correlation coefficients for the four emotional response scales are reported in Table 6.3. All but three of the fourteen items in the anxiety (STAI) scale came from the two subscales enjoyment and fear/anxiety. The strength and direction of correlations between these subscales and anxiety (STAI) suggest that enjoyment and fear/anxiety reflect the positive and negative aspects of state anxiety, a finding consistent with Izard's (1972) conception of state anxiety discussed
Table 6.3

Coefficients of correlation between measures of emotional response to school

<table>
<thead>
<tr>
<th>EMOTIONAL RESPONSE TO SCHOOL</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anxiety (STAI)</td>
<td>368</td>
<td>361</td>
<td>363</td>
<td></td>
</tr>
<tr>
<td>2. Enjoyment</td>
<td>-.786</td>
<td>364</td>
<td>363</td>
<td></td>
</tr>
<tr>
<td>3. Anger</td>
<td>.581</td>
<td>-.353</td>
<td>363</td>
<td></td>
</tr>
<tr>
<td>4. Fear/Anxiety</td>
<td>.721</td>
<td>-.219</td>
<td>.553</td>
<td></td>
</tr>
</tbody>
</table>

Note: Coefficients are reported below the diagonal and corresponding Ns above.

Table 6.4

Coefficients of correlation between needs for achievement, affiliation, dominance, supplication and deference

<table>
<thead>
<tr>
<th>NEEDS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Affiliation (nAff.)</td>
<td>370</td>
<td>371</td>
<td>371</td>
<td>369</td>
<td></td>
</tr>
<tr>
<td>2. Achievement (nAch.)</td>
<td>.081</td>
<td>371</td>
<td>370</td>
<td>369</td>
<td></td>
</tr>
<tr>
<td>3. Dominance (nDom.)</td>
<td>.071</td>
<td>.097</td>
<td>374</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td>4. Supplication (nSup.)</td>
<td>.251***</td>
<td>.120</td>
<td>.084</td>
<td></td>
<td>370</td>
</tr>
<tr>
<td>5. Deference (nDef.)</td>
<td>.122*</td>
<td>.348***</td>
<td>-.043</td>
<td></td>
<td>.475***</td>
</tr>
</tbody>
</table>

Note: Ns reported above the diagonal.

*p<.05
***p<.001
in Chapter Three (Section II). All coefficients in Table 6.3 were significant at the .001 level.

Table 6.4 contains correlations between the five measures of psychological need employed in this study. From this table it can be seen that need for deference correlates quite highly with both need for supplication and need for achievement. In Chapter Three needs for deference and supplication were identified as two motivational dimensions of a relationship between persons of unequal status and therefore a certain degree of association between the two is to be expected. The correlation between need for achievement and need for deference is less explicable. However, for most students successful achievement in high school is associated with particular behaviour patterns which primarily involve deference to teachers. Thus it is likely that by the time students reach high school achievement and deference motives will be aroused in response to similar environmental cues, and be present in similar strength as traits in most adolescents. Unlike the two correlations just discussed the one between nAff. and nSup. is consistent with Choo's (1973) findings discussed in Chapter Five (Section II).

Coefficients of correlation between six measures of environmental press are reported in Table 6.5. The dominant features of this table are the large negative correlations between teacher warmth and teacher compliance press for both English and science. These correlations suggest that rather than being two independent aspects of classroom press, teacher warmth and compliance, as measured in this study at least, are opposite sides of the same coin; students' perceptions of positive and negative aspects of their teachers' behaviour. A second point of interest in Table 6.5 are the inverse correlations
between teacher warmth press for English and science, and
between teacher compliance press for English and science.

Overall the pattern of coefficients in Table 6.5 suggests that
students who perceived their science teacher as a warm and friendly
person also tended to view their English teacher in more negative terms
and vice versa. In other words students appear to have had a high
regard for either their English teacher or their science teacher but
rarely did they have such positive feelings for both. A possible
explanation for this finding may be that students' subject preferences
were reflected in their ratings of their teachers. Since English and
science are very different types of subject it is not unlikely that
students tend to like one or the other but rarely both, and such feelings
may have influenced their responses to questions concerning their
teachers in these subjects.

Table 6.5

Coefficients of correlations between measures of high school environ­
mental press

<table>
<thead>
<tr>
<th>ENVIRONMENTAL PRESS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Affiliation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Student Dominance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>269***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Teacher Compliance (English)</td>
<td>-.064</td>
<td>.042</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Teacher Compliance (Science)</td>
<td>-.086</td>
<td>.057</td>
<td>-.230***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Teacher Warmth (English)</td>
<td>.133*</td>
<td>.014</td>
<td>-.635***</td>
<td>.229***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Teacher Warmth (Science)</td>
<td>.236***</td>
<td>.049</td>
<td>.300***</td>
<td>-.657***</td>
<td>-.163**</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  
**p<.01  
***p<.001

Note: Ns reported above the diagonal
The salience of environmental cues to different individuals varies as a function of their personality. Thus when asked to describe a particular situation different people will perceive, report and emphasise different aspects of that situation. In psychometric testing this phenomenon is known as projection. There is some evidence, for example, that persons whose unaroused or trait level of need for affiliation is high, tend to perceive the world as a less friendly place than persons whose trait level of nAff, is relatively low (Rosenfeld and Franklin, 1966). For such people the negative aspects of the social environment are more important than the positive ones.

The environmental press scales used in this study were designed to tap the existence of relatively specific concrete events in the school environment (e.g. whether a social club exists in the school or whether a teacher stays behind to help students with their work) rather than to determine whether or not students experience their school as, for example, a friendly place. The nature of individual experience is determined by the interaction between need and press rather than from press item responses alone. Substantial correlations between individual need and press scales would be an indication, though not conclusive evidence, that in responding to press items subjects were projecting their personality into their perceptions of the environment i.e. that they were interpreting their own experience rather than merely reporting events.

A positive correlation of .341 between need for dominance and student dominance press (Table 6.6) suggests that projection effects may have influenced students' responses to dominance press items. A perusal of the items in this press scale (see Appendix AIII) indicates that these items may in fact have encouraged students to report their
own feelings of personal dominance rather than concrete events in the manner described above. Students with strong dominance needs may perceive themselves (or with to perceive themselves) as influential to a greater extent than students with weaker dominance needs. In other words, their desire for dominance (a personality characteristic) may have influenced their responses to the dominance press scale.

However, this correlation is not so great as to suggest that the need for dominance and dominance press scales may not be used in subsequent analyses as measures of relatively independent psychological constructs. There were no other correlations between need and press measures which are large enough to constitute evidence of the possibility of further projection effects.

Table 6.6

Coefficients of correlation between psychological needs and student and teacher environmental press

<table>
<thead>
<tr>
<th>ENVIRONMENTAL PRESS</th>
<th>nAff.</th>
<th>nAch.</th>
<th>nDom.</th>
<th>nSup.</th>
<th>nDef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Affiliation</td>
<td>.097</td>
<td>.139*</td>
<td>.018</td>
<td>.230***</td>
<td>.245***</td>
</tr>
<tr>
<td></td>
<td>(372)</td>
<td>(371)</td>
<td>(374)</td>
<td>(374)</td>
<td>(371)</td>
</tr>
<tr>
<td>2. Student Dominance</td>
<td>.231***</td>
<td>.113*</td>
<td>.341***</td>
<td>.052</td>
<td>.012</td>
</tr>
<tr>
<td></td>
<td>(369)</td>
<td>(369)</td>
<td>(371)</td>
<td>(371)</td>
<td>(369)</td>
</tr>
<tr>
<td>3. Teacher Compliance (English)</td>
<td>.095</td>
<td>.081</td>
<td>-.021</td>
<td>-.003</td>
<td>-.035</td>
</tr>
<tr>
<td></td>
<td>(370)</td>
<td>(370)</td>
<td>(372)</td>
<td>(373)</td>
<td>(370)</td>
</tr>
<tr>
<td>4. Teacher Compliance (Science)</td>
<td>.013</td>
<td>-.170**</td>
<td>.130*</td>
<td>-.028</td>
<td>-.071</td>
</tr>
<tr>
<td></td>
<td>(370)</td>
<td>(369)</td>
<td>(371)</td>
<td>(373)</td>
<td>(371)</td>
</tr>
<tr>
<td>5. Teacher Warmth (English)</td>
<td>-.111</td>
<td>-.071</td>
<td>-.061</td>
<td>.075</td>
<td>.113*</td>
</tr>
<tr>
<td></td>
<td>(375)</td>
<td>(374)</td>
<td>(377)</td>
<td>(377)</td>
<td>(374)</td>
</tr>
<tr>
<td>6. Teacher Warmth (Science)</td>
<td>.065</td>
<td>.111</td>
<td>-.048</td>
<td>.099</td>
<td>.131*</td>
</tr>
<tr>
<td></td>
<td>(373)</td>
<td>(373)</td>
<td>(375)</td>
<td>(375)</td>
<td>(372)</td>
</tr>
</tbody>
</table>

*p < .05  Note: N used to calculate each coefficient is reported in brackets underneath it.

**p < .01

***p < .001
The results reported above have established that the measures of needs and press in this study were relatively empirically independent which justifies using them separately to construct eight separate measures of need-press dissonance. We must now examine zero-order correlations between each of these dissonance measures to determine the extent to which the different measures tapped different aspects of students' experience of social interaction with peers and teachers. These correlations are reported in Table 6.7.

A large number of the coefficients in Table 6.7 are statistically significant because of the large N's used in their calculation but it is the size of these coefficients in which we are interested rather than whether or not they are significant. From Table 6.7 it can be seen that corresponding dissonance measures for English and science (i.e. Teacher Affiliation) are quite highly related which is not surprising given that the same need scales (but different press scales) were used in their construction. A number of other substantial relationships are apparent in Table 6.7, in particular between (a) student affiliation dissonance and both teacher affiliation dissonance measures (i.e. English and science); (b) teacher affiliation (science) dissonance and teacher supplication (science) dissonance; and (c) teacher affiliation (English) dissonance and teacher supplication (English) dissonance. These correlations are also to be expected because in each relationship the two measures concerned were constructed using the same need or press scale (see pp.159-163 for details of how these scales were constructed). The pattern of relationships obtained for the various affiliative and supplicative measures of dissonance indicates that they all measured relatively similar aspects of students' experiences of affiliative-type relationships with peers and teachers.
### Table 6.7

Zero-order correlations between eight measures of need-press dissonance A

<table>
<thead>
<tr>
<th>Need-press Dissonance A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Student Affiliation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Student Dominance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Teacher Affiliation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. Teacher Supplication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. Teacher Deference</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6. Teacher Affiliation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7. Teacher Supplication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8. Teacher Deference</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>English</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>1</strong></th>
<th><strong>2</strong></th>
<th><strong>3</strong></th>
<th><strong>4</strong></th>
<th><strong>5</strong></th>
<th><strong>6</strong></th>
<th><strong>7</strong></th>
<th><strong>8</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>361</td>
<td>368</td>
<td>362</td>
<td>357</td>
<td>370</td>
<td>364</td>
<td>358</td>
</tr>
<tr>
<td>.040</td>
<td></td>
<td>359</td>
<td>362</td>
<td>356</td>
<td>361</td>
<td>364</td>
<td>357</td>
</tr>
<tr>
<td>.586***</td>
<td>-.055</td>
<td>367</td>
<td>360</td>
<td>371</td>
<td>365</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>.118*</td>
<td>.099</td>
<td>.589***</td>
<td>360</td>
<td>365</td>
<td>373</td>
<td>361</td>
<td></td>
</tr>
<tr>
<td>-.099</td>
<td>-.066</td>
<td>-.338***</td>
<td>-.147**</td>
<td>360</td>
<td>360</td>
<td>362</td>
<td></td>
</tr>
<tr>
<td>.580***</td>
<td>-.050</td>
<td>.435***</td>
<td>-.023</td>
<td>.114</td>
<td>369</td>
<td>362</td>
<td></td>
</tr>
<tr>
<td>.161**</td>
<td>.077</td>
<td>.049</td>
<td>.357***</td>
<td>.306***</td>
<td>.635***</td>
<td>364</td>
<td></td>
</tr>
<tr>
<td>-.138*</td>
<td>-.025</td>
<td>.090</td>
<td>.336***</td>
<td>.121*</td>
<td>-.325***</td>
<td>-.128*</td>
<td></td>
</tr>
</tbody>
</table>

* *p<.05  
** *p<.01  
*** *p<.001  

Note: Ns reported above the diagonal
The low correlations between the affiliative-type measures of dissonance and the deference and dominance measures indicate that these latter measures tap relatively unique areas of students' experience of social interaction at school.

II SCHOOL EFFECTS

In the introduction we suggested that differences between schools may influence the within-school process on which this study is primarily focussed that is, the relationship between students' experience of social interaction with peers and teachers (as reflected by their need-press dissonance scores) and their academic performance. This influence may occur in one of two ways. Firstly, all or part of the variance in academic performance explained by need-press dissonance may also be accounted by school membership, i.e. dissonance and school membership may be correlated. Additive school effects of this kind must be controlled in analyses of the dissonance-performance relationship so that the effect of dissonance on performance net of the effects of school differences may be determined. By including a school variable in the analyses we will know how much variance in performance is attributable to between-school differences and how much is attributable to the within-school process of social interaction (as measured by need-press dissonance). The second way in which school differences may affect the dissonance-performance relationship is that this relationship may be different in different schools; in other words, school and dissonance may exert an interactive effect on academic performance. If either additive or multiplicative (interactive) school effects are substantial they must be controlled when the dissonance-performance relationship is examined. Accordingly, a number of analyses were performed to determine the magnitude of additive and multiplicative school effects.
Analysis of Variance

One problem with looking for school effects is that school membership is a nominal scale variable. Since the numbers assigned to categories of a nominal scale are not assumed to have an order or to reflect units of measurement (students in different schools are simply assigned a different category number), they cannot be treated as conventional interval scale scores (e.g. in the way IQ scale scores can be used). One way of getting around this problem would be to use analysis of variance (Winer, 1971; Scheffe, 1959) to look for additive and multiplicative school effects because this technique requires that all independent variables are in categorical form. However, there are two problems associated with the use of ANOVA which make it unsuitable for use in this study. Firstly, since we wish to look for interactions between school and other variables (i.e. multiplicative effects) continuous independent variables such as IQ would have to be converted into categories which would inevitably lead to a loss of information.  

A second and more serious problem with traditional ANOVA techniques is that they require predictors (or independent variables) to be independent of one another, i.e. that the number of cases in each cell be equal or at least proportional. To the extent that this condition is not met (i.e. that the predictors are correlated) the interpretation of ANOVA results becomes difficult and any serious violation of this assumption of independance invalidates them altogether (Evans and Anastasio, 1968). For example, we wish to determine the magnitudes of the additive effect of school membership on academic performance and the effect of the interaction between school and IQ on performance. But if school

---

1 We shall look at this problem in greater detail in Chapter Seven.
selection procedures result in substantial differences between the mean IQ of different within-school samples (as appears to have occurred for the schools in the present study) then IQ and school membership will be correlated which violates the assumption of independence underlying the ANOVA technique.

Multiple Regression Analysis

(a) Dummy Variables

When predictors are correlated (as is generally the case in social science research) a more appropriate method for looking for main and interaction effects is multiple regression analysis (Kerlinger and Pedhazur, 1973; Kelly, Beggs and McNeil, 1969) since this technique does not require that predictor variables be independent of one another. In fact, an important use of this technique is to determine the effect of particular independent variables net of the effects of other related predictor variables.

Multiple regression analysis requires that independent variables be at the interval level of measurement (i.e. continuous) but categorical variables such as school membership can be included through the use of dummy variables to represent school membership (Gujarati, 1970; Stolzenberg, 1974; Specht and Warren, 1976). A set of dummy variables is created by treating each category of a nominal variable (in this case school membership) as a separate variable and assigning arbitrary scores for all cases depending upon their absence or presence in each of the categories. For example, the nominal variable school with five categories (representing the five schools in the study) can be conceived as five separate dichotomous variables. All students can be assigned arbitrary scores of, say, 1 or 0 on all five of these variables. If 1s and 0s are used as scores students in school A in
Table 6.1 would be scored 1 on the dummy variable standing for school A and 0 on all the others. A student in school B would be assigned a 1 for the dummy variable standing for school B and 0 on all the others, and so on. Since the dummy variables have arbitrary metric values of 0 and 1, they may be treated as interval variables and inserted into a regression equation. However, the inclusion of all dummies created from a given nominal variable would render the normal equation unsolvable because the kth dummy is completely determined by the first k-1 dummies entered into the regression equation. It is therefore necessary to exclude one of the dummies from the equation. This does not result in a loss of information because the excluded category becomes a reference by which the effects of the other dummies are judged and interpreted.

(b) Additive and Multiplicative School Effects

To examine additive and multiplicative school effects the dependent variable (academic performance) is regressed on all but one of the dummy variables created to represent school membership, other dummy variables and product terms formed between the dummy variables and the other continuous independent variables (Astin, 1968; Gujarati, 1970). This technique is similar to the more familiar use of product terms in regression equations to test for interactions among continuous variables (Dignam, 1966; Ezekiel and Fox, 1967). The partial regression coefficients for the dummy variables and product terms can be interpreted by reference to the omitted group: significant coefficients for the dummy variables themselves indicate additive school effects in the sense that school membership alone adds to an
explanation of variance in academic performance, while significant coefficients for the product terms indicate that the partial regression slopes differ between the schools or, in interaction terms, that the nature of the dependent-independent relationship differs between the schools.

Astin (1968) used dummy variables to study the effects of college academic quality (a between-school effect) on student academic performance. Institutional characteristics which were represented in his analysis by means of dummy variables included colleges' religious affiliations (e.g. Protestant, Catholic or Baptist) and the source of their funding (e.g. public or private), while other characteristics such as the proportion of degrees awarded in different fields were included as continuous variables. Astin also looked for interactions between environmental variables and student characteristics (e.g. between students' ability and mean ability score for a college) to test predictions that academic performance could be best explained by interactions between personality and environment characteristics.

Another interesting aspect of the Astin study was his use of multiple regression analysis to control for the effects of student characteristics on the environment-performance relationship. He regressed academic performance on the institutional variables and established a number of significant additive and multiplicative effects. However, when he re-analyzed the data and included student characteristics (and in particular, student ability) most of these effects disappeared. This occurred because student characteristics (and in particular ability) and environmental characteristics were closely related (since the 'best' students tend to go to the 'best' colleges) so that when the effects of student characteristics were held constant (i.e. controlled) the relationship between academic performance and environmental characteristics disappeared.
This finding demonstrates the ability of multiple regression analysis to cope with correlated predictors. If A and B are related and we wish to assess the unique effect which B has on Y (i.e. the effect of B net of the effect of A) we regress Y on A followed by B using a stepwise approach. The partial regression coefficient obtained for B will indicate the magnitude of its effect on Y net of the influence of A; that is, it will indicate the strength of the relationship between Y and the part of B not related to A. If A and B are closely correlated any relationship between B and Y will disappear when the effect of A is held constant — this is what occurred in the Astin (1968) study.

(c) **Interpreting Product Term Coefficients**

Although the technique of including product terms in regression equations to test for interactions has been used for some time (Kelly et al., 1969; Anderson, 1970; Specht and Warren, 1976; Spaeth, 1977) there are problems associated with it. Glass (1968) has argued that the interpretation of product term coefficients is problematical and Althauser (1971) goes even further to suggest that the technique is invalid because of the effects of multicollinearity on the product term coefficients. However, Allison (1977) has demonstrated that these problems relate to the meaning of the coefficients rather than to tests of their statistical significance. Accordingly we consider the statistical significance of these terms as an indication of group differences in effects, but do not interpret the coefficients themselves.

\[^1\] Very high correlations between the product terms and the variables from which they are formed.
This is satisfactory for our present purpose because we are primarily concerned with determining the magnitude of school effects rather than interpreting them.

(d) Curvilinear Effects

Regression analysis assumes that the underlying relationships among the variables are linear and additive; that is, it is assumed that the relationship between the dependent variable and each independent variable is linear and also that the combined effects of independent variables are additive. However, both non-linear and non-additive (interactive) effects can be examined provided the data are transformed appropriately by means of manipulation of the independent variables. In part (b) above we showed how product terms could be used to study interactions and non-linear relationships can also be studied using similar data transformation techniques. Simple non-linear relationships can be analyzed by the use of polynomial regression. In this approach the independent variable is raised to a certain power and included in the equation along with the original independent variable. The highest power to which an independent variable is raised indicates the degree of the equation. For example, an equation containing a squared or quadratic term is a second-degree equation and an equation containing a cubed or cubic term is a third-degree equation. The degree of a polynomial equation is related to the number of 'bends' in the curved regression line that it describes; specifically, the maximum number of bends possible is always one less than the degree of the equation. Thus if we are looking for a U-shaped or quadratic relationship (i.e. one bend) a second-degree equation (including a squared term) would be used, and if we are looking for a
relationship with two bends in it (a cubic relationship) a third-degree
equation (including a cubed term) would be used and so on.

Pulvino and Hansen (1972) (reviewed in Chapter Three) investigated
- among other things - the possibility that the relationship between
academic performance and need-press dissonance is non-linear. (A
similar hypothesis is tested in the present study). To do this they
regressed academic performance on need-press dissonance using a
polynomial regression equation and dissonance was included as a
linear term, a quadratic term and a cubic term in the analysis.
However, no significant effects were observed.

Regression Analysis of School Effects

The magnitude of additive and multiplicative school effects was
determined by regressing academic performance (English and science)
on dummy variables for 4 of the 5 schools, IQ, need for achievement,
anxiety, social needs (needs for affiliation, supplication, deference
and dominance), environmental press [student affiliation press, student
dominance press, teacher warmth (English and science) press, teacher
deference (English and science) press], and product terms formed between
each of the dummy variables and the continuous independent variables.
It will be recalled that in Chapter Three five social need-press
combinations were identified which, it was argued, would contribute
to an explanation of variance in academic performance. These were:
need for affiliation-student affiliation press, need for dominance-
student dominance press, need for deference-teacher compliance press
(English and science), need for supplication-teacher warmth press
(English and science) and need for affiliation-teacher warmth press
(English and science). With two measures of academic performance and
five separate social need-press combinations ten separate regression
analyses of the type described above were performed. When English performance was analyzed English teacher press measures were used, and science teacher press measures were used for the analyses of science performance; the same student press measures were used in the analysis of English performance and science performance.

All the analyses were performed using listwise deletion of missing data. Listwise deletion causes a case to be omitted from analysis if it is missing (i.e. contains a missing value) for any of the variables involved in the analysis. For example, in the regression analysis reported in Table 6.8 a case was omitted if it had a missing value for any of the six independent variables included (IQ, need for achievement, anxiety, need for affiliation, teacher warmth press, and school) or the dependent variable science performance. In general, listwise deletion has the effect of reducing the number of cases available. How large this reduction is depends upon the overall amount of missing data, the number of variables involved and the distribution of the missing data among the cases and the variables. If the missing data are highly concentrated by case, the net effect will not be great. If, on the other hand, missing data are fairly evenly spread among a large proportion of the cases (as in the present study), listwise deletion can cause a major reduction in the workable N available for analysis (e.g. available N for the regression analysis reported in Table 6.8 was 315 even though the total sample was 390). \(^1\) The workable N is further affected by the distribution of missing values among the variables; the variable with the largest amount of missing data will establish the maximum number of cases available (in this case IQ). However,

\(^1\) It will be recalled from Chapter Five that IQ scores were not available for 40 students. This loss of information was primarily responsible for the reduction in N rated above.
listwise deletion is the only way to ensure that the simple correlation coefficients on which the regression analysis is based are computed from the same universe of data. The alternative missing data option, pairwise deletion, which was discussed earlier has the advantage of utilizing as much of the data as possible (cases are deleted only if they are missing for either variable used to calculate a particular correlation coefficient rather than if they are missing for any variable in the matrix). It has the disadvantage however that regression coefficients may be produced from a correlation matrix which contains coefficients based on very different numbers of cases and perhaps even on quite different subpopulations. As a result little confidence can be placed in multiple regression statistics when pairwise deletion is used.

For all the analyses the variables were entered in three separate steps: (a) the continuous independent variables (IQ, need for achievement, anxiety, social need and environmental press) which made up the basic additive model; (b) the dummy variables representing school membership; and (c) the product terms formed between the dummy variables and the continuous independent variables. The variables were entered in this way in order to determine firstly, whether the increase in explained variance (R^2) due to the dummy variables was statistically significant after the effect of the basic additive model was taken into account, and secondly, whether the increase due to the product terms was significant after the effects of both the basic additive model and

---

1 However, if correlation coefficients are calculated only to determine the strength of particular bivariate relationships (as was the case in Tables 6.2 to 6.7) rather than for multiple regression analysis, pairwise deletion can be used.
the dummy variables were taken into account. If the increase in $R^2$ due to the dummies is significant, we can conclude that significant additive school effects exist within the data, and if the increase in $R^2$ due to the product terms is also significant, we can conclude that significant multiplicative school effects also exist.

Table 6.8 contains a full summary of results for one of the five regression analyses of science performance. In this analysis, science performance was regressed on IQ, need for achievement, anxiety, need for affiliation, teacher warmth (science) press, dummy variables for four of the five schools, and product terms formed between the dummy and continuous independent variables. The results in Table 6.8 were those obtained at the final step, that is, when all variables had been entered into the analysis and the effect of each independent variable on science performance was adjusted for the effects of all other independent variables. Table 6.8 contains: (a) partial (metric) regression coefficients for each term adjusted for the effects of all other terms (column headed $b$); (b) the increase in explained variance attributable to each variable after the contribution of variables above it in the list had been taken into account (column headed RSQ); (c) the simple correlation between each term and science performance.

---

Thus even though some terms accounted for a substantial regression of variance in science performance (e.g., IQ), the regression coefficients for these terms were not statistically significant. This is because the RSQ values indicate the increase in explained variance for each successive step whereas the regression coefficients for each term were adjusted for the effects of all independent variables included in the analysis and, in particular, for the effects of the product terms. For example, the coefficient for IQ which was significant when IQ was first entered was adjusted for the effects of product terms in which IQ was included (as well as all the other independent variables) which reduced it in size to below a statistically significant level.
Table 6.8

Multiple regression of science performance on IQ, need for achievement (nACH) anxiety (ANX), need for affiliation (nAFF), science teacher warmth press (WRMPRESS), dummy variables for four schools (SCHOOL A to SCHOOL D) and product terms formed between dummy variables and continuous variables (N=315)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>RSQ1</th>
<th>RSQ2</th>
<th>RSQ3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>.039</td>
<td>.104</td>
<td>.317</td>
<td>.195</td>
<td>.129</td>
<td>.071</td>
</tr>
<tr>
<td>nACH</td>
<td>.041</td>
<td>.010</td>
<td>.140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX</td>
<td>-.012</td>
<td>.007</td>
<td>-.128</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF</td>
<td>-.010</td>
<td>.000</td>
<td>-.033</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS</td>
<td>.004</td>
<td>.072</td>
<td>.288</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL A</td>
<td>-3.593</td>
<td>.007</td>
<td>.176</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL B</td>
<td>-9.034</td>
<td>.110</td>
<td>.365</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL C</td>
<td>-4.189</td>
<td>.003</td>
<td>-.116</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL D</td>
<td>5.417</td>
<td>.004</td>
<td>-.167</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.A</td>
<td>-.018</td>
<td>.000</td>
<td>.179</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.B</td>
<td>.045</td>
<td>.004</td>
<td>.380</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.C</td>
<td>.005</td>
<td>.000</td>
<td>-.105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.D</td>
<td>-.012</td>
<td>.000</td>
<td>-.158</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.A</td>
<td>-.029</td>
<td>.001</td>
<td>.174</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.B</td>
<td>-.035</td>
<td>.002</td>
<td>.358</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.C</td>
<td>.115</td>
<td>.003</td>
<td>-.196</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.D</td>
<td>-.022</td>
<td>.001</td>
<td>-.139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.A</td>
<td>.031</td>
<td>.002</td>
<td>.174</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.B</td>
<td>.036</td>
<td>.002</td>
<td>.353</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.C</td>
<td>-.024</td>
<td>.000</td>
<td>-.126</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.D</td>
<td>-.029</td>
<td>.001</td>
<td>-.201</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.A</td>
<td>.175</td>
<td>.009</td>
<td>.184</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.B</td>
<td>.025</td>
<td>.002</td>
<td>.359</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.C</td>
<td>.055</td>
<td>.008</td>
<td>-.110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.D</td>
<td>-.139</td>
<td>.007</td>
<td>-.191</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.A</td>
<td>-.018</td>
<td>.003</td>
<td>.168</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.B</td>
<td>.165*</td>
<td>.020</td>
<td>.391</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.C</td>
<td>-.006</td>
<td>.000</td>
<td>-.101</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.D</td>
<td>.112*</td>
<td>.004</td>
<td>.065</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6.8 (cont'd)

Notes: Abbreviations used are as follows:

nACH: need for achievement
ANX: anxiety
nAFF: need for affiliation
WRMPRESS: science teacher warmth press

IQ.A
IQ.B
IQ.C
IQ.D

Product terms formed between IQ and each of the dummy variables for school

nACH.A
nACH.B
nACH.C
nACH.D

Product terms formed between need for achievement and each of the dummy variables for school

ANX.A
ANX.B
ANX.C
ANX.D

Product terms formed between anxiety and each of the dummy variables for school

nAFF.A
nAFF.B
nAFF.C
nAFF.D

Product terms formed between need for affiliation and each of the dummy variables for school

WRMPRESS.A
WRMPRESS.B
WRMPRESS.C
WRMPRESS.D

Product terms formed between English teacher warmth press and each of the dummy variables for school.
performance (column headed simple r); (d) the $R^2$ value for the basic additive model (column headed $RSQ_1$); (e) the increase in $R^2$ due to the dummy variables after the effect of the basic additive model was taken into account (column headed $RSQ_2$) and (f) the increase in $R^2$ due to the product terms after the effects of both the basic additive model and the dummy variables were taken into account (column headed $RSQ_3$). Asterisked coefficients were statistically significant ($p<.05$).

The four schools in Table 6.8 are schools A to D in Table 6.1. As mentioned in the first section of this chapter the mean IQ score for school E was substantially lower than those of the other four schools and this school also differed from the others in a number of other ways (e.g. it had originally been a technical high school). Because of these differences it was omitted on the grounds that if school effects existed they would be most apparent in a comparison between school E and the remaining four schools. Table 6.9 contains the results of the corresponding analysis in which English performance was regressed on IQ, need for achievement, anxiety, need for affiliation, English teacher warmth press, dummy variables for four schools and product terms formed between the dummies and the continuous independent variables. The results in Table 6.9 are presented in a similar manner to those in Table 6.8 and can be interpreted in the same way. The results for both these analyses were very similar to those obtained from the other eight analyses performed and the following discussion applies to them as well.

---

Increases in explained variance in English and science performance due to the basic additive model, dummy variables representing school and product terms for the other eight analyses are reported in Tables 1 and 2 of Appendix BII.
Table 6.9

Multiple regression of English performance on IQ, need for achievement (nACH), anxiety (ANX), need for affiliation (nAFF), English teacher warmth press (WRMPRESS), dummy variables for four schools (SCHOOL A to SCHOOL D) and product terms formed between dummy variables and continuous variables (N=317)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>RSQ1</th>
<th>RSQ2</th>
<th>RSQ3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>.100*</td>
<td>.066</td>
<td>.253</td>
<td>.077</td>
<td>.067</td>
<td>.075</td>
</tr>
<tr>
<td>nACH</td>
<td>.008</td>
<td>.004</td>
<td>.095</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX</td>
<td>-.018</td>
<td>.000</td>
<td>-.006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF</td>
<td>.098</td>
<td>.003</td>
<td>.043</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS</td>
<td>.109*</td>
<td>.001</td>
<td>.015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL A</td>
<td>8.561</td>
<td>.001</td>
<td>.070</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL B</td>
<td>14.390*</td>
<td>.018</td>
<td>-.054</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL C</td>
<td>2.548</td>
<td>.033</td>
<td>.167</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCHOOL D</td>
<td>10.900</td>
<td>.013</td>
<td>-.019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.A</td>
<td>-.068</td>
<td>.001</td>
<td>.074</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.B</td>
<td>-.076*</td>
<td>.015</td>
<td>-.047</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.C</td>
<td>-.008</td>
<td>.000</td>
<td>.188</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ.D</td>
<td>-.037</td>
<td>.001</td>
<td>-.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.A</td>
<td>.003</td>
<td>.000</td>
<td>.072</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.B</td>
<td>.048</td>
<td>.004</td>
<td>-.035</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.C</td>
<td>.005</td>
<td>.000</td>
<td>.172</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nACH.D</td>
<td>-.026</td>
<td>.000</td>
<td>-.018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.A</td>
<td>.039</td>
<td>.000</td>
<td>.070</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.B</td>
<td>.009</td>
<td>.000</td>
<td>-.056</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.C</td>
<td>.021</td>
<td>.000</td>
<td>.158</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANX.D</td>
<td>.038</td>
<td>.003</td>
<td>-.010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.A</td>
<td>-.020</td>
<td>.001</td>
<td>.071</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.B</td>
<td>-.103</td>
<td>.004</td>
<td>-.051</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.C</td>
<td>-.023</td>
<td>.002</td>
<td>.174</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nAFF.D</td>
<td>-.126</td>
<td>.007</td>
<td>-.028</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.A</td>
<td>-.031</td>
<td>.000</td>
<td>.099</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.B</td>
<td>-.149*</td>
<td>.030</td>
<td>-.065</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.C</td>
<td>.017</td>
<td>.000</td>
<td>.197</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRMPRESS.D</td>
<td>-.123*</td>
<td>.000</td>
<td>-.024</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From Table 6.8 it can be seen that the basic additive model accounted for approximately 20 per cent of variance in science performance (RSQ₁) and the increases due to school membership (dummy variables) and interactions between school and other independent variables (product terms) were 13 per cent and 7 per cent respectively (columns headed RSQ₂ and RSQ₃). The comparable figures in Table 6.9 were 8 per cent, 7 per cent and 8 per cent respectively. A comparison of these figures indicates that the continuous independent variables (basic additive model) and school membership accounted for a greater degree of variance in science performance than English performance.

The increase in $R^2$ due to the four dummy variables in each case (RSQ₂) indicates substantial additive school effects. That is, knowledge of school membership alone adds considerably to explained variance in academic performance. In each case the increase in $R^2$ due to the dummy variables was statistically significant (science performance: $F=13.29$, df=4 and 305, $p<.001$; English performance: $F=4.89$, df=4 and 307, $p<.001$). Thus attending different schools had a significant effect on the academic performance of the students in the sample used in this study, and if we wish to determine the magnitude of the dissonance-performance relationship net of this effect we must control for school membership in subsequent analyses.

The results for the product terms indicate a general absence of interactive or multiplicative school effects. In other words the relationships between academic performance and each of the continuous independent variables did not vary substantially from school to school. The increase in $R^2$ due to the product terms (column headed RSQ₃ in each table) was in fact statistically significant for both English ($F=1.63$, df=20 and 287, $p<.05$) and science ($F=1.92$, df=20 and 285, $p<.001$) performance, but this was due to the large number of variables
involved rather than the presence of substantial interaction effects. Adding multiplicative terms to a multiple regression equation always has the effect of increasing $R^2$ and even though each individual increase may not be great the cumulative effect can be significant.

The increases in $R^2$ due to the product terms in Tables 6.8 and 6.9 do not warrant controlling for school multiplicative effects in subsequent analyses of the dissonance-performance relationship since the inclusion of the product terms in such analyses will not greatly alter the results of such analyses; the product terms are not on the whole significantly related to academic performance and therefore could not substantially alter the magnitude of the regression coefficient obtained for the dissonance term when academic performance was regressed on dissonance. Failure to control for the additive effects of school membership, on the other hand, may distort the results of this analysis. For example, failure to include dummy variables in such analyses may lead to an inflated view of the strength of relationships between dissonance and performance because some of the variance in academic performance attributed to these terms might in fact be accounted for by school membership. This is quite likely to occur since school membership accounts for a substantial proportion of variance in academic performance (and particularly science performance) and students' perceptions of environmental press (which were used to construct the dissonance measures) can be expected to vary from school to school.
SUMMARY OF CHAPTER SIX

The analyses reported in the first part of this chapter were designed to test predictions concerning differences between the sexes made in Chapter Three and to determine the extent to which the different measures used in this study were empirically independent of one another. The results of the sex difference analysis indicated, as predicted, that overall females scored higher on need for affiliation than males and males scored higher than females on need for dominance. Other results were that females performed better than males in both English and science and that males scored higher on need for achievement than females. With regard to academic performance these results are consistent with the findings of earlier research but the result for need for achievement is not. The most recent evidence suggests that the sexes do not differ with respect to the strength of their achievement motives.

Bivariate relationships between different independent variables were reported in Tables 6.2 to 6.7. The coefficients in these tables reveal strong correlations between, firstly, the four emotional response scales and secondly the measures of dissonance associated with needs for supplication and affiliation. This latter finding indicated that these measures were tapping quite similar aspects of students' experience of affiliative relationships with others at school rather than distinguishing between experiences of different types of relationships with different types of people (i.e. students and teachers). The lower correlations between measures of dissonance associated with needs for deference and dominance and the affiliative-type measures mentioned above indicated that these two scales were tapping different aspects of students' experience of social interaction at school.
In the second part of the chapter the effects of school membership (additive effects) and interactions between the school variable and other continuous variables (multiplicative effects) on academic performance were examined using multiple stepwise regression with dummy variables to represent school membership. Although the results indicated that the increments to $R^2$ attributable to additive and multiplicative school effects were both statistically significant, it was argued that only the increase due to the school membership variable (i.e. the additive effect) was sufficiently substantial to warrant controlling for its effects in subsequent analyses of the dissonance-performance relationship. Very few individual interactions were found to be significant and the increment in $R^2$ attributable to the effect of interactions between school and other variables was significant because of the cumulative effect of the twenty product terms introduced into the equation rather than the presence of substantial interactions. Consequently, the failure to control for the additive effect of school on academic performance can be expected to distort the results of analyses of the dissonance-performance relationship whereas failure to control for the effect of interactions between school and other variables is not.

In Chapter Seven the result of the main data analysis - statistical tests of the hypotheses developed earlier - are presented and in Chapter Eight the implications of the data analysis findings for the study of social interaction and academic performance are discussed.
INTRODUCTION

In this chapter the results of statistical tests of the hypotheses developed in Chapters Three and Four are presented. The chapter is divided into three major sections. In the first section the hypotheses to be tested are briefly summarized and the strengths and weaknesses of various techniques which could be used to test them are discussed. On the basis of this discussion a strategy for testing the hypotheses is developed which involves combining two different types of regression analysis: multiple regression analysis using dummy variables and multiple classification analysis. Either of these techniques fulfils almost all the requirements necessary to test the hypotheses but both contain limitations which would prevent them being fully investigated and the data being fully utilized. When combined however they form a particularly powerful and flexible research tool with which to test the wide variety of hypotheses developed in the study. In the last part of Section I an example is developed from data collected for this study in order to demonstrate the use of these two techniques.

In Section II the results of tests of hypotheses derived from the first theoretical perspective (the social climate perspective) are presented and in Section III the results of tests of hypotheses arising out of the second theoretical perspective (the extrinsic tendency perspective) are presented.
I THE APPROACH TO DATA ANALYSIS ADOPTED IN THIS STUDY

Hypotheses

In Chapters Three and Four we identified a number of variables which were considered to exert an important influence on adolescent achievement behaviour, and developed a number of hypotheses concerning how these variables were related both to each other and to academic performance. The variables included in this multivariate model of achievement were as follows: between school differences, sex, IQ, state anxiety, need for achievement and need-press dissonance associated with needs aroused in adolescents during social interaction with peers and teachers. Within the context of this model we are primarily interested in the nature of the relationship between measures of dissonance and academic performance.

It will be recalled that in Chapters Three and Four we discussed two different theoretical perspectives concerning the nature of need-press dissonance and its relation to academic performance, each of which led to the development of hypotheses concerning relationships between all the variables mentioned above. The first of these (the social climate perspective discussed in Chapter Three) considered measures of dissonance (associated with needs experienced during social interaction at school) to reflect students' experience of high school social climate in much the same way as was done in earlier studies using the dissonance construct. (This earlier research was reviewed in Chapter Two). From this perspective it was argued that the relationship between dissonance (or experience of social climate) and academic performance was an indirect one mediated by state anxiety. Climatic conditions characterized by high levels of dissonance, it was suggested, inhibited academic performance because under these conditions students perceive
the high school environment as stressful and experience arousal of debilitating anxiety as a result. In other words, we suggested that high levels of state anxiety were the experiential consequence of perceptions of dissonance. In contrast, it was suggested that conditions characterized by congruence (i.e. low levels of dissonance) would facilitate academic performance because under these conditions students do not experience debilitating anxiety. The discussion of this perspective led to the proposal of the basic hypothesis that need-press dissonance would be inversely related; that is, when the effects of sex, school differences and IQ are controlled, low levels of dissonance (congruence) will be associated with high academic performance. It was also suggested that dissonance associated with needs for affiliation, deference and supplication would be more strongly related to academic performance among females than males, while dissonance associated with need for dominance would be more strongly related to performance among males than females.

Stern's (1962b) comment that an optimal learning environment might be one which mildly stimulated students rather than completely satisfied them, led to the alternative suggestion that the relationship between dissonance and performance might be an inverse curvilinear one (in the shape of an inverted U) rather than an inverse linear one as suggested above. Such a suggestion is consistent with the relationship between drive level and task performance proposed by Yerkes and Dodson (1908). In the absence of existing research to indicate which of these hypotheses was correct it was decided to test both of them.
Two other secondary hypotheses derived from discussion of the social climate perspective were (a) that the positive relationship between IQ and performance was stronger under conditions of congruence than dissonance (assuming the effects of sex and school membership are controlled) and (b) that the positive relationship between need for achievement and performance will be stronger under conditions of congruence than dissonance (assuming that effects of sex and school are controlled). The results of hypotheses derived from discussion of the social climate perspective are presented in Section II of this chapter.

The second theoretical perspective examined in this study (the extrinsic tendency perspective discussed in Chapter Four) attempted to place measures of need-press dissonance (associated with social needs) within the framework of the expectancy-value theory of achievement motivation developed by Atkinson and his colleagues. From this perspective need-press dissonance was viewed as an integral component of the achievement tendency \( T_A \) which, according to achievement motivation theory, is directly related to academic performance. Specifically, measures of dissonance were considered to reflect the strength of different extrinsic tendencies to engage in achievement activities. Achievement motivation theory argues that the extrinsic tendency is a positive achievement tendency, that is, it encourages subjects to engage in achievement activities. Thus the basic hypothesis to arise out of the discussion of this perspective was that need-press dissonance (reflecting the strength of the extrinsic tendency) and academic performance would be positively related (assuming the effects of sex, school and IQ are controlled).
Atkinson (1974a) also identified two other tendencies which, he argued, contribute to the overall strength of the achievement tendency. These are tendency to succeed and tendency to avoid failure. Tendency to succeed, like the extrinsic tendency to achieve, he considered was a positive achievement tendency while tendency to avoid failure he saw as a negative tendency. The strength of students' overall achievement tendency, Atkinson argued, was related to performance in a curvilinear fashion and he cited the Yerkes-Dodson Law to support his theory. In this study the strength of students' final achievement tendency was measured using achievement, anxiety and dissonance scores, and on the basis of Atkinson's argument a number of hypotheses were developed concerning relationships between these scales and academic performance. These hypotheses are listed at the end of Chapter Four [see hypotheses 8(a) to 10(b) on p. 142]. Results of tests of all the hypotheses arising out of discussion of the extrinsic tendency perspective are reported in Section III of this chapter.

In order to test these hypotheses a statistical technique is required which enables the user to not only investigate a particular criterion-predictor relationship (in this case the academic performance-dissonance relationship) but also to look for interaction between the predictor of interest and the control variables. For example, we wish to control for the effects of IQ on the dissonance-performance relationship but also to test for dissonance by IQ interactions. The technique used must also allow investigations of curvilinear relationships and be able to cope with categorical and continuous independent variables both as predictors (factors) and controls (covariates).
Analysis of Covariance

Basically what is required is an analysis of covariance technique but the traditional form of this type of analysis (see Elashoff, 1969; Winer, 1971) is unsuitable to test the hypotheses developed in this study for two reasons. Firstly, it will not analyze factor-covariate interactions, and secondly, it cannot deal with covariates which are categorical in nature.

Traditionally, analysis of covariance has been used by researchers who were interested in the effects of different treatments (e.g. teaching methods) on behaviour (e.g. academic performance) and wished to remove variation in the dependent variable due to other variables or covariates (e.g. IQ) which might be expected to distort the performance-treatment relationship in some way. (This of course is the problem of correlated predictors which is common to much of social science research and was discussed in Chapter Six). Ideally subjects are allocated randomly to different groups (and groups to treatments) but if the researcher is forced to work with intact groups which he suspects may differ in terms of IQ or some other variable he can use covariance procedures to adjust for this bias. In this type of analysis regression procedures are used to remove variation from the dependent variable due to covariates and a conventional one-way analysis of variance is then performed on the adjusted achievement scores (see Evans and Anastasio, 1968; and Elashoff, 1969 for details of this procedure).

One feature of analysis of covariance performed in this way is that all independent variables (apart from covariates) must be in a categorical form. This means that a continuous variable such as

---

1 In this situation the assumption of randomization underlying analysis of covariance is partially violated and the results of the analysis must be interpreted with caution.
dissonance would have to be divided into different 'treatment' groups which involves some loss of information [although Duncan and Morgan (1975) have demonstrated that a loss of this kind will not be very great]. More importantly when analysis of covariance is performed in this way all covariates must be continuous variables. This means that categorical variables such as sex and school type cannot be introduced as covariates. Furthermore, this type of analysis does not allow the analysis of factor (or treatment) by covariate interactions. To test the hypotheses developed in this study it is necessary both to use categorical independent variables as covariates (for example, to control for school effects) and to test for the type of interactions just mentioned (e.g. IQ by dissonance interactions). Since conventional analysis of covariance does not provide the user with either of these capabilities it is not an appropriate technique for this study.

Multiple Regression Analysis

These problems can be avoided by performing the analysis of covariance using multiple regression techniques (see for example, Spaeth, 1977; Astin, 1968). By combining the use of dummy variables with the stepwise technique categorical variables can be introduced into the analysis as covariates and factor-covariate interactions can be tested. The general form of this type of analysis is presented in the following equation:

\[ Y = A + b_1 D + b_2 X + b_3 Z + b_4 D.X + b_5 D.Z + b_6 X.Z \]

where \( Y \) is the criterion, \( A \) is the constant term (the \( Y \) intercept), \( D \) a dummy for a two category independent variable, \( X \) and \( Z \) two continuous independent variables, and \( D.Z \) and \( X.Z \) two product terms.
Variables are entered into the analysis in the order indicated and
the coefficient for any independent variable at a particular step
indicates the strength of the relationship between that variable and
the criterion adjusted for the effects of all other independent
variables included at that step. Thus the stepwise technique (entering
variables singly or in groups in a specific order) can be used to
examine how a relationship between a particular independent variable
and the criterion changes as the effects of other independent variables
entered in successive steps are taken into account. The independent
variable of interest would be entered first and then changes in its
regression coefficient would be examined as each new independent
variable was introduced.

Multiple regression analysis and its use in the research
literature was described in some detail in Chapter Six and only the
major points of that discussion will be summarized here. In that
earlier discussion we described how categorical independent variables
(e.g. school membership) can be included in the regression equation
through the use of dummy variables. We also described the use of
product terms formed between independent variables (both continuous
and categorical) to test for interaction effects, and squared and
cubed terms to test for curvilinear effects. One aspect of multiple
regression analysis which is of importance to the present study is
that factor by covariate interactions can be analysed. Using the
stepwise technique covariates and factors can be introduced into the
analysis at the first step and factor-criterion relationships adjusted
for the effects of all covariates can be examined. At the second
step product terms formed between factors only, covariates only and
factors and covariates can be introduced. These interactive effects—
which are adjusted for main effects (since all independent variables which make up the product terms will already be entered) - can then be examined.

This brief summary of the capabilities of multiple regression analysis demonstrate that it fulfils the necessary requirements to test the hypotheses described earlier. Its major advantages over conventional analysis of covariance are firstly that independent variables can be either categorical or continuous. This means that categorical variables can be introduced as controls (or covariates) and continuous variables do not have to be split into categories in order to be used as factors. The second major advantage of the multiple regression technique is that factor by covariate interactions can be tested.

In the light of these advantages multiple regression analysis was used in the first instance to test the hypotheses developed in this study. However, there are a number of problems associated with its use - particularly with regard to the interpretation of significant results. In Chapter Six the problem of interpreting product term regression coefficients was discussed. At the conclusion of that discussion it was suggested, on the basis of Allison's (1977) study, that it was legitimate to consider the statistical significance of a product term coefficient as an indication of the degree to which a particular effect differed between two or more groups (be they naturally occurring groups such as sex groups or simply different levels of a continuous variable) but not to interpret such differences. In other words a significant product term coefficient can be taken as an indication of the presence of an interaction but does not indicate precisely what form that interaction takes.
In this study we have predicted the existence of a number of interactions and it would be desirable to know not only whether such interactions existed (indicated by significant product term coefficients) but also whether they were of the kind predicted. For example, we have predicted that dissonance associated with need for affiliation will be more strongly related to academic performance among females than males. To test this prediction a product term formed between a dummy variable for sex and dissonance associated with need for affiliation would be entered into a regression equation after separate terms for sex and dissonance (and any covariates, e.g. school membership and IQ). If the regression coefficient obtained for this product term was statistically significant we would know that an interaction existed but not if it was of the type predicted; for example, dissonance and performance might be more strongly related among males and females rather than, as predicted, being more strongly related among females than males.

If we are to determine in greater detail the nature of any interactions revealed by regression analysis an alternative technique for examining the data is required.
Similarly, significant coefficients for main effects would indicate that significant predictor-criterion relationships exist and the sign of the coefficients would indicate the direction of such relationships. But the results of regression analysis do not indicate the precise nature of such relationships. For example, we would wish to know if a particular dissonance-performance relationship held for the whole range of dissonance scores collected or only over a part of the range. Also we have predicted that dissonance and performance may be curvilinearly related. The size and sign of a squared term coefficient would indicate that the relationship is of the general type predicted (e.g. an inverted U shape). But if we wish to take a closer look at it (to determine, for example, if performance is greatest under conditions of moderate dissonance as predicted) we need a method of displaying such a relationship in graph form.

Multiple Classification Analysis

A related technique which allows a more detailed examination of the relationships between variables than other forms of regression analysis is multiple classification analysis (MCA). MCA (Andrews, Morgan and Sonquist, 1967; Andrews, Morgan, Sonquist and Klem, 1973) is a technique for examining inter-relationships between several independent variables and a dependent variable within the context of a multivariate additive model. The MCA technique can handle many kinds of data for which simpler forms of traditional multivariate techniques are inappropriate; for example, weak measurement (nominal scales)
on the predictor variables, correlated predictors, and non-linear relationships. Andrews et al. (1967) pointed out that in essence MCA is multiple regression using dummy variables, a technique which has already been discussed at some length in this study. However, "Its chief advantage over conventional dummy variable regression is a more convenient input arrangement and understandable output that focuses on sets of predictors such as occupation groups, and on the extent and direction of the adjustments made for intercorrelations among the sets of predictors." (Andrews et al., 1967: p.10, italics added).

Results obtained from MCA are easier to understand and interpret than the results of conventional regression analysis because the latter only identify substantial relationships within the data (indicated by significant regression coefficients) while the former not only identify such relationships but indicate the form they take; this is particularly useful in the case of non-linear relationships. MCA results show the effect of each predictor on the dependent variable (both before and after taking into account the effects of all other variables) in the form of unadjusted and adjusted mean criterion scores. All predictor variables (with the exception of covariates) are treated as sets of categories and for each category of each variable MCA calculates the mean value of the criterion — the unadjusted mean. It then calculates an adjusted mean value of the criterion for each category of each variable which provides an estimate of the effect of a variable as if it were independent of all other explanatory variables. The relationship between the dependent variable and a particular independent variable, free of the effects of other independent variables, can be examined visually
by plotting adjusted category mean scores for a particular independent variable against the criterion variable.

In a recent Australian study Rosier (1978) used the MCA technique to examine the effects which personal and environmental factors had on the decision of 16 year old students to remain at school or to leave. Using this technique he was able to determine the effect which each of a range of predictor variables had on high school retentivity in this age group net of the effects of the remaining variables. By plotting adjusted and unadjusted mean criterion scores for each variable he was able to demonstrate the effect which each predictor variable exerted on retentivity, and the change in these relationships when the effects of other predictor variables were controlled. For example, he found that retentivity in government schools tended to be lower than in non-government schools. Also within the non-government sector retentivity in metropolitan schools tended to be higher than in non-metropolitan schools, although there was no corresponding consistent difference within the government sector. However, all these observed differences were reduced by controlling for both the sex and mean socio-economic status of the students at the schools concerned.

As well as adjusted and unadjusted mean criterion scores MCA also provides $eta$ and $beta$ coefficients for each explanatory variable. $Eta$ is the correlation ratio, calculated as the square root of the ratio of the sums of squares (based on unadjusted deviations for the explanatory variable) to the total sums of squares. The square of the $eta$ coefficient indicates the proportion of variance explained by the explanatory variable for which it is calculated (all categories combined). $Beta$ is analogous to $eta$ but is based on the deviations
from the adjusted means and reflects the influence of a particular explanatory variable while holding constant the effects of other explanatory variables in the analysis. The beta coefficient in MCA is similar to the standardized regression coefficient in multiple regression analysis. It is useful to compare the value of the eta coefficients (which are equivalent to simple betas from the bivariate linear regression of the dependent variable on each explanatory variable) with the partial betas resulting from controlling for other explanatory variables. MCA output also provides multiple R and R² values for the relationship between the dependent variable and all of the predictor variables taken together. Some programs also provide various sums of squares useful for calculating a variety of different F tests which enable the user to identify statistically significant effects.

As mentioned earlier the MCA technique treats all independent variables (apart from covariates) as categorical. The advantage of this is that even variables at a nominal level of measurement (e.g. sex or school) can be included in the analysis as predictors. The major disadvantage with this is that any continuous predictor variables must be converted to categorical variables which, as discussed earlier involves a loss of information. Duncan and Morgan (1975) however argue that this loss is not great and that using categorical variables can, in fact, be an aid to understanding non-linear relationships. They argue that even if the relationship being studied

... were truly linear, the fraction of explanatory power still available using R classes instead of an infinite set of numbers is only \((1 - 1/R^2)\). With five subgroups of roughly equal size, one still has 96 percent as much potential explanatory power and with seven groups, 98 percent. In addition, if the relationship is nonlinear, one usually explains and learns more with categorical predictors (pp.460-461).
Loss of information was not a problem in this study anyway because the data were analysed first using the multiple regression technique described earlier and subsequently using the MCA technique. MCA was used to shed further light on significant findings revealed by the multiple regression analysis. Combining the two techniques in this way produced a comprehensive statistical tool with which to test the hypotheses described earlier; the use of multiple regression ensures that the information in the data can be fully utilised and the use of MCA ensures that the results of the regression analysis can be fully interpreted.

The Approach to Data Analysis Adopted in this Study

The usefulness of combining these two approaches is particularly apparent when testing for interactions. The problems associated with testing for interactions using multiple regression analysis were discussed earlier in this chapter, and in Chapter Six we concluded that significant product term coefficients indicated the existence but not the nature of interactions. A weakness of the MCA technique is the assumption of additivity which underlies it and precludes testing for interactions; in fact the presence of interactions between predictor variables renders the results of MCA meaningless. But if we use multiple regression analysis first to identify interactions we can then use MCA to interpret them thus avoiding the weaknesses of both techniques. For example, if sex and dissonance exert an interactive effect on academic performance we can examine the relationships between dissonance and performance separately for

---

1 Consequently, the possibility that interactions occur between predictor variables must be checked before MCA is used.
each sex and then compare them to determine the nature of the interaction. The efficacy of combining these two techniques to test the hypotheses will be more apparent if we develop an example using data collected for the present study.

As mentioned earlier one of the major hypotheses derived from the social climate perspective was that, assuming the effects of sex, IQ and school differences are controlled, dissonance associated with social needs will be inversely related to academic performance. It was also suggested that dissonance associated with needs for affiliation, supplication and deference would be more strongly (inversely) related to female academic performance than male performance and that dissonance associated with need for dominance would be more strongly related to male performance than female performance. (In other words, in this second hypothesis we are predicting an interaction between sex and dissonance with respect to academic performance).

It will be recalled from Chapter Five that measures of need-press dissonance A were created by convering need and press scores to standard scores and subtracting press from need. Each of the resulting dissonance A measures can either be used as a single measure of dissonance or divided into two different measures: dissonance B in which need scores exceed press (i.e. the positive half of the dissonance A measure) and dissonance C in which press scores exceed need scores (i.e. the negative half of dissonance A). Perfect congruence for each measure is indicated by a zero score.

We have argued that need-press dissonance will be inversely related to academic performance. If this is correct, and both dissonance B and C are linearly related to performance in an inverse fashion, performance and need-press dissonance A (the combined B and C scores) will be

---

1 See the section headed 'Measurement of Need-Press Dissonance' in Chapter Five (p.159).
curvilinearly related to academic performance. This expected relationship is described in Figure 7.1. The left hand side of the curve describes the expected inverse relationship between performance and the negative dissonance C scores and the right hand side of the curve describes the expected inverse relationship between performance and the positive dissonance B scores; the two expected linear relationships when combined produce a curvilinear one. Therefore, if we are to test the hypothesis that dissonance and performance are inversely related using dissonance A scores this measure should be included in a regression analysis as a squared term in order to test for an inverse curvilinear effect.

![Predicted relationship between academic performance and need-press dissonance A.](image)

Fig. 7.1: Predicted relationship between academic performance and need-press dissonance A.

---

1 Dissonance is greatest at either end of the continuum where the discrepancies between need and press (negative discrepancies in the case of dissonance C and positive discrepancies in the case of dissonance B) are greatest and least in the middle where the discrepancies are least. Perfect congruence for both dissonance measures is indicated by a zero score.
Eight measures of need-press dissonance A were constructed (see Table 5.6 in Chapter Five). The procedures involved were described in Chapter Five and more briefly in Chapter Six. The eight measures were as follows: two measures of student dissonance (student affiliation dissonance A and student dominance dissonance A), three measures of English teacher dissonance [teacher supplication (English) dissonance A, teacher deference (English) dissonance A and teacher affiliation (English) dissonance A], and three measures of science teacher dissonance [teacher supplication (science) dissonance A, teacher deference (science) dissonance A and teacher affiliation (science) dissonance A]. The two student dissonance measures were analysed in relation to both measures of academic performance while the science and English teacher dissonance measures were analysed in relation to science performance and English performance respectively; thus ten separate stepwise regression analyses of the type described above were performed.

The full set of results for one of these analyses [student affiliation dissonance A (DAFF) and science performance] are presented in Table 7.1. Table 7.1 contains metric partial regression coefficients for each variable at the final step of the analysis, that is, when all variables had been entered into the equation; asterisked coefficients are statistically significant (p < .05). The column headed RSQ indicates the increment to explained variance attributable to each variable in the equation, adjusted for the contribution of variables entered earlier. Simple correlation coefficients between science performance and each independent variable are reported in the column headed 'simple r'; asterisked coefficients in this column are also statistically significant (p<.05).
Table 7.1

Stepwise regression of science performance on sex, school, IQ, student affiliation dissonance $A$ squared (DAFF$^2$) and student affiliation dissonance $A$ squared by sex (DAFF$^2$.SEX) (N=326)

<table>
<thead>
<tr>
<th>Explanation of regression terms</th>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dummy for sex</td>
<td>Sex</td>
<td>-.606*</td>
<td>.015</td>
<td>-.126*</td>
</tr>
<tr>
<td>2. Dummies for 4 of the 5 schools</td>
<td>School A</td>
<td>1.873*</td>
<td>.023</td>
<td>.168*</td>
</tr>
<tr>
<td></td>
<td>School B</td>
<td>2.430*</td>
<td>.158</td>
<td>.357*</td>
</tr>
<tr>
<td></td>
<td>School C</td>
<td>.490</td>
<td>.002</td>
<td>-.097</td>
</tr>
<tr>
<td></td>
<td>School D</td>
<td>.302</td>
<td>.009</td>
<td>-.130*</td>
</tr>
<tr>
<td>3. IQ</td>
<td>IQ</td>
<td>.056*</td>
<td>.049</td>
<td>.336*</td>
</tr>
<tr>
<td>4. Student affiliation dissonance $A$ (squared)</td>
<td>DAFF$^2$</td>
<td>-.080</td>
<td>.000</td>
<td>-.014</td>
</tr>
<tr>
<td>5. Dissonance by sex product term to test for interactions</td>
<td>DAFF$^2$.SEX</td>
<td>.192*</td>
<td>.009</td>
<td>.029</td>
</tr>
</tbody>
</table>

Notes:  

*b*: metric partial regression coefficients for the relationship between academic performance and each independent variable (adjusted for all other variables).

*RSQ*: increment to explained variance attributable to each variable.

*Simple r*: zero-order correlation coefficients between academic performance and each independent variable.

*__: indicates coefficients which were statistically significant at the 5 per cent level or greater (i.e. $p < .05$).
We wish to determine the nature of the relationship between dissonance and academic performance net of the influence of sex, IQ and school differences. To do this academic performance was regressed on IQ, dummy variables for four of the five schools and dissonance A measures (squared). Since we also wish to control for sex and test for sex by dissonance interactions a dummy variable representing sex and a sex by dissonance product term were also included in the analysis.

The stepwise technique was used to enter the variables into the analysis in the following order: a dummy for sex, dummies for school membership, IQ, need-press dissonance A (squared) and a product term formed between the dummy variable for sex and need-press dissonance. The partial regression coefficients calculated for each term indicate the nature of the relationship between each independent variable and the dependent variable. This means that we can examine the dissonance-performance relationship net of the effects of IQ, sex and school membership, and the effect of the interaction between dissonance and sex on performance net of the effects of sex and dissonance as well as the other controls. The variables were entered (using the stepwise technique) in the order given above so that the main effects could be examined before being adjusted for the interaction term. On the second last step all main effects are included and adjusted for one another so that the strength of the dissonance-performance relationship net of the effects of the other independent variables can be determined. And on the last step the interaction term is entered so that the sex by dissonance interaction hypothesis can be tested.
Results for dummy variables are interpreted in relation to the omitted category. Thus from Table 7.1 it can be seen that students in schools A and B performed significantly better than those in the omitted school E and that males performed significantly worse than the omitted female group. In other words the mere fact that students attended different schools and were of different sexes exerted a significant effect on science performance. Coefficients for IQ and the product term were also significant. In each case the coefficients indicate the strength of the relationship between academic performance and the independent variables adjusted for the effects of all the other variables. In other words these results were obtained on the last step of the analysis. In the case of the product term this means that the interaction between sex and dissonance squared exerts a significant effect on academic performance even after the main effects of sex and dissonance were taken into account. Since the regression coefficient for the squared dissonance A term was not significant we can conclude that need-press dissonance A and academic performance were not curvilinearly related in the manner predicted.

The significant coefficient for the product term indicates that an interaction exists but does not indicate precisely the form it takes. In the normal course of events we would not be particularly interested in the nature of this interaction because of the small contribution it makes to explained variance (less than 1 per cent). However, in this instance it will be examined further in order to demonstrate the use of the MCA technique. In order to examine this interaction it was necessary to determine the nature of the relationship between student affiliation dissonance and science performance separately for each sex so that they can be compared; accordingly the data were analysed separately for each sex using MCA.
The first step in the MCA procedure is to ensure that there are no interactions between the independent variables in the analysis. This was done by performing an analysis of variance for each sex separately prior to the MCA; no such interactions were found. The student affiliation dissonance A measure was then divided into ten categories (of approximately equal size) for each sex, and mean science performance scores, adjusted for IQ and school differences, were calculated for each category using MCA. Mean category scores for each sex (unadjusted and adjusted for school and IQ) are reported in Table 7.2 for males and in Table 7.3 for females; both sets of means are plotted in Figure 7.2. Mean scores only are reported rather than a full summary of MCA statistics because the intention is to elaborate and amplify the regression analysis findings rather than duplicate them.

From Figure 7.2 it can be seen that student affiliation dissonance A was not curvilinearly related to science performance in the manner predicted in Figure 7.1; this finding was already anticipated by the results in Table 7.1. However, what Figure 7.2 does indicate (and which could not be deduced from the regression findings alone) is the presence of other types of relationships within the data. In particular, Figure 7.2 suggests that among females the two dissonance measures (B and C) which combined make up the dissonance A measure may each be curvilinearly related to academic performance rather than linearly related as suggested earlier. In Figure 7.2 dissonance C for females is represented in categories 1 to 4 and dissonance B in categories 4 to 10. (In other words the score of zero which indicates complete congruence for both scales, falls in category 4). If these scales are considered separately it can be seen that each of
Table 7.2

Mean male science performance scores for ten categories of student affiliation dissonance (DAFF), adjusted for IQ and school differences
Grand Mean = 4.91

<table>
<thead>
<tr>
<th>Dissonance Categories</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Adjusted for School Differences</th>
<th>Adjusted for IQ and School Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
<td>5.39</td>
<td>4.93</td>
<td>4.92</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>4.83</td>
<td>4.74</td>
<td>4.85</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
<td>4.90</td>
<td>5.22</td>
<td>5.08</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>5.07</td>
<td>4.92</td>
<td>5.16</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>5.94</td>
<td>5.39</td>
<td>5.26</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
<td>4.91</td>
<td>4.82</td>
<td>4.48</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>5.79</td>
<td>6.08</td>
<td>6.22</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>3.77</td>
<td>4.65</td>
<td>4.58</td>
</tr>
<tr>
<td>9</td>
<td>21</td>
<td>4.19</td>
<td>4.11</td>
<td>4.16</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>4.20</td>
<td>4.43</td>
<td>4.82</td>
</tr>
</tbody>
</table>

Table 7.3

Mean female science performance scores for ten categories of student affiliation dissonance (DAFF), unadjusted and adjusted for school differences and IQ
Grand Mean = 5.54

<table>
<thead>
<tr>
<th>Dissonance Categories</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Adjusted for School Differences</th>
<th>Adjusted for IQ and School Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>4.50</td>
<td>4.51</td>
<td>4.62</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>5.69</td>
<td>5.65</td>
<td>5.99</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
<td>6.34</td>
<td>6.21</td>
<td>6.29</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>5.41</td>
<td>5.48</td>
<td>5.50</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>5.57</td>
<td>4.94</td>
<td>5.12</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>6.40</td>
<td>5.87</td>
<td>5.72</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>6.40</td>
<td>6.00</td>
<td>5.71</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>6.10</td>
<td>6.10</td>
<td>6.10</td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>5.05</td>
<td>5.56</td>
<td>5.52</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>3.75</td>
<td>4.63</td>
<td>4.42</td>
</tr>
</tbody>
</table>
them is curvilinearly related to science performance among females. This finding provides support for the major alternative hypothesis to arise from the social climate perspective that dissonance and performance may be inversely related in a curvilinear fashion rather than inversely related in a linear fashion. This alternative hypothesis, which arose out of Stern's (1962b) suggestion that moderate conditions of dissonance may provide the optimum learning situation, was discussed earlier in this chapter.

In Figure 7.2 need-press dissonance C for males is represented in categories 1 to 7 and need-press dissonance B in categories 7 to 10 and zero falls in category 7. Dissonance C, it will be recalled, contains negative scores which indicate the extent to which press exceeds needs, and dissonance B positive scores which indicates the extent to which needs exceed press. Since the categories were of roughly equal sizes (see Tables 7.3 and 7.4) the difference between the number of categories representing dissonance C among males (7) and females (4) reflect a difference in the tendency of each sex to report higher press than need scores. Overall males' student affiliation press scores tended to exceed their need for affiliation scores while females' need for affiliation scores tended to exceed their student affiliation press scores. The result of this was that males were overrepresented among those students who received student affiliation dissonance C scores and females were overrepresented among those students who received student affiliation dissonance B scores.
Fig. 7.2 Male and female science performance as a function of student affiliation dissonance A, adjusted for school and IQ.
From Figure 7.2 it can be seen that the pattern of mean scores reported for each sex differed considerably although it is not obvious which particular differences produced the interaction reported in Table 7.1. Possibly, the patterns of results for the two sexes between categories 1 to 3 were responsible. Within these categories student affiliation dissonance was inversely related to science performance among females (the dissonance C scores were negative) and unrelated to science performance among males.

This example demonstrates how multiple regression analysis and multiple classification analysis can be combined with considerable effect to test the hypotheses developed in this study. Multiple regression analysis identifies linear, curvilinear and interactive relationships within the data while MCA allows us to explore the nature of those relationships in greater detail than is possible with conventional regression analysis alone. Furthermore, as was seen earlier, because it allows direct "eyeballing" of the data MCA can be used as an exploratory tool to uncover relationships within the data of which the researcher is unaware. In the next two sections the results of tests of all the hypotheses developed in the study are presented. In Section II the results of tests of hypotheses arising out of the social climate theoretical perspective are presented and in Section III the results of tests of hypotheses derived from the extrinsic tendency perspective are presented.
II STATISTICAL TESTS OF HYPOTHESES DERIVED FROM THE SOCIAL CLIMATE PERSPECTIVE

The two major hypotheses which arose out of discussion of the social climate perspectives were firstly, that need-press dissonance and academic performance would be inversely related in a linear fashion assuming the effects of sex, school membership and IQ are controlled (hypothesis 1, p.140); and secondly, that these two variables would be inversely related in a curvilinear fashion i.e. that the relationship would be in the shape of an inverted U (hypothesis 2, p.140).

The first of these hypotheses was based on the argument that students perform best under conditions of complete need-press congruence (characterized by an absence of state anxiety), and the second that they perform best under conditions of moderate need-press dissonance (characterized by a moderate level of anxiety or arousal). Thus an accompanying hypothesis was that the dissonance-performance relationship was mediated by state anxiety (hypothesis 3, p.141).

Other hypotheses developed in the discussion of the basic linear hypothesis were as follows: (a) dissonance associated with needs for affiliation supplication and deference will be more strongly inversely related to female academic performance than male performance, while dissonance associated with need for dominance will be more strongly inversely related to male performance than female performance (hypotheses 4(a) and 4(b) on p.141); (b) the positive relationships between academic performance and both IQ and need for achievement will be stronger under conditions of congruence or low dissonance than high dissonance (hypotheses 5(a) and 5(b) on p. 141); and (c) a series of hypotheses concerning relationships between measures of need-press dissonance and the four emotional response to school
scales: anxiety, enjoyment, anger and anxiety/fear (see hypotheses 6(a) to 6(d) on p.141). Results of tests of these hypotheses are presented below.

Results of Tests for Linear Inverse Relationships Between Measures of Need-Press Dissonance and Academic Performance

The basic linear hypothesis that dissonance and performance were inversely related, assuming the effects of sex, IQ and school were controlled (hypothesis 1, p.140) was tested using the regression analysis model described in the previous section of this chapter. The hypotheses concerning interactions between sex and dissonance [4(a) and 4(b)] were tested at the same time. Dummy variables for sex (males) and four of the five schools were entered into the equation followed by IQ, need-press dissonance A (squared) 2 and a product term formed between sex and need-press dissonance A. In the previous section the results of one of these analyses (that involving science performance as the criterion and student affiliation dissonance A) were reported in detail. Altogether, ten separate analyses of the type described

1 All hypotheses tested in this study are listed on pp.140-142.

2 It will be recalled that looking for inverse linear relationships between academic performance and measures of dissonance B and C (which together make up the dissonance A measures) involved looking for a curvilinear relationship between academic performance and need-press dissonance A (see Section I). Dissonance A was not entered as a linear term as well because firstly, a linear relationship was not predicted, and secondly, linear relationships between academic performance and both dissonance B and C were tested later in the chapter.
above were performed and the results of these are summarized in Table 7.4 (science performance) and 7.5 (English performance). We are particularly interested in the effects of the dissonance and dissonance-by-sex product terms on academic performance. Therefore, the results from all ten analyses for these two terms only are reported in Table 7.4. The partial regression coefficients (columns headed b) reported indicate the strength and direction of the effects, the different dissonance A terms and product terms on academic performance adjusted for sex, school and IQ (as well as for each other). (Asterisked coefficients are statistically significant: p < .05). The columns headed RSQ, simple r and N contain the increment in explained variance attributable to each term (after the contributions of terms entered above it only are taken into account), the magnitude of the simple correlation between academic performance and each term, and the sample size for each analysis respectively.

From Table 7.4 it can be seen that although a number of dissonance and product terms exerted a significant effect on performance the increment in explained variance attributable to these terms in each case is very small. Specifically, these results show that teacher affiliation (science) dissonance A, teacher deference (science) dissonance A, and teacher supplication (science) dissonance A are all significantly related to science performance even when the effects of sex, school and IQ are controlled. The significant coefficients for the product terms formed between sex and both DAFF and DAFSCI indicate that the relationship between science performance

---

1 Coefficients were asterisked if they were statistically significant when first entered into the analysis even if the inclusion of subsequent terms (e.g. product terms) reduced them in magnitude to below a significant level. This occurred in the case of the DDEFSCI coefficient in Table 7.4.
Table 7.4

Stepwise regression of science performance on sex, school, IQ dissonance A squared and dissonance A squared by sex: partial regression coefficients and $R^2$ values for dissonance A (squared) and dissonance A (squared) by sex

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>$b$</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAFF$^2$</td>
<td>-.080</td>
<td>.000</td>
<td>-.014</td>
<td>326</td>
</tr>
<tr>
<td>DAFF$^2$.SEX</td>
<td>.192*</td>
<td>.009</td>
<td>.029</td>
<td></td>
</tr>
<tr>
<td>DDOM$^2$</td>
<td>-.011</td>
<td>.000</td>
<td>-.017</td>
<td>326</td>
</tr>
<tr>
<td>DDOM$^2$.SEX</td>
<td>-.015</td>
<td>.000</td>
<td>-.056</td>
<td></td>
</tr>
<tr>
<td>DAFFSCI$^2$</td>
<td>-.225*</td>
<td>.004</td>
<td>-.083</td>
<td>318</td>
</tr>
<tr>
<td>DAFFSCI$^2$.SEX</td>
<td>.325*</td>
<td>.026</td>
<td>.020</td>
<td></td>
</tr>
<tr>
<td>DDEFSCI$^2$</td>
<td>-.077*</td>
<td>.021</td>
<td>-.149*</td>
<td>318</td>
</tr>
<tr>
<td>DDEFSCI$^2$.SEX</td>
<td>-.103</td>
<td>.003</td>
<td>-.163</td>
<td></td>
</tr>
<tr>
<td>DSUPSCI$^2$</td>
<td>-.160*</td>
<td>.018</td>
<td>-.129*</td>
<td>318</td>
</tr>
<tr>
<td>DSUPSCI$^2$.SEX</td>
<td>-.049</td>
<td>.000</td>
<td>-.102</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Abbreviations of variable names are as follows:
DAFF : student affiliation dissonance A
DDOM : student dominance dissonance A
DAFSCI : teacher affiliation (science) dissonance A
DDEFSCI: teacher deference (science) dissonance A
DSUPSCI: teacher supplication (science) dissonance A
Table 7.5
Stepwise regression of English performance on sex, school, IQ, dissonance A squared and dissonance A squared by sex: partial regression coefficients and R² values for dissonance A (squared) and dissonance A (squared) by sex

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAFF²</td>
<td>-.008</td>
<td>.004</td>
<td>.084</td>
<td>312</td>
</tr>
<tr>
<td>DAFF².SEX</td>
<td>.140</td>
<td>.006</td>
<td>-.007</td>
<td></td>
</tr>
<tr>
<td>DDOM²</td>
<td>.054</td>
<td>.000</td>
<td>.019</td>
<td>312</td>
</tr>
<tr>
<td>DDOM².SEX</td>
<td>-.071</td>
<td>.000</td>
<td>-.069</td>
<td></td>
</tr>
<tr>
<td>DAFENG²</td>
<td>-.035</td>
<td>.000</td>
<td>.028</td>
<td>312</td>
</tr>
<tr>
<td>DAFENG².SEX</td>
<td>.069</td>
<td>.000</td>
<td>-.056</td>
<td></td>
</tr>
<tr>
<td>DDEFENG²</td>
<td>.028</td>
<td>.001</td>
<td>.020</td>
<td>312</td>
</tr>
<tr>
<td>DDEFENG².SEX</td>
<td>-.127</td>
<td>.005</td>
<td>-.117*</td>
<td></td>
</tr>
<tr>
<td>DSUPENG²</td>
<td>-.049</td>
<td>.001</td>
<td>.055</td>
<td>312</td>
</tr>
<tr>
<td>DSUFENG².SEX</td>
<td>.148</td>
<td>.008</td>
<td>.011</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Abbreviations of variable names are as follows:

DAFF : student affiliation dissonance A
DDOM : student dominance dissonance A
DAFENG : teacher affiliation (English) dissonance A
DDEFENG : teacher deference (science) dissonance A
DSUPENG : teacher supplication (science) dissonance A
and each of these dissonance measures differed between the sexes. The first of these interactions was examined in some detail in the first section of this chapter. The results of similar regression analyses with English performance (see Table 7.5) failed to reveal any significant findings; once the effects of sex, school and IQ have been taken into account the effects of all dissonance A measures and product terms on English performance are not significant.

We have predicted curvilinear relationships (in the shape of an inverted U) between measures of need-press dissonance A and academic performance. The significant dissonance term coefficients in Table 7.4 indicate the existence of quadratic relationships between science performance and need-press dissonance A (net of the effects of IQ, sex and school) and their negative signs indicate that they are of the general type (i.e. in the form of an inverted U) predicted (see Kelly, Beggs and McNeil, 1969, p.164). But further analysis is required if we are to determine the shape of such relationships in more detail. For example, since the dissonance A measures were made up of two separate dissonance measures (B and C) it is desirable to determine if the predicted relationships occur for both or only one of these two dissonance measures.

Multiple classification analysis was used to examine relationships between science performance and, firstly, teacher supplication (science) dissonance A (DSUPSCI), secondly, teacher deference (science) dissonance A (DDEFSCI), and thirdly, teacher affiliation (science) dissonance A (DAFSCI). The last relationship mentioned was investigated separately for each sex because the results in Table 7.4 indicate that this particular relationship differs between the sexes.
DSUPSCI and DDEFSCI were each divided into ten categories and mean science performance scores, adjusted for sex, IQ and school, were calculated for each category. These mean scores are reported in Tables 7.6 and 7.7. Each table contains: the grand mean for science performance (the mean score for all cases included in the analysis), N sizes for each of the ten dissonance categories, unadjusted category means and category means adjusted for sex, school and IQ. The adjusted means reported in Table 7.6 are plotted in Figure 7.3 and those reported in Table 7.7 are reported in Figure 7.4.

From Figure 7.3 it can be seen that the relationship between teacher supplication (science) dissonance A (DSUPSCI) and science performance is, as predicted, in the form of an inverted U; science performance is higher in low dissonance categories (categories 4 to 7) and lower in the high dissonance categories (categories 1 to 3 and 8 to 10). Earlier in this chapter it was described how the dissonance A variable could be divided into two further measures of need-press dissonance: dissonance B in which needs exceed press (positive scores in the dissonance A measure) and dissonance C in which press exceeds needs (negative scores in the dissonance A measure). In Figure 7.3 categories 1 to 6 represent the dissonance C (or negative) part of teacher supplication (science) dissonance A and categories 6 to 10 the dissonance B (or positive) part of this measure. Perfect congruence

---

1 Prior to these analyses an ANOVA was carried out to ensure that no interactions existed between any of the independent variables.

2 The difference between the total N used for these analyses and those reported for the corresponding regression analyses in Table 7.4 is due to differences between the computational procedures used for each analysis.
Table 7.6

Mean science performance for ten categories of teacher supplication (science) dissonance A: unadjusted and adjusted for sex, school and IQ

Grand Mean = 5.26

<table>
<thead>
<tr>
<th>Factor Categories</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Means Adjusted for School, Sex and IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSUPSCI 1</td>
<td>31</td>
<td>5.48</td>
<td>5.07</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>5.65</td>
<td>5.40</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>5.92</td>
<td>5.69</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>5.73</td>
<td>5.97</td>
</tr>
<tr>
<td>5</td>
<td>29</td>
<td>5.41</td>
<td>5.32</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>5.64</td>
<td>5.66</td>
</tr>
<tr>
<td>7</td>
<td>42</td>
<td>5.36</td>
<td>5.42</td>
</tr>
<tr>
<td>8</td>
<td>26</td>
<td>4.77</td>
<td>4.95</td>
</tr>
<tr>
<td>9</td>
<td>39</td>
<td>5.00</td>
<td>4.96</td>
</tr>
<tr>
<td>10</td>
<td>31</td>
<td>4.35</td>
<td>3.93</td>
</tr>
</tbody>
</table>

Fig. 7.3: Mean science performance as a function of teacher supplication (science) dissonance A (DSUPSCI) adjusted for sex, school and IQ. (DSUPSCI B = categories 6 to 10; DSUPSCI C = categories 1 to 6).
Table 7.7

Mean science performance for ten categories of teacher deference (science) dissonance A: unadjusted and adjusted for sex, school and IQ

Grand Mean = 5.67

<table>
<thead>
<tr>
<th>Dissonance Categories</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Means Adjusted for School, Sex and IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDEFSCI 1</td>
<td>32</td>
<td>3.53</td>
<td>3.38</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>5.20</td>
<td>5.27</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
<td>5.42</td>
<td>5.49</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>5.48</td>
<td>5.51</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>5.95</td>
<td>5.75</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>5.72</td>
<td>5.97</td>
</tr>
<tr>
<td>7</td>
<td>21</td>
<td>6.80</td>
<td>6.98</td>
</tr>
<tr>
<td>8</td>
<td>24</td>
<td>6.59</td>
<td>6.29</td>
</tr>
<tr>
<td>9</td>
<td>41</td>
<td>6.13</td>
<td>5.92</td>
</tr>
<tr>
<td>10</td>
<td>27</td>
<td>6.30</td>
<td>6.24</td>
</tr>
</tbody>
</table>

Fig. 7.4: Mean science performance as a function of teacher deference (science) dissonance A (DDEFSCI) adjusted for sex, school and IQ. (DDEFSCI B = categories 6 to 10; DDEFSCI C = categories 1 to 6).
between needs and press (i.e. a score of 0) occurs in category 6.  

The graph in Figure 7.3 suggests that although both dissonance B and dissonance C were inversely related to science performance this relationship may be stronger for the dissonance B than the dissonance C measure. In Figure 7.4 on the other hand need-press dissonance C (categories 1 to 6) is more strongly (inversely) related to science performance than need-press dissonance B (categories 6 to 10). In fact this graph suggests that the relationship between teacher deference (science) dissonance A (DDEFSCI) is linear rather than curvilinear. This impression is supported by the significant main effect for this dissonance term reported in Table 1 of Appendix BIII. (This ANOVA was performed to check for interactions). When this dissonance measure was treated as a continuous variable in the regression analysis reported in Table 7.4 it was related to science performance in a curvilinear fashion. This was only a weak relationship (b = —.133) and was sufficiently close to being linear that when the dissonance term was converted into categories and included in the ANOVA it exerted a significant linear effect.

The third relationship investigated using MCA was that between teacher affiliation (science) dissonance A (DAFSCI) and science performance. As mentioned earlier this relationship was investigated within each sex separately because the regression analysis reported in Table 7.2 revealed a significant interaction between DAFSCI and sex with respect to science performance. Once again the dissonance

---

1 Scores of zero are included in both dissonance measures to indicate perfect congruence between needs and press.

2 This was the magnitude of the DDEFSCI regression coefficient before the product term was introduced. When the product term was introduced the size of this coefficient was reduced to —.077 — the value reported in Table 7.4.
measure was divided into ten categories and an ANOVA and MCA computed in which the factors were school, dissonance and IQ, and the criterion variable was science performance (sex was omitted as a factor from these analyses because they were performed separately for males and females). MCA results are reported in Tables 7.8 and 7.9 for males and females respectively. These tables follow the same format as those described earlier (i.e. Tables 7.6 and 7.7).

The ANOVA results indicate an absence of significant interactions between school and DAFSCI for both males and females but, contrary to earlier expectations, the main effect of DAFSCI on female science performance was significant. This indicates that the relationship between teacher affiliation (science) dissonance A (DAFSCI) and science performance among females is linear rather than curvilinear as predicted. The science performance mean scores for each DAFSCI category, adjusted for school and IQ, are plotted separately for males and females in Figure 7.5.

The graph for males indicates that dissonance B (categories 7 to 10) is, as predicted, inversely related to science performance but, contrary to expectation, that negative dissonance C (categories 1 to 7) scores are positively related to science performance. Dissonance scores are greatest at either end of the DAFSCI continuum and least in the middle. Therefore if dissonance C is inversely related to science performance mean performance scores will be greater in categories 4, 5 and 6 than in 1, 2 and 3. The graph for females suggests that there is a weak inverse relationship between

---

1 See Table 2 in Appendix BIII
2 Perfect congruence (i.e. a score of zero) occurred in category 7.
Table 7.8
Mean male science performance scores for ten categories of teacher affiliation (science) dissonance A: unadjusted and adjusted for school and IQ
Grand Mean = 4.93

<table>
<thead>
<tr>
<th>Factor Categories DAFSCI</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Adjusted for School and IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
<td>6.33</td>
<td>6.21</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>5.30</td>
<td>5.46</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>4.70</td>
<td>4.62</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>5.26</td>
<td>5.29</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>5.20</td>
<td>5.21</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>5.21</td>
<td>4.83</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>4.85</td>
<td>4.50</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>4.86</td>
<td>4.51</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>3.46</td>
<td>3.84</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>3.75</td>
<td>4.02</td>
</tr>
</tbody>
</table>

Table 7.9
Mean female science performance scores for ten categories of teacher affiliation (science) dissonance A: unadjusted and adjusted for school and IQ
Grand Mean = 5.59

<table>
<thead>
<tr>
<th>Factor Categories DAFSCI</th>
<th>N</th>
<th>Unadjusted Means</th>
<th>Adjusted for School and IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>5.85</td>
<td>5.17</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>7.95</td>
<td>6.46</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>5.83</td>
<td>5.62</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>6.25</td>
<td>6.19</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>6.42</td>
<td>6.50</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
<td>5.42</td>
<td>5.75</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>4.98</td>
<td>5.86</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>4.41</td>
<td>4.88</td>
</tr>
<tr>
<td>9</td>
<td>21</td>
<td>5.14</td>
<td>5.35</td>
</tr>
<tr>
<td>10</td>
<td>17</td>
<td>2.76</td>
<td>3.65</td>
</tr>
</tbody>
</table>
Fig. 7.5: Male and female science performance as a function of teacher affiliation (science) dissonance A adjusted for school and IQ.

(DAFSCI B = Males: categories 7 to 10; Females: categories 5 to 10; DAFSCI C = Males: categories 1 to 7; Females: categories 1 to 5)
DAFSCI C (categories 1 to 5) and female science performance
and a strong inverse relationship between DAFSCI B (categories
1 to 10) and female science performance. The net effect of
these two relationships was the significant linear effect of DAFSCI
on female science performance reported in the ANOVA table in Appendix BIII.

Further regression analyses were carried out with these data
in order to, firstly, check that the use of the squared dissonance A
terms had not obscured significant linear relationships between
science performance and either dissonance B or dissonance C measures,
and secondly, to determine which of the two dissonance measures
(B or C) which made up the dissonance A measures were primarily
responsible for the significant effects observed in Table 7.4. This
was done by computing stepwise regression analysis similar to those
discussed above using measures of dissonance B and dissonance C
separately. Twenty separate analyses were performed (10 with
dissonance B and 10 with dissonance C) using a similar model to the
one reported in Table 7.1. Sex, school and IQ were entered into
the equation followed by either dissonance B or dissonance C terms
and then by product terms formed between sex and dissonance B or C.

---

1 It will be recalled that dissonance B was the positive half of
dissonance A (i.e. needs > press) and dissonance C the negative
half (i.e. press > needs). High dissonance B was indicated by
large positive discrepancy scores and low dissonance B (or
congruence) by small positive scores or a score of 0. In contrast
high dissonance C was indicated by large negative scores and
low dissonance C (or congruence) by small negative scores or a
score of 0. Thus a score of 0 indicated complete need-press
congruence for dissonance B and dissonance C. The dissonance B
measure used in these analyses comprised all dissonance A scores
greater than OR equal to 0, and the dissonance C measure, all
dissonance A scores less than OR equal to 0. A frequency count
of these two measures is contained in Table 5.6 in Chapter Five.

2 Table 2 in Appendix BIII.
We expect linear relationships between academic performance and both dissonance B and dissonance C, therefore they were entered into the regression equation as linear terms and not quadratic terms as was the case for the analyses using dissonance A terms. A full summary of results for one of these analyses [teacher affiliation (science) dissonance B and science performance] is presented in Table 7.10. This table contains: metric partial regression coefficients for each variable after all terms had been entered into the equation (column headed b), the increment to explained variance attributable to each term (column headed RSQ) and the zero-order correlations between each term and science performance (column headed r). Asterisked coefficients were statistically significant (p < .05). The finding of interest in Table 7.10 is that DAFSCI B exerts a significant inverse effect on science performance even when the effects of sex, school and IQ are controlled. This relationship was observed separately for each sex in Figure 7.5.

Table 7.10

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>-1.065</td>
<td>.024</td>
<td>-.157</td>
</tr>
<tr>
<td>School A</td>
<td>2.506*</td>
<td>.095</td>
<td>.318*</td>
</tr>
<tr>
<td>School B</td>
<td>1.924*</td>
<td>.124</td>
<td>.308*</td>
</tr>
<tr>
<td>School C</td>
<td>.591</td>
<td>.018</td>
<td>-.014</td>
</tr>
<tr>
<td>School D</td>
<td>-.333</td>
<td>.000</td>
<td>-.295*</td>
</tr>
<tr>
<td>IQ</td>
<td>.048*</td>
<td>.048</td>
<td>.324*</td>
</tr>
<tr>
<td>DAFSCI B</td>
<td>-.866*</td>
<td>.051</td>
<td>-.317*</td>
</tr>
<tr>
<td>DAFSCI B.SEX</td>
<td>.458</td>
<td>.004</td>
<td>-.214*</td>
</tr>
</tbody>
</table>

1 Because dissonance B and C scores could only be calculated for approximately half the total sample in each case (see Table 5.6) the workable N for this analysis and those reported in Table 7.11 was drastically reduced.
The remainder of the results for the analysis involving science performance and dissonance B measures are summarized in Table 7.11. Metric partial regression coefficients (for dissonance B and product terms only) are included (column headed b) together with increments to explained variance attributable to these terms and zero-order correlations between these terms and science performance. Apart from the result for DAFSCI B which has already been noted, the results in Table 7.11 indicate that significant inverse relationships occurred between DSUPSCI B and science performance, and between science performance and the interaction between sex and DDEFSCI B. Similar main effects were reported earlier for the dissonance A measures in Table 7.4 but in each case the main effects in Table 7.11 accounted for a greater proportion of variance in science performance than their analogues in Table 7.4. This suggests that relationships between science performance and the dissonance B half of both teacher affiliation (science) dissonance A (DAFSCI²) and teacher supplication (science) dissonance A (DSUPSCI²) produced the two corresponding main effects reported in Table 7.4. Both of these findings were observed earlier in Figures 7.3 and 7.5 respectively. In Figure 7.3 dissonance B is represented in categories 6 to 10 and in Figure 7.5 in categories 4 to 10 (for females) and categories 7 to 10 (for males). The degree of dissonance B in each case increases from lower to higher categories and in both Figures 7.3 and 7.5 science performance is lower in the high dissonance categories than the low dissonance categories.
Table 7.11

Stepwise regression of science performance on sex, school, IQ, dissonance B and dissonance B by sex: partial regression coefficients for dissonance B and dissonance B by sex

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAFF B</td>
<td>-.418</td>
<td>.005</td>
<td>-.122</td>
<td>158</td>
</tr>
<tr>
<td>DAFF B.SEX</td>
<td>.644</td>
<td>.005</td>
<td>-.146</td>
<td></td>
</tr>
<tr>
<td>DDOM B</td>
<td>.060</td>
<td>.006</td>
<td>-.136</td>
<td>158</td>
</tr>
<tr>
<td>DDOM B.SEX</td>
<td>-.513</td>
<td>.004</td>
<td>-.167*</td>
<td></td>
</tr>
<tr>
<td>DAFSCI B</td>
<td>-.866*</td>
<td>.051</td>
<td>-.317*</td>
<td>161</td>
</tr>
<tr>
<td>DAFSCI B.SEX</td>
<td>.458</td>
<td>.004</td>
<td>-.214*</td>
<td></td>
</tr>
<tr>
<td>DDEFSCI B</td>
<td>.590</td>
<td>.000</td>
<td>.016</td>
<td>170</td>
</tr>
<tr>
<td>DDEFSCI B.SEX</td>
<td>-1.158*</td>
<td>.031</td>
<td>-.190*</td>
<td></td>
</tr>
<tr>
<td>DSUPSCI B</td>
<td>-.851*</td>
<td>.045</td>
<td>-.273*</td>
<td>149</td>
</tr>
<tr>
<td>DSUPSCI B.SEX</td>
<td>.207</td>
<td>.001</td>
<td>-.146</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Abbreviations of variable names are as follows:

DAFF B : student affiliation dissonance B
DDOM B : student dominance dissonance B
DAFSCI B : teacher affiliation (science) dissonance B
DDEFSCI B : teacher deference (science) dissonance B
DSUPSCI B : teacher supplication (science) dissonance B

--- Males
---- Females

Fig. 7.6: Male and female mean science scores as a function of teacher deference (science) dissonance B, adjusted for the effects of school and IQ.
The interaction between DDEFSCI B and sex reported in Table 7.11 was investigated further using MCA; adjusted mean science scores were calculated separately for each sex and plotted in Figure 7.6. The dissonance measure was only divided into five categories because of the reduced sample size when the dissonance B and C measures were examined separately. From Figure 7.6 it appears that among females DDEFSCI B and science performance are unrelated and among males, inversely related. This finding is contrary to the prediction made earlier that dissonance associated with need for deference would be more strongly (inversely) related to academic performance among females than males.

The interaction between sex and DDEFSCI B reported in Table 7.11 merely indicates that the slopes for males and females were significantly different from one another. It does not indicate whether DDEFSCI B was significantly related to science performance among either males or females (i.e. whether either slope was significantly different from zero). To determine whether DDEFSCI and science performance were significantly related among either sex this relationships must be tested separately for each sex. This was done by means of an analysis of variance [in which DDEFSCI B (5 levels), school (5 levels) and IQ (3 levels) were factors, and science performance was the dependent variable] which was performed separately for each sex. The results of these analyses indicated that the main effect of DDEFSCI B on science performance was not statistically significant for either sex; in other words, science performance and DDEFSCI B are not significantly related among either males or females.
Stepwise regression analysis of the kind reported in Tables 7.10 and 7.11 were also carried out with, firstly, science performance and dissonance C measures, and secondly, English performance and both dissonance B and dissonance C measures. These analyses revealed only three significant findings. These were an inverse relationship between teacher deference (science) dissonance C (DDEFSCI C) and interactions between firstly, teacher affiliation (science) dissonance C (DAFSCI C) and sex with respect to science performance, and secondly, teacher supplication (English) dissonance C (DSUPENG C) and sex with respect to English performance. These two results produced, firstly, the inverse relationship between teacher deference (science) dissonance A (see Figure 7.4) noted earlier and the significant interaction between sex and teacher affiliation (science) dissonance A (squared) reported in Table 7.4. The second interaction mentioned above (that between sex and DSUPENG C) was not anticipated by the results of earlier analyses.

The relationship between DDEFSCI C and science performance can be observed in Figure 7.4 where DDEFSCI C is represented by categories 1 to 6. Dissonance C decreases from lower to higher categories (i.e. 1 to 6) which indicates that DDEFSCI C and science performance were, as predicted, inversely related. The first interaction reported above can be observed in Figure 7.5 if the left handsides of the male and female graphs are compared. DAFSCI C among males is represented by categories 1 to 5 and among females by categories 1 to 7. Since dissonance C decreases from the lower to the higher categories (i.e. from left to right) Figure 7.5 indicates that among females science performance and DAFSCI C are, as predicted, inversely related but among males, positively related. This interaction provides support
for the earlier prediction that the inverse relationship between academic performance and dissonance associated with need for affiliation would be stronger among females than males. As mentioned earlier the presence of an interaction indicates a significant difference between the slopes for each sex but not that the relationship between criterion and predictor is significant for either sex. This possibility was investigated by examining the main effect of DAFSCI C on science performance for each sex separately by means of analysis of variance. The results indicated that the main effect of this dissonance measure was not statistically significant for either sex.

The second interaction mentioned above is reported in Table 7.12 which has the same format as Table 7.10. The nature of this interaction was investigated using the MCA technique in the same way as the one discussed above. Male and female English performance mean scores for five dissonance C categories, adjusted for school and IQ, were calculated and are plotted in Figure 7.7. From the graphs in Figure 7.7 it can be seen that, contrary to what was predicted, teacher supplication (English) dissonance C was positively related to male English performance (dissonance decreases from categories 1 to 5). Among females, however, this relationship was in the opposite and predicted direction. This interaction also provides support for an earlier prediction; that dissonance associated with need for supplication would be more strongly (inversely) related to academic performance among females than males. However, the results of the ANOVAs (performed as part of the MCA technique) which were performed separately

1 It also produced the interaction between sex and teacher affiliation (science) dissonance A squared (DAFSCI²) which was reported in Table 7.4 because a similar interaction did not occur between DAFSCI and sex (see Table 7.11).
### Table 7.12

Stepwise regression of science performance on sex, school, IQ, teacher supplication (English) dissonance C (DSUPENG C) and DSUPENG C by sex (N=172)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>-2.437*</td>
<td>.072</td>
<td>-.269*</td>
</tr>
<tr>
<td>School A</td>
<td>.536</td>
<td>.007</td>
<td>.105</td>
</tr>
<tr>
<td>School B</td>
<td>-.444</td>
<td>.009</td>
<td>-.083</td>
</tr>
<tr>
<td>School C</td>
<td>.162</td>
<td>.000</td>
<td>.007</td>
</tr>
<tr>
<td>School D</td>
<td>.102</td>
<td>.001</td>
<td>.006</td>
</tr>
<tr>
<td>IQ</td>
<td>.024</td>
<td>.030</td>
<td>.195*</td>
</tr>
<tr>
<td>DSUPENG C</td>
<td>.435</td>
<td>.009</td>
<td>-.111</td>
</tr>
<tr>
<td>DSUPENG C.SEX</td>
<td>-1.185*</td>
<td>.054</td>
<td>-.017</td>
</tr>
</tbody>
</table>

* p < .05

---

Fig. 7.7: Male and female mean English performance scores as a function of teacher supplication (English) dissonance C adjusted for the effects of IQ and school.
for each sex indicated that the relationship between DSUPENG C and English performance was statistically significant for males but not females.

Summary of the Results of Tests for Linear Inverse Relationships Between Academic Performance and Measures of Need-Press Dissonance

The results reported in the previous section provide only limited support for the hypothesis that academic performance and dissonance associated with social needs are inversely related in a linear fashion. Twenty separate relationships were analyzed (5 measures of dissonance B and 5 measures of dissonance C with both science performance and English performance) and only three statistically significant relationships, in the direction predicted were revealed. These were between science performance and teacher supplication dissonance B, teacher affiliation dissonance B and teacher deference dissonance C. One other significant relationship which was found but not predicted was a positive relationship between teacher supplication dissonance C and English performance (males only). Three significant interactions were also observed and two of these [those between sex and teacher affiliation (science) dissonance C with respect to science performance, and between sex and teacher supplication (English) dissonance C with respect to English performance] provided support for the hypothesis that dissonance associated with social needs (with the exception of needs for dominance) would be more strongly related (inversely) to the academic performance of males than females.

See Table 3 in Appendix BIII.
Results of Tests for Linear Relationships Between Academic Performance and Needs and Press

Similar regression analyses to those reported above were performed using measures of needs and press as separate scales rather than combined as dissonance measures. This was done in order to determine whether the amount of variance in academic performance explained by measures of needs and press was greater when they were used separately than when they were combined. The need and press scales were entered in the same combinations used to construct the dissonance measures together with measures of IQ, sex and school, and product terms formed between the need and press scales.

The results of these analyses are reported in Tables 7.13 (science performance) and 7.14 (English performance). Since IQ, sex and school were introduced as controls only the results for the need and press measures and product terms only (adjusted for the effects of the three controls) are reported. The only significant results in these two tables were the main effects for teacher warmth (science) press and teacher compliance (science) press; the former scale was positively related to science performance and the latter scale was inversely related to science performance. Both of these press scales accounted for approximately the same proportion of variance in science performance as the three dissonance measures (reported above) which were significantly related to science performance. Since teacher warmth (science) press and teacher compliance (science) press were used to construct these three scales, and the three need scales used

\[\text{Teacher warmth (science) press was used with need for affiliation to construct teacher affiliation (science) dissonance B and with need for supplication to construct teacher supplication (science) dissonance B, and teacher compliance (science) press was used with need for deference to construct teacher deference (science) dissonance C.}\]
Table 7.13

Partial regression coefficients (b), increments to explained variance (RSQ) and simple correlation coefficients (simple r) for needs, environmental press and product terms formed between needs, press and sex from the regression of science performance on school, IQ, sex needs, press and product terms

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>nAFF</td>
<td>.064</td>
<td>.003</td>
<td>-.038</td>
<td>335</td>
</tr>
<tr>
<td>AFFPRESS</td>
<td>.143</td>
<td>.001</td>
<td>.060</td>
<td></td>
</tr>
<tr>
<td>nAFF.AFFPRESS</td>
<td>-.003</td>
<td>.001</td>
<td>.026</td>
<td></td>
</tr>
<tr>
<td>SEX.nAFF</td>
<td>.006</td>
<td>.000</td>
<td>-.136</td>
<td></td>
</tr>
<tr>
<td>SEX.AFFPRESS</td>
<td>-.017</td>
<td>.000</td>
<td>-.105</td>
<td></td>
</tr>
<tr>
<td>nDOM</td>
<td>-.003</td>
<td>.001</td>
<td>.013</td>
<td>333</td>
</tr>
<tr>
<td>DOMPRESS</td>
<td>-.023</td>
<td>.000</td>
<td>.054</td>
<td></td>
</tr>
<tr>
<td>nDOM.DOMPRESS</td>
<td>-.007</td>
<td>.000</td>
<td>.040</td>
<td></td>
</tr>
<tr>
<td>SEX.nDOM</td>
<td>.009</td>
<td>.005</td>
<td>-.103</td>
<td></td>
</tr>
<tr>
<td>SEX.DOMPRESS</td>
<td>.074</td>
<td>.002</td>
<td>-.093</td>
<td></td>
</tr>
<tr>
<td>nAFF</td>
<td>.017</td>
<td>.002</td>
<td>-.028</td>
<td>335</td>
</tr>
<tr>
<td>WRMPRESS</td>
<td>.139*</td>
<td>.046</td>
<td>.291</td>
<td></td>
</tr>
<tr>
<td>nAFF.WRMPRESS</td>
<td>-.001</td>
<td>.002</td>
<td>.230</td>
<td></td>
</tr>
<tr>
<td>SEX.nAFF</td>
<td>-.014</td>
<td>.002</td>
<td>-.139</td>
<td></td>
</tr>
<tr>
<td>SEX.WRMPRESS</td>
<td>-.016</td>
<td>.004</td>
<td>-.059</td>
<td></td>
</tr>
<tr>
<td>nDEF</td>
<td>.029</td>
<td>.008</td>
<td>.082</td>
<td>329</td>
</tr>
<tr>
<td>CPLPRESS</td>
<td>-.188*</td>
<td>.053</td>
<td>-.324</td>
<td></td>
</tr>
<tr>
<td>nDEF.CPLPRESS</td>
<td>.002</td>
<td>.000</td>
<td>-.205</td>
<td></td>
</tr>
<tr>
<td>SEX.nDEF</td>
<td>-.079</td>
<td>.003</td>
<td>-.106</td>
<td></td>
</tr>
<tr>
<td>SEX.CPLPRESS</td>
<td>.332</td>
<td>.001</td>
<td>-.153</td>
<td></td>
</tr>
<tr>
<td>nSUP</td>
<td>-.013</td>
<td>.002</td>
<td>.021</td>
<td>335</td>
</tr>
<tr>
<td>WRMPRESS</td>
<td>.056</td>
<td>.045</td>
<td>.298</td>
<td></td>
</tr>
<tr>
<td>nSUP.WRMPRESS</td>
<td>.007</td>
<td>.000</td>
<td>.252</td>
<td></td>
</tr>
<tr>
<td>SEX.nSUP</td>
<td>.008</td>
<td>.000</td>
<td>-.108</td>
<td></td>
</tr>
<tr>
<td>SEX.WRMPRESS</td>
<td>-.007</td>
<td>.000</td>
<td>-.051</td>
<td></td>
</tr>
</tbody>
</table>

*Coefficient was statistically significant (p<.05) when entered.

Notes:

nAFF : need for affiliation
nDOM : need for dominance
nDEF : need for deference
nSUP : need for supplication
AFFPRESS : student affiliation press
DOMPRESS : student dominance press
WRMPRESS : teacher warmth (science) press
CPLPRESS : teacher compliance (science) press
Table 7.14

Partial regression coefficients (b), increments to explained variance (RSQ) and simple correlation coefficients (simple r) for needs and environmental press and product terms formed between needs, press and sex from the regression of English performance on school, IQ, sex, needs, press and product terms

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>nAFF</td>
<td>.034</td>
<td>.003</td>
<td>.036</td>
<td>335</td>
</tr>
<tr>
<td>AFFPRESS</td>
<td>.038</td>
<td>.000</td>
<td>-.021</td>
<td></td>
</tr>
<tr>
<td>nAFF.AFFPRESS</td>
<td>-.002</td>
<td>.005</td>
<td>-.004</td>
<td></td>
</tr>
<tr>
<td>SEX.nAFF</td>
<td>.004</td>
<td>.000</td>
<td>-.214</td>
<td></td>
</tr>
<tr>
<td>SEX.AFFPRESS</td>
<td>.098</td>
<td>.014</td>
<td>-.175</td>
<td></td>
</tr>
<tr>
<td>nDOM</td>
<td>.039</td>
<td>.010</td>
<td>-.088</td>
<td>333</td>
</tr>
<tr>
<td>DOMPRESS</td>
<td>.158</td>
<td>.000</td>
<td>-.010</td>
<td></td>
</tr>
<tr>
<td>nDOM.DOMPRESS</td>
<td>-.006</td>
<td>.001</td>
<td>-.061</td>
<td></td>
</tr>
<tr>
<td>SEX.nDOM</td>
<td>.082</td>
<td>.009</td>
<td>-.184</td>
<td></td>
</tr>
<tr>
<td>SEX.DOMPRESS</td>
<td>.034</td>
<td>.000</td>
<td>-.181</td>
<td></td>
</tr>
<tr>
<td>nAFF</td>
<td>-.040</td>
<td>.003</td>
<td>.038</td>
<td>337</td>
</tr>
<tr>
<td>WMRPRESS</td>
<td>.023</td>
<td>.017</td>
<td>.018</td>
<td></td>
</tr>
<tr>
<td>nAFF.WMRPRESS</td>
<td>.000</td>
<td>.000</td>
<td>.027</td>
<td></td>
</tr>
<tr>
<td>SEX.nAFF</td>
<td>.032</td>
<td>.000</td>
<td>-.219</td>
<td></td>
</tr>
<tr>
<td>SEX.WMRPRESS</td>
<td>.033</td>
<td>.003</td>
<td>-.169</td>
<td></td>
</tr>
<tr>
<td>nSUP</td>
<td>-.004</td>
<td>.000</td>
<td>-.036</td>
<td>338</td>
</tr>
<tr>
<td>WMRPRESS</td>
<td>.035</td>
<td>.015</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td>nSUP.WMRPRESS</td>
<td>-.006</td>
<td>.000</td>
<td>-.009</td>
<td></td>
</tr>
<tr>
<td>SEX.nSUP</td>
<td>.017</td>
<td>.000</td>
<td>-.215</td>
<td></td>
</tr>
<tr>
<td>SEX.WMRPRESS</td>
<td>.040</td>
<td>.006</td>
<td>-.168</td>
<td></td>
</tr>
<tr>
<td>nDEF</td>
<td>.032</td>
<td>.005</td>
<td>.049</td>
<td>334</td>
</tr>
<tr>
<td>CPLPRESS</td>
<td>-.001</td>
<td>.003</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>nDEF.CPLPRESS</td>
<td>-.004</td>
<td>.000</td>
<td>.029</td>
<td></td>
</tr>
<tr>
<td>SEX.nDEF</td>
<td>.035</td>
<td>.001</td>
<td>-.194</td>
<td></td>
</tr>
<tr>
<td>SEX.CPLPRESS</td>
<td>-.029</td>
<td>.001</td>
<td>-.208</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- nAFF : need for affiliation
- nDOM : need for dominance
- nDEF : need for deference
- nSUP : need for supplication
- AFFPRESS : student affiliation press
- DOMPRESS : student dominance press
- WRMPRESS : teacher warmth (English) press
- CPLPRESS : teacher compliance (English) press
were not related to science performance (see Table 7.13), we can conclude that the effects of dissonance on science performance reported above were produced by the press components of those dissonance measures. However, since there were no significant interactions between sex and either needs or press in Tables 7.13 and 7.14 sex by dissonance interactions mentioned above were not produced by either sex by needs or sex by press. In other words the interactions reported between sex and dissonance exerted a unique effect on academic performance.

The analyses reported in Table 7.14 were performed separately for males and females and the results indicated that teacher warmth (English) press exerted a significant effect on English performance among males only which suggests that it was the press component (teacher warmth press) of teacher supplication (English) dissonance C which produced the significant positive relationship between this dissonance measure and English performance among males which was reported earlier (see Fig. 7.7).

---

1 This conclusion was checked by regressing these dissonance measures on science performance while controlling for the effects of needs and press. The results were uninterpretable because of the effects of multicollinearity i.e. high correlations between the dissonance measures and both need and press measures. However, the fact that they were so highly related confirms the conclusion that the effect of dissonance in each case was not independent of the effect of press.
The second major hypothesis derived from the social climate perspective was that assuming the effects of sex, IQ and school are controlled, the relationship between dissonance and performance will be an inverse curvilinear one i.e. that, the relationship takes the form of an inverted U (hypothesis 2, p.140). This curvilinear hypothesis was based on the argument that performance is optimal under conditions of moderate dissonance. Under these conditions it was suggested that students will experience a moderate level of arousal which, according to the Yerkes-Dodson Law, is associated with optimum performance. Thus we are suggesting that the relationship between academic performance and both B- and C-type need press dissonance will be an inverse curvilinear one rather than an inverse linear one.

This curvilinear hypothesis was tested using the following regression model:

\[ Y = A + b_1D_1 + b_2D_2 + b_3D_3 + b_4D_4 + b_5D_5 + b_6X_1 + b_7X_2 + b_8X_2^2 + b_9D.X_2 + b_{10} D.X_2^2 \]

where (a) \(D_1\) to \(D_5\) are dummy variables representing sex (\(D_1\)) and four of the five schools (\(D_2\) to \(D_5\))

(b) \(X_1\) is IQ

(c) \(X_2\) is either a dissonance B or C term

(d) \(D.X_2\) is a product term formed between the dummy for sex and dissonance

(e) \(X_2^2\) is the squared dissonance term

(f) \(D.X_2^2\) is a product term formed between the dummy for sex and the squared dissonance term
Sex, school and IQ were included as controls and dissonance was entered both as a linear and squared term so that the magnitude of the curvilinear effect of dissonance B or C on academic performance could be determined after its linear effect was taken into account. A curvilinear interaction term \( D_1.X_2^2 \) was included in order to test the possibility that the slope of the dissonance-performance curve differed between the sexes and the linear interaction term \( D_1.X_2 \) was included in order to control for its effects while the existence of curvilinear interactions was tested.\(^1\)

Since each of the dissonance measures has B and C-type components (e.g. student affiliation dissonance B and student affiliation dissonance C) twenty separate analyses of the type described were performed; ten in which science performance was the criterion and ten in which English performance was the criterion. A significant curvilinear relationship of the type predicted would be indicated by a significant negative coefficient for the squared dissonance term, but no such effects were found. Only two significant linear interactions were revealed both of which have already been examined. The interaction between sex and teacher deference (science) dissonance B was plotted in Figure 7.6, and that between sex and teacher supplication (English) dissonance C was plotted in Figure 7.7.

In Figure 7.2 (Section I) the adjusted relationship between student affiliation dissonance A and science performance was plotted separately for each sex. The graph for females suggested that each of the component parts of dissonance A (dissonance B and C) were both

\(^1\) Testing for curvilinear interactions with multiple regression analysis is discussed in detail by Kelly et al. (1969)
curvilinearly related to science performance in the manner suggested above (i.e. inverted U curves). The male graph, on the other hand, suggested that science performance was not systematically related to either type of dissonance. This finding suggests that some measures of need-press dissonance may indeed be curvilinearly related to academic performance but only within one or other of the sexes. Accordingly, the analyses described above were performed separately for each sex. However, the only significant curvilinear relationship found was that between males' science performance and teacher deference (science) dissonance B which was plotted in Figure 7.6. The relationships between student affiliation dissonance B and C and female science performance which were mentioned above approached, but did not reach, statistical significance. On the basis of these negative findings we can conclude that need-press dissonance, as measured in this study, is not curvilinearly related to academic performance in the manner predicted.

Results of Tests for Interaction Between IQ and Need-Press Dissonance and Between Need for Achievement and Need-Press Dissonance

The analyses reported in this section were designed to test hypotheses 5(a) and 5(b) (see p. 141). These were firstly, that the positive relationship between need for achievement (nAch) and academic performance would be stronger under conditions of congruence than dissonance [hypothesis 5(a)], and secondly that the positive relationship between IQ and academic performance would be stronger under conditions of congruence than dissonance [hypothesis 5(b)]. In other words we were predicting significant interactions between need for achievement and need-press dissonance, and between IQ and need-press dissonance with respect to academic performance.
These hypotheses were tested using a stepwise regression model in which sex and school were entered into the equation first followed by either need for achievement (nAch) or IQ, need-press dissonance A (squared), and the product term formed between the squared dissonance term and either nAch or IQ. A summary of results for the analysis involving science performance, need for achievement and student affiliation dissonance A is presented in Table 7.15. This table contains: metric partial regression coefficients for each term (column headed b), increments to explained variance attributable to each term (column headed RSQ), and zero-order correlations between each term and science performance (Simple r). Asterisked coefficients are statistically significant (p<.05).

The results in this table indicate that while the unadjusted bivariate relationship between science performance and need for achievement is statistically significant the same relationship, adjusted for sex and school, is not. Also it can be seen from Table 7.15 that the interaction between need for achievement and student affiliation dissonance is not significant.

The remaining analyses involving science and English performance, need-press dissonance A and need for achievement also failed to reveal any significant interactions between nAch and squared dissonance A terms. The same regression model was used to test hypotheses 5(b) but once again no significant interaction between need-press dissonance A and IQ were found. The possibility that the use of the squared dissonance A term masked significant interactions involving either measures of dissonance B or dissonance C was also checked by repeating the analyses described with measures of dissonance B and dissonance C separately. The results of this analysis also failed to support either hypothesis 5(a) or 5(b).
Table 7.15

Stepwise regression of science performance on sex, school, need for achievement (nAch), student affiliation dissonance A squared (DAFF\(^2\)) and the product formed between sex and DAFF\(^2\) (N=344)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>.440</td>
<td>.016</td>
<td>-.130*</td>
</tr>
<tr>
<td>School A</td>
<td>2.058*</td>
<td>.023</td>
<td>.167*</td>
</tr>
<tr>
<td>School B</td>
<td>2.989*</td>
<td>.160</td>
<td>.359*</td>
</tr>
<tr>
<td>School C</td>
<td>.385</td>
<td>.000</td>
<td>-.133*</td>
</tr>
<tr>
<td>School D</td>
<td>.600</td>
<td>.005</td>
<td>-.142*</td>
</tr>
<tr>
<td>nAch</td>
<td>.055</td>
<td>.013</td>
<td>.139*</td>
</tr>
<tr>
<td>DAFF(^2)</td>
<td>-.095</td>
<td>.000</td>
<td>-.033</td>
</tr>
<tr>
<td>DAFF(^2).nAch</td>
<td>.002</td>
<td>.000</td>
<td>-.010</td>
</tr>
</tbody>
</table>

Results of Tests for Relationships Between Need-Press Dissonance and Emotional Response to School

The four hypotheses concerning need-press dissonance and emotional response to school were as follows: 6(a) The factor subscale enjoyment will be inversely related to measures of need-press dissonance, 6(b) The factor subscale fear/anxiety will be most strongly (positively) related to measures of dissonance associated with needs for affiliation and supplication, 6(c) The factor subscale guilt/anxiety will be most strongly (positively) related to measures of dissonance associated with need for deference, and 6(d) The factor subscale anger will be most strongly (positively) related to measures of dissonance associated with need for dominance. Factor analysis of Izard's (1972) DES+A scale failed to identify guilt/anxiety as an independent factor (see Table 5.7) which meant that only hypotheses (a), (b) and (d) could be tested. Also the correlation coefficients in Table 6.3 indicate that the 14 item STAI
anxiety scale was closely related to the enjoyment, anger and fear/anxiety factor subscales; therefore relationships between the STAI anxiety scale and the various measures of need-press dissonance were also investigated.

These hypotheses were tested using a stepwise regression model similar to those used in the data analysis discussed in earlier parts of this chapter. Dummy variables for sex and school were entered into the equation first followed by A-type measures of dissonance and finally by product terms formed between dissonance A measures and sex. Need-press dissonance A and the emotional response to school scales were expected to be curvilinearly related for the same reason that the relationship between dissonance A and academic performance was expected to be curvilinear; low dissonance (i.e. congruence) is designated by small positive or negative scores or by a score of zero (i.e. the middle of the dissonance A scale) and high dissonance is designated by large positive or negative scores (i.e. either end of the scale). Specifically, it was expected that the relationship between need-press dissonance A and enjoyment of school would be an inverse curvilinear one (an inverted U shaped relationship) and that the relationships between dissonance and the three remaining scales (STAI anxiety scale, anger and fear/anxiety) would be positive curvilinear ones (U-shaped relationships). To test for these curvilinear relationships each measure of need-press dissonance A was included in the analysis as a squared term. A negative regression coefficient for a squared term indicates that the relationship between this term and the dependent variable is in the shape of an inverted U, and a positive coefficient indicates that this relationship is U-shaped (see Kelly et al., 1969, p.164).
In Chapter Six mean emotional response scale scores for males and females were compared and no statistically significant differences were found; thus we would not expect sex to exert a significant effect on emotional response to school. However, sex was included in the analyses reported here so that the effect of interactions between sex and various dissonance terms on academic performance, adjusted for the main effects of both dissonance and sex, could be examined. Even though the main effect of sex is not statistically significant, if it was not controlled for it might, in combination with the effect of the interaction term, produce a spuriously significant interaction effect. A full summary of results for the stepwise regression of anxiety (i.e. the 14 item STAI scale) on sex, school, student affiliation dissonance A (DAFF) and the product term formed between sex and DAFF, is reported in Table 7.16.

**Table 7.16**

Stepwise regression of anxiety on sex, school, student affiliation dissonance A squared (DAFF²) and the product term formed between sex and DAFF² (N=328)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>.417</td>
<td>.001</td>
<td>-.038</td>
</tr>
<tr>
<td>School A</td>
<td>3.562*</td>
<td>.017</td>
<td>.129*</td>
</tr>
<tr>
<td>School B</td>
<td>2.536</td>
<td>.002</td>
<td>.024</td>
</tr>
<tr>
<td>School C</td>
<td>.586</td>
<td>.003</td>
<td>-.110</td>
</tr>
<tr>
<td>School D</td>
<td>3.703*</td>
<td>.020</td>
<td>.098</td>
</tr>
<tr>
<td>DAFF²</td>
<td>.455*</td>
<td>.006</td>
<td>.107</td>
</tr>
<tr>
<td>SEX.DAFF²</td>
<td>-.512</td>
<td>.007</td>
<td>-.023</td>
</tr>
</tbody>
</table>
This table contains: partial regression coefficients for each term (column headed $b$), the increments to explained variance attributable to each term (column headed RSQ), and zero-order correlations between anxiety and each term in the equation (Simple $r$). Asterisked coefficients are statistically significant ($p < .05$). The results in Table 7.16 indicate significant effects for schools A and D and student affiliation dissonance. However, the increase in explained variance attributable to each of these terms is negligible.

The three DES+A factor subscales (enjoyment, anger and anxiety/fear) and the STAI anxiety scale were each regressed on sex, school and the eight measures of need-press dissonance plus product terms using the stepwise model described above. The results of these analyses are summarized in Table 7.17. Only the results ($b$, RSQ and Simple $r$) for the squared dissonance A and product terms are reported. Values not reported were regression coefficients less than twice their standard error, increases in RSQ which were less than 1%, and zero-order correlations which were less than .10. Asterisked coefficients are significant ($p < .05$). The figures in brackets in Table 7.17 are the increases in explained variance (adjusted for sex and school) attributable to the need and press scales used to construct each dissonance term when they were entered separately i.e. the additive effects of need and press in each case.

The results in Table 7.17 provide consistent support for hypothesis 6(a) only. The factor subscale enjoyment was inversely related to four of the eight dissonance terms (DAFF, DAFSCI, DAFENG and DSUPSCI) and since the regression coefficients for these terms were negative these relationships were, as predicted above, in the shape of an inverted U. As dissonance decreases from the negative
Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (simple r) for measures of need-press dissonance A (squared) and the product terms formed between sex and dissonance squared from regression of four measures of emotional response to school on sex, school, need-press dissonance A (squared) and product terms.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Anxiety (STAI)</th>
<th>Enjoyment</th>
<th>Anger</th>
<th>Anxiety/Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>RSQ</td>
<td>Simple r</td>
<td>b</td>
</tr>
<tr>
<td>DAFF&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX.DAFF&lt;sup&gt;2&lt;/sup&gt;</td>
<td>.455*</td>
<td>---</td>
<td>.098</td>
<td>.107</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DDOM&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX.DDOM&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DPFSC&lt;sup&gt;12&lt;/sup&gt;</td>
<td>.911*</td>
<td>.034</td>
<td>.044</td>
<td>.185*</td>
</tr>
<tr>
<td>SEX.DPFSC&lt;sup&gt;12&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DAFENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td>.682*</td>
<td>.014</td>
<td>.022</td>
<td>.137*</td>
</tr>
<tr>
<td>SEX.DAFENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DDEFSCI&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX.DDEFSCI&lt;sup&gt;2&lt;/sup&gt;</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DDEFENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX.DDEFENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DUPSFC&lt;sup&gt;2&lt;/sup&gt;</td>
<td>.634*</td>
<td>---</td>
<td>.039</td>
<td>.115*</td>
</tr>
<tr>
<td>SEX.DUPSFC&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DSUPENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEX.DSUPENG&lt;sup&gt;2&lt;/sup&gt;</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Notes: DAFF: student affiliation dissonance A  
DDOM: student dominance dissonance A  
DPFSC: teacher affiliation (science) dissonance A  
DAMFENG: teacher affiliation (English) dissonance A  
DDEFSCI: teacher deference (science) dissonance A  
DDEFENG: teacher deference (English) dissonance A  
DSUPFC: teacher suppliance (science) dissonance A  
DSUPENG: teacher suppliance (English) dissonance A

If a coefficient for a dissonance term is asterisked but not reported (i.e. ---*) it indicates that it was significant when the term was first entered into the equation but was reduced to less than twice its standard error by the subsequent inclusion of the product term.
(dissonance C) end of the dissonance A scale towards the middle, enjoyment of school increases. It then decreases as dissonance begins to increase towards the positive (dissonance B) end of the dissonance A scale (see Figure 7.8).

From Table 7.17 it can also be seen that these four dissonance terms were also significantly positively related to the STAI anxiety scale. These relationships were U-shaped since the regression coefficients in each case were positive; anxiety decreased as the level of dissonance decreased and then increased as the level of dissonance began to increase. However, in all cases the increase in explained variance due to the additive effects of need and press was greater than that attributable to the corresponding dissonance term.

![Dissonance A Scale](image)

Fig. 7.8 Predicted relationship between need-press dissonance A and enjoyment of school.
The analyses reported in Table 7.17 were repeated using dissonance B and C measures separately in order to determine whether the relationships reported in Table 7.17 would change when each type of dissonance was treated separately. Results for these analyses are reported in Tables 7.18 and 7.19 respectively. The format of these tables is the same as that of Table 7.17. An overall comparison of these two tables indicates that dissonance B measures were generally more closely related to the emotional response scales than the dissonance C measures; twelve significant relationships were reported in Table 7.18 but only seven in Table 7.19. Only one dissonance C measure was related to anxiety (DDEFSCI C) whereas four dissonance B measures were related to this scale (DAFF B, DAFSCI B, DAFENG B, and DSUPSCI B) and it is obviously these latter relationships which produced the relationships between anxiety and need-press dissonance A reported in Table 7.17. In Tables 7.18 and 7.19 anxiety was inversely related to dissonance C measures and positively related to dissonance B measures. As dissonance C decreases in strength its numerical scale score increases (from -5 to 0) while the reverse is true of dissonance B; as dissonance B increases in strength its numerical score also increases (from 0 to +5). Consequently, state anxiety was, as predicted, positively related to both C- and B- type measures of dissonance.

With respect to enjoyment of course, these relationships were in the opposite direction because enjoyment and dissonance were (once again as predicted) inversely related. Three dissonance B measures (DAFF B, DDOM B, and DSUPSCI B) were significantly related to enjoyment and four different dissonance C measures (DAFENG C, DDEFSCI C, DDEFENG C, DSUPSCI C) were also related to this factor.
Table 7.18

Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (Simple r) for measures of need-press dissonance B and the product terms formed between sex and dissonance from the regressions of four measures of emotional response to school on sex, school, need-press dissonance B and product terms.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependant Variables</th>
<th>Anxiety b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>Enjoyment b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>Anger b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>Fear/Anxiety b</th>
<th>RSQ</th>
<th>Simple r</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAFF B</td>
<td></td>
<td>1.840</td>
<td>.040</td>
<td>.277*</td>
<td>-2.707*</td>
<td>.060</td>
<td>-.301</td>
<td>1.830*</td>
<td>.047</td>
<td>.242*</td>
<td>2.949*</td>
<td>.019</td>
<td>.120*</td>
<td>156</td>
</tr>
<tr>
<td>SEX. DAFF B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDOM B</td>
<td></td>
<td></td>
<td>.010</td>
<td>.140</td>
<td>.028*</td>
<td>-.154</td>
<td></td>
<td>3.042*</td>
<td>.036</td>
<td>.134</td>
<td></td>
<td></td>
<td></td>
<td>162</td>
</tr>
<tr>
<td>SEX. DDOM B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAFSCI B</td>
<td></td>
<td>2.514*</td>
<td>.045</td>
<td>.266*</td>
<td></td>
<td></td>
<td></td>
<td>1.534*</td>
<td>.038</td>
<td>.215*</td>
<td>1.673*</td>
<td>.041</td>
<td>.239*</td>
<td>163</td>
</tr>
<tr>
<td>SEX. DAFSCI B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAFENG B</td>
<td></td>
<td>.022</td>
<td>.181</td>
<td></td>
<td>.015*</td>
<td>-.131</td>
<td></td>
<td></td>
<td></td>
<td>.021*</td>
<td>1.74*</td>
<td></td>
<td></td>
<td>178</td>
</tr>
<tr>
<td>SEX. DAFENG B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDEFSCI B</td>
<td></td>
<td></td>
<td>.010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>175</td>
</tr>
<tr>
<td>SEX. DDEFSCI B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDEFENG B</td>
<td></td>
<td></td>
<td>.010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>171</td>
</tr>
<tr>
<td>SEX. DDEFENG B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSUPSCI B</td>
<td></td>
<td>2.417*</td>
<td>.046</td>
<td>.282*</td>
<td>-2.274*</td>
<td>.050</td>
<td>-.258*</td>
<td></td>
<td></td>
<td></td>
<td>-.046*</td>
<td>.262*</td>
<td></td>
<td>155</td>
</tr>
<tr>
<td>SEX. DSUPSCI B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSUPENG B</td>
<td></td>
<td></td>
<td>.010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>174</td>
</tr>
<tr>
<td>SEX. DSUPENG B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for Tables 7.18 and 7.19: Abbreviations are the same as those used in Table 7.17 except that they were dissonance A measures and these are B- and C-type measures. If a coefficient for a dissonance term is asterisked but not reported (i.e. ---) it indicates that it was significant when the term was first entered into the equation but was reduced to less than twice its standard error by the subsequent inclusion of the product term.
Partial regression coefficients (b), RSQ values (RSQ) and simple correlation coefficients (simple r) for measures of need-press dissonance C and product terms formed between sex and dissonance from the regressions of four measures of emotional response on sex, school, need-press dissonance C and sex by dissonance product terms.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependant Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anxiety</td>
</tr>
<tr>
<td></td>
<td>b  RSQ  Simple r</td>
</tr>
<tr>
<td>DAFF C</td>
<td></td>
</tr>
<tr>
<td>SEX.DAFF C</td>
<td></td>
</tr>
<tr>
<td>DDOM C</td>
<td></td>
</tr>
<tr>
<td>SEX.DDOM C</td>
<td></td>
</tr>
<tr>
<td>DAFSCI C</td>
<td></td>
</tr>
<tr>
<td>SEX.DAFSCI C</td>
<td></td>
</tr>
<tr>
<td>DAFENG C</td>
<td>-1.871  .012  -.111</td>
</tr>
<tr>
<td>SEX.DAFENG C</td>
<td></td>
</tr>
<tr>
<td>DDEFSCI C</td>
<td>-1.994*  .027  -.223*</td>
</tr>
<tr>
<td>SEX.DDEFSCI C</td>
<td></td>
</tr>
<tr>
<td>DDEFENG C</td>
<td></td>
</tr>
<tr>
<td>SEX.DDEFENG C</td>
<td></td>
</tr>
<tr>
<td>DSUPSCI C</td>
<td></td>
</tr>
<tr>
<td>SEX.DSUPSCI C</td>
<td></td>
</tr>
<tr>
<td>DSUPENG C</td>
<td></td>
</tr>
<tr>
<td>SEX.DSUPENG C</td>
<td></td>
</tr>
</tbody>
</table>

N 174  168  176  161  157  161  165  155
subscale. However, the increase in explained variance attributable to the additive effects of needs and press\(^1\) (i.e. the effects of need and press when they are introduced separately into the equation) was generally as great or greater than that attributable to the corresponding dissonance terms in the relationships mentioned above. The only relationship in which a dissonance measure accounted for a substantially greater amount of variance in the dependent variable than its component need and press scales was that between teacher deference (English) dissonance C (DDEFENG C) and the anger subscale in Table 7.19. These findings indicate that generally the simple additive model in which need and press are introduced separately has as great or greater explanatory power than the more complex model in which dissonance terms are used.

The results obtained for the factor subscale anger were particularly interesting. For the dissonance C measures anger was significantly (positively) related to measures of dissonance associated with needs for deference (English and science). The relationship between teacher deference (English) dissonance C (DDEFENG C) and the anger subscale was particularly strong and accounted for over 12% of variance in the latter. The equivalent science measure (DDEFSCI C) however, accounted for only 4% of variance in the anger subscale. Although not predicted these two findings are nevertheless not very surprising. The C-type dissonance scales measure discrepancies between needs and press in which press exceeds needs, and DDEFSCI C and DDEFENG C in particular measure the extent to which teacher compliance press (teacher's demands for respect and obedience etc.) exceed students' need for deference (need to defer to the authority and opinions of others perceived as superior). Students who consider that teachers' demands for respect and authority are excessive

\(^1\) Reported in brackets in Table 7.17.
(i.e. exceed their needs for deference) are quite likely to react angrily to what they see as an unnecessary display of power by their teachers. In contrast, the significant (inverse) relationship between enjoyment and these two dissonance C measures which were also reported in Table 7.19 indicate that students who experience a relatively high degree of congruence between their deference needs and the degree of authority exerted by their teacher find school to be an enjoyable experience.

The pattern of relationships between the anger subscale and B-type measures of dissonance (Table 7.18) is quite different to the one between C-type measures and this subscale discussed above. From Table 7.18 it can be seen that students who expressed anger were those who experienced dissatisfaction associated with needs for affiliation (DAFF B, DAFSCI B) and supplication (DSUPSCI B). The B-type dissonance scales measured the extent to which prevailing press was insufficient to meet students' needs. At school students who find themselves in this situation are relatively powerless; those experiencing dissatisfaction associated with affiliative and supplicative needs cannot force their peers and teachers to like them more and neither can they leave school because at the Year 10 level attendance is required by law. Consequently, their emotional reaction is similar to that of students who feel that their teachers exert too much authority over them and who are also powerless to change the situation they find themselves in – they get angry.

The interaction reported in Table 7.18 was examined using the MCA technique and male and female mean anger scale scores for each of five student dominance dissonance B categories are plotted in Figure 7.9. (These mean scores were adjusted for the effects of
school membership). From Figure 7.9 it can be seen that among males anger and DDOM B were, as predicted, positively related while among females this relationship was in the opposite direction. However, the within-sex analyses of variance performed as part of the MCA procedure indicated that neither of these within-sex relationships were statistically significant. Thus all we can conclude is that the direction of these relationships differed significantly between the sexes.

Fig. 7.9: Male and female mean anger response scores as a function of student dominance dissonance B (DDOM B) adjusted for the effects of school differences.
Summary of Results of Tests for Relationships Between Need-Press Dissonance and Emotional Response to School

Overall the relationships reported in Tables 7.18 and 7.19 provide only limited support for the hypotheses listed at the beginning of this section. The greatest amount of support was found for hypothesis 6(a) which predicted an inverse relationship between need-press dissonance and the factor subscale enjoyment. The results indicate that enjoyment was inversely related to measures of dissonance associated with needs for affiliation (DAFF B and DAFENG C), dominance (DDOM B), deference (DDEFSCI C and DDEFENG C) and supplication (DSUPSCI B and DSUPSCI C). Hypothesis 6(b) predicted that dissonance associated with needs for affiliation and supplication would be most strongly (positively) related to the anxiety/fear subscale. No support was found for this hypothesis but four measures of dissonance B associated with needs for affiliation (DAFF B, DAFSCI B, DAFENG B) and supplication (DSUPSCI B) were significantly related (in the predicted direction) to the larger STAI anxiety scale. Also no support was found for hypothesis 6(d) which predicted that dissonance associated with the need for dominance would be most closely related to the anger subscale. The only significant relationship in which student dominance dissonance was involved was with the anger subscale but that was between anger and the interaction between student dominance dissonance B and sex. This interaction accounted for only 3 per cent of variance in anger. By far the strongest relationship in which the anger subscale was involved was that with teacher deference (English) dissonance C (DDEFENG C). This relationship, which was discussed earlier, accounted for over 12 per cent of variance in the anger subscale.
We have suggested that the relationship between need-press dissonance and academic performance is an indirect one mediated by state anxiety (hypothesis 3, p. 141). In other words that the relationship between these three variables is as follows:

Need-press dissonance \rightarrow anxiety \rightarrow academic performance

We have established the existence of statistically significant relationships between some measures of dissonance and both academic performance and anxiety. In order to establish the existence of an indirect relationship of the type suggested above we must demonstrate that the variance common to dissonance and academic performance can be fully explained by anxiety; in other words, that if the effect of anxiety on the relationship between dissonance and academic performance established earlier is controlled, these relationships will disappear. This was done by re-running the regression analyses reported earlier in Tables 7.4 and 7.5. These analyses were carried out in order to examine relationships between measures of need-press dissonance and academic performance adjusted for the effects of sex, IQ and school. In this second set of analyses anxiety was also included as a control to determine whether this had the effect of making the significant relationships between dissonance and performance, observed earlier, disappear. Once again ten separate analyses (five for English performance and five for science performance) were performed using the stepwise technique so that sex, IQ, school and anxiety were entered into the equation before measures of dissonance. A full summary of results for one of these
analyses is reported in Table 7.20. The format of this table is the same as those used earlier to report the results of regression analysis.

Table 7.20

Stepwise regression of science performance on sex, school, IQ anxiety and student affiliation dissonance A squared (DAFF²) (N=311)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>.049*</td>
<td>.103</td>
<td>.321</td>
</tr>
<tr>
<td>Sex</td>
<td>-.197</td>
<td>.008</td>
<td>-.108</td>
</tr>
<tr>
<td>School A</td>
<td>2.168*</td>
<td>.021</td>
<td>.182</td>
</tr>
<tr>
<td>School B</td>
<td>2.584*</td>
<td>.119</td>
<td>.356</td>
</tr>
<tr>
<td>School C</td>
<td>.592</td>
<td>.002</td>
<td>-.107</td>
</tr>
<tr>
<td>School D</td>
<td>.419</td>
<td>.001</td>
<td>-.141</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.029</td>
<td>.007</td>
<td>-.110</td>
</tr>
<tr>
<td>DAFF²</td>
<td>.008</td>
<td>.000</td>
<td>-.021</td>
</tr>
</tbody>
</table>

* p < .05

The results in Table 7.20 indicate significant main effects for IQ and schools A and B on science performance. However, neither the adjusted or unadjusted (simple r) relationships between science performance and both anxiety and student affiliation dissonance were statistically significant. The results of all ten analyses are summarized in Table 7.21 for science performance and Table 7.22 for English performance; partial regression coefficients and RSQ values for relationships between academic performance and each measure of need-press dissonance are reported.
Whether or not the relationship between need-press dissonance and academic performance is mediated by anxiety can be determined by comparing corresponding regression coefficients for relationships between dissonance measures and academic performance adjusted for sex, school and IQ (obtained from the analyses reported earlier) and coefficients for these relationships adjusted for sex, school, IQ and anxiety (obtained from the analyses mentioned above). If these coefficients are of approximately equal strength then controlling for the effect of anxiety did not reduce the strength of the original relationship between dissonance and performance, and we can conclude that this relationship is not mediated by state anxiety. If, on the other hand, the coefficients adjusted for anxiety are weaker than those for the original relationships we can conclude that the relationship between dissonance and performance is partly mediated by state anxiety and, if the original coefficients are reduced to insignificance, we can conclude that this relationship is fully mediated by anxiety. To make these comparisons easier partial regression coefficients (b) and RSQ values for relationships between dissonance measures and performance, adjusted for sex, IQ and school but not anxiety are also reported in Tables 7.21 and 7.22.

Overall the results in both tables indicate that controlling for anxiety had little effect on relationships between need-press dissonance and academic performance. Relationships which were originally significant remained so when adjusted for anxiety and the strength of these relationships also did not alter substantially.

1 These values were obtained from the second last step of the analyses reported in Table 7.4 and 7.5. In other words, they are the values obtained for each dissonance measure before the sex by dissonance product terms were entered into the equation. The values reported in Tables 7.4 and 7.5 were those obtained for the final step i.e. after the product terms had been entered.
Table 7.21
Partial regression coefficient and RSQ values for regression of need-press dissonance A squared on science performance adjusted for (a) sex, IQ and school and (b) sex, IQ, school and anxiety

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Adjusted for Sex, IQ and School</th>
<th>Adjusted for Sex, IQ, School and Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>RSQ</td>
</tr>
<tr>
<td>DAFF$^2$</td>
<td>.002</td>
<td>.000</td>
</tr>
<tr>
<td>DDOM$^2$</td>
<td>-.022</td>
<td>.000</td>
</tr>
<tr>
<td>DAFSCI$^2$</td>
<td>-.065</td>
<td>.004</td>
</tr>
<tr>
<td>DDEFSCI$^2$</td>
<td>-.133*</td>
<td>.021</td>
</tr>
<tr>
<td>DSUPSCI$^2$</td>
<td>-.134*</td>
<td>.018</td>
</tr>
</tbody>
</table>

* p < .05

Notes: Abbreviations used are as follows:
- DAFF: student affiliation dissonance A
- DDOM: student dominance dissonance A
- DAFSCI: teacher affiliation (science) dissonance A
- DDEFSCI: teacher deference (science) dissonance A
- DSUPSCI: teacher supplication (science) dissonance A

Table 7.22
Partial regression coefficients and RSQ values for regression of need-press dissonance A squared on English performance adjusted for (a) sex, school and IQ, and (b) sex, school, IQ and anxiety

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Adjusted for Sex, IQ and School</th>
<th>Adjusted for Sex, IQ, School and Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>RSQ</td>
</tr>
<tr>
<td>DAFF$^2$</td>
<td>.060</td>
<td>.004</td>
</tr>
<tr>
<td>DDOM$^2$</td>
<td>.004</td>
<td>.000</td>
</tr>
<tr>
<td>DAFENG$^2$</td>
<td>.006</td>
<td>.000</td>
</tr>
<tr>
<td>DDEFENG$^2$</td>
<td>-.037</td>
<td>.001</td>
</tr>
<tr>
<td>DSUPENG$^2$</td>
<td>.035</td>
<td>.001</td>
</tr>
</tbody>
</table>

Notes: Abbreviations used are the same as those in Table 7.19 except that the teacher dissonance measures refer to English and not science.
Thus we can conclude that the relationship between need-press dissonance (as measured in this study) and academic performance is not mediated, either wholly or partly, by state anxiety. Both anxiety and dissonance are related to performance but no amount of variance in performance was accounted for jointly by both anxiety and dissonance.

This concludes the report of results of tests of hypotheses derived from the social climate perspective. In the next section (III) the results of tests of hypotheses derived from the extrinsic tendency perspective are reported.

III STATISTICAL TESTS OF HYPOTHESES DERIVED FROM THE EXTRINSIC TENDENCY PERSPECTIVE

In the second theoretical perspective explored in this study the role of dissonance associated with social needs was considered from the point of view of the expectancy-value theory of achievement motivation developed by Atkinson and his colleagues (see Chapter Four). It was suggested that the degree of reported dissonance reflected the strength of students' extrinsic tendencies to engage in achievement activities; in other words, arousal of social needs (as reflected by the degree of dissonance reported in association with them) was considered to be a positive tendency which encouraged students to engage in achievement activities. This view of the role of need-press dissonance in the achievement process contrasts sharply with the one outlined in Chapter Three (i.e. the social climate perspective) in which it was argued that need-press dissonance would be inversely related to academic performance i.e. that a high degree of dissonance would inhibit successful academic performance.
Achievement motivation theory argues that the final strength of the tendency to engage in achievement activities ($T_A$) is determined by the relative strengths of two positive tendencies and one negative tendency. The two positive tendencies are the extrinsic tendency ($T_{ext}$) mentioned above and the tendency to succeed ($T_S$), and the negative tendency is the tendency to avoid failure ($T_f$). The final strength of $T_A$ is determined by the algebraic sum of the two positive tendencies which encourage achievement-oriented activity and the negative tendency which functions as resistance to such activity.

In earlier studies resultant achievement motivation ($T_S - T_f$) has been assessed using measures of need for achievement (generally the TAT) and test anxiety respectively (see for example, Atkinson and O'Connor, 1966; Entin, 1974). (The theoretical rationale for measuring resultant achievement motivation in this way was outlined in Chapter Four). If, as suggested above, the strength of students' extrinsic achievement tendencies are reflected in the degree of dissonance they report in association with social needs, then the final strength of their achievement tendencies can be assessed by subtracting their test anxiety scores (measured using the 14 item STAI state anxiety scale described in Chapter Three) from the sum of their need for achievement scores (measured using the need achievement subscale of Stern's (1970) Activities Index) and need-press dissonance scores.

In this model of achievement behaviour measures of need-press dissonance were, as mentioned earlier, considered to reflect a positive tendency to engage in achievement activities. Therefore, in order that the final strength of the achievement tendency could be calculated

---

1 The use of this scale to measure test anxiety was justified in Chapter Five.
in the manner suggested above, need-press dissonance must be expressed as positive numerical scores. It will be recalled that the dissonance A measures were comprised of both positive and negative scores (i.e., dissonance B and dissonance C respectively) which meant that dissonance A scores could not be used to measure the final strength of the achievement tendency ($T_A$). Consequently, dissonance A was split into dissonance B and dissonance C in the manner described in Chapter Five (see Table 5.6).

The negative dissonance C scores were multiplied by -1 to convert them to positive scores, and dissonance B and these converted dissonance C scores were used separately to assess the strength of $T_A$.

Sixteen different measures of achievement tendency were constructed in the manner described above; students' standardized anxiety scores were subtracted from their standardized need for achievement scores to produce a measure of resultant achievement motivation in the manner described by Atkinson and O'Connor (1966) and this value was added to one of sixteen measures of need-press dissonance (8 measures of need-press dissonance B and 8 measures of need-press dissonance C).

Procedures involved in the construction of these measures of need-press dissonance were described in Chapter Five. The sixteen measures of final achievement tendency obtained in this way are listed in Table 7.23.

Atkinson (1974b) suggested that the relationship between performance efficiency (i.e., performance adjusted for IQ) and the final strength of the achievement tendency is a curvilinear one in the shape of an inverted U (see Figure 7.10); increases in the strength of the achievement tendency will, he argued, lead to increases in performance up to a maximum point which occurs at the optimal level of motivation for the task concerned. Further increases in motivation beyond this optimal point serve to impair performance. This predicted relationship is described in Figure 7.10 in which maximum performance (P) occurs at the optimum level of motivation (M).
Table 7.23

Sixteen measures of the strength of final achievement tendency constructed from resultant achievement motivation (RESNACH) and sixteen measures of need-press dissonance.

1. RESNACH + student affiliation dissonance B
2. RESNACH + student affiliation dissonance C
3. RESNACH + student dominance dissonance B
4. RESNACH + student dominance dissonance C
5. RESNACH + teacher affiliation (science) dissonance B
6. RESNACH + teacher affiliation (science) dissonance C
7. RESNACH + teacher affiliation (English) dissonance B
8. RESNACH + teacher affiliation (English) dissonance C
9. RESNACH + teacher deference (science) dissonance B
10. RESNACH + teacher deference (science) dissonance C
11. RESNACH + teacher deference (English) dissonance B
12. RESNACH + teacher deference (English) dissonance C
13. RESNACH + teacher supplication (science) dissonance B
14. RESNACH + teacher supplication (science) dissonance C
15. RESNACH + teacher supplication (English) dissonance B
16. RESNACH + teacher supplication (English) dissonance C

Fig. 7.10: Predicted relationship (Atkinson, 1974b) between performance efficiency and strength of achievement tendency.
On the basis of this relationship Atkinson suggested that performance would be greater under conditions of moderate achievement tendency than under either low or high achievement tendency (assuming the effect of IQ is controlled). This hypothesis (see hypothesis 7 on p. 142) is tested in the first part of this section. A discussion of this hypothesis in Chapter Four led to the proposal of a number of other hypotheses concerning relationships between task performance, need for achievement, anxiety and need-press dissonance [see hypotheses 8(a) to 10(b) on pp. 142]. The results of tests of these hypotheses are presented in the second part of this section.

Results of Tests of Atkinson's (1974b) 'Curvilinear' Hypothesis

Atkinson's (1974b) curvilinear hypothesis was tested using a stepwise regression model in which the following variables (in the following order) were regressed on academic performance:

- A dummy variable representing sex,
- Dummy variables representing 4 of the 5 schools,
- IQ,
- Final achievement tendency ($T_A$),
- Final achievement tendency squared ($T_A^2$),
- Two product terms formed between $T_A$ and sex, and between $T_A^2$ and sex.

Dummies for sex and school were included to control for the main effects of sex and school observed earlier and IQ was included because in Atkinson's hypothesis performance is adjusted for IQ (i.e. performance efficiency).

As has been noted already, this hypothesis predicts a curvilinear relationship between performance efficiency and achievement tendency and in order to determine whether or not such a relationship exists this latter variable was included in the regression analysis as a
squared term. However, this variable was also included as a linear term so that the increment to explained variance due to the squared term, after the effects of the linear term had been taken into account, could be examined. Finally, product terms were included to check for significant interactions between sex and both the linear and squared achievement tendency terms.

1 Twenty separate stepwise analyses were performed using this model - ten in which science performance was the dependent variable and ten in which English performance was the dependant variable. A full summary of results for one of these analyses is presented in Table 7.24. The format of this table is the same as that of similar tables of results (of similar analyses) reported earlier (see for example, Table 7.16) and its contents can be interpreted in the same way as the contents of these earlier tables. From Table 7.24 it can be seen that neither of the two achievement tendency terms exerted a significant effect on science performance once the effects of sex, school and IQ had been taken into account.

These results (in Table 7.24) are similar to those obtained for the remaining nineteen analyses performed in that no significant curvilinear relationships of the type predicted were found. These negative findings are not surprising for two reasons. First, as we have already seen in part II of this chapter, the dissonance measures used in these analyses were either unrelated or inversely

---

1 The first four measures in Table 7.23 were included (separately) in analyses of both science and English performance (a total of 8 analyses) and the remaining measures were included (separately) in analyses of either science performance (those labelled science) or English performance (those labelled English). These latter twelve analyses plus the eight already mentioned produced a total of twenty analyses.
Table 7.24

Stepwise regression of science performance on sex, school, IQ, final achievement tendency ($T_{A1}$), final achievement tendency squared ($T_{A1}^2$) and the product terms formed between sex and $T_{A1}$, and sex and $T_{A1}^2$ ($N=151$)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>-.266</td>
<td>.044</td>
<td>-.211*</td>
</tr>
<tr>
<td>School A</td>
<td>2.233*</td>
<td>.078</td>
<td>.301*</td>
</tr>
<tr>
<td>School B</td>
<td>2.016*</td>
<td>.101</td>
<td>.266*</td>
</tr>
<tr>
<td>School C</td>
<td>.585</td>
<td>.006</td>
<td>-.073</td>
</tr>
<tr>
<td>School D</td>
<td>-.041</td>
<td>.002</td>
<td>-.196*</td>
</tr>
<tr>
<td>IQ</td>
<td>.058*</td>
<td>.040</td>
<td>.372*</td>
</tr>
<tr>
<td>$T_{A1}$</td>
<td>-.104</td>
<td>.000</td>
<td>.113</td>
</tr>
<tr>
<td>$T_{A1}^2$</td>
<td>.051</td>
<td>.000</td>
<td>.117</td>
</tr>
<tr>
<td>$T_{A1}$ . Sex</td>
<td>.301</td>
<td>.002</td>
<td>-.022</td>
</tr>
<tr>
<td>$T_{A1}^2$ . Sex</td>
<td>-.146</td>
<td>.007</td>
<td>-.159</td>
</tr>
</tbody>
</table>

* $p < .05$

Notes: $T_{A1} =$ RESNACH + student affiliation dissonance B.

N size was reduced because dissonance B scores used to construct $T_{A1}$ were available for approximately half the sample (see Table 5.6).

related to academic performance (when the effects of IQ, sex and school were controlled). Second, although anxiety and need for

1 Except for the positive relationship between teacher supplication dissonance C and English performance among males.
achievement (used to measure resultant achievement motivation) were inversely and positively correlated to academic performance respectively, these relationships disappeared when the effects of IQ, sex, school and each other were taken into account (see Table 7.25). The only exception to this was the relationship between anxiety and English performance for which neither the simple correlation coefficient nor the partial regression coefficient was statistically significant. Thus none of the components of the final achievement tendency as measured in this study was related to academic performance in the manner suggested by Atkinson once the effects of IQ, sex and school were taken into account.
Table 7.25
Partial regression coefficients (b) and increments to explained variance (RSQ) for anxiety and need for achievement (nACH) adjusted for sex, school, IQ and each other. Simple correlation coefficients for each term are also reported (simple r).

<table>
<thead>
<tr>
<th>Dependent Variable: Science Performance N=321</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>nACH</td>
<td>.050</td>
<td>.017</td>
<td>.148**</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.025</td>
<td>.008</td>
<td>-.127*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable: English Performance N=321</th>
<th>b</th>
<th>RSQ</th>
<th>Simple r</th>
</tr>
</thead>
<tbody>
<tr>
<td>nACH</td>
<td>.035</td>
<td>.010</td>
<td>.095*</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.003</td>
<td>.000</td>
<td>-.015</td>
</tr>
</tbody>
</table>

** p < .01    * p < .05 (one-tailed tests)

Relationships Between Academic Performance, Need for Achievement, Anxiety and Need-Press Dissonance

A number of other hypotheses were derived from Atkinson's curvilinear hypothesis. These were as follows:

8(a) n Achievement will be positively related to academic performance when anxiety is high and need-press dissonance is low.

(b) n Achievement will be inversely related to academic performance when anxiety is low and need-press dissonance is high.

9(a) Anxiety will be inversely related to academic performance when n Achievement is low and need-press dissonance is low.

(b) Anxiety will be positively related to academic performance when n Achievement is high and need-press dissonance is high.
10(a) Need-press dissonance will be inversely related to academic performance when n Achievement is high and anxiety is low.

(b) Need-press dissonance will be positively related to academic performance when n Achievement is low and anxiety is high.

To test these hypotheses measures of anxiety, need for achievement and need-press dissonance were divided at the median; scores above the median in each case were designated as 'high' and scores below, as 'low'. The strength and direction of each predicted relationship was then examined within each of the specified groups using a stepwise regression procedure. Thus, for example, to test hypothesis 8(a) the relationship between academic performance and need for achievement was examined within the group of students who scored high on anxiety and low on need-press dissonance. In the regression model used sex, school and IQ were entered before the independent variable in question [in the case of hypothesis 8(a) this was need for achievement and in the case of hypothesis 9(a) anxiety and so on] so that the predicted relationship between academic performance and this independent variable, adjusted for the effects of these three variables, could be examined. Hypothesis 8(a) was tested using the following model: dummy variables for sex and school were entered into the equation followed by IQ, need for achievement and the product term formed between sex and need for achievement. The interaction term was entered last so that its effect on academic performance, adjusted for the separate effects of sex and need for achievement could be assessed.

Initially only the B-type measures of need-press dissonance were used but the results of some of these analyses could not be interpreted in a meaningful way because the number of cases on which they were
performed were too small (N<30). The analyses affected by these reductions in sample size were those in which only high or low dissonance B scores were used [i.e. tests of hypotheses 8(a) and 9(b)]. It will be recalled from Chapter Five (see Table 5.6 in Chapter Five) that dissonance B scores were only calculated for approximately half the total sample and when only half of these B-type scores were used in the analyses mentioned above the N available is drastically reduced. This problem is also aggravated by the use of the listwise method of deleting missing data which was discussed in Chapter Six. This method ensures that all calculations are based on the same universe of data. However, it also can result in large reductions in the N especially when, as in the present study, missing data are fairly evenly spread among a large proportion of cases.

A possible solution to this problem is the use of the pairwise method for deleting missing data. Under pairwise deletion, a case is omitted from the computation of a given simple coefficient if the value of either of the variables involved is missing. If both values are available the case is included when that particular coefficient is calculated even though it may be missing for other coefficients in the matrix. Pairwise deletion has the advantage of utilizing as much of the data as possible in the computation of a correlation matrix from which (as in this case) regression coefficients are to be calculated. It has the disadvantage, however, that under some circumstances regression coefficients are produced from simple correlation coefficients which are themselves based on a very different number of cases and perhaps even on quite different sub-populations.

---

1 Blalock (1960, p.142) argued that tests of significance cannot be legitimately used on samples of less than 30 because it is no longer reasonable to assume that the sample distribution approximates the normal curve.
As a result of these computational inaccuracies, little confidence can be placed in multiple regression statistics where pairwise deletion is used and for these reasons pairwise deletion was not used to overcome the problem of reduced N's in the analyses discussed above. Two other possible solutions to this problem are firstly, to estimate the missing values using what data are available (e.g. school leaving age can be estimated using academic performance and chronological age), and secondly, using variable mean scores for cases where a score for a particular variable is missing. Neither of these solutions was used. The estimation method was not used because scores on the psychological variables in which we are interested cannot be easily estimated from scores on the other variables for which we have data (in fact the purpose of the present study is to investigate relationships between these variables); and mean scores were not used because not all the analyses performed in connection with any one hypothesis were affected by reduced N's. As mentioned above, ten separate analyses were performed to test each of the hypotheses listed and for any one hypothesis the maximum number of analyses in which the workable N was less than 30 was five [hypothesis 8(b)]. Thus, even in this case the hypothesis was tested five separate times which was considered sufficient.

Overall these analyses revealed very little support for the hypotheses listed above. With respect to hypothesis 8(a) the results generally indicated that under conditions of high anxiety and low dissonance, need for achievement and academic performance were positively related. However, in only one analysis (that involving student affiliation dissonance B and English performance) was this relationship statistically significant. No support was found for hypothesis 8(b); need for achievement and academic performance were
not consistently inversely related and none of the relationships, either positive or negative, was statistically significant. Analysis of relationships between anxiety and performance [hypotheses 9(a) and 9(b)] revealed only one significant finding; contrary to what was predicted in hypothesis 9(a), anxiety and science performance were significantly positively related among students with low need for achievement scores and low student affiliation dissonance B scores. Tests of hypothesis 10(a) also revealed one significant result: teacher affiliation (science) dissonance B was, as predicted, inversely related to science performance when need achievement was high and anxiety was low. However, both teacher affiliation (science) dissonance B and teacher supplication (science) dissonance B were also inversely related to science performance when need for achievement was low and anxiety high; a relationship opposite to the one predicted in hypothesis 10(b).

Because of the large number of analyses performed it is possible that the few significant results obtained may have occurred by chance and therefore it is problematical whether they can be interpreted as evidence of psychological processes. Certainly unexpected and isolated findings can be treated as occurring merely by chance but even those findings which did support earlier predictions would have to occur more consistently before we could confidently interpret them as evidence of aspects of the achievement process.

The results of the same analyses in which C-type measures were used provide even less support for hypotheses 8, 9 and 10. Of the sixty separate regression analyses performed (ten for each of six

1 Once again not all the results of these analyses could be meaningfully interpreted because of the reduction in sample sizes which occurred due to the use of listwise deletion of missing data.
hypotheses) four revealed significant findings; tests of hypothesis 9(a) revealed three significant interactions and tests of hypothesis 10(b) indicated that, as predicted, teacher deference (science) dissonance C was positively related to science performance under conditions of low need for achievement and high anxiety. Under these conditions resultant achievement motivation (need for achievement minus anxiety) is low and we would expect an increase in the extrinsic tendency to achieve (measured by need-press dissonance) to be associated with an increase in academic performance. However, once again the large number of analyses performed means that little confidence may be placed in the few significant findings revealed.

Summary and Discussion of Results of Tests of Hypotheses Derived from the Extrinsic Tendency Perspective

The findings presented in Section III of this chapter provided no support for the second theoretical perspective investigated in this study. Tests of Atkinson's curvilinear hypothesis failed to reveal the inverse curvilinear relationship which was predicted between performance efficiency and final achievement tendency. One reason for these negative results appeared to be that none of the component measures used to construct final achievement tendency (anxiety, need for achievement and need-press dissonance) was related to academic performance in the manner predicted by Atkinson (1974b). Once the effects of sex, school and IQ were controlled measures of need-press dissonance were (with one exception) either inversely related or unrelated to academic performance and both anxiety and need for achievement were unrelated to performance. Given these findings it is not surprising that no support was found for Atkinson's (1974b) curvilinear hypothesis or the other hypotheses derived from it. There
is sufficient evidence to support Atkinson's contention that generally anxiety is inversely related to academic performance and that need for achievement is positively related to performance [see Gaudry and Spielberger (1971), Naylor (1972) and Lavin (1965) as well as other evidence reviewed in earlier chapters]. Since relationships of this kind were not found in the present study the failure to find support for Atkinson's curvilinear hypothesis suggests that the measures used were at fault rather than the theory.

The few inverse relationships between academic performance and measures of need-press dissonance reported in Section II of this chapter suggest that insofar as the dissonance scales measure anything at all they reflect students' perceptions of their high school social climate (as suggested in the social climate perspective discussed in Chapter Three) rather than the strength of their extrinsic achievement tendencies. If this is the case it suggests once again that no support was found for Atkinson's curvilinear hypothesis because the components of the final achievement tendency were incorrectly measured rather than that the theory itself is incorrect. We shall pursue the discussion of both these findings and those reported in Section II in greater detail in Chapter Eight. In the final part of this chapter the results of tests of each of the hypotheses are summarized.
SUMMARY OF CHAPTER SEVEN

The hypotheses tested in this chapter and the results of these tests are summarized below.

(a) Summary of Results of Tests of Hypotheses Derived from the Social Climate Perspective

1. Assuming the effects of sex, IQ and school differences are controlled academic performance and need-press dissonance will be inversely related in a linear fashion.

Only limited evidence was found to support this hypothesis; twenty separate relationships were analyzed and only three statistically significant relationships, in the direction predicted, were revealed. These were between science performance and three measures of teacher-oriented dissonance: teacher affiliation (science) dissonance B, teacher supplication (science) dissonance B and teacher deference (science) dissonance C.

One other significant relationship which was found but not predicted was a positive relationship between teacher supplication (English) dissonance C and English performance among males.

2. Assuming the effects of sex, IQ and school differences are controlled academic performance and need-press dissonance will be inversely related in a curvilinear fashion.

Since only one significant relationship (of a possible forty) of the type predicted was found [between teacher deference (science) dissonance B and science performance among males] we can conclude that no support was found for this hypothesis.

3. The relationship between academic performance and need-press dissonance will be mediated by state anxiety.

No support was found for this hypothesis.
4(a) Dissonance associated with needs for affiliation, supplication and deference will be more strongly (inversely) related to females' academic performance than to males' performance.

(b) Dissonance associated with need for dominance will be more strongly (inversely) related to males' academic performance than females' performance.

Two sex by dissonance interactions were observed which out of a possible twenty provided support for hypothesis 4(a). Teacher affiliation (science) dissonance C was more strongly (inversely) related to science performance among females than males, and teacher supplication (English) dissonance C was more strongly (inversely) related to English performance among females than males.

No support was found for hypothesis 4(b).

5(a) The positive relationship between need for achievement and academic performance will be stronger under conditions of need-press congruence than dissonance.

(b) The positive relationship between IQ and academic performance will be stronger under conditions of need-press congruence than dissonance.

No support was found for either hypothesis 5(a) or 5(b).

6(a) The factor subscale enjoyment will be inversely related to measures of need-press dissonance.

(b) The factor subscale fear/anxiety will be most strongly related to measures of dissonance associated with needs for affiliation and supplication.

(c) The factor subscale guilt/anxiety will be most strongly related to measures of dissonance associated with need for deference.

(d) The factor subscale anger (i.e. anger/contempt/hostility) will be most strongly related to measures of dissonance associated with need for dominance.
Tests of these hypotheses revealed support for hypothesis 6(a) only; the enjoyment subscale was inversely related to dissonance associated with needs for affiliation [student affiliation dissonance B, teacher affiliation (English) dissonance C], dominance [student dominance dissonance B], deference [teacher deference (science) dissonance C and teacher deference (English) dissonance C] and supplication [teacher supplication (science) dissonance C and teacher supplication (science) dissonance B]. Only one measure of dissonance [teacher affiliation (science) dissonance B] was positively related to the fear/anxiety subscale.

Other findings of interest concerned the anger subscale. Although, contrary to earlier predictions, this subscale was not significantly related to dissonance associated with need for dominance it was related to C-type measures of dissonance (press exceeds need) associated with need for deference, and B-type measures of dissonance (need exceeds press) associated with needs for affiliation and supplication.

(b) Summary of Results of Tests of Hypotheses Derived from the Extrinsic Tendency Perspective

7. Assuming the effects of sex, IQ and school differences are controlled students with a moderate achievement tendency will perform better on academic tasks than those with either a weak achievement tendency or a strong achievement tendency.

No support was found for this hypothesis.

8(a) n Achievement will be positively related to academic performance when anxiety is high and need-press dissonance is low.

(b) n Achievement will be inversely related to academic performance when anxiety is low and need-press dissonance is high.
9(a) Anxiety will be inversely related to academic performance when n Achievement is low and need-press dissonance is low.

(b) Anxiety will be positively related to academic performance when n Achievement is high and need-press dissonance is high.

10(a) Need-press dissonance will be inversely related to academic performance when n Achievement is high and anxiety is low.

(b) Need-press dissonance will be positively related to academic performance when n Achievement is low and anxiety is high.

No consistent support was found for any of these hypotheses.
INTRODUCTION

Overall the findings of this study provided very little support for the hypotheses which were tested and the major purpose of this chapter is to try and account for why so little support was found for them. The chapter is divided into two major parts: the first part contains a summary of the study itself and its findings and the second a discussion of these findings. The summary presented in Part I re-acquaints the reader with the broader theoretical framework from which the study was derived and prepares the way for a discussion of the findings within the context of this framework.

I SUMMARY OF THE STUDY AND ITS FINDINGS

Summary of the Study

In Chapter One it was argued that the high school experience is essentially a social one since almost all activities at school are carried on within a context of ongoing social interaction with peers and teachers. It was also argued that, students' experience of this interaction will be related to their academic performance and school-related feelings. Literature reviewed in Chapter One revealed a paucity of information concerning firstly, the student perspective of within-school social interaction and secondly, the relationship between students' experience of this interaction and their academic performance. Accordingly, this study was designed to address the
question: How is adolescents' experience of social interaction with peers and teachers related to their academic performance?

At a general level it was argued that human experience is an outcome of the interaction between background or personality (which reflects past experience) and current perceptions of the environment. In the light of this it was considered that adolescents' experience of social interaction with peers and teachers could be understood in terms of the degree of dissonance or dissatisfaction they experience in association with needs aroused during interaction. By their nature, it was argued, social needs are aroused by environmental cues present in interactive situations and satisfied (or left unsatisfied) by the behavioural exchange which this interaction implies. This theoretical perspective meshed nicely with an available methodology. This was Stern's (1970) psychometric development of Murray's (1938) needs-press model and in Chapter Two this model was defended as the best available paradigm within which to approach an empirical investigation of the research question mentioned above.

It was argued that, for the majority of adolescents, needs aroused during student-peer interaction would reflect a desire for peer-group status (popularity and social dominance) and those aroused during student-teacher interaction would reflect a desire for student-teacher rapport. In the light of this four social needs were identified in Chapter Three which were considered to dominate adolescents' experience of social interaction with peers and teachers. Needs for affiliation and dominance were considered to characterize students' interaction with their peers and needs for affiliation, supplication and deference were considered to characterize students' interaction
with their teachers. Viewed in terms of the needs-press model, adolescents' experience of social relationships is reflected in the type of needs aroused during social interaction and the degree of dissatisfaction or dissonance experienced in association with those needs.

Pace and Stern (1958) suggested that need-press dissonance would be inversely related to academic performance but a review of the literature indicated that researchers had generally been unsuccessful in establishing this relationship empirically (see Chapter Two). A number of reasons for this apparent failure were offered. These were as follows: firstly, the absence in most studies of a sound theoretical justification for the selection of the need-press constructs studied; secondly, the failure in most studies to differentiate between the type of dissonance which occurs when needs exceed press (dissonance B in this study) and the type which occurs when press exceeds need (dissonance C in this study); thirdly, the failure in most studies to explore more thoroughly the nature of the relationship between dissonance and academic performance (i.e. a failure to answer the question: what variables, if any, mediate this relationship); and finally, the use of an overly simplistic correlational approach in most studies with no attempt being made to investigate the possibility that the nature of the dissonance-performance relationship may change as a function of changes in one or more other variables.

An attempt was made to take all these criticisms into account when the present study was designed and executed. In Chapter Three, the selection of needs for affiliation, supplication, dominance and deference as the central theoretical constructs of this study was
justified on the basis that the majority of adolescents would experience the arousal of one or more of these needs when interacting with peers and teachers; and it was argued that the degree of dissonance reported between these needs and their corresponding press would reflect their experiences of the outcome of such interactions. The second criticism mentioned above was taken into account by measuring dissonance B (needs > press) and dissonance C (press > needs) separately and using them as individual scales as well as combined as a single measure (dissonance A) in the data analysis.

The last two criticisms mentioned were dealt with by investigating two different theoretical perspectives concerning relationships between need-press dissonance and academic performance. The first of these treated measures of dissonance (associated with needs experienced during social interaction) as an index of students' experience of high school social climate and, in the manner of the studies reviewed in Chapter Two, it was argued that climatic conditions associated with (or reflected by) need-press congruence would facilitate performance while the conditions associated with relatively high degrees of dissonance would inhibit performance. However, unlike these earlier studies, in the present study this theoretical perspective was fully developed and the relationship between need-press dissonance and academic performance was viewed as an indirect one mediated by state anxiety. Specifically, it was argued that perceptions of dissonance would be accompanied by the arousal of debilitating state anxiety which would impair academic performance,

1 This was justified in terms of Thelen's (1954) argument that the experience of high school social climate was primarily an experience of social interaction with peers and teachers.
while perceptions of congruence would not be accompanied by a similar arousal and consequently performance would not be impaired. This perspective and the hypotheses arising from it were discussed in Chapter Three.

The second perspective, which was discussed in Chapter Four, attempted to place measures of dissonance associated with social needs into the framework of the expectancy-value theory of achievement motivation, and considered dissonance of this kind to reflect the strength of extrinsic components of the tendency to engage in achievement activities. From this perspective need-press dissonance was viewed as a positive tendency which encourages students to engage in achievement activities and is directly related to academic performance i.e. it was argued that dissonance and performance would be positively related. This extrinsic tendency view, discussed in Chapter Four, contrasts sharply with the social climate approach described above and, not surprisingly, led to the proposal of a different set of hypotheses concerning relationships between need-press dissonance and academic performance. All the hypotheses tested in this study were listed at the conclusion of Chapter Four (see pp.140-142). The results of statistical tests of these hypotheses are summarized below.

Summary of Findings Concerning the Social Climate Perspective

The fundamental hypothesis arising out of the social climate perspective was that measures of need-press dissonance (which were considered to reflect students' experience of the high school social climate) were inversely related to academic performance. Relationships between measures of need-press dissonance and two measures of
academic performance were examined using a stepwise regression technique so that the effects of sex, school and IQ on these relationships could be controlled. Twenty separate relationships were analyzed and only three statistically significant relationships in the direction predicted were revealed. These were between science performance and three measures of teacher dissonance: teacher affiliation (science) dissonance B, teacher supplication (science) dissonance B and teacher deference (science) dissonance C. A subsidiary hypothesis was that the inverse relationship between academic performance and dissonance associated with social needs (with the exception of need for dominance) would be stronger among females than males; two sex by dissonance interactions were found (again out of a possible twenty) which provided support for this hypothesis. Dissonance associated with needs for affiliation and supplication [teacher affiliation (science) dissonance C and teacher supplication (English) dissonance C] were more strongly negatively related to academic performance among females than males.

It was also predicted that the inverse relationships between need-press dissonance and academic performance would be mediated by state anxiety. This hypothesis was tested by comparing two sets of relationships between need-press dissonance and academic performance; those adjusted for anxiety (as well as sex, school and IQ) and those adjusted for sex, school and IQ but not anxiety. Controlling for anxiety had no effect on the strength of the relationship between measures of dissonance and academic performance (i.e. these two sets of relationships were of equal strength) and, on the basis of these results, it was concluded that the relationship between need-press dissonance (as measured in this study) and academic performance was not mediated by state anxiety.
An alternative hypothesis presented in Chapter Three was that the relationship between dissonance and academic performance was in the form of an inverted U curve. This followed from Stern's (1962b) comment that an ideal learning environment might be one which moderately stimulates the student rather than completely satisfies him and is consistent with Yerkes and Dodson (1908) hypothesis concerning the relationship between arousal and performance. B- and C-type dissonance measures were entered into a regression equation as linear (first order) and squared (second order) terms together with controls for sex, school and IQ. However, no significant curvilinear effects were found.

Two other hypotheses arising out of the discussion of the social climate perspective were that the positive relationships between academic performance and both IQ and need for achievement would be stronger under conditions of need-press congruence than dissonance; in other words, that interactions between IQ and measures of dissonance and between need for achievement and measures of dissonance would exert significant effects on academic performance. However, no significant interactions of either kind were found.

The last set of hypotheses derived from the social climate perspective concerned relationships between measures of dissonance and emotional response to school. An inverse relationship was predicted between the factor subscale enjoyment and need-press dissonance, and positive relationships were predicted between: firstly, the anger subscale and dissonance associated with need for dominance; secondly, the guilt/anxiety subscale and dissonance associated with needs for deference; and thirdly, the fear/anxiety subscale and dissonance associated with needs for affiliation and supplication. Results of statistical tests of these hypotheses
revealed support for the first of these hypotheses only: the enjoyment subscale was inversely related to two measures of dissonance associated with need for affiliation, one associated with need for dominance, two associated with need for deference and two associated with need for supplication. These were: student affiliation dissonance B, teacher affiliation (English) dissonance C, student dominance dissonance B, teacher deference (science) dissonance C, teacher deference (English) dissonance C, teacher supplication (science) dissonance C and teacher supplication (science) dissonance B. Only one measure of dissonance [teacher affiliation (science) dissonance B] was significantly related to fear/anxiety but four B-type measures of dissonance associated with needs for affiliation and supplication were positively related to the STAI anxiety scale. These were DAFF B, DAFSCI B, DAFENG B and DSUPSCI B. The other findings of interest were those involving the anger subscale. Although, contrary to earlier predictions, this subscale was not significantly related to dissonance associated with need for dominance it was related to C-type measures of dissonance (press > need) associated with need for deference, and B-type measures of dissonance (needs > press) associated with needs for affiliation and supplication. Earlier it was suggested that students in both these situations (i.e. those who felt their teachers' authority was excessive or whose affiliation and supplication needs were not satisfied) would feel relatively powerless and frustrated and react angrily as a result.

Summary of Findings Concerning the Extrinsic Tendency Perspective

The major hypothesis arising out of the discussion of the extrinsic tendency perspective was Atkinson's (1974b) hypothesis that the relationship between final achievement tendency and performance efficiency (performance adjusted for IQ) was an inverted U-function. The strength of the final achievement tendency is determined by the
relative strengths of two positive tendencies (tendency to succeed and the extrinsic tendency to engage in achievement activities) and one negative tendency (tendency to avoid failure). The strength of students' achievement tendency was determined by combining their resultant achievement motivation scores and need-press dissonance scores. Resultant achievement motivation was measured by subtracting standardized anxiety scores from standardized need for achievement scores and the strength of final achievement tendency was determined by summing resultant achievement motivation and need-press dissonance (measured by subtracting standardized press scores from standardized need scores) to produce sixteen different measures of final achievement tendency (see Table 7.23).

The relationships between each of these measures of final achievement tendency and performance were investigated using a stepwise regression technique; terms for sex, IQ and school were entered into the equation first (to control for the effects of these variables) followed by terms for achievement tendency, achievement tendency squared and two product terms formed between sex and each of the achievement tendency terms. A curvilinear relationship was predicted between achievement tendency and performance efficiency and consequently achievement tendency was entered into the equation as a squared term. However, it was also included as a linear term before the squared term so that the magnitude of the curvilinear effect of achievement tendency on performance could be determined after its linear effect was taken into account. The results of these analyses provided no support for Atkinson's (1974b) curvilinear hypothesis. These negative findings are not surprising since none of the three components of achievement tendency (need for achievement, state anxiety and need-press dissonance) was related to academic
performance in the manner predicted by the extrinsic tendency perspective. When the effects of school membership, sex and IQ were taken into account the relationships between academic performance and both anxiety and achievement were not significant, and the relationships between need-press dissonance and performance were (with one exception) either inverse or not statistically significant.

A variety of other hypotheses derived from Atkinson's curvilinear hypothesis were also tested [hypotheses 8(a) to 10(b) listed on p. 142]. The two hypotheses of particular interest in this group were hypotheses 10(a) and 10(b) which tested the possibility that the relationship between need-press dissonance and academic performance varied in direction as a function of the strengths of students' need for achievement and anxiety in achievement situations. In the light of the negative findings mentioned above it is not surprising that no consistent support was found for any of these hypotheses.

II DISCUSSION OF THE FINDINGS

Need-Press Dissonance and Academic Performance

The findings summarized above provide little or no support for either of the two theoretical perspectives investigated in this study. In the discussion of the social climate perspective it was predicted that academic performance and need-press dissonance would be inversely related (assuming that the effects of sex, IQ and school membership were controlled), while in the discussion of the extrinsic tendency perspective it was predicted that performance and dissonance would be positively related (once again assuming the effects of the control variables mentioned above were taken into account). Three relationships were found to support the former prediction and one (among males only) was found to support the latter prediction. However, given
that twenty separate relationships between measures of dissonance and academic performance were tested; these results do not provide substantial support for either perspective. Furthermore, when the effects of sex, IQ and school were controlled, the press scales used to construct these dissonance measures accounted for approximately the same amount of variance (and in some cases a slightly greater amount) as the dissonance measures themselves, and since dissonance and press were highly related, we can conclude that it was the press components of the dissonance scales which produced their effect on academic performance. However, neither the dissonance nor press scales concerned accounted for more than 5 per cent of variance in academic performance in any of the relationships tested.

On the basis of these findings we can say two things. First, that the simpler additive model in which need and press were entered separately is as good a predictor of academic performance as the more complex model in which these scales were introduced in a combined fashion as dissonance measures; and second, that once the effects of background variables (IQ and sex) and school membership have been taken into account, the contribution of the within-school process of social interaction (at least when measured by need-press dissonance) is very small indeed. For example, in Table 7.1 in Chapter Seven background variables and school membership accounted for approximately 26 per cent of variance in science performance while the student affiliation dissonance measure plus the product term formed between sex and this dissonance term accounted for less than 1 per cent of variance in science performance. The amount of variance explained by measures of dissonance increased to a maximum of approximately 5 per cent when the three teacher-oriented measures of dissonance, teacher
affiliation (science) dissonance B, teacher supplication (science) dissonance B and teacher deference (science) dissonance C, were introduced.

These results suggest either that students' experiences of social interaction do not contribute a great deal to an explanation of academic performance, or that the dissonance measures used in this study did not successfully capture this experience. In the light of the evidence reviewed in Chapter One which suggested that within-school social interaction was an important factor in accounting for schooling outcomes we must conclude that the second suggestion made above is more likely to be the correct one; that is, that the dissonance measures used in this study did not successfully capture students' experience of social interaction with peers and teachers.

Poor measurement also appears to be the reason for the failure of this study to provide support for Atkinson's (1974b) curvilinear hypothesis; once the effects of sex, school and IQ were taken into account none of the measures of final achievement tendency was significantly related to academic performance. Once again, since Atkinson (1974b) has produced a reasonable amount of evidence for his hypothesis we must conclude that the measures used in this study were at fault rather than the hypothesis itself.

In the studies reviewed in Chapter Four the strengths of motives to succeed and avoid failure were measured using the TAT (Atkinson, 1958) for n Achievement and the TAQ (Mandler and Sarason, 1952) respectively, and the strength of subjects' extrinsic tendency was inferred from the type of situation in which they performed the given tasks. In these studies (e.g. Atkinson and Reitman, 1956; Entin, 1974) the conditions under which subjects worked were
manipulated so that the degree of extrinsic motivation experienced varied considerably between the different types of condition. These authors also placed subjects with different trait levels of need for affiliation in different types of arousal conditions so that the range of levels of motivation experienced by subjects was maximized. In the present study student motives to succeed and to avoid failure were measured using the Stern (1970) n Achievement scale and fourteen items from Spielberger et al.'s (1970) STAI respectively; and the strength of their extrinsic achievement tendency was inferred from the degree of dissonance they perceived in association with needs aroused during social interaction with peers and teachers. This was done on the basis of an argument presented in Chapter Two that the degree of arousal students generally experience in a given situation can be inferred from the degree of dissonance (or dissatisfaction) they report in association with needs aroused in that situation. Although in Chapters Four and Five the use of these different measures was defended on theoretical grounds, it would appear from the negative results of tests of hypotheses derived from the extrinsic tendency perspective that they did not measure the strengths of the three components of the final achievement tendency in the same way as the measures used in the studies reviewed in Chapter Four. In particular it would appear wrong to conclude that the degree of extrinsic arousal subjects generally experience in a given situation can be inferred from the degree of dissonance they perceive in association with social needs aroused in that situation (that is assuming that we have correctly identified the social needs aroused in the high school situation).

In Chapter Four it was argued that an experience of dissonance associated with needs aroused in students during student-teacher interaction (reflecting an experience of poor teacher-student
relations) and student-peer interaction (reflecting an experience of low peer group status) would act as an incentive to encourage students to engage in achievement activities. It was also argued that students experiencing dissonance might work harder and perform better than those experiencing congruence in order to improve their relations with their teacher and their peer group status and, if this was the case, we might expect dissonance and performance to be positively related and not, as suggested in discussion of the social climate perspective, inversely related.

But the relationships between measures of dissonance and academic performance reported in Chapter Seven suggest that, if anything, dissonance and performance were inversely related rather than positively related. In other words, need-press dissonance, as measured in this study, appears to reflect students' experience of the social climate of the high school rather than their extrinsic tendency to engage in academic performance. This conclusion is reinforced by the fact that the press components of these dissonance measures appear to have produced the effects of dissonance on performance. These press scales basically measured students' perceptions of teachers' behaviour in science and English classes and in Chapter One it was argued, on the basis of Thelen's (1954) observations, that students' experience of high school was primarily determined by their experience of the social behaviour of others.

The three press scales which were significantly related to academic performance were teacher warmth (science) press, teacher compliance (science) press and teacher warmth (English) press (males only). In Table 6.5 in Chapter Six a very high correlation
was reported between the first of these two press measures and it was suggested that rather than being two independent aspects of classroom press, teacher warmth and compliance press (for both science and English press) are opposite sides of the same coin - students' perceptions of positive and negative aspects of their teachers' behaviour. Why students' perceptions of their teachers' behaviour should be more closely related to their performance in science than in English is not immediately obvious. This may have occurred because in science students learn more directly from their teachers than in English. Students are more familiar with the subject matter of English than science and therefore are more likely to be able to perform well in that subject without their teacher's help than in science. This suggests that good teacher-student relations are more important for success in science than in English. A student who does not get on well with his English teacher may still perform well because he can work on his own but a science student in the same position may not be able to perform well because the learning process in science involves the teacher more directly. Consequently, students' perceptions of their teachers are more likely to be related to their performance in science than English because those who perceive their teacher as lacking in warmth, for example, are less likely to have the good relationship with their teacher necessary for success in science but not so vital for success in English. Whether or not this is the case we must not lose sight of the fact that the two press scales in question accounted for approximately 5 per cent of variance in science performance which is hardly a finding substantial enough to build a theory on! Also, the fact that teacher warmth (English) press was related to English performance among males means that the above explanation should be considered with caution.
Overall the results of tests for relationships between academic performance and need-press dissonance were very disappointing and there seems little doubt that the Stern (1970) need and press scales are not appropriate measures for assessing students' experience of social interaction within the high school. The greater success achieved with these scales in distinguishing between groups of individuals in terms of their personality characteristics (Chilman, 1959; Cosby, 1962; Stern, 1962; McLaughlin, 1966; Vacchiano and Adrian, 1966) and to describe different learning environments (Stern, 1963b, 1965, 1970; Kight and Herr, 1966; Mitchell, 1968; Marks, 1970) suggests that these scales are better suited for use at the group level than for studying the individual student. The majority of studies in which individual need and press scores have been combined into measures of dissonance in order to predict academic performance have revealed negative findings. These studies were reviewed in Chapter Two and in this study an attempt was made to overcome the shortcomings of these earlier studies in order to demonstrate that need-press dissonance as measured by the Stern scales could consistently predict individual student performance. The failure in this study to demonstrate such a relationship suggests, in the light of these earlier findings, that it simply does not exist and reinforces the suggestion made above that the Stern need and press scales are better suited for research into between-group effects rather than within-group effects.

These negative findings do not necessarily invalidate the basic approach to studying the relationship between students' experience of social interaction with peers and teachers and their academic performance which was adopted in this study. In Chapter One we suggested that students' experience of this interaction
could be conceptualized in terms of the degree of satisfaction they experience in association with social needs (e.g. needs for affiliation and dominance) aroused in them during interaction, and that satisfaction of this kind will be positively related to their academic performance and the favourability of their feelings concerning school. The negative results of this study indicate that need satisfaction as measured by the composite need-press dissonance scales is not related to academic performance. If the general hypothesis that need satisfaction and academic performance are related is correct then an alternative approach to the measurement of need satisfaction is obviously required in order to demonstrate this.

One possible approach is to experimentally manipulate the degree of satisfaction which students experience in much the same way as the level of extrinsic motivation experienced was manipulated in the Entin (1974) study described in Chapter Four. For example, students with strong affiliative needs could be placed in 'affiliative' and 'non-affiliative' classrooms; that is, classrooms in which teachers were friendly, warm and helpful and those in which teachers were cold, aloof and generally uninterested in their students, respectively. Students with strong affiliative needs would be more likely to achieve satisfaction of them in the former classrooms than in the latter. If this was the case and the general hypothesis stated above is correct then students with strong affiliative needs should perform better in the former classrooms than the latter even when the effects of IQ, sex and class membership are controlled.\footnote{In a study of this kind McKeachie, Lin, Milholland Isaacson (1966) demonstrated that males with high affiliative needs performed better in 'warm' classrooms than 'cool' ones; results for females were inconclusive.}
In Chapter One the lack of information concerning the student perspective of student-teacher interaction and, to a lesser extent, student-peer interaction, was emphasized. Consequently, before experimental research of the type suggested above is initiated it may be necessary to use a less structured approach (e.g. interviews) in order to determine more precisely how students do experience social interaction with their peers and teachers. It is possible that to conceptualize this experience in terms of need satisfaction is too simplistic and therefore unlikely to prove fruitful in future research. Holt's (1964, 1967) classroom observation studies certainly suggest that this may be the case in that they give the impression that the relationship between students' interaction with peers and teachers and how they learn (and don't learn) is an extraordinarily complex one. In order to understand how adolescents' experience of social interaction with peers and teachers is related to their academic performance as well as to other schooling outcomes it may be necessary to adopt less traditional techniques of social psychological inquiry and, in particular, to develop alternative methods of assessing students' experience of social interaction.

Need-Press Dissonance and Emotional Response to School

An attempt was made to establish relationships between different measures of need-press dissonance and some of the components of state anxiety identified by Izard (1972). He argued that state anxiety is not a unitary construct but rather a combination of fundamental interacting emotions and developed scales to measure nine such emotions. In the present study relationships between need-press dissonance and
three scales (enjoyment, anger and fear/anxiety), plus a state anxiety scale constructed from items from these three subscales were investigated.

The results of tests for these relationships were more encouraging than those for relationships between dissonance and academic performance in the sense that measures of dissonance entered into significant relationships with these emotional response scales to a greater extent than they did with academic performance. Also two hypotheses - that dissonance would be positively related to state anxiety and inversely related to enjoyment of school - were generally supported by the results of these analyses. However, as was the case with the few significant dissonance-performance relationships observed, the increases in explained variance attributable to the dissonance terms in each case (over and above that accounted for by sex and school) were generally not as great as the increases due to the additive effects of the need and press scales used to construct them, i.e. the increases in variance explained when need and press scales were introduced separately rather than combined as dissonance measures. The only relationship in which a dissonance measure accounted for a substantially greater proportion of variance in the dependent variables than its component need and press scales was that between teacher deference (English) dissonance C and the anger subscale (see Table 7.19 in Chapter Seven).

1 It was intended to use the guilt/anxiety subscale as well but factor analysis of selected items from Izard's DES+A scale failed to identify this subscale as a separate factor.
in the light of these findings we can draw a conclusion similar to the one drawn earlier with respect to academic performance; that is, that the simple additive model in which needs and press are added separately generally has as much, or more, explanatory power than the more complex dissonance model.

However, for one group of relationships the dissonance measures account for approximately the same amount of variance in emotional response to school as the separate need and press scales, and the nature of these relationships is easier to explain when thought of in terms of need-press dissonance. These were relationships between the factor subscale anger and four teacher-oriented dissonance measures. These were: teacher deference (English) dissonance C, teacher deference (science) dissonance C, teacher affiliation (science) dissonance B and teacher supplication (science) dissonance B. The relationship between teacher deference (English) dissonance C (DDEFENG C - see Table 7.19) and the anger subscale (which was mentioned above) was particularly strong and accounted for 12 per cent of variance in the latter (after the effects of sex and school were taken into account). The equivalent science measure (DDEFSCI C) however accounted for only 4 per cent of variance in the anger subscale (slightly less than that accounted for by the need for deference and science teacher compliance press scales when entered separately).

The C-type dissonance scales measure discrepancies between needs and press in which press exceeds needs and DDEFSCI C and DDEFENG C in particular measure the extent to which teacher compliance press (teacher demands for respect and obedience etc.) exceed students' need for deference (need to defer to the authority
and opinions of others perceived as superior). Students who consider that teachers' demands for respect and authority are excessive (i.e. exceed their needs for deference) are quite likely to react angrily to what they see as an unnecessary display of power by their teachers. In contrast, the significant (inverse) relationship between enjoyment and these two dissonance C measures which were also reported in Table 7.19 indicate that students' who experience a relatively high degree of congruence between their deference needs and the degree of authority exerted by their teacher find school to be an enjoyable experience.

The pattern of relationships between the anger subscale and B-type measures of dissonance (Table 7.18) is quite different to the one between C-type measures and this subscale discussed above. From Table 7.18 it can be seen that students who expressed anger were those who experienced dissatisfaction associated with needs for affiliation (DAFSCI B) and (DSUPSCI B). The B-type dissonance measure the extent to which prevailing press is insufficient to meet students' needs. At school students who find themselves in this situation are relatively powerless; those experiencing dissatisfaction associated with affiliative and supplicative needs are not in a position to make their teachers act in a more friendly or supportive fashion towards them and they cannot leave the class because attendance at school is required by law at the Year 10 level. As was pointed out in Chapter One teachers occupy a dominant position in the classroom and students are relatively powerless when it comes to affecting real change in their teachers' behaviour, either by making them less disciplinarian (to reduce the degree of C-type dissonance perceived) or more friendly (to reduce the degree of B-type dissonance perceived). In Chapter Seven we suggested that
the emotional reaction of students who feel powerless to change an unsatisfactory situation will be anger, and that it was this association which produced the dissonance-anger relationships reported in Tables 7.18 and 7.19.¹

Even though these dissonance terms do not account for a greater amount of variance in the anger subscale than the need and press scales from which they were constructed, they are more useful than the latter in accounting theoretically for the findings discussed above. In other words we must draw a distinction between explanation at the empirical level (i.e. variance explained), and explanation at the theoretical level (i.e. why did the results occur). Both must be taken into account when the results of data analysis are interpreted for there is little point in establishing substantial relationships between dependent and predictor variables unless we can explain why such relationships occur.

¹ This suggestion is consistent with studies of protest voting in the U.S.A. and violence among Negroes (Horton and Thompson, 1962; Thompson and Horton, 1960; Ransford, 1968). Horton and Thompson found that voters with feelings of political powerlessness were more likely to be dissatisfied with their position in society and hold resentful attitudes towards community leaders, and Ransford (1968) found that Negroes with intense feelings of powerlessness were more prone to violent action than those who were less alienated.
Measuring Need-Press Dissonance

The finding that one type of dissonance associated with a particular need is related to anger but not the other type of dissonance associated with the same need (e.g. dissonance C and B associated with need for deference) supports the argument made in Chapter Two that the two types of need-press dissonance (i.e. B and C) are different types of experience which may be related in different ways to academic performance and emotional response. Also limited support was found for the prediction that B-type dissonance in which needs exceed press would be more strongly related to academic performance and emotional response to school than C-type dissonance in which press exceeds needs. In Chapter Two it was argued that 'true' dissonance (i.e. dissatisfaction as originally conceived by Murray) only occurs in situations in which people find prevailing press insufficient to meet their needs, and that only this type of dissonance (as distinct from the situation in which press exceeds needs) would be related to behavioural outcomes. Two significant inverse relationships between academic performance and measures of dissonance B were found and two also were found between need-press dissonance C and performance. But twice as many measures of dissonance B were significantly related to the emotional response scales as measures of dissonance C.

However, overall the use of the need-press dissonance B and C scales to measure students' experience of social interaction was a failure. Intuitively, we would expect this experience (particularly of student-teacher interaction) to be related to academic performance and this view is supported by the limited amount of research carried out in this area. But the dissonance scales used to measure this
experience in the present study were generally not related to academic performance at all. It was argued that adolescents' experience of social interaction could be conceptualized in terms of the interaction between particular aspects of their personality (and, in particular, social needs aroused during interaction) and their perceptions of their immediate social environment. And it was suggested that it was the reluctance of educational research to come to grips with a personality X environment interactive paradigm of this kind which, in the past, has prevented educational research from becoming more productive. The measures of dissonance used in this study were an attempt to reflect this theoretical commitment to the interactive approach at an empirical level. But it was a failure because generally the interaction between needs and press (as reflected in the dissonance measures) had less explanatory power with respect to academic performance and emotional response to school than the additive effects of the separate need and press scales; and even these additive effects accounted for only very small proportions of variance in the dependent variables. Consequently, we are no further forward in explaining the relationships between students' experience of within-school social interaction and schooling outcomes than the studies of relationships between such outcomes and measures of liking and trust, which were criticized in Chapter One as being too simplistic to increase our understanding in this area. Earlier, it was suggested that in order to shed more light on the type of question posed in this study an alternative approach to the assessment of adolescents' experience of social interaction is required and it is to this that we now turn.

1 Product terms formed between the need and press scales also failed to exert a significant effect on academic performance.
Assessing Human Experience

In Chapter One Hargreaves' (1972) criticism of social psychology for its failure to properly understand the concepts of friendship, love and liking from the point of view of peoples' experience of them, was pointed to as one reason why research into the relationship between social interaction and student behaviour had achieved so little. Similar criticisms of social psychology at a more general level have been made by other authors (Armistead, 1974; Heather, 1976). Armistead argued that social psychology knows very little about people's experience of social life in general because social psychologists have been more concerned to understand people's behaviour rather than the experience which underlies their behaviour. He suggested that:

the fundamental task of any social psychology should be to help us understand other people's experience both for its own sake and to compare it with our own. To do this, we need to examine people's past and present experience in and of everyday social situations ... Of course, there's been a lot of work done in such areas by sociologists and social psychologists, but by and large this work does not tell us much about people's experience. The focus has usually been on regularities in people's behaviour and on making generalizations about that behaviour in relation to aspects of the environment or the person that can be quantified (neighbourhood characteristics, income, self-esteem, cognitive complexity etc.) (pp.115-116).

It must be admitted that this describes much of the research concerned with social interaction and academic performance which was reviewed in Chapter One. The limited usefulness of this research and the present study in throwing light on the major question posed in this study suggests, as has already been pointed out, that alternative methods of assessing human experience are required if we are to further our understanding of the relation between the school experience and school-related behaviour.
Armistead argued that to understand social behaviour (that is, behaviour as motivated action as distinct from behaviour as movement) we must concern ourselves with experience: the meanings which people attach to their actions and the reasons they do the things they do. He then went on to argue that the use of less structured data gathering methods - open-ended questionnaires, interviews and discussions with subjects - is necessary if people's experience is to be effectively assessed and understood. He contended that more structured methods such as multiple-choice questionnaires (of the type used in the present study) are of little use in understanding experience because they tend to limit the expression of experience within the parameters laid down by the researcher who constructs the questions and categories used. The major point made by Armistead is that people should be allowed to speak for themselves and express their experience in terms of their own language and organizational categories rather than those imposed by the researcher. He cited studies by Toch (1972) and Cohen and Taylor (1972) of violent men and long-term prisoners respectively, which he considered met some of the requirements necessary for a comprehensive study of experience. These authors were at pains to allow the people they studied to present their own perspectives of the situations they were in and their behaviour within those situations. They did this through the use of the unstructured techniques mentioned above as well as essays, diaries, poems, peer-interviews and group discussions in which subjects discussed and interpreted their own and others' accounts of aggressive acts and coping with life 'inside'. In this way, Armistead suggested these authors obtained far more authentic insights into the men
they studied - the ways in which they experienced their own particular worlds and their reasons for behaving in the way they did - than would have been possible if they used more structured methods of data collection.

Concluding Remarks

In Chapter One the paucity of information concerning students' perspectives of social interaction with peers and teachers was emphasized. It is possible that before we can answer the type of question posed in this study concerning the relationship between students' experience of within-school interaction and schooling outcomes, studies (along the lines proposed by Armistead) of students' experiences of the social life of high schools need to be carried out in order to determine what aspects of those experiences are crucial to an understanding of, for example, their achievement behaviour. Studies of this nature would indicate, for example, whether the needs-satisfaction approach adopted in this study is too simplistic or in fact a reasonably sensible way of going about answering this question.

The failure of the present study to contribute to an understanding of social interaction and its relation to academic performance through the use of the needs-press model suggests, in the light of the generally negative findings of similar earlier studies, that the research tools used were inappropriate for the question asked. Perhaps an approach which places much greater emphasis on students' own constructions of their experiences of social interaction at school and of how these experiences influence their achievement behaviour will provide us with a greater understanding of this relationship.
Definitions of Activities Index scales and complementary High School Characteristics Index scales (from Stern 1970, p.315)

**Achievement**: Surmounting obstacles and attaining a successful conclusion in order to prove one's worth, striving for success through personal effort.

**Affiliation**: Gregariousness, group-centred friendly, participatory associations with others versus social detachment, social independence, self-isolation, or unsociableness.

**Deference — Restiveness**: Respect for authority, submission to the opinions and preferences of others perceived as superior versus noncompliance, insubordination, rebelliousness, resistance, or defiance.

**Dominance — Tolerance**: Ascendancy over others by means of assertive or manipulative control versus nonintervention, forbearance, acceptance, equalitarianism, permissiveness, humility, or meekness.

**Supplication — Autonomy**: Dependence on others for love, assistance, and protection versus detachment, independence or self-reliance.
APPENDIX AII

Administration instructions for the five Stern (1970) AI scales were as follows:

Listed below are a number of different activities which you may or may not enjoy. Read each statement carefully and then circle the number which indicates whether you generally like or dislike the activity. Circle 1 if you strongly like the activity, 2 if you like it, 3 if you are uncertain, 4 if you dislike it, and 5 if you strongly dislike the activity. (If you have not done some of these activities indicate to what extent you imagine you would like or dislike them.)

<table>
<thead>
<tr>
<th>Strongly Like</th>
<th>Like</th>
<th>Neutral</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Need for Achievement

2. Setting higher standards for myself than anyone else would, and working hard to achieve them ............. 1 2 3 4 5

7. Competing with others for a prize or goal .................. 1 2 3 4 5

12. Taking examinations ............. 1 2 3 4 5

15. Working on tasks so difficult I can hardly do them ........... 1 2 3 4 5

20. Doing something very difficult in order to prove I can do it ...... 1 2 3 4 5

24. Choosing difficult tasks in preference to easy ones ......... 1 2 3 4 5

29. Sacrificing everything else in order to achieve something outstanding ..... 1 2 3 4 5

34. Picking out some hard task for myself and doing it ........... 1 2 3 4 5

80. Setting difficult goals for myself 1 2 3 4 5

a Numbers beside each item indicate the order in which they appeared in the questionnaire
Need for Affiliation
1. Going to the park or beach with a crowd ............ 1 2 3 4 5
6. Leading an active social life ...................... 1 2 3 4 5
11. Meeting a lot of people ......................... 1 2 3 4 5
16. Going to parties where I'm expected to mix with the whole crowd ....... 1 2 3 4 5
21. Having lots of friends who come to stay with us for several days during the year ....... 1 2 3 4 5
*25. Going to the park or beach only at times when no-one else is likely to be there ............... 1 2 3 4 5
30. Going on a vacation to a place where there are lots of people ............ 1 2 3 4 5
35. Inviting a lot of people home for a snack or party ............ 1 2 3 4 5
79. Belonging to a social club ...................... 1 2 3 4 5

Need for Deference
5. Doing what most people tell me to do, to the best of my ability .............. 1 2 3 4 5
10. Listening to a successful person tell about his experience ...................... 1 2 3 4 5
14. Going along with a decision made by a supervisor or leader rather than starting an argument ...................... 1 2 3 4 5
19. Listening to older persons tell about how they did things when they were young ...................... 1 2 3 4 5
23. Carrying out orders from others with snap and enthusiasm ...................... 1 2 3 4 5
28. Having friends who are superior to me in ability ...................... 1 2 3 4 5
*†33. Seeing someone make fun of a person who deserves it ...................... 1 2 3 4 5
†38. Disregarding a supervisor's directions when they seem foolish ...................... 1 2 3 4 5

†Items omitted after item analysis
*Items for which scores were not reversed
Need for Deference (Continued)

78. Turning over the leadership of a group to someone who is better for the job than I ............. 1 2 3 4 5

Need for Dominance

3. Persuading a group to do something my way ............ 1 2 3 4 5
9. Getting my friends to do what I do 1 2 3 4 5
13. Organising groups to vote in a certain way in elections ....... 1 2 3 4 5
18. Being able to hypnotise people .. 1 2 3 4 5
26. Organising a protest meeting ... 1 2 3 4 5
31. Talking someone into doing something I think ought to be done 1 2 3 4 5
36. Directing other people's work .. 1 2 3 4 5
39. Influencing or controlling the actions of others ............ 1 2 3 4 5
81. Having other people depend on me for ideas and opinions ....... 1 2 3 4 5

Need for Supplication

4. Belonging to a close family group that expects me to bring my problems to them ............ 1 2 3 4 5
8. Working for someone who always tells me exactly what to do and how to do it ............ 1 2 3 4 5
17. Having someone in the family help me out when I'm in trouble .... 1 2 3 4 5
22. Knowing an older person who likes to give me guidance and direction 1 2 3 4 5
27. Having people fuss over me when I'm sick ............ 1 2 3 4 5
32. Receiving advice from the family 1 2 3 4 5
37. Having people talk to me about a personal problem of mine ....... 1 2 3 4 5
Need for Supplication (Continued)

40. Being with someone who always tries to be sympathetic and understanding  
1 2 3 4 5

77. Having others offer their opinions when I have to make a decision . .  
1 2 3 4 5

Scoring Procedures for Need Scales

Scale scores were calculated so that a high numerical score indicated a strong need. Most items were worded so that a 'strongly like' (1) or 'like' (2) response indicated a strong need while a 'dislike' (4) or 'strongly dislike' (5) indicated a weak need. In order that a high numerical score would indicate a strong need the majority of item scores had to be reversed (i.e. 1 became 5, 2 became 4, 3 remained 3, 4 became 2 and 5 became 1). The only items not reversed (those marked with an asterisk) were those in which a 'like' or 'strongly like' response indicated a weak rather than a strong need.
APPENDIX AIII

Administration instructions* for the two Gardner (1972) classroom press scales were as follows:

Listed below are a number of statements which may or may not be true of your English teacher and your work in English this year. Your teacher has given permission for you to answer these questions. Remember the survey is anonymous and no-one at your school will see your answers, so please be as honest as you can.

We want you to answer two questions about each statement. Read each statement carefully and then circle the number which indicates to what extent each statement is generally true firstly of the school you presently attend and secondly to what extent each statement is true of the school you would most like to attend.

For example:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Our English teacher gives a lot of homework

(a) in this school .................. 1 2 3 4 5

(b) in the school I would most like to attend .................. 1 2 3 4 5

To answer question (a) of this example circle 1 if you strongly agree your English teacher in the school you presently attend gives a lot of homework, 2 if you agree, 3 if you are uncertain, 4 if you disagree and 5 if you strongly disagree that your English teacher in the school you presently attend gives a lot of homework. To answer question (b) you repeat this procedure while imagining the school you would most like to attend. This need not be any school that you have attended or know about just the sort of school you think you would be happiest in. Circle 1 if you strongly agree that the English teacher in your ideal school would give a lot of homework, circle 2 if you agree and so on.

Now go ahead and complete the rest.

*Instruction for items referring to the science teacher were the same as these except that the word English was replaced with science
*42. Our English teacher doesn't mind if we argue about the marks given to us for a test or assignment

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

*45. Our English teacher doesn't readily admit a mistake

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

*48. My English teacher is pretty tolerant of students' ideas even if the teacher doesn't think they're right

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

51. Our English teacher demands that students offer proper respect

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

54. Students rarely express opinions different from those of the teacher in English lessons

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

57. Students have to be pretty careful to toe the line in English

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

60. In most lessons our English teacher lectures at us; we just sit and listen, or take notes

(a) In this school ............ 1 2 3 4 5
(b) In the school I would most like to attend ............ 1 2 3 4 5

*Items for which scores were not reversed when scale scores were calculated.
Teacher Compliance Press (Continued)

63. Students almost always wait to be called on before speaking in English classes
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

66. The way our English teacher piles on the work, you'd think that English was the only subject we do
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

Teacher Warmth Press

43. Our English teacher is the sort of person you could take your personal problems to
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

46. Our English teacher spends a lot of time during lunch or after school helping individual students
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*49. My English teacher is sometimes sarcastic to the pupils in this class
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

52. Our English teacher gives us lots of useful advice about things outside the classroom
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

55. My English teacher is a warm and friendly sort of person
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*Items for which scores were not reversed when scale scores were calculated.
Teacher Warmth Press (Continued)

58. Our English teacher treats us as individuals
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*61. My English teacher is a cold and distant person
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*64. Our English teacher frequently gets bad tempered without much apparent reason
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

67. My English teacher tries very hard to be helpful to those students in the class who are struggling with the subject
   (a) In this school ............ 1 2 3 4 5
   (b) In the school I would most like to attend ............ 1 2 3 4 5

Administration instructions for student press scales were as follows:

Listed below are some more statements which may or may not be true of your school. Once again we want you to answer two questions about these statements. Firstly to what extent they are generally true of the school you presently attend and secondly to what extent they would be true of the school you would most like to attend.

Complete the scales the same way you completed the ones in the previous section.

\[
\begin{array}{c|c|c|c|c|c}
\text{Strongly Disagree} & \text{Disagree} & \text{Agree} & \text{Strongly Agree} \\
1 & 2 & 3 & 4 & 5 \\
\end{array}
\]

*Items for which scores were not reversed when scale scores were calculated.
*58. Students seldom get out and support the school sports teams
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

60. Generally relations between students are warm and friendly
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

62. There is a lot of school (group) spirit
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

64. It is easy to make friends in this school because of the many things that are going on that anyone can participate in
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*66. There are very few clubs and student group activities to which students may belong
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

68. School fetes and carnivals are held every year and everyone has to help out with them
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

70. The kids here are great fun when we're all together in a group
   (a) In this school ............ 1 2 3 4 5  
   (b) In the school I would most like to attend ............ 1 2 3 4 5

*Items for which scores were not reversed when scale scores were calculated.
Student Affiliation Press (Continued)

72. Many projects are assigned in which small groups of students work together (either in or out of school)
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

74. There are many parties or dances sponsored by the school
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

*76. There is little interest in school clubs or social groups
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

Student Dominance Press

59. I am satisfied with my ability to get my friends to do what I want them to do
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

61. I am respected by most of the kids I know
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

63. Others generally go along with what I say
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

†65. You have to act like all the others in order to be in with the group
   (a) In this school .............. 1 2 3 4 5
   (b) In the school I would most like to attend .............. 1 2 3 4 5

*Items for which scores were not reversed when scale scores were calculated.
†Items omitted after item analysis
Student Dominance Press (Continued)

67. I am recognised as one of the student leaders (official or unofficial) in 3rd year
   (a) In this school . . . . . . 1 2 3 4 5
   (b) In the school I would most like to attend . . . . . . 1 2 3 4 5

*69. I seldom stay around after school for different group activities (e.g. debating drama) or sports
   (a) In this school . . . . . . 1 2 3 4 5
   (b) In the school I would most like to attend . . . . . . 1 2 3 4 5

71. I am a fairly influential person among my friends
   (a) In this school . . . . . . 1 2 3 4 5
   (b) In the school I would most like to attend . . . . . . 1 2 3 4 5

*73. I am rarely an organiser of class or school activities
   (a) In this school . . . . . . 1 2 3 4 5
   (b) In the school I would most like to attend . . . . . . 1 2 3 4 5

75. My friends often ask me for advice and guidance
   (a) In this school . . . . . . 1 2 3 4 5
   (b) In the school I would most like to attend . . . . . . 1 2 3 4 5

Scoring Procedures for Press Scales

Press scales were scored so that a high numerical score indicated a high degree of the press being measured (e.g. a high degree of perceived teacher warmth). The majority of press items were worded so that a 'strongly agree' (1) or 'agree' (2) response indicated a high degree of perceived press while 'disagree' (4) or 'strongly dislike' (5) indicated a low degree of perceived press. In order that a high numerical score would indicate a high degree of press the majority of press item scores had to be reversed using the score procedure used for the need item scores. The only items not reversed (those marked with an asterisk) were those in which a 'strongly agree' response indicated a low degree of perceived press.

+ Items omitted after item analysis
Administration instructions for the modified DES + A scale (Izard 1972) used in this study were as follows:

We are interested in the effect your school has on you. Listed below are words which may or may not describe the way your school generally makes you feel. Read each word carefully and then complete the scales below circling the appropriate number to indicate the extent to which each word describes the way this school generally makes you feel.

For example:

<table>
<thead>
<tr>
<th>Annoyed</th>
<th>Almost Never</th>
<th>Seldom</th>
<th>About as Often as Not</th>
<th>Very Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Circle 1 if this school almost never makes you feel annoyed, 2 if it seldom makes you feel annoyed, 3 if it does about as often as not, 4 if it does very often and 5 if this school almost always makes you feel annoyed.

**DES + A scale**

1. tense* 1 2 3 4 5
2. confident* 1 2 3 4 5
3. angry 1 2 3 4 5
4. downhearted 1 2 3 4 5
5. scared 1 2 3 4 5
6. contemptuous (despising) 1 2 3 4 5
7. jittery (jumpy)* 1 2 3 4 5
8. sad 1 2 3 4 5
9. secure* 1 2 3 4 5
10. enraged 1 2 3 4 5
11. happy 1 2 3 4 5
12. scornful 1 2 3 4 5

*STAI items (state anxiety)
### Scoring Procedures for DES+A

Scale scores for emotion factor subscales and the STAI state anxiety subscale were calculated by simply summing the scores for the items in each scale; a high numerical scale score indicated a high degree of anxiety/emotional response.

*STAI items (state anxiety)
APPENDIX BI
Table 1

Total sample means (\(\bar{X}\)) and standard deviation scores (sd) for needs, environmental press, IQ, academic performance (English and science) and emotional response to school

<table>
<thead>
<tr>
<th></th>
<th>(\bar{X})</th>
<th>sd</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Affiliation</td>
<td>33.29</td>
<td>5.27</td>
<td>380</td>
</tr>
<tr>
<td>(b) Dominance</td>
<td>26.28</td>
<td>5.23</td>
<td>379</td>
</tr>
<tr>
<td>(c) Supplication</td>
<td>30.22</td>
<td>5.07</td>
<td>379</td>
</tr>
<tr>
<td>(d) Achievement</td>
<td>28.30</td>
<td>5.13</td>
<td>377</td>
</tr>
<tr>
<td>(e) Deference</td>
<td>21.32</td>
<td>4.11</td>
<td>376</td>
</tr>
<tr>
<td>Press</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Student Affiliation</td>
<td>30.48</td>
<td>5.93</td>
<td>383</td>
</tr>
<tr>
<td>(b) Student Dominance</td>
<td>20.08</td>
<td>4.03</td>
<td>381</td>
</tr>
<tr>
<td>(c) Teacher Warmth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) English</td>
<td>25.08</td>
<td>9.33</td>
<td>387</td>
</tr>
<tr>
<td>(ii) Science</td>
<td>29.17</td>
<td>8.19</td>
<td>385</td>
</tr>
<tr>
<td>(d) Teacher Compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) English</td>
<td>25.06</td>
<td>6.91</td>
<td>383</td>
</tr>
<tr>
<td>(ii) Science</td>
<td>24.13</td>
<td>6.06</td>
<td>382</td>
</tr>
<tr>
<td>IQ</td>
<td>113.42</td>
<td>11.41</td>
<td>350</td>
</tr>
<tr>
<td>Academic Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) English</td>
<td>5.24</td>
<td>2.34</td>
<td>382</td>
</tr>
<tr>
<td>(b) Science</td>
<td>5.13</td>
<td>2.71</td>
<td>380</td>
</tr>
<tr>
<td>Emotional Response</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Fear</td>
<td>19.86</td>
<td>6.46</td>
<td>373</td>
</tr>
<tr>
<td>(b) Anger</td>
<td>17.89</td>
<td>5.71</td>
<td>375</td>
</tr>
<tr>
<td>(c) Enjoyment</td>
<td>23.26</td>
<td>6.39</td>
<td>370</td>
</tr>
<tr>
<td>(d) Anxiety (STAI)</td>
<td>39.00</td>
<td>8.10</td>
<td>370</td>
</tr>
</tbody>
</table>
Table 2

Total sample means and standard deviation scores for eight measures of need-press dissonance A

<table>
<thead>
<tr>
<th>Measure</th>
<th>$\bar{x}$</th>
<th>$sd$</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Affiliation Dissonance A</td>
<td>-0.011</td>
<td>1.347</td>
<td>372</td>
</tr>
<tr>
<td>Student Dominance Dissonance A</td>
<td>-0.017</td>
<td>1.146</td>
<td>371</td>
</tr>
<tr>
<td>Teacher Supplication (English) Dissonance A</td>
<td>-0.009</td>
<td>1.358</td>
<td>377</td>
</tr>
<tr>
<td>Teacher Supplication (science) Dissonance A</td>
<td>-0.009</td>
<td>1.339</td>
<td>375</td>
</tr>
<tr>
<td>Teacher Affiliation (English) Dissonance A</td>
<td>-0.029</td>
<td>1.363</td>
<td>373</td>
</tr>
<tr>
<td>Teacher Affiliation (science) Dissonance A</td>
<td>-0.000</td>
<td>1.486</td>
<td>375</td>
</tr>
<tr>
<td>Teacher Deference (English) Dissonance A</td>
<td>-0.001</td>
<td>1.433</td>
<td>370</td>
</tr>
<tr>
<td>Teacher Deference (science) Dissonance A</td>
<td>-0.021</td>
<td>1.460</td>
<td>368</td>
</tr>
</tbody>
</table>
APPENDIX BII
Table 1

Increases in explained variance in English performance (RSQ) due to four basic additive models, dummy variables for school and product terms formed between the dummies and the continuous independent variables which made up the basic additive models

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>RSQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic model 1</td>
<td>.081</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.069</td>
</tr>
<tr>
<td>Product terms</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic model 2</td>
<td>.089</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.043</td>
</tr>
<tr>
<td>Product terms</td>
<td>.077</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic model 3</td>
<td>.074</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.038</td>
</tr>
<tr>
<td>Product terms</td>
<td>.047</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic model 4</td>
<td>.083</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.046</td>
</tr>
<tr>
<td>Product terms</td>
<td>.070</td>
</tr>
</tbody>
</table>

Notes:  
(a) Model 1 contained: IQ, need for achievement, state anxiety, need for supplication and teacher warmth (English) press.  
(b) Model 2 contained: IQ, need for achievement, state anxiety, need for dominance and student dominance press.  
(c) Model 3 contained: IQ, need for achievement, state anxiety, need for affiliation and student affiliation press.  
(d) Model 4 contained: IQ, need for achievement, state anxiety, need for deference and teacher compliance (English) press.
Table 2

Increases in explained variance in science performance (RSQ) due to four basic additive models, dummy variables for school, and product terms formed between the dummies and the continuous independent variables which made up the basic additive models

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>RSQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic model 1</td>
<td>.199</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.121</td>
</tr>
<tr>
<td>Product terms</td>
<td>.045</td>
</tr>
<tr>
<td>Basic model 2</td>
<td>.159</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.113</td>
</tr>
<tr>
<td>Product terms</td>
<td>.061</td>
</tr>
<tr>
<td>Basic model 3</td>
<td>.153</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.119</td>
</tr>
<tr>
<td>Product terms</td>
<td>.061</td>
</tr>
<tr>
<td>Basic model 4</td>
<td>.219</td>
</tr>
<tr>
<td>Dummy variables for school</td>
<td>.121</td>
</tr>
<tr>
<td>Product terms</td>
<td>.023</td>
</tr>
</tbody>
</table>

Notes: (a) Model 1 contained: IQ, need for achievement, state anxiety, need for supplication and teacher warmth (science) press.
(b) Model 2 contained: IQ, need for achievement, state anxiety, need for dominance and student dominance press.
(c) Model 3 contained: IQ, need for achievement, state anxiety, need for affiliation and student affiliation press.
(d) Model 4 contained: IQ, need for achievement, state anxiety, need for deference and teacher compliance (science) press.
APPENDIX BIII
### Table 1

Analysis of variance of the effects of IQ, school and teacher deference (science) dissonance A on science performance\(^1\) (N=266)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissonance</td>
<td>119.734</td>
<td>3</td>
<td>39.911</td>
<td>7.973***</td>
</tr>
<tr>
<td>School</td>
<td>274.904</td>
<td>4</td>
<td>68.726</td>
<td>13.729***</td>
</tr>
<tr>
<td>IQ</td>
<td>127.270</td>
<td>2</td>
<td>63.635</td>
<td>12.712***</td>
</tr>
<tr>
<td>Dissonance × School</td>
<td>54.599</td>
<td>12</td>
<td>4.550</td>
<td>.909</td>
</tr>
<tr>
<td>Dissonance × IQ</td>
<td>56.565</td>
<td>6</td>
<td>9.427</td>
<td>1.883</td>
</tr>
<tr>
<td>School × IQ</td>
<td>40.572</td>
<td>8</td>
<td>5.071</td>
<td>1.013</td>
</tr>
<tr>
<td>Dissonance × School × IQ</td>
<td>62.346</td>
<td>20</td>
<td>3.117</td>
<td>.623</td>
</tr>
</tbody>
</table>

**p < .001**

---

\(^1\) Sex was not included because it increased the number of cells to a number greater than the maximum that the SPSS program could cope with. Consequently, checking for interactions for the MCA had to done in steps; all interactions involving dissonance, school, IQ and sex were checked except the 4-way interaction involving them all.
Table 2

Analysis of variance of the effects school, IQ, and teacher affiliation (science) dissonance A on female science performance (N=170)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissonance</td>
<td>56.201</td>
<td>4</td>
<td>14.050</td>
<td>2.786*</td>
</tr>
<tr>
<td>School</td>
<td>236.895</td>
<td>4</td>
<td>59.224</td>
<td>11.742***</td>
</tr>
<tr>
<td>IQ</td>
<td>14.374</td>
<td>2</td>
<td>7.187</td>
<td>1.425</td>
</tr>
<tr>
<td>Dissonance x School</td>
<td>84.120</td>
<td>16</td>
<td>5.258</td>
<td>1.042</td>
</tr>
<tr>
<td>Dissonance x IQ</td>
<td>38.306</td>
<td>8</td>
<td>4.788</td>
<td>.949</td>
</tr>
<tr>
<td>IQ x School</td>
<td>13.335</td>
<td>8</td>
<td>1.667</td>
<td>.330</td>
</tr>
<tr>
<td>Dissonance x IQ x School</td>
<td>139.098</td>
<td>22</td>
<td>6.323</td>
<td>1.25</td>
</tr>
</tbody>
</table>

* p < .05  *** p < .001
### Table 3

Analysis of variance of the effects of school, IQ and teacher supplication (English) dissonance C on male science performance (N=87)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissonance</td>
<td>50.148</td>
<td>4</td>
<td>12.537</td>
<td>2.981*</td>
</tr>
<tr>
<td>School</td>
<td>4.072</td>
<td>4</td>
<td>1.018</td>
<td>.242</td>
</tr>
<tr>
<td>IQ</td>
<td>8.491</td>
<td>2</td>
<td>4.246</td>
<td>1.009</td>
</tr>
<tr>
<td>Dissonance x School</td>
<td>26.107</td>
<td>11</td>
<td>2.373</td>
<td>.564</td>
</tr>
<tr>
<td>Dissonance x IQ</td>
<td>12.822</td>
<td>8</td>
<td>1.603</td>
<td>.381</td>
</tr>
<tr>
<td>IQ x School</td>
<td>25.347</td>
<td>6</td>
<td>4.224</td>
<td>1.004</td>
</tr>
<tr>
<td>Dissonance x School x IQ</td>
<td>45.486</td>
<td>7</td>
<td>6.498</td>
<td>1.545</td>
</tr>
</tbody>
</table>

* p < .05


ASCH, S.E. Effects of group pressure upon the modification and distortion of judgements. In Cartwright, D. and Zander, A. *Group Dynamics*, Tavistock, 1960 (2nd ed.)


BESWICK, D.G. Why more women are entering higher education. *Education News*, 1975, 15, 4 and 5, 70-77.


GOLD, M. Power in the classroom. Sociometry, 1958, 21, 50-60.


LITWIN, G.H. and STRINGER, R.A. *Motivation and Organizational Climate*, Graduate School of Business Administration, Harvard University, 1966.


YERKES, R.M. and DODSON, J.D. The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurological Psychology*, 1908, 18, 459-82.