

THE UNIVERSITY OF CALGARY

**Adolescent Internalization of Parental
Expectations of Achievement**

by

Lois Gair

A THESIS

**SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF SCIENCE**

DIVISION OF APPLIED PSYCHOLOGY

CALGARY, ALBERTA

MARCH, 2001

© Lois Gair 2001



National Library
of Canada

Bibliothèque nationale
du Canada

Acquisitions and
Bibliographic Services

Acquisitions et
services bibliographiques

395 Wellington Street
Ottawa ON K1A 0N4
Canada

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file *Votre référence*

Our file *Notre référence*

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-64952-0

Canada

ABSTRACT

The current study utilized an adapted version of the Achievement-Choice Model developed by Eccles and her colleagues, a framework for the examination of the many complex and interrelated factors that impact student achievement and career related choices.

The purpose of this study was to examine adolescent perceptions of parental beliefs, expectations, and attitudes in relation to school achievement. Specific student perceptions studied were centered on students' beliefs about their parents' expectations for their success, or failure in school, particularly in Math and Science. Student responses were examined to see if differences existed in student perceptions based on age or gender.

The sample consisted of 808 grade 7 students (435 girls and 373 boys) and 523 grade 10 students (291 girls and 232 boys). Statistical procedures involved multivariate analysis and power analysis. Results indicate a general trend across gender, with students in grade 10 perceiving they are meeting parental expectations less than grade 7 students. The largest declines appear in the areas of meeting parental expectations in math and science. Feeling able to count on their mother had a medium effect size, as well as feeling able to count on their father for help with homework. Additional effect sizes which were discussed include liking being with their mother, and liking being with their father.

The findings from the current study indicate that adolescent perceptions of being able to meet their parental expectations in school decrease as the students mature across gender. The findings from the current study provide support for the Eccles model and related literature.

ACKNOWLEDGMENTS

I would like to first thank Dr. Judy Lupart, my thesis advisor. You invited me into the world of research, and created so many opportunities for teamwork, learning, and sharing. Thank you for the time and effort that has gone into this thesis over time and distance.

I would also like to thank Dr. Tak Fung for his guidance in the statistical analyses conducted for this thesis. I could not have completed this work without his timely assistance, advice and feedback. I would like to thank Dr. Michael Pyryt for his additional advice on the statistical analyses, and his time in helping with the editing of these statistics.

Thank you to the administrators who welcomed us into their schools, to the teachers who gave up valuable teaching time to allow us to survey their students, and especially to those students who participated in the survey. Without all these individuals working with our team, this project would not have been possible.

I would like to thank my sisters, Laurie and Jennifer for their unparalleled editing skills and advice, not just on this project, but over the past three years. Thank you Jack and Jean for providing endless hours of child care. I would like to thank my good friends Linda and Elayne for providing excellent advice, humor, sharing, understanding, and for being such excellent role models.

I would like to thank my husband John for providing emotional and financial support during this program and throughout our marriage. Lastly, I would like to thank my sons Jacob, Andrew, and Mitchell for being the most beautiful, patient, and precious children any mother could hope for.

This work is dedicated to the memory of
Eleanor Kickham
and
Alice O'Donnell.

TABLE OF CONTENTS

	Page
APPROVAL.....	ii
ABSTRACT.....	iii
ACKNOWLEDGMENTS.....	iv
DEDICATION.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
CHAPTER I: INTRODUCTION.....	1
A. Women and Achievement.....	1
CHAPTER II: NATURE OF THE PROBLEM.....	6
A. Gender Differences.....	6
B. Adolescent Development.....	9
CHAPTER III: REVIEW OF THE RELEVANT LITERATURE.....	14
A. Eccles Model.....	14
B. Parental Role In Socialization of Attitudes.....	19
C. Stereotypical Attitudes.....	21
D. Parental Attitudes.....	23
E. Mothers' Attitude.....	28
F. Adolescent's Perceptions.....	30

CHAPTER IV: METHOD.....	3 7
A. Overview of the Current Study.....	3 7
B. Sampling.....	3 8
C. Procedure.....	4 0
D. Instrumentation.....	4 2
E. Data Analysis.....	4 3
Multivariate Statistics.....	4 4
Power Analysis.....	4 4
F. Summary.....	4 5
 CHAPTER V: RESULTS.....	 4 6
A. Participants.....	4 6
B. Items Analyzed.....	4 6
C. Research Questions and Data Analysis.....	4 7
D. Power Analyses.....	4 8
E. Summary.....	6 9
 CHAPTER VI: DISCUSSION AND IMPLICATIONS	
A. General Discussion.....	7 0
B. Exploratory Question #1: Gender by Grade Interaction on Student Perception.....	7 0
C. Exploratory Question #2: Gender Differences in Student Perception.....	7 1
D. Exploratory Question #3: Grade Differences in Student Perception.....	7 2

E. Meeting Others' Expectations in Math and Science.....	75
F. Activities With Parents.....	77
G. Parent-Child Affective Relationship.....	78
H. Implications.....	80
I. Limitations.....	82
I. Future Studies.....	83
H. Conclusions and Summary.....	85
REFERENCES.....	86

APPENDICES

A. Invitational Letter Describing the Major research Project.....	100
B. Consent Forms.....	101
C. Academic Choices and Achievement Survey.....	103
D. 36 Survey Items Analyzed Through Multivariate Statistics.....	122
E. Exploratory Question #3: 28 Univariately Significant Survey Items.....	124
F. Item Number and Effect Size.....	126

LIST OF TABLES

Table	Page
1. Q 59: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Meeting Parental Expectations in Math.....	5 1
2. Q 110: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Meeting Parental Expectations in Science.....	5 4
3. Q 33: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Being Able to Count on Mother for Help with Homework.....	5 8
4. Q 25: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Being Able to Count on Dad to Help With Homework.....	6 1
5. Q 32: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Liking Being with Mother.....	6 4
6. Q 24: Means and Standard Deviations of Grade 7 and Grade 10 Students' Perceptions of Liking Being with Father.....	6 7

LIST OF FIGURES

Figure	Page
1. Eccles' Expectancy-Value Model.....	18
2. Q 59: Main Effect of Grade on Student Perception of Meeting Parental Expectations in Math.....	52
3. Q 110: Main Effect of Grade on Student Perception of meeting Parental Expectations in Science.....	55
4. Q 33: Main Effect of Grade on Student Perception of Being Able to Count on Mother to help With Homework.....	59
5. Q 25: Main Effect of Grade on Student Perception of Being Able to Count on Father to Help With Homework.....	62
6. Q 32: Main Effect of Grade on Student Perception of Liking to Be With Mother.....	65
7. Q 24: Main Effect of Grade on Student Perception of Liking to Be With Dad.....	68

CHAPTER I

INTRODUCTION

Women and Achievement

Throughout time, women have contributed to society in a variety of ways. The history of the work of women has largely been in the home, raising children and maintaining the household. This type of work lacks pay and social status (Levine & Zimmerman, 1995). Recent history has shown some change to this pattern. During the World Wars, particularly the Second World War, North American women moved into the work force en masse, taking over the jobs vacated by men making aircraft, rifles, ammunition, anti-aircraft guns and radar equipment (Byers, 1986). This drastic entrance into the work world ended almost as quickly as it had begun when the war ended and the veterans returned home. Women quickly vacated their positions in order to free up jobs for these returning men. When these women married and had families, they tended to stay in the domestic workplace, again, rearing children for no pay and little recognition.

The rise of feminism in the 1960's and the introduction of the birth control pill gave women more control over their at home and work adult life choices. This was also a time in history when society began to realize that women had a great deal of occupational skills, yet they were often unable to utilize them fully in their limited career positions. Over the past thirty years women's participation in the work force has increased dramatically (Fast & DaPont, 1997, Lupart & Barva, 1998), and the patterns and quality of work force participation has also changed radically

(Greene, & Stitt-Gohdes, 1997). However, women's attachment to the labor force is still often viewed as weaker, or perhaps less serious, than men's'. Consequently, it is still unclear if employment patterns and career choices for women have really improved in the last thirty years. Indeed, many theorists and researchers have proposed a hypothesis of deficit or underachievement to explain these differences.

The rate of employment for women has shown a minimal increase over the last decade. Actual numbers of working men and women indicate in 1991 there were 14,220,235 employed Canadians, aged 15 years and over. There was an increase in this number by 1996 to 14,317,545 (Statistics Canada, 2001a). Comparison of employed men versus employed women, in 1996, indicates that 72.2% of Canadian men aged 15 and over were employed. This compares to 57.5% of same aged women. By 2000, the number of women employed rose slightly to 59.5% (Statistics Canada, 2001b). These numbers demonstrate the trend of women increasing their participation in the workplace. However, women continue to be clustered in lower paying, lower status occupations.

The focus of the current study is on academic choices and achievement, specifically, why women tend to opt out of the high status and high paying mathematical and scientific occupations. To begin, the number of women working in these fields needs to be examined. The actual number of Canadians working in the Natural and Applied Science and Related Occupations was 669,970 in 1991. By 1996 this number had risen to 712,495 (Statistics Canada, 2001a). This rise in numbers indicates a growing need for qualified people in the mathematics, science

and technology fields. Predictions are that this trend will not only continue, but increase. However, the statistics do not reflect equal distribution of men and women employed in these areas. An examination of Natural and Applied Sciences and Related Occupations by Gender (Statistics Canada, 2001c) reveals large discrepancies between the sexes. In 1996, the total number of individuals employed in these fields was 712,495. Of these, 82% were men, and 18% were women. Within Mathematics, Systems Analysts, and Computer Programmers, 168,385 people were working. Of these, 72% were men, and 28% were women. The field of Life Sciences had 19,225 employed individuals in 1996, 71% of which were men, and 29% were women. The most glaring discrepancy appears in the area of engineering. Within the fields of Civil, Mechanical, Electrical and Chemical Engineering, 101,040 individuals were employed. Of these, 92% were men, and 8% were women. (Statistics Canada, 2001c). In the workplace, women represent less than 4% of registered professional engineers in Canada (Gilbride, Kennedy, Waalen & Zywno (1999). There are also few women teaching such subjects; as Nauta, Epperson and Kahn (1998) point out, only 3% of American Engineering faculty are women. The discrepancies between men and women in career choices are frequently accompanied by discrepancies in pay. Even within the field of engineering, Straka (2000) estimated women earn 20.7% less than their male counterparts.

Indeed, Statistics Canada reveals several discrepancies in pay between men and women. When examining all workers in 1989, statistics Canada reveals that the average wage for a male worker was \$33,826,

and for a female worker it was \$19,965. This represents an earnings ratio of 59.0%, meaning that for every dollar a male earned, a woman earned 59 cents. By 1998 these numbers had changed only marginally. The average Canadian male was earning \$34,171, compared to a female average of \$21,999. The earning ratio had improved slightly for women to 64.4%. It is important to consider that many women work part-time or seasonally, due to family responsibilities. Therefore, examination of full-year, full-time workers should also be considered. In this category of employment, the discrepancy is slightly smaller, but still evident. The average gross income for full year, full time working men in 1989 was \$42,767, and for women was \$28,219. This creates an earnings ratio of 66%. By 1998, the men in this category earned \$45,070, and women earned \$32,553. The earnings ratio improved slightly for women to 72.2% (Statistics Canada, 2001d).

There are a variety of reasons for this wage gap, including differences in education, occupational history, and field of study (Statistics Canada, 2001e). Women are enrolling in post secondary studies at a rate considerably greater than that of men. In 1998-1999 there were 575,713 university students enrolled full time in Canada. Of these, 260,901 were men, and 319,475 were women (Statistics Canada, 2001f). This same table shows a gradual increase in the number of women enrolled full-time in university over the past few years, rising from 305,644 in 1994-1995 to the 1998-1999 total of 319,475. Men showed a declining trend, from a total of 270,069 on 1993-1994 to the 1998-1999 number of 260,901. Regarding university degrees granted by sex, the total number

of all degrees granted in 1998 was 172,076; 71,949 went to men and 100,127 went to women (Statistics Canada, 2001g). Despite this positive trend, women are choosing not to take the academic programs which will ultimately give them access to the higher wage earning professions such as mathematics and engineering (Entwisle, Alexander & Olson, 1994). The Statistics Canada data indicates that in 1998, 10,121 men and only 2,709 women graduated with engineering and applied science degrees. In mathematics and physical sciences, 6,876 men graduated, compared to only 3,116 women (Statistics Canada, 2001g).

This data helps clarify what career choices Canadian women are making, and the ramifications of those choices on their future employability and earning potential. However, it does little to help researchers understand why women are choosing not to train in professions such as math and science. The following section will examine some of the issues which impact academic and career choices of young women.

CHAPTER II

NATURE OF THE PROBLEM

Gender Differences

As shown in the introductory discussion, there are many discrepancies in male and female achievement and career decisions. Gender differences also exist for children and adolescents. Farenga & Joyce (1999) suggest that differences in science interests are evident from a young age. They report that young girls showed more interest in biological sciences, such as bird watching and flower collection, whereas young boys tended to choose the physical sciences more, playing with chemistry sets, building trains, race cars, and Lego. Students make choices about courses, expectations for success, aptitudes, and effort to be expended. These decisions may influence adolescents to opt into one career path and out of another. Curry, Trew, Turner & Hunter (1994) suggest the issue of gender differences can be examined from several perspectives. The biological and socialization perspectives are most relevant to the current study, and will be examined next. (see also Heller & Ziegler, 1996; Jacklin & Baker, 1992; Meece, & Eccles-Parsons, 1982).

Gender differences attributed to the biological perspective received substantial media attention in 1980 with the findings of Benbow and Stanley that gifted seventh and eighth grade males scored higher on standardized math tests than gifted seventh and eighth grade females (Benbow & Stanley, 1980). This finding led the researchers to conclude that the males in their sample had more natural aptitude than the females in their sample. In a recent article about the Benbow and Stanley

findings, Lewis (2000) claims that there may still be support for the biological theory. Lewis (2000) completed follow up questionnaires with 1,975 of the initial gifted respondents and found that on average, these men primarily chose physical sciences and engineering careers, while the women tended towards the medical, biological, and social sciences, arts and humanities. Lewis states that students tend to gravitate academically into an area which is of particular strength for them. For men, the area of strength is especially pronounced in the areas of math and physical sciences, while for women, it is in the humanities.

Despite these compelling findings, much research disputes the theory that gender differences in math ability are genetically based and male favored. For example, the recent publication of the human genome project suggests that biology may play a less important role in determining capabilities than scientists once thought (Nature, 2001). Brandon, Newton, and Hammond (1987) agreed with Benbow and Stanley (1980) that gender differences existed in mathematical abilities. however, in contrast they found that the differences favored girls. Brandon et al. (1987) also examined ethnic differences in ability and found that the ethnic group with the smallest gender differences were among the Caucasian students. These findings offer support for sociological explanations of gender differences in mathematical ability in that Schlosser (1999) reports the findings that Japanese girls scored lower than Japanese boys on international examinations in physics, yet American girls scored higher on average than American boys. Findings such as the above add support to the theory that gender differences in

achievement maybe more related to socialization experiences than genetic make up. Many other subsequent studies have been done with larger, more representative samples than the original Benbow and Stanley students. These studies have found that where ability differences do exist they are very small, and usually inconsistent (Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley 1983; McVicar, 1994).

Despite the evidence that girls are generally as capable in math and science as boys, the literature is quite consistent in supporting the finding that young girls have significantly lower self concepts in mathematics than their male peers (Collis, 1990; Adams, 1998). Within the school context, the general classroom climate is a critical element in the developing perceptions of adolescents. Eccles (1985) felt that general classroom climate may play an important role in reinforcing sex differences in achievement beliefs and performance. This claim is further supported in the research of Shakeshaft (1995), who adds that general classroom activities, curriculum, and teaching patterns rarely include the experiences of girls, the language of girls, and the lives of girls. Washburn (1994) supports this picture of the typical classroom noting that in elementary school, girls express themselves less in class, receive less praise and encouragement, and are rewarded for being conforming, unassertive, and dependent.

Eccles and Jacobs (1986) cite educational influences which impact student achievement to an equal or greater degree than does biology. These include time spent on mathematics, citing that boys may receive more actual math instruction from their teachers than girls. A recent

study found that girls tend to suffer with more anxiety about their math ability than boys (The Times, 2000). This math anxiety is not helped by the popular media which initially distorted the Benbow and Stanley findings (Eccles and Jacobs, 1986; Jacobs & Eccles, 1982) and continues to manipulate girls' developing beliefs about themselves (Adams, 1998; Eccles, 1989). The role of other skill development must also be considered. Young boys tend to have more exposure to toys which may assist their developing math and/or science skills (Tracy, 1987). It is also possible that boys are more experienced in test taking strategies (Shakeshaft, 1995).

Lastly, the socialization impact of parents is critical to the developing adolescents' perceptions. Mother's perceptions in particular were noted as having a considerable impact on student gender stereotyped beliefs about mathematics (Eccles and Jacobs, 1986). It is the perceptions students have of these parental influences which will be the focus of the current study. Before moving to a discussion on the impact of parental expectations, a brief review of adolescent development is most relevant.

Adolescent Development

Much has been written about adolescence. It is recognized as a time of great physical growth and change. It is also a time of cognitive development, maturation, and decision making. It is a time that is referred to as 'storm and stress' by many writers (Eccles, Arberton, Buchanan, Jacobs, Flanagan, Harold, MacIver, Midgley, Reuman, & Wigfield 1992; Santrock, 1984). There is much research which takes a more optimistic view of adolescence, in that adolescence is recognized as a

period of identity development, and an opportunity for youths to shape an integrated concept of self (Atkinson, Atkinson, Smith, Bem, and Nolen-Hoeksema, 1996; Newman, 1989). Part of this self concept building involves separation from parents and development of one's own ideas and belief systems. An integral part of this separation is the changing parent-adolescent relationship. How this relationship evolves over time impacts the youth's understanding of her parents, and how she perceives their expectations, their beliefs and their dreams for their children. As this relationship evolves, differences may develop in how the adult and the adolescent perceive each other and the world. Even though the literature suggests a powerful shift in the parent-adolescent relationship, these developmental changes are infrequently studied and not well specified (Feldman & Gehring, 1988).

The concept of a 'generation gap' is an old idea which represents the differences in experiences and perceptions of life events between parents and their offspring (Kaplan & Sadock, 1998). Factors such as growing perceptual differences between parents and their children about morals, sexual attitudes, school work, and occupational choices contribute to this notion of a generation gap. Adolescents need to assume increased independence from their parents, while still feeling receptive to parental approval and disapproval (Kaplan & Sadock, 1998). Making adolescence a period of smooth transition is largely dependent on how this relationship grows and changes, and is impacted by both the parents and the adolescent. Shek (2000) points out that how relationships are perceived by the adolescents themselves is unclear, largely due to a lack of research

in this specific area.

Nevertheless, how parents impact their children has been studied throughout history (Santrock, 1984). The age old tradition of adolescent rite of passage is largely lacking in North America for most youth. As such, it is difficult for parents and children to move through this phase of development with a full understanding of what is expected of each other. Rites of passage allow the youth to enter the adult world, and then be treated accordingly. Without such rituals, there is no identifiable milestone for an adolescent to reach and then to perceive themselves cognitively mature. Additionally, this lack of ritual leaves expectations unclear, both on the part of what parents expect from their adolescent offspring, and on the part of adolescents, uncertain about what their parents expect of them. When the concept of the generation gap is added, it becomes more difficult for parents and youth to communicate with each other, and miscommunication can become more severe.

In addition to how parents impact their children, there is abundant research about adolescent development, attitudes towards school, grades, future prospects, and desires (Gutbezahl, 1999). Schlosser (1999) found that young girls tend to do very well in school and are confident and secure prior to adolescence. Chouinard, Vezeau, Bouffard, & Jenkins (1999) point out that many adolescents have a declining attitude towards school as they mature, particularly towards math and science (see also: Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983). Many factors are perceived to contribute to this declining attitude, including interaction between the environment and the developmental changes the

adolescent is experiencing (Eccles, Midgley, Wigfield, Buchanan, Reuman, Flanagan, & MacIver, 1993).

Parents are widely recognized as the most significant role models and socializers for their children. Research has been carried out to examine how parents impact their childrens' developing attitudes, and the importance of these attitudes on developing competency beliefs. Eccles et al. (1983) have found that parental expectations are so important they have more impact on childrens' competency beliefs than their actual capabilities. With such strong influence in the hands of parents, it is important to understand how these parental expectations are actually internalized by their children.

This internalization of parental expectations remains an area of adolescence which is less well studied. While a large body of research has examined adolescence and parenting, only recently have researchers begun to study the variety of factors that may simultaneously shape the nature of the relationship. Rainey & Borders (1997) point out the need to study influential factors such as how parental expectations are communicated and internalized by adolescent girls. Changes in perceptions held by adolescents as they move through these adolescent years also require further study.

The current study will examine adolescent perceptions of their parents' attitudes, beliefs, and expectations in an attempt to further our understanding of adolescent choices and decision making. It will not examine the perspective of the parents and what they believe. Rather, it will query the youth directly, as an important factor in the understanding

of what adolescents believe their parents expect and believe their children are capable of.

To evaluate these perceptions, the current study will address three exploratory questions:

1. Will there be an interaction effect between male, female, grade 7, and grade 10 students' perceptions of parents' beliefs, expectations and attitudes?
2. Do females have different perceptions of parents' beliefs, expectations, and attitudes than males? and
3. Do grade 7 students have different perceptions of parents' beliefs, expectations, and attitudes than grade 10 students?

Using multivariate statistics and power analysis, this study will analyze how these perceptions impact developing teenage beliefs, perceptions and attitudes.

CHAPTER III

REVIEW OF THE RELEVANT LITERATURE

The review of the literature will begin with an overview of the model used in the design of the current study, known as the Expectancy-Value Model developed by Eccles and her colleagues (Eccles, 1983; Eccles, 1985; Eccles, 1987; Eccles & Jacobs, 1986). This will then be followed with a review of the parental role in socialization of attitudes, stereotypical attitudes, parental attitudes, mothers' attitudes, and adolescents' perceptions as they relate to parental expectations.

Eccles' Model

In an attempt to understand these many complex and interrelated factors which impact student achievement related choices, Jacqueline Eccles has developed an Expectancy-Value Model (see Figure 1), (Eccles, 1983; Eccles, 1985; Eccles, 1987; Eccles & Jacobs, 1986). This model is very broad and comprehensive, and includes many components believed to impact decision making. This model has been chosen as the basis for the current study because it is sufficiently comprehensive to include the most important influences concerning adult-life role choices. This model considers human development from a balanced rather than a deficit perspective. Thus it considers the perceptions of the individual in their interpretation of the world around them. It relates to career development theories, by taking the questions to a younger population in order to understand what impacts youth to eventually make the career decisions they make. The Expectancy-Value model pulls many elements from Attribution theory, and Locus of Control theory, and it then adds to and

builds upon these constructs, while utilizing the information to understand youth decision making. Throughout its development over the last 30 years, it has been empirically tested, revised, and supported by Eccles and her colleagues, and other researchers.

The model focuses on the role of cognitive factors in understanding what determines achievement behaviors. The model is most directly influenced by the constructs of expectancy of success and task value. There are two major components within the model; the psychological and the developmental. The psychological component specifies the interactions of various cognitive factors at any point in time. This involves variables such as task choice, persistence, expectancies of success, and the value placed on success. These values are determined by variables such as self concept, goals, perceptions of socializers' expectations, causal attributions, and perceived task difficulty. The developmental component examines the origins of individual differences in these psychological factors (Eccles, 1983; Spence, 1983). The model includes the relationship of parental expectations and children's perceptions as being very complex and subject to change over time. The model attempts to incorporate this complexity by suggesting that children's self concepts of ability and socializers attitudes mutually influence one another (Meece et al., 1982).

Eccles (1983) points out that the theory is built upon the assumption that it is the interpretation of reality which most directly determines children's expectancies, values, and behaviors. This means that one of the factors which will help a child grow to believe she is successful or not successful, is how she perceives past experiences. The

child will make causal attributions for these successes or failures, based on a variety of influences such as locus of control, perceptions, sex role identity, socializers' influence, and perceptions about the task in question (utility value, cost). Each of these influences impacts the determination the child makes about the task value, and the expectancy of success. These factors then influence achievement related behaviors, such as choice of activity, intensity of effort put into the task, and ultimate performance.

There are ten central constructs in the Expectancy-Value Model. They are: 1) the cultural milieu, 2) socializers beliefs and behaviors, 3) individuals' aptitudes, temperaments and talents, 4) individuals' previous achievement-related experiences, 5) individuals' perception of socializers beliefs, expectations and attitudes, gender roles, and activity stereotypes, 6) individuals' interpretations of experience, 7) individuals' goals and general self schemata, 8) individuals' expectations of success, 9) individuals' affective memories, and 10) subjective task value (See Figure 1), (Eccles, 1983; Eccles, 1985).

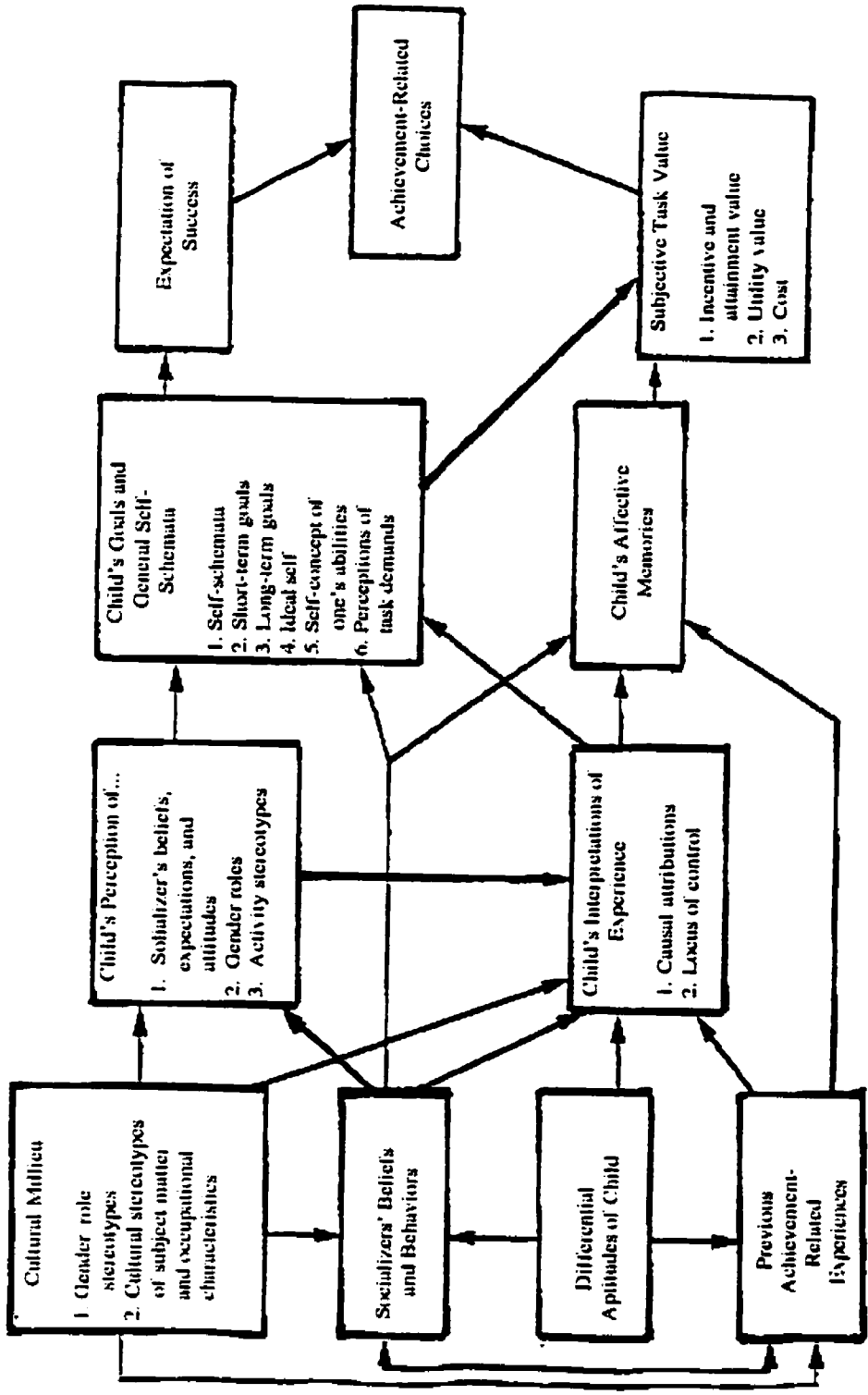
How the model relates to the current study is outlined below. The Eccles model is based on the assumption that an individuals' interpretation of reality has a more direct influence on one's expectancies, values, and achievement behavior than one's actual past successes and failures. The previous research using this model has shown that adolescents are maturing in a culture which is laden with gender role stereotypes, with many adults believing in traditional gender role prescriptions regarding appropriate activities for male and females. Adults also believe in 'natural' talents and interests, and these beliefs

influence their perceptions of their own children's interests and talents. These beliefs are held despite evidence that the distribution of talent is very similar between young boys and girls. A consequence of these nonconscious beliefs is that parents have different expectations and aspirations for boys and girls, and they provide boys and girls with different interpretations of reality and different forms of advice regarding school and career options. The result of these experiences on young boys and girls is that they operate in the absence of accurate information on which to base their developing ideas about adult occupations. Young girls, compared to young boys, begin to develop less confidence in their math abilities, less interest in these areas, and less interest in pursuing a career in these fields (Eccles, 1989).

Within the context of the Eccles model, several topics appear which relate to Box 2A, child's perception of socializers' beliefs, expectancies and attitudes, the focus of the current study. As such, the review of the literature will next examine specifics as they relate to the adolescents' perception of parental beliefs, expectations, and attitudes. This includes the parental role in the socialization of attitudes, stereotypical attitudes, parental attitudes, mothers' attitudes, and adolescents' perceptions.

Figure 1

Eccles' Expectancy-Value Model



Parental Role In Socialization of Attitudes

Clearly, the biggest impact on childhood perceptions are the parents through their subtle influence in a variety of ways. Parents are the child's primary role model. They give direct and subtle expectations, and demonstrate specific attitudes and beliefs. As children grow they develop an understanding of what they believe their parents' attitudes, beliefs, and expectations are. Eccles, Jacobs & Harold (1990) point out how through self fulfilling prophecies, parents can play a vital role in socializing gender differences in children's self-perceptions, interests, and skill acquisition. The impact of parental beliefs, expectations, and attitudes will be the focus of this section.

Research in the field of modeling has established the importance of adult behavior as a standard for children. The behaviors exhibited by parents and other adults are the behaviors which children adopt as their own repertoire (Meece et al, 1982). In addition to modeling behaviors, the achievement literature has documented the importance of socializers' attitudes and expectations in shaping children's self concepts and general expectations for success (Meece et al, 1982). Eccles (1983) sums it up very explicitly; that students for whom teachers and parents have high expectations also have high expectations for themselves, and in fact do better in course work.

Meece et al. (1982) suggests that socializers have different expectations for girls and boys which they convey to these children in a variety of ways, both directly and indirectly. In addition, by providing different activities for female or male children, socializers can train

different interests and skill levels. For example, boys and girls may be provided with different toys, and these early socialization experiences may influence development of spatial and math abilities (Cooper & Robinson, 1989; Tracy, 1987). It is not unusual for boys to play with Lego and other materials that help to develop these abilities. These early experiences can impact the child's developing attitudes towards math, and later performance in math. These attitudes which the children develop are sustained by the important socializers in their lives, and further expressed by the child's developing attitudes about their own abilities.

Jacobs (1991) used path analysis to examine if parents' gender role stereotypes about mathematical ability influenced parental beliefs about their child's mathematical ability directly or indirectly, and the influence these perceptions had on the child's self perceptions. She found that parents' gender role stereotypes did not have a direct influence on children's self perceptions. Rather, her findings indicated that parental stereotypes interact with the sex of the child to directly influence the parents' beliefs about the child's abilities. These beliefs about their children, directly influence their child's self perceptions.

Male and female socializers probably have different attitudes and behaviors towards math themselves, and so through their position as a role model, they help create differences in the developing children's perceptions (Meece et al., 1982). It is clear that the process is complex, and cyclical. Socializers influence developing attitudes, which the children begin to accept as their own constructs of their reality, and they express desire to do more, enjoyment, etc., which the parents encourage,

and the circle repeats itself.

The complexity of parental influence is highlighted in the work of Terman (1954). Eccles (1985) points to the Terman studies of gifted individuals and found that parents of gifted sons rated their sons as more mechanically inclined and rated their gifted daughters as having more drama and music skills. What is unclear in these results is if the parents were estimating based on what they actually saw in their gifted offspring, or if they created the behavioral differences through differential socialization processes. This concern is echoed in the work of Meece et al. (1982) who notes that there is considerable difficulty in ascertaining if socializers are reflecting actual achievement differences, or if the achievement expectations are causing the differences. The results reported in Eccles (1985) ongoing study are somewhat more clear. This work has found traditional stereotypes on the part of socializers, with parents of girls expecting their daughters to follow traditional patterns of working, then leaving the work force to child rear while they expect their sons to enter the math and science fields. The type and degree of stereotypical attitudes on the part of socializers as they influence youth career decision choices, will be examined next.

Stereotypical Attitudes

Many cultural stereotypes hold that girls are generally less competent in academic pursuits, particularly in math and science. If girls incorporate these gender role stereotypes into their developing self concepts, it could lead them to have less confidence in their general abilities (Eccles, 1985). There is some evidence that parents do have lower

expectations for adolescent girls than for adolescent boys (Parsons, Adler & Kaczala, 1982). Math is sometimes sex typed as a masculine subject. If girls infer that parents and teachers expect less from them in these masculine subjects, they may internalize these views and reduce their own expectations of themselves, and choose not to enroll in such courses (Eccles, 1985; Meece et al., 1982). Meece et al. (1982) has found that there is some support for the hypothesis that socializers do treat girls and boys differently in a variety of ways that might be linked to math and course selection. For example, they found that these beliefs lead to an understanding of the occupational world, and the need to prepare oneself for employment in that world. Without the required math courses, girls develop different views about their potential involvement in that world, and about their ability to financially support themselves (Eccles, 1985).

Meece et al. (1982) found that much of the literature in the area of gender stereotypes has mixed results. They point out that sex differences in expectations of significant others are not universally found, but when they do exist, they tend to favor boys over girls. They add that generally, parents do not rate their daughters' math ability as lower than their sons', but they do rate their daughters' expectations for performance as lower than their sons'. This means that parents believe both sexes are equally capable of doing well in math, but parents do not expect them both to measure up to those capabilities. This is consistent with Parsons, Adler, & Kaczala (1982) in their finding that in general most parents have higher educational expectancies for their sons than for their daughters.

In contrast, in a critical study, Yee & Eccles (1988) found that it is

not the parental influence as a role model which impacts their childrens' developing attitudes as much as their role as interpreters of reality. This study found that it was not the child's actual ability which impacted parental perceptions as much as perceived parental beliefs about their child's abilities. Parents in this study believed their daughters had to work harder than did parents of sons to do well in math. They attributed success in math to hard work for daughters and to natural talent for sons. These attitudes then in turn impact how the child perceives her developing sense of competency.

Parents impact childrens' attitudinal development and achievement choices in countless ways. A great deal of research has been done over the years into the role of parents as socializers (Gregory, 1996). What is less well known, however, is how the children perceive their parents' beliefs, expectations, and attitudes. Through their role as socializers, how do parents help formulate their children's developing self concept, and how do the children perceive this interaction? Rejskind (1994) and Eccles (1987) agree that the individuals' interpretation of an experience has more impact than the actual experience. Therefore, in order to accurately understand how the developing adolescent perceives her parents' beliefs, expectations and attitudes, it is necessary to question the youth directly. Studies which survey youth directly will be examined next.

Parental Attitudes

The attitudes parents hold about the roles of women and men in a relationship impact the entire family unit. The beliefs parents hold about

their sons' and daughters' competencies begin when their children are young, and significantly formulate the children's attitudes. Recognition of the importance of the family as the major socializer was asserted very early on by Ginzberg, Berg, Brown, Herma, Yohalem, & Gorelick (1966) when they pointed out that we are shaped by the society around us, and that who we become is largely shaped by the families and society which we are born into. They added that the quality of education and economic status are additional forces which shape individuals. Acknowledgement of the myriad of socializers which impact development is also recognized in the theories of systemic interventions. These theories highlight the system in which the individual functions, and note that change in one part of the system affects all parts of the system (Hackney & Cormier, 1996). Within this framework, individuals can be best understood within the larger social context in which they live. This theory recognizes the strong influence of cultural and ethnic factors which produce wide variations among families (Hackney & Cormier, 1996). This framework allows recognition of the family as functioning as a system within other systems in society, and it helps expand our understanding of the cultural diversity evident in our schools and culture. It also highlights the importance of the role of the family in socialization of youth, and helps us understand where their perceptions of their parents and teachers originate, what they perceive the expectations of these people to be, and where the students' beliefs and values are stemming from.

Parents are recognized as being the most significant socialization influence for their children, and primary determiners of children's career

choices (Birk & Blimline, 1984; Eccles & Harold, 1993; Trusty & Pirtle, 1998). Trusty (1999) states that parents are the most influential force in children's educational development. As children mature, other socializers begin to impact them (Gladwell, 1999) but the role of parents remains primary during the early years. The belief that parents play a crucial role in math and science education and competency is highlighted by Campbell & Mandel (1990). This research highlights to parents the need to talk to their daughters about the importance of math and science as a necessity in many career options. However, researchers are finding that, frequently, parents are not fully supportive of their daughters' academic abilities. Blevins-Knabe and Musun-Miller (1991) completed a study on parental beliefs about their 4 and 5 year old children's number skills. They found that parents of boys had higher expectations of their sons than parents of girls did of their daughters, believing that the boys would be able to solve math tasks sooner than the girls. They argue that these attitudes towards daughters' capabilities may have detrimental impacts on these young girls' developing attitudes about their own competency in math. Gutbezahl (1999) reiterates Lummis and Stevenson's (1990) finding that by the time children enter kindergarten their parents expect boys to be better at math and girls to be better at verbal tasks. Trusty and Pirtle (1998) support this argument by pointing out that the process of transmission of goals from parent to child is strong, and parental educational expectations influence children right through to adolescence. Furthermore, Birk and Blimline (1984) point out that in their role as primary career development facilitators, parents are frequently

reinforcing stereotypic career choices. They add that parents convey these stereotypes to their children through encouragement, or lack of encouragement towards some career options and away from others through their willingness to offer financial support to some career choices, and not others.

In a study examining patterns of school achievement for boys and girls, Updegraff, McHale and Crouter (1996) examined gender roles in marriage and the impact traditional versus egalitarian marriages have on children. They hypothesized that girls from traditional families would be more likely to exhibit the 'normative' declines in math and science achievement seen across transitions to grade seven. Traditional marriages were defined as those in which the woman does the majority of household chores and childrearing, and egalitarian marriages are those in which both parents have relatively equal responsibilities in relation to child care and household chores. The researchers suggest that egalitarian families may reward their daughters' math and science achievements and emphasize non-traditional career opportunities more than traditional families. The findings indicated higher levels of paternal involvement for both girls and boys in egalitarian families, whereas no significant difference was found in absolute time spent with mothers across family types. Egalitarian family types had less traditional sex role attitudes on the part of both mothers and fathers. The major finding supported their hypothesis in that girls from egalitarian families were less likely to exhibit the 'normative' declines in math and science grades which are generally reported across the transition to seventh grade. The findings relating to

boys were not significant. The study highlights the impact that both parents have on developing attitudes of their children. The authors suggest that mothers and fathers together create an environment which may impact the developing attitudes of their adolescent children. This work is supported by Trusty and Pirtle (1998) who found that, contrary to previous research, educational aspirations were influenced equally by mothers' and fathers' expectations for their children. Examination of parental competency beliefs will be examined next within the context of this research on the impact of both parents transmission of gender roles.

The Parsons, Adler and Kaczala (1982) study found no significant difference in math competency on grades or standardized test scores for students, yet parents did have sex differences in competency beliefs about their children. These sex-differentiated perceptions and attitudes play a critical role in socializing girls' and boys' self perceptions of their competency in math (Jacobs & Eccles 1992). Additional support of these stereotypic attitudes is made by Eccles, Adler, and Kaczala (1982) in their study which found that parents of daughters believed their daughters had to work harder to do well in math than did parents of sons, even when the children's actual ability in math was controlled for. In addition, parents of sons believed advanced math courses were more important for their sons than did parents of daughters. Yee and Eccles (1988) support this finding with results that show that parents credited daughters with more effort than sons, and sons with more talent than daughters for successful math performances. Specifically, they found that mothers credited their sons' successes to talent, and their daughters' to hard work and effort. Fathers,

however, did not differ in their attributions of ability for sons or daughters. However, fathers did attribute effort in the same fashion as mothers. Essentially, parents perceive talent (the quality responsible for their sons' success) is a stable attribution, and effort (the quality responsible for their daughters' success) is an unstable attribution.

In addition, Eccles, Jacobs, Harold, Yoon, Arbretton, and Freedman-Doan (1993) add that their previous work has also shown that parents believe that gender differences in math talent exist. They add that parents were more likely to attribute their child's success to natural talent in math and sports if their child is a boy, and were more likely to attribute their child's success in language endeavors to natural talent if their child was a girl. With these beliefs, parents may be communicating confidence about their sons' future success in math, while conveying doubts about their daughters' likelihood of success in mathematical endeavors.

Jacobs and Weisz (1992) note that parental gender stereotypes directly influence their perceptions of their children's abilities, resulting in more positive perceptions for children favored by the stereotype. For example, daughters were favored to engage in social activities, and sons in math and sports activities. In turn, they found that these parental perceptions influence their children's self-perceptions of their abilities in each domain. They conclude that parents' gender stereotypes have an indirect influence on their children's self-perceptions of ability, and that depends on the child's gender.

Mothers' Attitudes

There is continuing debate about whether or not parents equally

influence their adolescents educational expectations. The trend in the literature does suggest there are differences in the ways mothers and fathers impact their adolescent's developing perceptions (Noller & Callan, 1989; Pipp, Shaver, Jennings, Lamborn & Fischer 1985; Trusty & Pirtle, 1998). More research has examined the impact of mothers' attitudes towards their children than fathers impact. Findings indicate that the beliefs that mothers hold about their children impact developing attitudes in a variety of ways. These influences will be examined in this section.

Research into the direct influence mothers have on their children was conducted by Jacobs and Eccles (1992). They surveyed approximately 1500 mothers and their 11 to 12 year old children about the children's abilities in three sex-typed domains (math, sports, and social activities). The goal of this study was to investigate the relationship between mothers' gender stereotypic beliefs, their perceptions about their children's competence, and their children's self perceptions in the above mentioned domains. The issue in this study was one of perceptions held by parents, those who endorse the culturally dominant stereotypes, and those who do not. Was there a difference in how these two types of parents distorted their perceptions of their own child's competencies? The results indicated that parental stereotypes do impact and distort their beliefs about their children's competencies. If the child's sex was favored by the stereotype, then parents tended to overestimate their child's ability. However, if the child's sex was not favored by the parent's stereotype, then the parent tended to underestimate their child's ability. The overall influence from these stereotypes is subtle, yet their impact has long term

implications. Parents can create a self fulfilling prophesy over time by channeling the child's actions to confirm the perceiver's stereotype. The young girl whose mother holds stereotypical views about girls and math may receive less favorable messages about her own abilities, and less opportunities to develop her skills. In turn, this can limit her beliefs about her own abilities, her choices of courses, and ultimately occupations. These limitations may leave her unable to compete in the math and science areas, and only eligible for traditional female, lower paying occupations. How adolescents internalize these expectancies will be examined next.

Adolescents Perceptions

There has been very little research done to date which examines the child's perceptions of the parents' beliefs. Shek (2000) points out that how relationships are perceived by the adolescents themselves is unclear, largely due to a lack of research in this specific area. Eccles has shown how parental beliefs can impact the growing child's perception of herself as competent, but little research exists on how the child perceives the parents' beliefs, expectations and attitudes. The following section will examine the literature about how students internalize their parents' beliefs, expectations and attitudes.

Pipp et al. (1985) point out the developmental nature of adolescence as a time of reorganization of identity, and reevaluation of relationships with parents. A major task of this progression is to maintain the parent/child relationship while restructuring it so that the child can become an adult within the relationship. Part of this experience involves

dominance, and they found that as the adolescent self becomes increasingly dominant, the parents' dominance decreases. This process occurs within a framework of home, school, peers, and increasing physical separateness from parents. Pipp et al. (1985) note that adolescents typically make bleak reports about their relationships with their parents as being dissatisfying and disruptive.

The work of Noller & Callan (1989) examined adolescents' perceptions of the nature of their communication with each parent. Their work supports Pipp et al. (1985) in the finding that adolescents view their relationship with their mother as more negotiable than the relationship with their father. They also found that it was the mothers' more frequent initiation of discussions with their younger adolescents and their greater recognition of their opinions lead to older adolescents interacting more often with mothers than fathers.

Newman (1989) examined the parent-child relationship in an attempt to help clarify the changing balance between individuation and cohesiveness over the age span of 11-17 years. Of interest was how male and female students perceived their parents socialization processes, and if mothers and fathers differ in their responses to sons and daughters. The findings suggested that the processes of individuation and cohesiveness were different for boys and girls. Daughters reported wanting to be more like their mothers than sons, and girls were more confident about their mothers' love than were sons. Daughters also had a greater willingness to rely on the opinions of others when making decisions. Overall, the older adolescents were least confident in their parents' love. Closeness and

understanding appeared to diminish from age 11 to 17, with 11 year olds being the most confident about their parents' love for them, and the 17 years olds being the least confident about parental love for them. In addition, Newman found that fathers showed an increasing confidence in their childrens' ideas, and encouraged independence most in their 14 year old sons. At age 17 this new level of individuation was expressed in 17 years olds' willingness to defy their parents. At the same time their parents expected their 17 year olds to make decisions on their own. When asked about which qualities adolescents and parents admired most about each other, mothers admired cohesive qualities, while fathers tended to admire individuation qualities. Likewise, the adolescents admired cohesive qualities most in their mothers, and individuation qualities in their fathers. Newman's data indicated that families with adolescents strive to develop individuation and cohesiveness, but overall there was a strong preference for cohesiveness.

Shek (2000) completed a study on adolescent perceptions relating to differences between fathers and mothers in the treatment of and relationships with their children. After conducting several 2X2 analyses of variance, the statistics revealed a main effect for time, with the older adolescents perception of parental concern becoming less positive. The findings indicate the adolescents found fathers to be less responsive, less demanding, demonstrated less concern, and tended to be more harsh than mothers. They also reported more negative feelings when communicating with fathers. When adolescent females were compared to adolescent males, the females felt their parents were more demanding. Over time,

parenting characteristics were rated less favorably. Shek (2000) also adds that adolescent females showed a trend of having slightly more negative perceptions of their fathers' parenting characteristics than adolescent males. Overall, the adolescents in this survey reported a better relationship with their mothers than with their fathers. Regarding gender differences, Shek (2000) found that adolescent females perceived their parents to be more demanding, while males perceived their parents to be more harsh. Shek notes that his findings are generally consistent with previous research such as Paulson & Sputa, (1996) in particular that the adolescents perceived parenting characteristics to be less positive across time. Also, Shek (2000) found that family cohesion was perceived to be lower by twelfth graders as compared with ninth graders.

An interesting finding was made in the work of Pipp et al. (1985) in their study of adolescent theories about their relationships with their parents. Pipp et al. (1985) found that adolescents characterized their relationships with their two parents differently, portraying their relationship with their mothers' as more equal, and marked by more responsibility and friendliness. Their relationships with their fathers were marked by less equality and more authority. They suggest that adolescents may perceive their relationship with their mothers' as more negotiable. Noller & Callan (1989) add that adolescents were more likely to limit their communications with their fathers, and to be more defensive and guarded toward them. Moreover, Noller and Callan (1989) found that adolescents report less conflict with their fathers than with their mothers. They suggest that this may be due to adolescents having most of

their meaningful communication with their mothers, and so more opportunities arise for disagreement. This finding is important because much has been written about how parents perceive their sons and daughters differently, particularly about their skills in math, science, and language arts, but there is little written about how adolescents perceive differences in their perceptions of their parents'.

Paulson and Sputa (1996) completed a study designed to examine adolescents' perceptions of parenting style and parental involvement, and changes in parenting style between the adolescents' ninth and twelfth grades. Questionnaires were completed by 244 grade nine student participants, with 31 families participating in a follow-up questionnaire three years later. In each case the adolescents completed a questionnaire, with their mothers and fathers completing their respective versions of the questionnaire. One of the foci of this study was to explore the difference between parents' and adolescents' perceptions of parenting style and parental involvement. The authors recognized the importance of parental involvement in achievement outcomes, particularly parental values and expectations. They suggested that what parents perceive they are doing at home may not be what the adolescent perceives. In an attempt to understand this discrepancy, they completed the questionnaires with parents and adolescents, and completed the longitudinal study as follow-up. The authors expected the level of parenting to decline, but also expected the perceptions of parenting to remain the same. The results revealed that both mothers and fathers consistently perceived themselves as higher on parenting characteristics (demandingness, responsiveness,

achievement values, school work, and school functions) than did their adolescents. The data also showed that students report both their mothers and fathers show less interest in their schoolwork, but report no change in values towards achievement between grade 9 to grade 12. The authors discuss the importance of perceptions, noting that it may be the perceptions which are actually more important predictors of outcomes than actual behavior. This finding is in support of the work by Meece et al. (1982) which also found it is the perceptions children develop which become their reality.

Studies of student attitudes show that some adolescent girls perceive they are as capable in math as their male peers. The work of Chouinard, Vezeau, Bouffard and Jenkins (1999) in Montreal found that girls presented a more positive attitude towards mathematics than did boys. This study surveyed 1,885 students about gender differences in relation to perceptions of attitudes of social agents (for example, how important the student believes her success in math is to her parents). Both the boys and girls reported receiving less encouragement from their mothers as they matured. Once again this finding is critical because parental attitude has been shown to be a greater indicator of success in math than actual performance results (Eccles et al., 1983; Jacobs & Eccles, 1992; Meece et al., 1982).

In summary, it would appear that there is a significant gap in the literature with respect to how youth perceive their family unit as socializers. How do adolescents perceive and internalize the varied and complex messages from their teachers, counselors, and parents? An

examination of these socializers from the perspective of the youth has not been adequately addressed in the literature. Moreover, Cannon, Lupart, & Rose, (1998) point out that there are very few Canadian studies at the junior and senior high school levels which examine the psychological and sociological influences on student's academic choices and future career paths. The present research attempts to address these significant gaps in the research. Through multivariate statistics, using the data generated from the adapted Academic Choices and Achievement Survey, the current study will address three exploratory questions:

1. Will there be an interaction effect between male, female, grade 7, and grade 10 students' perceptions of parents' beliefs, expectations and attitudes?
2. Do females have different perceptions of parents' beliefs, expectations, and attitudes than males? and
3. Do grade 7 students have different perceptions of parents' beliefs, expectations, and attitudes than grade 10 students?

CHAPTER IV

METHOD

Overview of the Current Study

The current study is couched within the framework of a larger research project entitled Gender Differences in Student Participation and Achievement in the Sciences: Choice or Chance? This larger study has several objectives. These are:

1. To investigate the key personal and educational factors that contribute to junior and senior high school participation and high achievement in the sciences for males and females.
2. To identify the factors that most directly contribute to decisions on the part of males and particularly females to pursue programs and careers in science and related disciplines.
3. To explore roots of differences and similarities for males and females in early decisions about adult life role and career choices.
4. To investigate parent/teacher/counselor influence on student participation in the sciences.
5. The employment and assessment of the value of Eccles' Achievement-Choice Model" (Lupart, 1998. SHRC Research Grant Proposal).

This extensive project involves data collection from students, parents, teachers, and counselors, over a three year period. The initial phase involved administration of and statistical analysis of a survey, administered to a large sample of grade 7 and grade 10 students (Lupart & Cannon, 2000).

The Michigan Study of Adolescent Life Transitions Questionnaire (MSALT) has been extensively developed and statistically validated by Eccles and others over the past two decades (see Eccles, 1987; Eccles &

Jacobs, 1986; Eccles-Parsons, Kaczala, & Meece, 1982; Wigfield & Eccles, 1992). For the purposes of the larger study entitled "Academic Choices and Achievement Survey" a 209 item survey was developed, based on the MSALTQ. The current study involves a selection of questions from the initial quantitative data from the grade 7 and 10 student surveys. The focus was on the investigation of specific factors (i.e., individual's perception of parents' beliefs, expectations and attitudes, which are believed to impact achievement related choices using Eccles' Expectancy-Value model (Eccles, 1985, 1987).

Sampling

The survey included 808 grade 7 students (435 girls and 373 boys) and 523 grade 10 students (291 girls and 232 boys) drawn from Calgary and area schools. The schools were selected to give representation to all socioeconomic strata, and to each quadrant of the city, as well as and to ensure representation from rural areas surrounding the city. Approval for urban student participation was requested from the Calgary Board of Education and the Calgary Roman Catholic Separate School District. Approval for rural participants was sought from Rocky View School District and Foothills School District. Administrators responsible for research for each of the four school boards were contacted, and provided with a sample information and consent letter. Based on the recommendations of these administrators, school principals were then contacted.

The process of individual school selection consisted of a representative sample of senior high schools first, with the junior high

schools which feed into the senior high schools later approached for participation. Once approval was obtained from the respective school boards, the choices of individual schools were then finalized. The final sample consisted of 14 senior high schools and 17 junior high feeder schools. Discussion was then carried out with each of the school principals and/or science coordinators to ensure they were fully aware of the goals and intents of the study, and to provide sufficient information to discuss the survey and time requirements with their staff.

Letters outlining specific detail to school principals and parents regarding Informed Consent and adherence to the School Act-Freedom of Information and Protection of Privacy (FOIPP) were provided (Cannon, Lupart, & Rose, 1998) (Appendix A). This letter described the aims and methods of the research, the detailed nature of student involvement, and the possible risks to which students may have been exposed. The letter ensured that student participation was strictly voluntary, and that parental permission was required in order for any student to participate. This letter noted that students were to be informed that they had the option to withdraw at any time even with their parents' permission to participate. The letter outlined the steps which would be undertaken to ensure participant anonymity, such as removal of identifying data, assignment of a number code, and guarantees that no identifying data would be released to teachers, and that the surveys were to be securely stored and accessible only to individuals directly involved with the project. This letter noted that results would be used in graduate student theses and published articles.

Duplicate parental consent forms were attached to this letter (Appendix B). This consent form reiterated the information provided in the above mentioned letter, and provided additional detail, such as adding that further protection will be in place after survey completion through keeping all records in a locked storage facility at the University of Calgary. Furthermore, it stated that all data is to be destroyed 5 years after data analysis is completed, through shredding. This consent form provided space for parents to either authorize their child to participate, or not to participate. It requested that parents return the consent form regardless of their decision, for study record keeping purposes. The duplicate consent form was provided so that parents could keep one copy for their records.

Procedure

Once the schools were selected, individual students were invited to participate. School staff tallied the number of grade 7 and 10 students enrolled in science during the school year. This provided the research team with numbers for the consent packages. The researchers then provided the information letter (Appendix A) to the parents, two consent forms, (Appendix B) and a stamped, university addressed envelope, in another stamped, sealed envelope to the school secretarial staff. In order to ensure university staff maintained the School Act-Freedom of Information and Protection of Privacy regulations, school secretarial staff then labeled the packages, and mailed them to parents. The positive response rate was approximately 40%, with a balance between males and females.

Two pilot surveys were completed in December 1999 with the university team to determine time requirements and develop

standardized administration procedures. Graduate students were trained in the requirements of adhering to the School Act-Freedom of Information and Protection of Privacy procedures. The team developed procedures for contacting participating teachers in the school, setting up times, and informing teachers of the general time requirements for each grade. Based on the first two pilot surveys completed, it was determined that grade 7 students required approximately 30-45 minutes to complete, and grade 10 students required approximately 20-30 minutes.

Surveys were administered from January 2000 to June 2000. The graduate students worked in teams of two for each survey administration, to ensure adequate student supervision and safety. The teams were responsible for arranging a time with each classroom teacher and/or administrator which was suitable to the schools needs. They took to each school the original university copies of parental consent forms, and allowed administrators and/or students to verify their participation if requested. Administration was consistently scheduled during science class times, and a supply of Science Activity Packages designed to occupy any non-participating students was available if requested, by the supervising science teacher.

The research team developed specific administration procedures. These began with instructions to the students that they were participating in a University of Calgary survey entitled "Gender Differences in Student Participation and Achievement in the sciences: Choice or Chance?" The survey was briefly discussed, informing the students that the questions were about their attitudes, plans, career decisions, and some general

demographic information. They were informed that there were no right or wrong answers to the questions, just their individual responses. Students were also told about the School Act-Freedom of Information and Protection of Privacy procedures; that their participation was voluntary, even with their parents' consent, and that they had the freedom to withdraw from the survey at any time. Students were informed of the steps which would be undertaken to ensure their anonymity, such as removal of identifying data, guarantees that no identifying data would be released to teachers, and the surveys were to be securely stored and accessible only to individuals directly involved with the project. They were also informed that results would be used in graduate student theses and published articles. Once the students began the survey, team members went to each individual and asked them to check their name off the master list, to ensure that each student was authorized to participate, and to keep an accurate count of student numbers. These student lists were later destroyed.

Instrumentation

Based on the Eccles Michigan Study of Adolescent Life Transitions Questionnaire (MSALTQ) a current 209 item survey was adapted and developed. The MSALT is a 15 year longitudinal study of approximately 1000 adolescents from southeast Michigan (Eccles, 1994). The main focus of this study was to study adolescent psychosocial development across three life stages: 1) transition from middle school to junior high, 2) transition from junior high through to high school, and 3) transition from high school to post-secondary/college. The results of this study have

provided strong support of the validity and reliability of the MSALT questionnaire. The primary change in the adapted version employed in the current study were to eliminate questions irrelevant to the subject age groups and/or the specific research interests specified by Lupart, Cannon and Rose.

The survey also included the following sections: (i) background information (e.g. gender, family status, level of parental education, language spoken at home), (ii) general (e.g. schoolwork, self esteem), (iii) relationship with father and/or mother, (iv) interest and value of math, language arts, science, and computers, (v) future plans and career choices, (vi) adult roles in society, (vii) friends, and (viii) family attachment. Most questions had responses on a five point Likert scale, with responses consisting of Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree. See Appendix C for the complete survey.

The subsample of constructs pulled from the Expectancy-Value model which are relevant to the current study include involved parents, parent-child affective relationship, admiration of parents, parental reactions to schoolwork, parents' beliefs about important behaviors, parents' importance for responsibility, parents' importance for achievement, activities with parents, reaching others' expectations in math, reaching others' expectations in language arts, reaching others' expectations in science, and importance to parents.

Data Analysis

A complete list of the survey items analyzed in the current study

can be found in Appendix D. Data analysis was carried out in two stages. Stage one consisted of multivariate statistics, and stage two involved power analysis.

Multivariate Statistics

The current study involves the initial quantitative data from the grade 7 and grade 10 student surveys. From the 209 survey items, 36 were selected as they related to the present study of individuals' perceptions of parents' beliefs, expectations, and attitudes and the corresponding constructs (see Appendix D). Items 21, 23, 29, 31, 35, were worded in the negative, and so were recoded. Recoding involved computer programming to reverse the Likert scale in order to be consistent with the rest of the survey. For example, question 21 was recoded. It read, 'No matter how well I do in school, my dad doesn't think it's good enough.' The Likert scale was then reversed, so that responses ranged from a score of 5 for Strongly Disagree and a score of 1 for Strongly Agree. This procedure ensured that all responses were worded in the same direction for statistical analysis. Dependent variables were the five response choices on the Likert scales (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, and 5 = Strongly Agree). Consistent with the three exploratory questions, multivariate analysis of variance was performed to determine if there were any gender differences, grade differences, or interaction effects. The significance level was set at .05.

Power Analysis

In order to further examine grade differences between the males and females, the effect sizes (d) were computed as the larger mean minus the

smaller mean, divided by the common standard deviation (Cohen, 1988; Tabachnick & Fidell, 1996). Accordingly, an effect size about .2 should be considered a small one, while an effect size about .5 might be considered as moderate, and an effect size more than .8 should be seen as important.

Summary

In summary, the Gender Differences and Student Participation and Achievement in the Sciences: Choice or Chance? survey provided the framework for the current study. Key areas of focus included examination of factors which contribute to participation in the maths and sciences in school, and later in career choices. Informed Consent and School Act-Freedom of Information and Protection of Privacy information has been highlighted. Data collection procedures were discussed through the use of a 209 item questionnaire. The intent was to administer it to 1500 grade 7 and 1500 grade 10 students in the Calgary and surrounding areas. Data analyses consisted of multivariate statistics, followed by power analysis.

CHAPTER V

RESULTS

Participants

For the purposes of the current research, 1331 surveys were validated and employed in the data analysis. Of these 1331, 808 were grade 7 students, (435 girls, and 373 boys) and 523 were grade 10 students (291 girls and 232 boys).

Items Analyzed

This study examined grade 7 and grade 10 students' perceptions of their parental expectations, beliefs, and values. Initially, items were drawn from a larger data matrix which examined 56 variables in total. These 56 items were the survey questions which related directly to the Eccles Expectancy-Value Model, box 2A (see Figure 1). From this larger pool, 36 items were selected for analysis which related to the specific focus of individuals' perceptions of parents' beliefs, expectations, and attitudes (Appendix D). For statistical analysis, each response on the Likert scale was coded as 1: Strongly Disagree, 2: Agree, 3: Neither Agree nor Disagree, 4: Disagree, and 5: Strongly Agree, for data entry.

For the purposes of this research, information relating specifically to the area of individuals' perceptions of parents' beliefs, expectations, and attitudes was used. The constructs included in the data analysis consisted of grade; gender; fathers' job satisfaction; parent child affective relationship; parental reactions to school work: (not good enough); involved parents; parental reactions to school work: (disappointed); activities with parents: get help from parents; mothers job satisfaction,

parents beliefs about important behaviors; parent importance for responsibility; parental importance for achievement; influence of fathers' advice; reaching others' expectations in math; importance to others: all domains. Appendix D contains a list of the 36 specific survey items analyzed through multivariate statistics.

A multivariate analysis of variance using Statistical Package for the Social Sciences (SPSS) was performed to test the three exploratory questions which provide the focus of this study. These questions were posed to examine if differences would occur in the data based on the age of respondents, gender of respondents, or if age and gender had any interaction effects. The significance level was set at .05.

Research Questions and Data Analyses

Exploratory Question 1:

Will there be an interaction effect between male, female, grade 7, and grade 10 students' perceptions of parents' beliefs, expectations and attitudes?

Multivariate statistics were used to examine the relevant 36 survey items through a 2 (Grade) by 2 (Gender) multivariate analysis of variance. These variables are listed in Appendix D. This analysis examined if an interaction occurred between the two variables of gender and grade. There was no significant gender by grade interaction effect (Wilks Lambda =0.968, $F(36,1241)=1.121$, $p=0.287$).

Exploratory Question #2:

Do females have different perceptions of socializers' beliefs, expectations, and attitudes than males?

As with exploratory question #1, multivariate statistics were again employed on the relevant 36 survey items analyzed for question #2. These survey items are listed in Appendix D. This analysis examined if a significant difference occurred in the responses based on the variable of gender. Using a 2 (Grade) by 2 (gender) multivariate analysis, there was no significant main effect of gender (Wilks Lambda = 0.968, $F(36,1241)=1.137$, $p=0.267$).

Exploratory Question #3:

Do grade 7 students have different perceptions of socializers' beliefs, expectations, and attitudes than grade 10 students?

As with exploratory questions #1 and #2, the same 36 relevant survey items were also examined statistically to determine if differences occurred by grade. These 36 items are listed in Appendix D. Multivariately, there was a significant effect by grade (Wilks Lambda = 0.729, $F(36,1241)=12.781$, $p<0.001$). Univariately, there were 28 significant effects by grade which are listed in Appendix E. Multivariate analyses allow the researcher to understand where significant differences exist in the data, but they do not allow for an adequate examination of the size of these differences. Of the 28 significant findings, the data does not distinguish which results represent the largest differences between grade 7 and grade 10 students. In order to isolate these size differences, these 28 statistically significant differences were then examined in more detail through power analysis.

Power Analysis

Only the third research question was found to be significant in the

multivariate statistical analysis, and therefore the first two questions were eliminated from the power analyses. To further understand the magnitude of the differences between grade 7 and grade 10 students, the data was collapsed across the grades. Power analysis was then completed to determine the effect sizes (d) or the degree to which a phenomenon exists. By converting mean differences into standardized scores, a comparative effect size could be determined (Cohen, 1988; Farenga & Joyce 1999). The effect sizes ranged from Trivial, to Small, to Medium. The respective survey questions are listed, with their effect sizes in Appendix F. Only the largest six items were then selected for discussion, those which fell into the medium and small effect size. These questions, and the constructs they support will be discussed below.

As discussed in the instrumentation section, a sub-sample of constructs was identified as they relate to box 2A of the Expectancy-Value Model. This sub-sample includes the construct of reaching others' expectations in math, and reaching others' expectations in science. Specifically, survey items 59 and 110 are both related to the constructs of meeting parental expectations in math and science.

These items were examined for gender by grade interaction effects, which were not significant. Because there were no statistically significant interaction effects, the data was then examined for main effects. Survey items which were found to have statistically significant main effects, and will be analyzed in detail are Q24, Q25, Q32, Q33, Q59, and Q110. There was no gender by grade interaction effect on these individually selected items. This indicates that the gender effect does not change from grade to

grade, and that the grade effect does not change across gender.

Q59: I am going to do as well in math this year as my parent(s) want me to do.

Analysis of variance (ANOVA) on this item showed a significant difference by grade ($F(1,1276)=130.256$, $p<0.001$). More students chose Agree than any other rating. These results indicate that generally students' perceived they were measuring up to parental expectations. Students who rated Strongly Disagree made up 4 % of the surveys, and Disagree was 10.6%. The percentage of students who were undecided was 26%, 36.3% chose Agree and 22.5% selected Strongly Agree. This indicates that most of the students surveyed felt that they were going to meet parental expectations in math.

Power analysis revealed a medium effect size ($d=0.6416$) reflecting the difference which existed between the grade 7 perceptions and the grade 10 perceptions of meeting parental expectations. This was the largest effect size found indicating this item represented the largest change in adolescent perception. This main effect is depicted in Figure 2.

The statistically significant main effect shows that as a group, grade 7 students perceived they were going to meet parental expectations in math more strongly than grade 10 students. The trend within the data across gender was not statistically significant, however it indicates that grade 7 boys felt most confident about meeting parental expectations, followed by grade 7 girls. Grade 10 boys were less certain about meeting parental expectations, and grade 10 girls had the least confidence of all the groups. The means of these results are presented in Table 1.

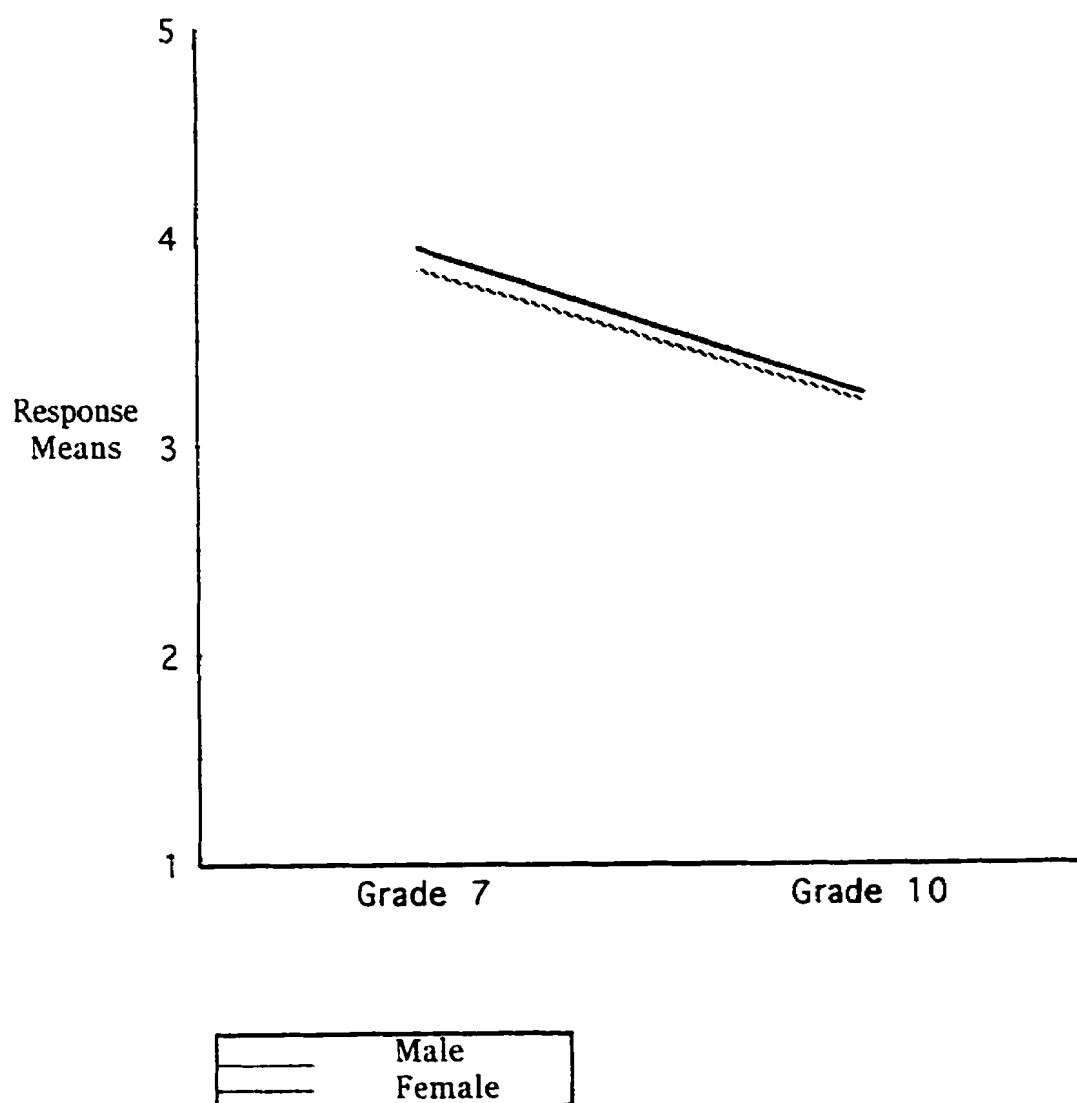
Table 1

Q 59: Means and Standard Deviations of Grade 7 and Grade 10 Students'
Perceptions of Meeting Parental Expectations in Math

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q 59	3.95(.967)	3.84(1.02)	3.25(.981)	3.22(1.07)

Figure 2

Q 59: Main Effect of Grade on Student Perception of Meeting Parental Expectations in Math



Q110. I am going to do as well in science this year as my parent(s) want me to do.

Analysis of variance (ANOVA) on this item revealed a significant difference by grade ($F(1,1276) = 64.003, p < 0.001$). Results indicate that generally students perceived they were measuring up to parental expectations with more students choosing Agree than any other rating. Students who rated Strongly Disagree made up 3.4 % of the surveys, and Disagree was 9%. The percentage of students who were undecided was 26.7%, 38.3% chose Agree and 22.6% selected Strongly Agree.

The power analysis revealed a small effect size ($d = 0.4549$) reflecting the difference which existed between the grade 7 perceptions and the grade 10 perceptions of meeting parental expectations. This main effect is graphically depicted in Figure 3.

Power analysis shows that as a group, grade 7 students perceived they were going to meet parental expectations in science more strongly than grade 10 students. Although across gender analysis was not significant, a trend in the data indicated that the grade 7 boys felt most confident about meeting parental expectations, followed by grade 7 girls. This expectation declined across the grades with grade 10 boys less certain about meeting parental expectations, and grade 10 girls had the least confidence of all the groups. Table 2 presents the means.

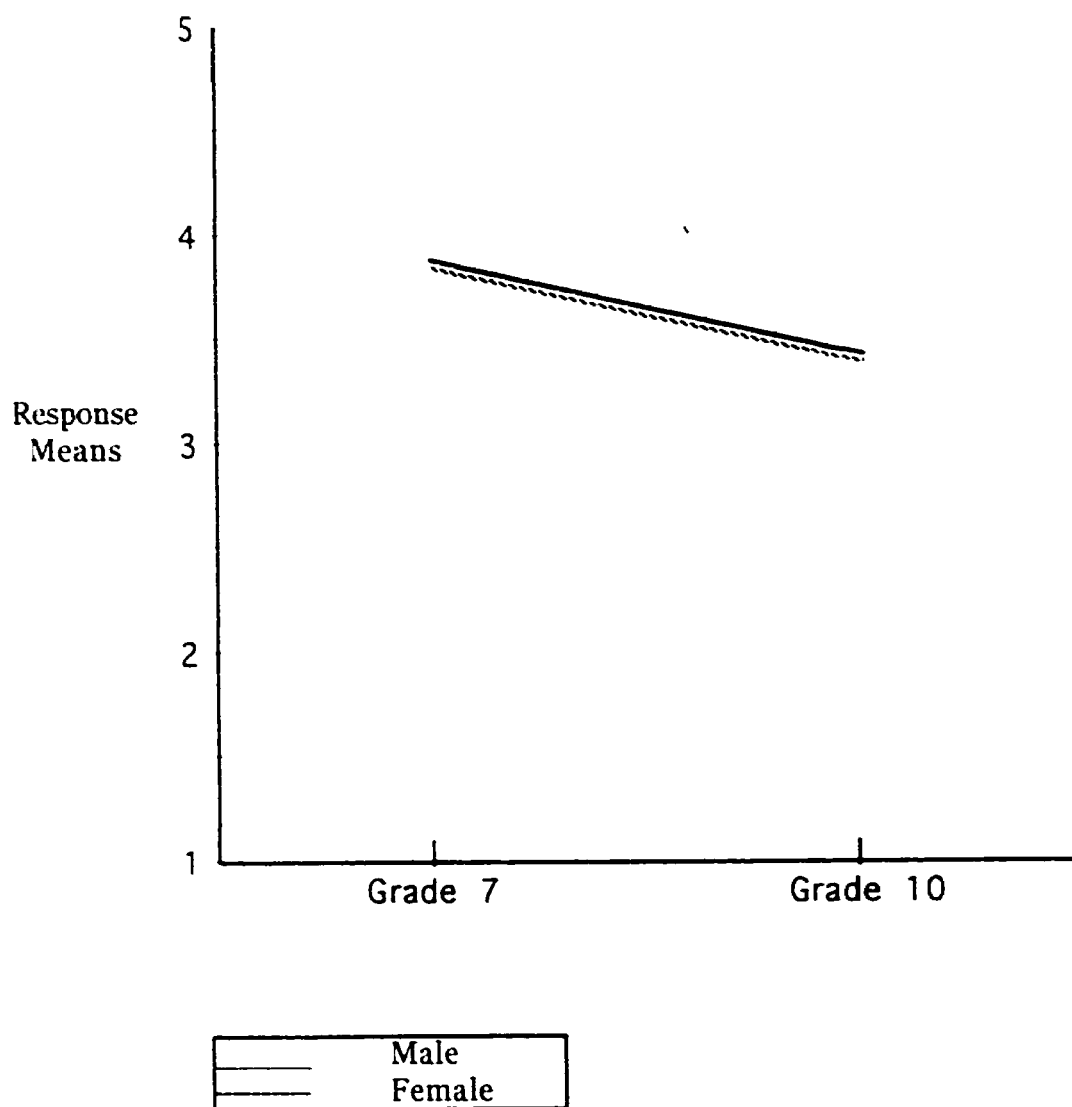
Table 2

Q 110: Means and Standard Deviations of Grade 7 and Grade 10 Students'
Perceptions of Meeting Parental Expectations in Science.

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q110	3.88(.943)	3.85(.974)	3.42(1.06)	3.39(1.04)

Figure 3

Q 110: Main Effect of Grade on Student Perception of Meeting
Parental Expectations in Science



Relating again to the sub-sample of constructs from the Expectancy-Value Model, survey items 33 and 25 are related to the construct of Activities with parents: get help from parents. These items examine the extent to which adolescent youth perceive they can count on their parents for assistance with homework.

Q33. If I need help with my homework, I can count on my mom.

Analysis of variance (ANOVA) on this item indicated a significant difference by grade ($F(1,1276) = 114.607, p < 0.001$). This difference between grade 7 and grade 10 scores represented a statistically significant main effect. Most students surveyed felt they could count on their mothers to help them with homework, with 36.1% choosing Agree, and 36.3% choosing Strongly Agree. The percentage of students who Neither Agreed nor Disagreed was 17.5, Disagree was 6.5, and Strongly Disagree was 3.7. Overall, this indicates that 72% of the survey sample perceive their mother is available to assist them with school work when it is required. These results are depicted in Table 3.

The main effect ($d = .6077$) derived from power analysis shows that as a group, grade 7 students perceived they could count on their mother for help with homework more than grade 10 students perceived they could rely on their mothers for assistance. This item showed the second largest main effect, falling within the range of medium effect size. This finding is consistent with the literature base. Gutbezahl, (1995) found that parents helped their daughters less with homework as they matured.

In addition to the above mentioned main effect, there was a trend in the data between boys and girls. This trend was evident in the

perception of maternal assistance being felt most by the grade 7 males with a mean score of 4.22 (SD = 0.95) in comparison to grade 7 females (mean = 4.18, SD = 0.93). The decline in perception of maternal availability and help was further evident in the grade 10 results. The grade 10 boys felt less likely to count on their mothers for help (mean = 3.67, SD = 1.06). The grade 10 females demonstrated the greatest drop in expectations for help from their mothers (mean = 3.51, SD = 1.09).

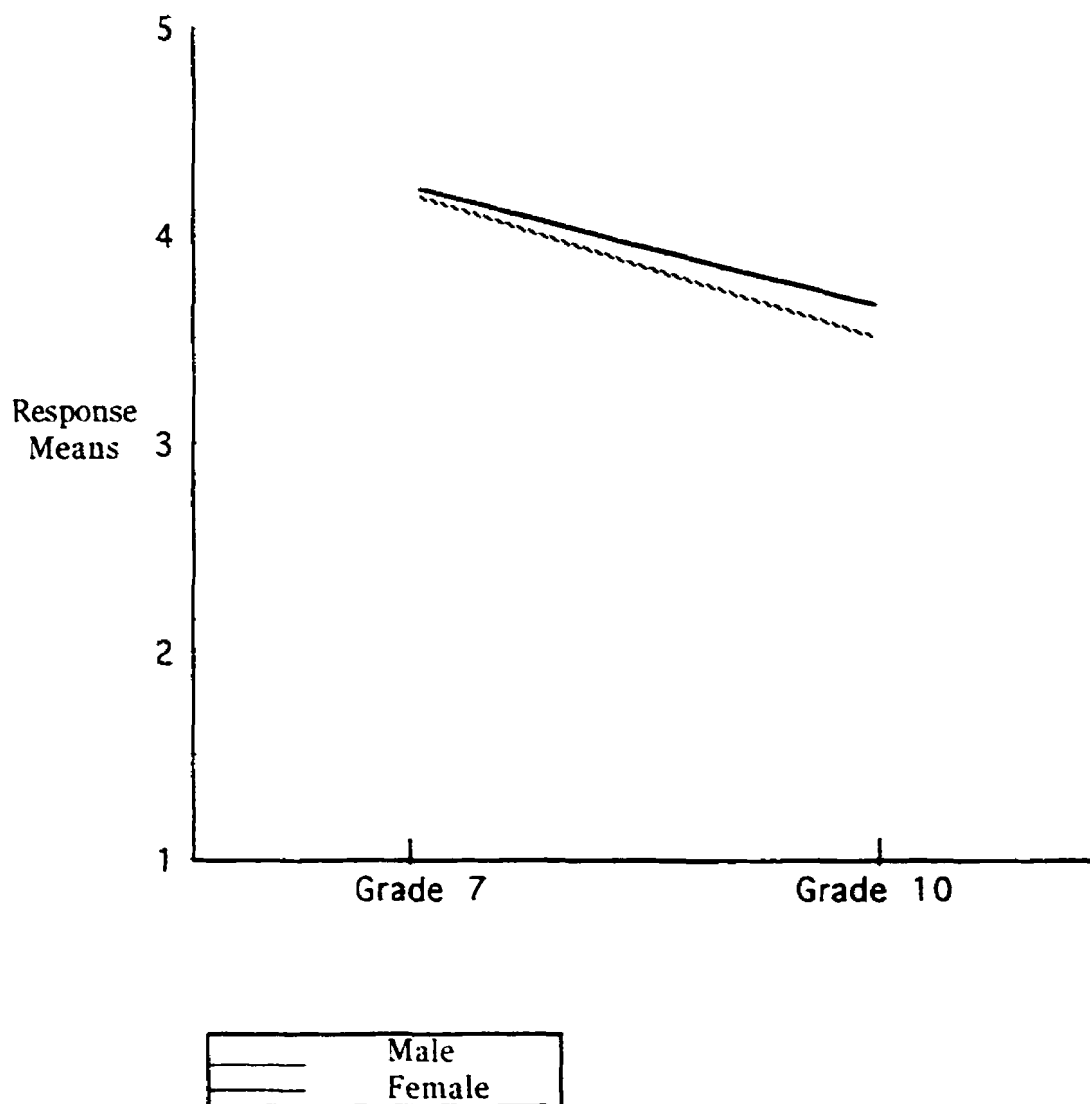
Table 3

Q 33: Means and Standard Deviations of Grade 7 and Grade 10 Students'
Perceptions of Being Able to Count on Mother for Help with Homework

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q33	4.22(.959)	4.18(.938)	3.67(1.06)	3.51(1.09)

Figure 4

Q 33: Main Effect of Grade on Student Perception of Being Able to Count on Mother to Help With Homework



Q25. If I need help with my homework, I can count on my dad.

Analysis of variance (ANOVA) on this item indicated a significant difference by grade ($F(1,1276) = 61.423, p < 0.001$). Most students selected Strongly Agree (40.5%). This compares to 31% selecting Agree, which adds up to 71.5% of all students surveyed feeling that their father was available to help them with school work when needed. Students who felt strongly that they could not count on their fathers for help made up 6.0% of the survey. Students who selected Disagree made up 8% of the survey, and 14.7% were undecided.

Power analysis revealed a small main effect ($d = .441$), depicted in Figure 5. This decline is consistent with the literature base in suggesting that parents offer less assistance with homework to their daughters than to their sons. Consistent with the other findings analyzed in the current study, it is the grade 10 adolescent girls who are most impacted by the feelings that their parents are unavailable to assist them with their schoolwork. Additional detail about this item is provided in the discussion.

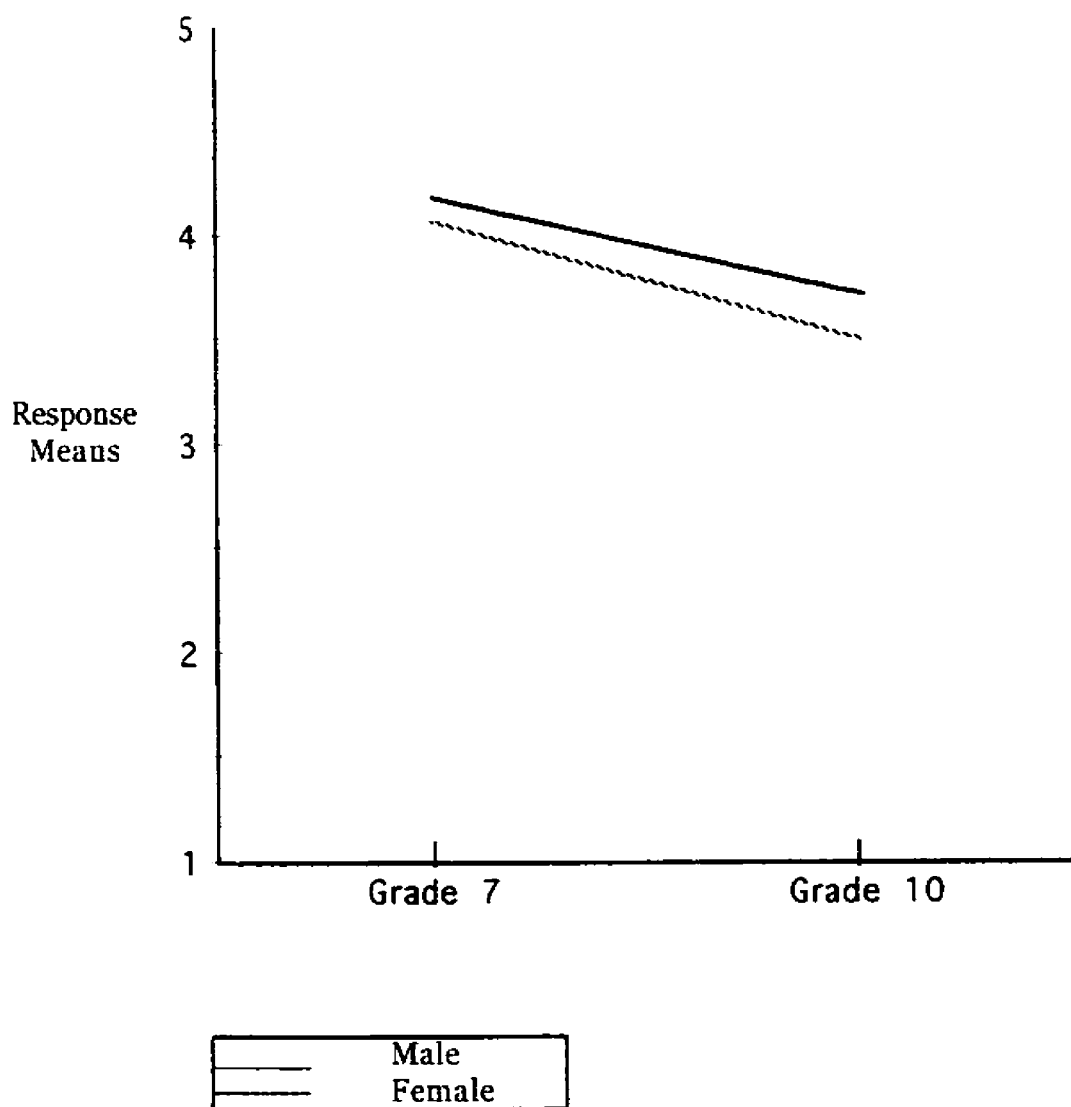
Both sexes perceived less help was available to them from their fathers in grade 10 than in grade 7. The non significant trend within this item is similar to the other items analyzed in that grade 7 boys had the most confidence in their father being available to assist them with schoolwork (grade 7 boys mean score = 4.19, SD = 1.08). This was followed by grade 7 girls with a mean score of 4.07 (SD = 1.09). The decline in expectation for help from fathers was evident in grade 10 boys (mean = 3.72, SD = 1.18) and girls (mean = 3.50, SD = 1.28), but impacted the girls more severely. These results are represented in Table 4.

Table 4
Q25: Means and Standard Deviations of Grade 7 and Grade 10 Students’
Perceptions of Being Able to Count on Dad to Help With Homework

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q25	4.19(1.08)	4.07(1.09)	3.72(1.18)	3.5(1.28)

Figure 5

Q 25: Main Effect of Grade on Student Perception of Being Able to Count on Dad to Help With Homework



Items 32 and 24 relate to the Expectancy-Value Model constructs of parent-child affective relationship, admire mom, and admire dad. These items examine the adolescent-parent relationship from the perspective of how the adolescent feels about spending time with their mother and with their father.

Q32. I like being with my mom.

Analysis of variance (ANOVA) on this item established a main effect by grade ($F(1,1276)=105.436$, $p<0.001$). The vast majority of respondents felt they enjoyed being with their mother, with 50.4% of students choosing Strongly Agree, and 37.4% choosing Agree. Only 8.6% chose Neither Agree nor Disagree. Students selecting Disagree made up 1.9%, and 1.8% of students chose Strongly Disagree.

Again, as with the other findings, the main effect showed a statistically significant decline in perception over grade ($d = .5746$), representing a medium effect size. Grade 7 students, as a group, preferred being with their mothers more than grade 10 students.

Across gender, although not significant, a trend in the data indicated that boys (mean = 4.58, SD = 0.68) liked being with their mothers more than girls across grades (grade 7 girls mean score = 4.47, SD = 0.77). Grade 10 boys showed a decline in their liking being with their mothers (mean score = 4.11, SD = 0.83), and grade 10 girls showed the greatest decline (mean = 3.98, SD = 0.93). These scores are depicted in Table 5. These findings are discussed in more detail in the Parent-Child Affective Relationship section of the discussion.

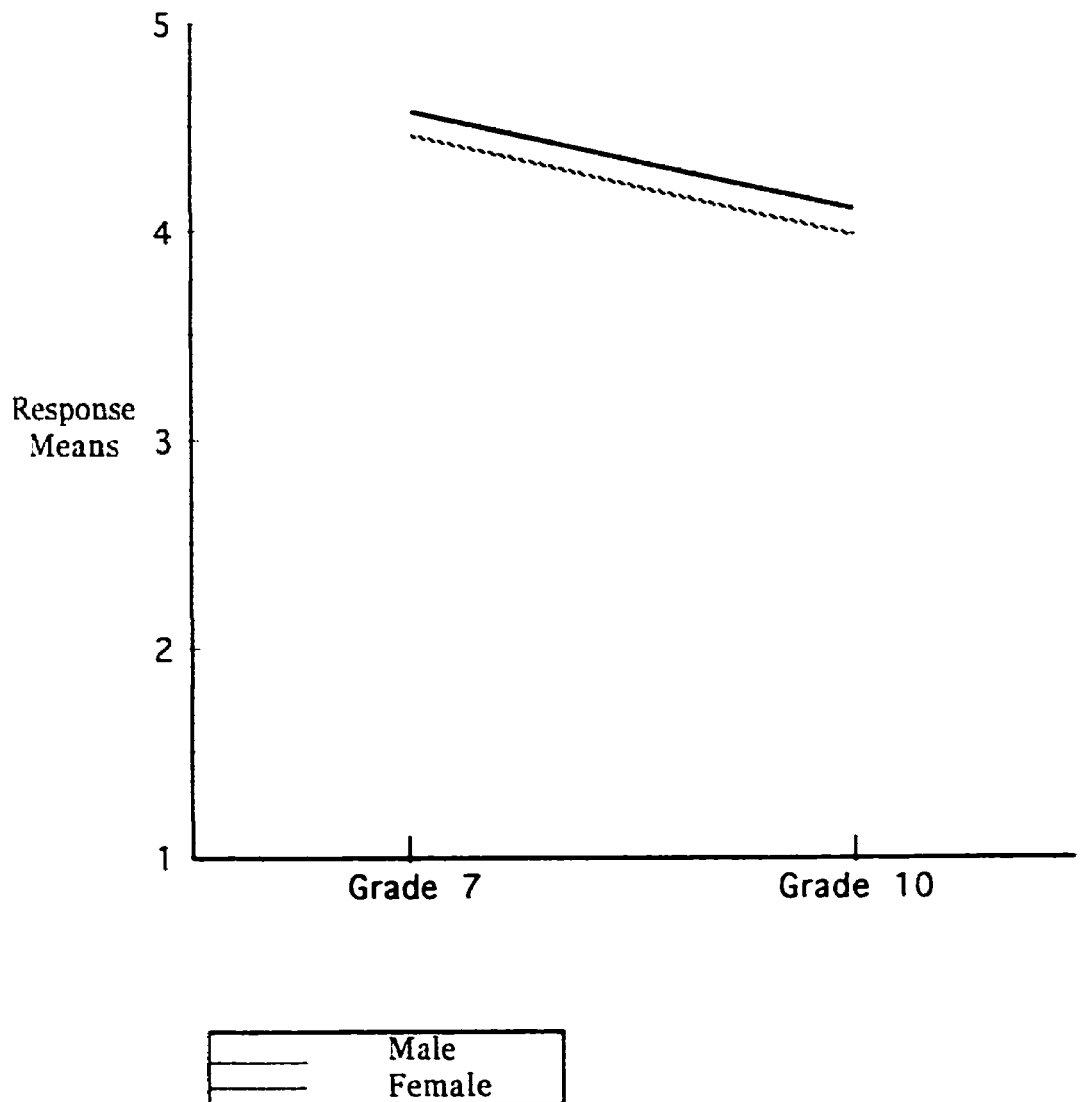
Table 5

Q 32: Means and Standard Deviations of Grade 7 and Grade 10 Students'
Perceptions of Liking Being with Mother.

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q32	4.19(1.08)	4.07(1.09)	3.72(1.18)	3.5(1.28)

Figure 6

Q 32: Main Effect of Grade on Student Perception of Liking to Be With Mother



Q24. I like being with my dad.

Question 24 surveyed student enjoyment of being with their father. Generally, the responses were positive, indicating that students across the grades enjoyed spending time with their father ($F(1, 1276)=85.53$, $p<0.001$). Percentages were as follows: 2.5% of students selected Strongly Disagree, 2.3% chose Disagree, 9.7% were Neither Agree nor Disagree, 33.3 chose Agree, and 52.3% selected Strongly Agree. Power analysis revealed an effect size of $d=.5127$; a medium effect size which is depicted in Figure 7.

Although there was no significant effect across grades, the trend in the data indicated that both sexes decreased in their stated desire to be with their father (grade 7 girls mean score = 4.42, SD = 0.89; grade 10 girls mean score = 3.94, SD = 1.02; grade 7 boys mean score = 4.57, SD = 0.72; grade 10 boys mean score = 4.11, SD = 0.90). These scores are represented in Table 6. These results are relevant to the discussion on Parent-Child Affective Relationship.

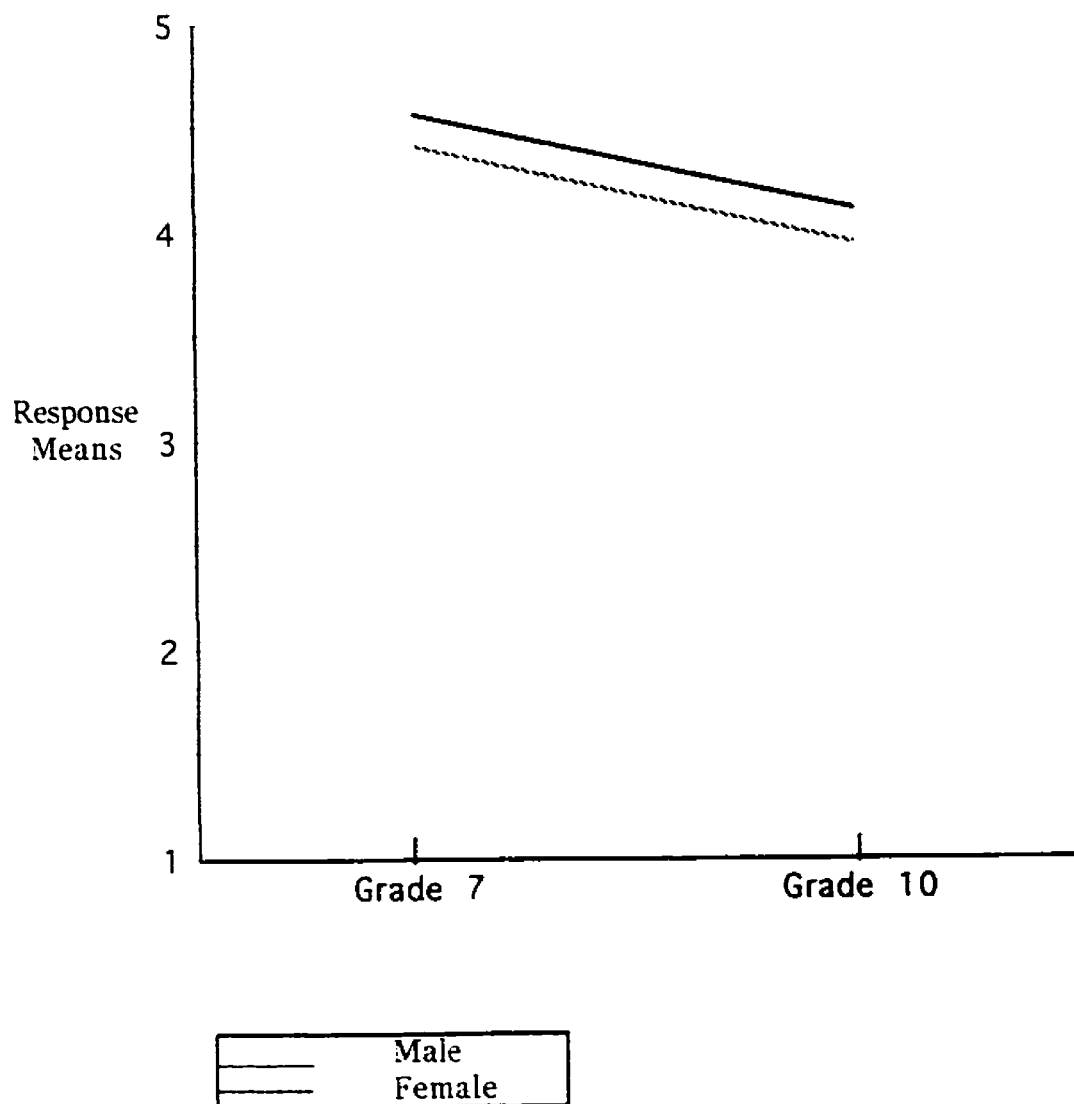
Table 6

Q 24: Means and Standard Deviations of Grade 7 and Grade 10 Students'
Perceptions of Liking Being with Father.

Variable	<u>Grade 7</u>		<u>Grade 10</u>	
	Male	Female	Male	Female
Q24	4.57(.723)	4.42(.897)	4.11(.901)	3.94(1.02)

Figure 7

Q 24: Main Effect of Grade on Student Perception of Liking to Be With Dad



Summary

The results of the current study examined three exploratory questions. Multivariate analyses results indicated no significant differences by gender, or interaction of gender by grade. However, there were significant differences across grade. The items selected for detailed discussion were those with the largest effect sizes. The statistically significant data indicated a decline occurring in both boys and girls in their perceptions of meeting parental expectations in math and science, in feeling able to count on parents for help with homework, and in liking being with parents. All these findings are consistent with the literature base. In addition, each of the questions analyzed in detail showed a similar trend in the data of girls having less confidence in their ability to meet parental expectations than boys, counting on their parents for help with their homework less than boys, and liking being with parents less than boys.

CHAPTER VI

DISCUSSION AND IMPLICATIONS

This research study investigated three questions aimed at understanding adolescents' perceptions of their parents' beliefs, expectations, and attitudes. Data analysis consisted of the examination of differences across gender, across grade, and interaction of gender by grade. This section begins with a general discussion of the study's findings. The subsequent sections in this chapter discuss the specific findings as they relate to the literature, implications of the findings, followed by a discussion of the study's limitations, and future research directions.

General Discussion

The current study explored adolescent perception of their parents' beliefs, expectations and attitudes. This section is organized so that each of the major findings is discussed separately. The sections will be as follows: general comments regarding exploratory question #1, and exploratory question #2. From question 3, the trends in the data will be considered, followed by the largest main effects discussed as they relate to the constructs of: meeting other's expectations in math and science, activities with parents: get help from parents, and parent-child affective relationship, admire mom, and admire dad.

Exploratory Question #1: Gender by Grade Interaction on Student Perception

The purpose of this question was to examine if there would be in interaction of gender by grade in the results. Specifically, through multivariate statistics, it looked for an interaction effect between male,

female, grade 7, and grade 10 students' perceptions of parents' beliefs, expectations and attitudes. An interaction effect could have provided information about differences and changes between males and females perceptions of parental expectations across grades. Because the multivariate analysis of this exploratory question was not significant, this data was not examined further.

However, one issue which arises from this question which deserves mention is the examination of why girls scores generally are lower than boys in grade 7. The decline in attitude is well documented in the literature, but the poorer self perceptions of girls at such a young age is disturbing. The statistically non significant trend of lower scores for girls across grades may indicate that girls are internalizing expectations that they are less competent at an extremely young age. The work of Blevins-Knabe and Munsun-Miller (1991) indicated that parental expectations are lower for girls in math and science abilities at the ages of 4 and 5. It stands to reason then, that girls are internalizing these lower expectations from a young age, and therefore may never be able to perceive themselves as capable as boys.

Exploratory Question #2: Gender Differences in Student Perception

The purpose of this question was to examine if gender differences existed in student perception of parents' beliefs, expectations, and attitudes. Because multivariate statistics found no significant differences in perceptions based on gender, this question was not analyzed in detail and will not be discussed in detail. However, it is interesting to note, that while the research base has found many differences in attitudes towards

school, and math and science based on student gender, (Chouinard, et al., 1999; Farenga & Joyce, 1999) the current study found no statistically significant evidence of a difference in how youth internalize parental expectations, based on gender. This result supports the findings of Feldman and Gehring (1988) who found no gender differences in boys and girls perceptions of family cohesion. This suggests that the task of redefining family relationships is similar for boys and girls, and that they follow the same time course. This implies that for this group of students surveyed, the differences in perceptions within each gender are as great as the differences between genders. Internalization of parental expectations, attitudes, and beliefs is clearly a complicated process, as unique for each youngster as each family unit is unique.

In addition, Adams (1998) reports that the levels of confidence among females decreases during the school years, whereas the confidence of males increases. As far as confidence in meeting parental expectations, the findings of the current study do not support this. The current study found a trend of expectations of meeting parental expectations decreased for both male and female students. However, the trend was more pronounced for girls.

Exploratory Question #3: Grade Differences in Student Perception

This aspect of the statistical analysis was aimed at seeking differences by grade in student perceptions of parental expectations, attitudes, and beliefs. As noted above, the internalization process appears to be complex and individualistic, yet statistically significant results did appear across the grades in the current study. This suggests that

maturational factors may play one of the largest roles in internalization of parental expectations, attitudes and beliefs. This question was found to be statistically significant in the multivariate analysis. A general discussion of the findings will be presented, followed by specific items analyzed in the previous chapter being discussed as they relate to the literature and to adolescent perceptions.

Eccles and Lord (1991) discuss the downward spiral which occurs for many adolescents as they enter puberty which can result in academic failure and school dropout. They point to patterns of decreases in intrinsic motivation, self-concepts, self-perception, and confidence in one's intellectual capabilities. Eccles & Lord (1991) suggest that these declines have been well documented in the literature, enough to cause researchers to wonder what is happening to our children as they mature through adolescence. The current study reveals similar findings. In general, the grade 10 students felt their parents were less supportive, less interested, and less available to help with homework.

The overall declining trend in the current data was most severe for the young girls surveyed. The literature indicates that parental expectations do decline for their daughters, especially in math and science skills and capabilities (Jacobs & Eccles, 1992). This trend appears to occur in adolescent perceptions of parental expectations as well. Baker & Entwisle (1987) found that on average young boys have higher expectations for their own math performance than do young girls. The current data indicate younger students have higher expectations for meeting parental performance standards than older students, with the

trend being that young boys are the most confident, and older girls the least confident. The data support the work of Jacobs & Weisz (1992) who found that boys had consistently higher mathematics ability beliefs and expectancies for future success than did girls. Even though the expectancies for success declined for both males and females in the current study, the overall trend of boys having higher expectations for success was evident. Jacobs & Weisz (1992) also found that childrens' perceptions of their abilities were negatively related to their age. Possible reasons for this decline include grades typically dropping in junior high and high school, and courses becoming more difficult. As adolescent girls internalize their parents' perceptions that they are less capable in math and science, this becomes a part of what they expect for themselves, and the cycle of underachievement and under representation continues.

Paulson and Sputa (1996) completed a study designed to examine adolescents' perceptions of parenting style and parental involvement, and changes in parenting style between the adolescents' ninth and twelfth grades. Their data showed that students report both their mothers and fathers show less interest in their schoolwork, between grade 9 to grade 12. The current study supports this finding. The grade 10 adolescents in the current study reported feeling that they could count less on both their mothers and fathers in providing help with homework than the grade 7 students reported. The grade 10 students also reported that they felt less likely to meet parental expectations in math and science than the grade 7 students. Paulson & Sputa (1996) found no change in parental values toward achievement. It is reasonable to conclude that the current findings

are also due more to maturational changes in adolescent perceptions than to changes in parental values towards achievement.

Meeting Others' Expectations in Math and Science

Survey item 59 (I am going to do as well in math this year as my parent(s) want me to) and 110 (I am going to do as well in science this year as my parent(s) want me to) are both related to the construct of Meeting other's expectations in Math and Science.

As previously noted in the literature review, parental expectations for girls tend to be lower than parental expectations for boys (Blevins-Knabe & Musun-Miller, 1991; Parsons, Adler, & Kaczala, 1982; Meece et al., 1982). Meece et al. (1982) found that generally, parents do not rate their daughters' math ability as lower than their sons', but they do rate their daughters' expectations for performance as lower than their sons'. This means that parents believe both sexes are equally capable of doing well in math, but parents do not expect them both to measure up to those capabilities. The trend in the current data is that for both boys and girls, the older students' perceptions of their socializers' beliefs, attitudes and values has declined, that is. they feel they cannot measure up to parental expectations as well as their younger peers. The current study does not examine the issue of parental expectations actually being lower for this group of students. but based on the literature, it can be assumed that these female students are exposed to the same decreasing parental expectations as many of their peers, both in The USA and Canada. This factor will be discussed in the overall Lupart and Cannon study.

Chouinard et al. (1999) has also shown that adolescent attitudes

decrease across grades. The current findings were consistent with this literature. The statistically significant finding was that older students predicted they would meet parental expectations less than younger students, in both math and science. The current findings showed a non significant trend of the older girls having even less confidence in themselves than the boys. Of all the groups, the grade 10 girls felt least likely to meet parental expectations in math and science. Chouinard et al. (1999) note that the distinctions between boys and girls attitudes towards mathematics are similar to their parents. They point to the finding that many parents believe mathematics is more difficult for girls, who must then work harder than boys to achieve (see also Buchanan et al., 1989; Eccles, 1983; Eccles, Adler, & Kaczala, 1982).

Heller & Ziegler (1996) report that boys performance superiority in math increases consistently from grade eight to ten and on, especially in physics and technology. This increase in achievement should be followed by an increase of feeling capable to meet parental expectations, but for the students in the current study, this did not seem to apply. Rather, the current data fit more with research which indicates a generalized decreasing trend in school motivation and feelings of competence for both males and females. Eccles, Jacobs, & Harold (1990) found that in general young women rate their math ability lower than young men. The non significant trends in this study indicate that young women expect to measure up to parental expectations less than young men.

Eccles-Parsons, Meece, Adler, & Kaczala, (1982) found that no sex differences were uncovered in either student perceptions of their own

math ability or in their current achievement expectations. However, girls rated their future expectations slightly lower than did boys. They conclude that taken together, this data provides little support for the learned helplessness argument, as boys and girls perceptions were similar. The current research supports this earlier finding, as the data in this study found the differences in perceptions of boys and girls tended to vary more as a function of age than as a function of gender. The current study, however, did find that girls rated their future expectations as slightly lower than did boys. This difference represents a trend in the data, which was not statistically significant. Wigfield, Eccles MacIver, Reuman, and Midgley (1991) found a general trend of declining attitudes towards math across the transition to junior high. An extension of this decline is evidenced in the current data across the transition to high school, through an statistically significant declines across time, with the older students feeling less positive about meeting expectations in regards to parents and school.

Activities With Parents

Items 33 (If I need help with my homework, I can count on my mom) and Q25 (If I need help with my homework, I can count on my dad) are related to the survey construct of Activities with Parents: get help from parents. These items both had medium effect sizes (Q33, $d = .60$, and Q25, $d = .44$).

The current data is supportive of the findings reported by Chouinard et al. (1999) which found that students felt their parents provided less encouragement as they matured. Chouinard et al. (1999) found that this

decline in perceptions of parental encouragement occurred for both boys and girls. The current study also demonstrated this decline in adolescent perception. The statistically significant data show that older students felt they could count on their parents less than younger students. The significant decline occurred across grade, but the non significant trend was felt most strongly by the girls, as reflected in the grade 10 girls having the lowest perceptions of expecting help from their fathers. This finding remains important in light of the research literature which clearly shows the impact parental attitudes have on student perceptions about achievement. Decisions to continue on in the math and science domains are greatly influenced by parental attitudes, and their beliefs about their children's capabilities to succeed in such domains. With these parental attitudes having more impact on student achievement than actual ability (Eccles & Jacobs, 1986) it is unfortunate that as these young girls are maturing they are decreasingly believing that they can count on their parents for help with schoolwork.

Parent-Child Affective Relationship

Items 32 (I like being with my mom) and 24 (I like being with my dad) relate to the survey construct of parent-child affective relationship, admire mom, and admire dad.

The work of Feldman and Gehring (1988) suggests that a marked decrease in family cohesion is perceived by adolescents between the ninth and twelfth grades. The results of the current study support this decrease in perception of family cohesion, with the older adolescents in the current study reporting that they felt less positively about liking to be with both

their mothers and fathers. Overall, most students reported that they did like being with their mothers and fathers, with large percentages agreeing that they liked being with both parents (85-87%). The current data indicates that these students also make subtle distinctions in their perceptions about their parents and the extent to which they can rely on them for help.

These findings can be considered within the context of family relations, changing dynamics, developing autonomy and family cohesion. Feldman and Gehring (1988) note that this decrease in cohesion is not interpreted by adolescents as desirable. The adolescents in the Feldman and Gehring (1988) study reported that at a time when they were feeling somewhat more distant from their parents, their relationship was not as close as they would have liked it to be. However, the adolescent desire for autonomy seems to indicate that they would welcome this change. Feldman and Gehring (1988) argue that family cohesion is compatible with autonomy, perhaps even providing the support and encouragement necessary for its emergence. If this is the case, then further research should examine ways to improve family cohesion, as the current results indicate that liking to be with parents continues to decline for the youths surveyed. Clearly, adolescent perceptions of parental expectations, beliefs, and attitudes are changing as youngsters mature, and part of these changes are represented in declining attitudes about affective relationships, reaching expectations, and doing activities with parents. These changing attitudes will impact the parent-child relationship through the modified perceptions the youth have about their parents

expectations, beliefs, and attitudes.

Newman (1989) also examined the changing balance between individuation and cohesiveness over the age span of 11-17 years. Closeness and understanding appeared to diminish from age 11 to 17, (see also Shek, 2000) with 11 year olds being the most confident about their parent's love for them, and the 17 years olds being the least confident about parental love for them. The current findings are consistent with the work of Shek (2000) with the older adolescents perception of parental concern becoming less positive. Shek (2000) found that adolescent females showed a trend of having slightly more negative perceptions of their fathers parenting characteristics than adolescent males (see also Paulson & Sputa, 1996). The current findings are that adolescents perceive less support from parents at a time when, according to the work of Newman, (1989) they increasingly prefer the cohesiveness in the family unit over individuation.

Implications

There are several educational implications which are relevant to the current study's findings. The first implication relates to the Expectancy-Value Model. As cited in the literature review of this study, the Eccles model relates to the current study in that the youths' interpretation of reality has a more direct influence on ones' expectancies, values, and achievement behavior than ones' actual past successes and failures. Additionally, research has shown that adolescents are maturing in a culture laden with gender role stereotypes, with many adults believing in traditional gender role prescriptions regarding appropriate activities for males and females. Adults also believe in 'natural' talents

and interests, and these beliefs influence their perceptions of their own childrens' interests and talents. Parents then hold different expectations for their sons and daughters, and provide different interpretations of reality and advice regarding school and career options. This results in adolescents operating without accurate information on which to base their developing ideas about adult occupations. Parents need to be more aware of specifically what their educational and career expectations are for their children, both sons and daughters. They then need to understand that these may be gender stereotyped, and as such, damaging to their children's career options. Without this understanding, the cycle remains unbroken.

As important as parental understanding of their childrens' academic capabilities really are, parents must also understand how their children internalize parental expectations. Parents may truly believe they hold no biases, and may actively work at not transmitting any gender biases onto their children. Yet, if the father always pays the bills and balances the chequebook, then the children may grow up to believe mathematical tasks are "mens' work". As pointed out by Paulson and Sputa (1996), what parents believe they are doing may not be what their children perceive parents are doing. Actions do speak as loudly as words in childrearing.

The need to raise public awareness on this issue is evident, and would most likely fall to educators. This is not a realistic task to add to the already full curriculum and teacher workload. However, teachers can be aware of their own gender biases, and work hard to ensure they are not

sharing these biases with their students, in the same fashion as parents may. Furthermore, critical thinking skills are an area which teachers do have some input. They must teach students to question what they read and hear, and critically examine information. Students must be attuned to gender biases which are prevalent in our society through advertising, television, and the internet, and they must be taught to recognize and question the accuracy of information. Teachers can play a beneficial role in helping students develop these thinking skills. Teachers must utilize resources to educate children about career options for all students. They must highlight the possibilities in all fields, for both genders. They must stress the importance of math and science careers for males and females. Teachers must hold and demonstrate expectations that students can achieve in a variety of careers, in order to raise awareness for adolescents about a variety of career possibilities worth considering.

Limitations of This Study

There are several limitations to the current study. Firstly, the current work examines only the perceptions of the adolescents. A parallel survey of their parents is required to examine the family dynamics and actual parental perceptions. As argued by Paulson & Sputa (1996) parents may perceive that they are parenting at one level, and adolescents may not perceive their behavior in the same way. This finding will be examined in greater depth in the additional phases of the larger study.

The current work was completed in one large western Canadian city. Due to the extensive diversity of this country, generalizability of the

findings to other regions of the country, and other nations, needs to be demonstrated. The work of Chouinard et al. (1999) with a French Canadian sample highlights this need. Their work found many similar trends to the current work, but overall, they state that contrary to the research literature, a general breakdown of attitudes was not evident in their survey. The current study does support the literature in finding these generalized declines in school and math motivation, for both males and females. Little research has been done on cultural particularities and values, and these differing Canadian findings suggest the need for more.

Future Studies

The larger survey which provided the limited data for the current analyses did ask questions about student attitudes towards math and science, and future prospects in these fields. However, this data was not analyzed or included in the current analysis. It would be worth future examination, now that we understand more about student perceptions of their socializers' beliefs, expectations, and attitudes, from the current study, to relate these findings to their attitudes towards math and science.

These findings have implications for the future development of the Eccles Model of Achievement Choices. The model should take into account that parents have different roles in the childrearing practice. Adolescents perceive their parents differently, and so internalize expectations uniquely about each parent. The model currently generalizes across both parents when examining influences. Adaptations to the model could take into account these differences.

More information about the changes in parenting across adolescence

is needed. When looking at the effects of parenting on adolescent outcome, researchers should be cautious about making generalizations about parenting practices across adolescence. Additionally, the perceptions of the adolescents in the current study should be examined across time, when they are late adolescents, and young adults. The perceptions of these students as they mature may change into a closer, more cohesive relationship with their parents after a few years of adulthood. Longitudinal follow up could help define perceptions of these relationships more clearly.

Conclusions and Summary

In conclusion, the purpose of the present study was to further understand the children's perception of parents' beliefs, expectancies, and attitudes. This was achieved through an examination of adolescent responses to the Academic Choices and Achievement Survey. Data was analyzed for differences across age and gender, and interaction effects. The results of the current research confirm the important role that parents have as socializers for their children. Therefore, it is important for parents to understand the significant contribution their behaviors and attitudes have on their children's developing identities as competent students in math and science, and all academic pursuits. These influences are seen in the results from the current study, which reflects how the youth have internalized their parents' expectations for them. Parents need to be aware of their own cultural stereotypes, and how these can impact their children's career choices. Only through understanding their children, and actively supporting their pursuits can society hope to change the future options for our youth.

References

Adams, T.L. (1998). Pulling the plug on gender-related differences in mathematics. Preventing School Failure, Summer, 176-180.

Atkinson, R.L., Atkinson, R.C., Smith, E.E., Bem, D.J., and Nolen-Hoeksema, S. (1996). Hilgard's introduction to psychology: twelfth edition. Harcourt Brace College Publishers, Toronto.

Baker, D.P., & Entwisle, D.R. (1987). The influence of mothers on the academic expectations of young children: a longitudinal study of how gender differences arise. Social Forces, 65(3), 670-694.

Belenky, M.F. (1994). Ways of knowing and the empowerment of women. In Gallivan, J., Crozier, S.D., & Lalonde, V.M. (Eds.) Women, girls & achievement. Captus university Publications.

Benbow, C. P., & Stanley, J.C. (1980). Sex differences in mathematical ability: Fact or artifact. Science, 210, 1262-1264.

Birk, J.M., & Blimline, C.A. (1984). Parents as career development facilitators: An untapped resource for the counselor. The School Counselor, March, 310-317.

Blevins-Knabe, B., & Musun-Miller, L. (1991). Parental beliefs about the development of preschool children's number skills. ED 338 379.

Brandon, P.R., Newton, B.J., & Hammond, O.W. (1987). Children's mathematics achievement in Hawaii: Sex differences favoring girls. American Educational Research Journal, 24(3), 437-461.

Brown University, (1996). Achieving Gender Equity in Science Classrooms: A Guide for Faculty. [http://www.brown.edu/Administration / Dean_of_the_College/homepginfo/equity/Equity_handbook.html](http://www.brown.edu/Administration/Dean_of_the_College/homepginfo/equity/Equity_handbook.html).

Buchanan, C.M., Eccles, J.S., Flanagan, C., Midgley, C. Feldlaufer, H., & Harold, R.D. (1989). Parents' and teachers beliefs about adolescents: effects of sex and experience. Journal of Youth and Adolescence, 19(4), 363-394.

Byers, A.R. Editor (1986). The Canadians at war 1939/45. The Readers Digest Association (Canada) Ltd., Montreal.

Campbell, J.R. & Mandel, F. (1990). Connecting math to parental influences. Contemporary Educational Psychology, 15, 64-74.

Cannon, E., Lupart, J. & Rose, S. (1998). Gender differences in student participation and achievement in the sciences: choice or chance?

Chouinard, R., Vezeau, C., Bouffard, T., and Jenkins, B. (1999). Gender differences in the development of mathematics attitudes. Journal of Research and Development in Education, 32(3), 184-190.

Cohen J. (1988). Statistical power analysis for the behavioral sciences: second edition. Lawrence Erlbaum Associates, Publishers, Hillsdale, New Jersey.

Collis, B. (1990). Adolescent females and computers: real and perceived barriers. In Women and education: second edition. Gaskell, J. S., and McLaren, A. T., (Editors) Detselig Enterprises Limited, Calgary.

Cooper S.E., & Robinson, D.A.G. (1989). Childhood play activities of women and men entering engineering and science careers. The School Counselor, 36, 338-342.

Curry, C., Trew, K., Turner, I., & Hunter, J. (1994) The effect of life domains on girls' possible selves. Adolescence, 29,(113), 133-150.

Eccles, J. (1983). Expectancies, values, and academic behaviors. In J.T. Spence (Ed.), Achievement and achievement motives (pp.75-146). San Francisco: W.H. Freeman & Co.

Eccles, J.S. (1985). Why doesn't Jane run? Sex differences in educational and occupational patterns. In F.D. Horowitz & M.O'Brien (Eds.) The gifted and talented: developmental perspectives, pp. 251-295. Washington, D.C: American Psychological Association.

Eccles, J.S. (1987). Gender roles and women's achievement-related decisions. Psychology of Women Quarterly, 11, 135-172.

Eccles, J.S. (1989). Bringing young women to math and science. In Crawford, M., & Gentry, M. (Eds.) Gender and thought. New York: Springer-Verlag.

Eccles, J.S. (1994). Understanding women's educational and occupational choices. Psychology of Women Quarterly, 18, 585-609.

Eccles (Parsons), J., Adler, T.F., Futterman, R., Goff, S.B., Kaczala, C.M., Meece, J.L., & Midgley, C., (1983). Expectancies, values and academic behaviors. In J.T. Spence (Ed.), Achievement and achievement motivation (pp. 75-145). San Francisco: W.H. Freeman.

Eccles-Parsons, J., Adler, T.F., & Kaczala, C.M. (1982).

Socialization of achievement attitudes and beliefs: Parental influences.

Child Development, 53, 310-321.

Eccles, J.S., Arberton, A., Buchanan, C.M., Jacobs, J., Flanagan, C.,

Harold, R., MacIver, D., Midgley, C., Reuman, D., & Wigfield, A. (1992).

School and family effects on the ontogeny of children's interests, self perceptions, and activity choices. Dienstbier, R. & Jacobs, J., (Eds.).

Developmental perspectives on motivation, vol. 40 of the Nebraska symposium on motivation, pp. 145-208. University of Nebraska press, Lincoln and London.

Eccles, J.S.. & Harold, R.D. (1993). Parent-school involvement

during the early adolescent years. Teachers College Record, 94(3), 568-587.

Eccles, J.S., & Jacobs, J.E., (1986). Social forces shape math

attitudes and performance. Signs, 11(2), 367-380.

Eccles, J.S., Jacobs, J.E., & Harold, R.D. (1990). Gender role

stereotypes, expectancy effects, and parents' socialization of gender differences. Journal of Social Issues, 46(2), 183-201.

Eccles, J.S., Jacobs, J.E., Harold, R.D., Yoon, S., Arbretton, A., and

Freedman-Doan, C. (1993). Parents and gender-role socialization during the middle childhood and adolescent years. In S. Oskamp & m. Costanzo (Eds.), Gender issues in contemporary society (pp. 59-83). Newbury park, CA: Sage Publications, Inc.

Eccles-Parsons, J., Kaczala, C.M., & Meece, J.L. (1982). Socialization of achievement attitudes and beliefs: parental influences. Child Development, 53, 310-321.

Eccles J.S., & Lord, S. (1991). What are we doing to early adolescents? The impact of educational contexts on early adolescents. American Journal of Education, August, 521-542.

Eccles, J.S., Midgley, C., Wigfield, A., Buchanan, C.M., Reuman, D., Flanagan, C., & MacIver, D. (1993). Development during adolescence: the impact of stage-environment fit on young adolescents' experiences in schools and families. American Psychologist, 48(2), 90-101.

Eccles-Parsons, J.S., Meece, J.L., Adler, T.F., & Kaczala, C.M. (1982). Sex differences in attributions and learned helplessness. Sex Roles, 8(4) 421-432.

Entwisle, D.R., Alexander, K.L., & Olson, L.S. (1994). The gender gap in math: its possible origins in neighborhood effects. American Sociological Review, 59, 822-838.

Farenga, S.J. & Joyce, B.A. (1999). Intentions of young students to enroll in science courses in the future: an examination of gender differences. Science Education, 83(1), 55-75.

Fast, J., & DaPont, M. (1997). Changes in women's work continuity. Canadian Social Trends.

Feldman, S.S., & Gehring, T.M. (1988). Changing perspectives of family cohesion and power across adolescence. Child Development, 59, 1034-1045.

Gilbride, K.A., Kennedy, D.C., Waalen, J.K., & Zywno, M. (1999). A proactive strategy for attracting women into engineering. Canadian Journal of Counselling, 33(1),55-65.

Gilligan, C. (1982). In a different voice: Psychological theory and women's development. Harvard University Press, Cambridge Massachusetts.

Ginzberg, E., Berg, I.E., Brown, C.A., Herma, J.L., Yohalem, A.M. and Gorelick, S. (1966). Life styles of educated women. Columbia University Press, New York.

Gladwell, M. (1999). Do Parents Matter? The New Yorker.

Greene, C.K., & Stitt-Gohdes, W.L. (1997). Factors that influence women's choices to work in the trades. Journal of Career Development, 23(4), 265-278.

Gregory R., (1996). Gender differences in laterality, socialization, and educational attainment in fourth grade students. ED 405 980

Gutbezahl, J. (1999). How negative expectancies and attitudes undermine females' math confidence and performance: a review of the literature. ED 380 279.

Hackney, H.L., & Cormier, L.S. (1996). The professional counselor: third edition. A process guide to helping. Allyn & Bacon, Toronto.

Hannan, D.J. (1995). Gender equity in the American classroom: where are the women? English Journal.

Hashizume, L., & Crozier, S.D. (1994). A female definition of career achievement. In Gallivan, J., Crozier, S.D., & Lalonde, V.M. (Eds.) Women, girls & achievement. Captus university Publications.

Heller, K.A., & Ziegler, A. (1996). Gender differences in mathematics and the sciences: Can attributional retraining improve the performance of gifted females? Gifted Child Quarterly, 40(4), 200-210.

Jacklin C.N., & Baker, L.A. (1992). Early gender development. Gender Issues in Contemporary Society.

Jacobs, J.E. (1991). Influence of gender stereotypes on parent and child mathematics attitudes. Journal of Educational Psychology, 83(4), 518-527.

Jacobs, J.E., & Eccles, J.S. (1992). The impact of mothers' gender-role stereotypic beliefs on mothers' and children's ability perceptions. Journal of Personality and Social Psychology, 63(6), 932-944.

Jacobs, J.E., & Weisz, V. (1992). Gender stereotypes: implications for gifted education. Roeper Review, 16(3), 152-155

Jacobs, J.E., & Wigfield, A. (1989). Sex equity in mathematics and science education: research-policy links. Educational Psychology Review, 1(1), 39-56.

Kaplan, H.I. & Sadock, B.J. (1998). Synopsis of psychiatry: behavioral sciences/clinical psychiatry, eighth edition. Williams & Wilkins, Maryland.

Leung, J.J. (1990). Aspiring parents' and teachers academic beliefs about young children. Sex Roles, 23(1/2) 83-90.

Levine, P.B., & Zimmerman, D.J. (1995). A comparison of the sex-type of occupational aspirations and subsequent achievement. Work and occupations, 22(1), 73-84.

Lewis, P. (2000). Where are they now? Twenty years later researchers report on career, life choices of students from 1980 study on gender differences in math ability. <http://www.psychologicalscience.org/newsresearch/publications/journals/psychsci.html>

Lupart, J.L., Cannon, E. & Rose, S. (1998). Gender Differences in Student participation and Achievement in the Sciences: Choice or Chance? Research Proposal to Social Sciences and Humanities Research Council of Canada.

Lupart, J., & Barva, C. (1998). Promoting female achievement in the sciences: research & implications. International Journal for the Advancement of Counselling, 20, 319-338.

Lupart, J.L., & Cannon, M.E. (2000). Gender differences in junior high school students towards future plans and career choices. Paper presented at the CCWEST Conference for the Advancement of Women in Engineering, Science and Technology, St. John's, Nfld.

Lummis, M., & Stevenson, H.W. (1990). Gender differences in beliefs and achievement: a cross cultural study. Developmental Psychology, 26, 254-263.

Meece, J.L., & Eccles-Parsons, J. (1982). Sex differences in math achievement: toward a model of academic choice. Psychological Bulletin, 91(2) 324-348.

Meece, J.L., & Wigfield, A. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. Journal of Educational Psychology, 82(1), 60-70.

McVicar, R. (1994). Intra-psycho factors as explanations for gender differences in children's academic achievement: a persistent myth. In Gallivan, J., Crozier, S.D., & Lalonde, V.M. (Eds.) Women, girls & achievement. Captus University Publications.

Midgley, C., Feldlaufer, H., & Eccles, J.S. (1989) Student/teacher relations and attitudes toward mathematics before and after the transition to junior high school. Child Development, 60, 981-992.

Nature Reviews Genetics. (2001). Nature. <http://www.nature.com/reviews.genetics>.

Nauta, M.M., Epperson, D.L. & Kahn, J.H. (1998). A multiple-groups analysis of predictors of higher level career aspirations among women in mathematics, science, and engineering majors. Journal of Counseling Psychology, 45(4), 483-496.

Newman, B.M. (1989). The changing nature of the parent-adolescent relationship from early to late adolescence. Adolescence, 24(96), 915-924.

Noller, P., & Callan, V.J. (1990). Adolescents' perceptions of the nature of their communication with parents. Journal of Youth and Adolescence, 19(4), 349-362.

Paulson, S.E., & Sputa C.L. (1996). Patterns of parenting during adolescence: perceptions of adolescents and parents. Adolescence, 31(122), 369-381.

Pipp, S., Shaver, P., Jennings, S., Lamborn, S., & Fischer, K.W. (1985). Adolescent's theories about the development of their relationships with parents. Journal of Personality and Social Psychology, 48,(4), 991-1001.

Rainey, L.M., & Borders. L.D. (1997). Influential factors in career orientation and career aspiration of early adolescent girls. Journal of Counseling Psychology, 44(2), 160-172.

Rejskind, G. (1994). Gendered relationships: perceptions of male and female university science students. In Gallivan, J., Crozier, S.D., & Lalonde, V.M. (Eds.) Women, girls & achievement. Captus university Publications.

Santrock, J.W. (1984). Adolescence, an introduction: Second edition. Wm. C. Brown Publishers, Dubuque, Iowa.

Shakeshaft, C. (1995). Reforming science education to include girls. Theory Into Practice, 34, 74-79.

Shek, D.T.L. (2000). Differences between fathers and mothers in the treatment of, and relationship with, their teenage children: perceptions of Chinese adolescents. Adolescence, 35(137), 135-146.

Schlosser, G.A. (1999). Breaking the silence about women's achievements: A literature review. AGATE, 13(1), 3-12

Spence, J.T. (1983) Achievement and achievement motives. San Francisco, W.H. Freeman & co. pp. 75 -146

Statistics Canada (2001a). Canadian statistics: Experienced labor force 15 years and over by occupation, 1991 and 1996 censuses. Canada. <http://www.statcan.ca:80/english/Pgdb/People/Labour/labor44.htm>

Statistics Canada (2001b). Canadian statistics: Labour force and participation rates. <http://www.statcan.ca:80/english/Pgdb/People/Labour/labouro5.htm>)

Statistics Canada (2001c). Canadian statistics: Natural and applied sciences and related occupations. <http://www.statcan.ca:80/english/census96/Mar17/occupa/table/t1p00c.htm>

Statistics Canada (2001d). Canadian statistics: Average earnings by sex and work pattern. <http://www.statcan.ca/english/Pgdb/People/Labour/laboro1b.htm>

Statistics Canada (2001e). Canadian Statistics: University degrees granted by field of study, by sex. <http://www.statcan.ca/english/Pgdb/People/Education/educ21.htm>

Statistics Canada. (2001f). Canadian Statistics: University enrollment, full-time and part-time, by sex. <http://www.statcan.ca:80/english/Pgdb/People/Education/educ03c.htm>

Statistics Canada (2001g). Canadian Statistics: University degrees granted by field of study, by sex. <http://www.statcan.ca/english/Pgdb/People/Education/educ21.htm>

Straka, V.A. (2000). Salary gap in the next millennium. Paper presented at New Frontiers, New traditions: A National Conference for the Advancement of Women in Engineering, Science and Technology, July 6-8, 2000. St. John's, Newfoundland, Canada.

Tabachnick, B.G. and Fidell, L.S. (1996). Using multivariate statistics: Third edition. Harper Collins College Publishers, New York.

Terman, L.M. (1954). The discovery and encouragement of exceptional talent. The American Psychologist.

The Daily: Statistics Canada (1999). Survey of labor and income dynamics: the wage gap between men and women.

<http://www.statcan.ca/Daily/English/991220/d991220a.htm>

The Times (2000). Girls suffer more from exam stress than boys. As reported in The Province, August 4, 2000.

Tracy, D.M. (1987). Toys, spatial ability and science and mathematics achievement: are they related? Sex Roles, 17(3/4), 115-138.

Trusty, J. (1999). Effects of eighth-grade parental involvement on late adolescents' educational expectations. Journal of Research and Development in Education, 32(4) 224-233.

Trusty, J., & Pirtle, T. (1998). Parents' transmission of educational goals to their adolescent children. Journal of Research and Development in Education, 32(1), 53-65.

Updegraff, K.A., McHale, S.M., & Crouter, A.C. (1996). Gender roles in marriage: what do they mean for girls' and boys' school achievement? Journal of Youth and Adolescence, 25(1), 73-88.

Washburn, C.A. (1994). Gender-role development: a pathway to understanding female achievement. In Gallivan, J., Crozier, S.D., & Lalonde, V.M. (Eds.) Women, girls & achievement. Captus university Publications.

Weinburgh, M. (1995). Gender differences in student attitudes toward science: a meta-analysis of the literature from 1970 to 1991. Journal of Research in Science Teaching, 32, (4), 387-395.

Wigfield, A., & Eccles, J.S. (1992). The development of achievement task values: a theoretical analysis. Developmental Review, 12, 265-310.

Wigfield, A., Eccles, J.S. MacIver, D., Reuman, D.A., & Midgley, C. (1991). Transitions during early adolescence: changes in children's domain-specific self perceptions and general self-esteem across the transition to junior high school. Developmental Psychology, 27(4), 552-565.

Yee, D. K., & Eccles, J.S. (1988). Parent perceptions and attributions for children's math and achievement. Sex Roles, 19, 317-333.

Yewchuk, C. (1999) Career development of gifted girls and women. AGATE, 13(1), 2.

Ziegler, A., & Heller, K.A. (2000). Conditions for self-confidence among boys and girls achieving highly in chemistry. The Journal of Secondary Gifted Education, 11(30), 144-151.



UNIVERSITY OF
CALGARY

APPENDIX A

FACULTY OF EDUCATION

Department of Educational Psychology
ED T302

Dear Parent/Guardian:

My name is Dr. Judy Lupart. I am a professor in the Department of Educational Psychology at the University of Calgary, conducting a research project along with two co-investigators, Dr. Sarah Rose from the Community Health Department and Dr. Elizabeth Cannon from the Department of Geomatics Engineering. We have received approval from Calgary Roman Catholic Separate School District to carry out this research and we would like to invite your child to participate in our study "Gender Differences in Student Participation and Achievement in the Sciences: Choice or Chance?"

This letter is to provide information regarding our research project, so that you can make an informed decision regarding your child's participation. The purpose of this study is to investigate the key influences on junior and senior high school students' choices for various activities, courses and careers, particularly in the sciences. Overall there will be approximately 3,000 students participating in this part of the study and since we need to keep track of letters from four school districts and numerous schools we would ask that you fill out and return the enclosed consent form whether or not you wish your child to participate.

If you agree to have your child participate, he/she will be asked to complete a questionnaire designed to investigate achievement-related decisions and participation in academic activities and careers. In addition, we will require access to school awarded grades, provincial achievement data, and your child's provincial identification number acquired either through Calgary Roman Catholic Separate School District or Alberta Learning. The data collection will be carried out during school hours at your child's school, and it will require approximately 45 minutes to complete.

Participation in this study will involve no greater risks than those ordinarily experienced in daily life. You should be aware that even if you give your permission for participation your child is free to withdraw at any time for any reason without penalty. This includes your child's own decision not to answer a question. Results, which we will be reporting in published articles or graduate student theses, will ensure your child's complete anonymity, and no identifying data will be released to teachers. All information gathered from the questionnaires will be securely stored and will only be accessible to those who are directly involved with this research project.

If you have any questions, please feel free to contact me at 220-6280, or Andrea Lynch at the Office of the Vice-President (Research) at 220-7114. Two copies of the consent form are provided. Please return a signed copy, which indicates your decision concerning your child's participation in this research using the stamped envelope provided. The other copy can be retained for your records.

Thank you for your cooperation.

Sincerely,

Judy L. Lupart, Ph.D.

PS: All forms returned by December 1, 1999 will be eligible for a draw of one of two prizes. For Parents or Guardians: one \$50. dinner certificate at Earl's Restaurant, and For Student Participants: one \$50. coupon for any purchase at Club Monaco.

APPENDIX B

CHESTEMERE HIGH SCHOOL	
CONSENT FORM	
Research Project Title: Gender Differences in Student Participation in the Sciences: Choice or Chance?	
Investigators:	Dr. Judy Leupart Educational Psychology Dr. Elizabeth Cannon Geomatics Engineering Dr. Sarah Rose Community Health
Funding Agency: Social Sciences and Humanities Research Council of Canada	

The information requested on this form is being collected pursuant to the *School Act - Freedom of Information and Protection of Privacy*. Information acquired through this form has been approved by the Rocky View School Division and will be kept secure and access to the information restricted to the researchers and their research assistants.

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your child's participation will involve. If you would like more detail about something mentioned here, please ask. Please take the time to read this information form carefully and to understand any accompanying information.

I/We understand that such consent allows the release of my child's school awarded course grades, provincial achievement test results, and provincial student ID number which would be obtained from either Rocky View School Division or Alberta Learning.

My/Our child will also be completing a student questionnaire, during a regularly scheduled science class, which will take approximately forty-five minutes to complete. The investigator will, as appropriate, explain to your child the research and his or her involvement, and will seek his or her ongoing cooperation throughout the project. (Parents or guardians must sign/co-sign for children).

I/We understand that participation in this study may be terminated at any time by my/our request or of the investigators. Participating in this project and/or withdrawal from this project will not affect my/our request or receipt of services from the school board or the university.

I/We understand that this study will not involve any greater risk than those ordinarily occurring in daily life.

I/We understand that all responses will be recorded with names being coded to ensure participant anonymity.

I/We understand that no personally identifying information will be released to teachers or used to report the data in any published reports.

PLEASE TURN PAGE OVER

I/We understand that all data, will be kept in a locked file cabinet in a locked office at the University of Calgary and destroyed five years after publication of the study results.

Your signature on this form indicates that you have understood to your satisfaction the information regarding your child's participation in the research project and that you agree or disagree to have your child participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. Your child is free to withdraw at any time. His or her continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your child's participation. If you should have further questions concerning matters related to this research, please contact:

Dr. Judy Lupart	220-6280
Dr. Elizabeth Cannon	220-3593
Dr. Sarah Rose	220-4297

If you have any questions concerning the ethics review of this project, or the way you have been treated, you may also contact the Office of the Vice-President (Research) and ask for Andrea Lynch, 220-7114. If you have concerns about the project itself, please contact the researchers.

THANK YOU FOR YOUR CONSIDERATION.

PLEASE INDICATE YOUR DECISION CHOICE BELOW:

I hereby give my consent for my child _____
 (Please Print Full Legal Name of Child)
 to participate in this study:

YES _____ If YES, please provide student birth date:

Month _____ /Day _____ / Year _____

NO _____

***Since we need to keep track of approximately 5,000 replies from four school districts, we ask that ALL PARENTS/GUARDIANS please sign on the space below, and return this form in the enclosed, stamped envelope.**

 Signature of Parent/Guardian

 Date

A copy of this consent form has been given to you to keep for your records and reference.

APPENDIX C

Academic Choices and Achievement Survey

Name: _____
School: _____
Grade: _____

We appreciate you participating in this study with us, and hope you will find this questionnaire both interesting and fun! The following pages contain a variety of questions about your activities, interests, likes, abilities, future plans, etc. We are interested in your opinion about these matters. Please read and answer each item carefully, and remember, there are no right or wrong answers. If you don't understand a question, don't spend a lot of time on it. Just go on to the next question.

All your answers will be kept confidential. Only those working on this research project will see your answers.

Part 1 Background Information

1. What is your date of birth? Month _____ Day _____ Year _____

2. Are you a _____ 1) Female _____ 2) Male

3. Who do you live with?

_____ Mother and father together

_____ Mother only

_____ Father only

_____ Mother + other adult

_____ Father + other adult

_____ Part of the time with each parent

_____ Other (specify) _____

	None	One	Two	Three	Four or more
4. How many brothers do you have?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	None	One	Two	Three	Four or more
5. How many sisters do you have?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. What is the highest level of education your parent(s) received?

Mother				Father			
some grade school	some high school	high school graduate	university, technical school or college	some grade school	some high school	high school graduate	university, technical school or college
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.	What language is most often spoken at home?	English <input type="checkbox"/>	Other <input type="checkbox"/>
----	---	-------------------------------------	-----------------------------------

8.	Which of the following courses are you taking at this time?	Language Arts/English <input type="checkbox"/>	Math <input type="checkbox"/>	Science <input type="checkbox"/>
----	---	---	----------------------------------	-------------------------------------

Part 2 General Questions About Yourself

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
--	-------------------	----------	----------------------------	-------	----------------

9.	I do my schoolwork because I want to learn new things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
----	--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

10.	I do my schoolwork because it's fun or interesting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

11.	I do my schoolwork because I feel bad if it's not done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

12.	I do my schoolwork because the teacher says I have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

13.	I do my schoolwork because it makes my parent(s) happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

14.	If I get stuck on a problem or make a mistake, I try and figure it out by myself, rather than asking the teacher for help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

15.	When a group I belong to plans an activity, I would rather organize it myself than have someone else organize it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

16.	I feel that winning is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	-----------------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

17.	I like myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	----------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Part 3 Questions About Your Dad

The following questions are about your dad or the person who is most like a dad to you. If this doesn't apply to you, go on to Part 4 - Questions About Your Mom

18.	What is your dad's main job?	Works full-time	Works part-time	Currently unemployed	Stay-at- home dad
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19.	My dad is happy with his main job.	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20.	I want to be like my dad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

21.	No matter how well I do in school, my dad doesn't think it's good enough.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

22.	My dad takes an interest in my activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

23.	I worry about what my dad will say if I don't do well at school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

24.	I like being with my dad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

25.	If I need help with my homework, I can count on my dad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Part 4 - Questions About Your Mom

The following questions are about your mom or the person who is most like a mom to you. If this doesn't apply to you, go on to Part 5 - General Questions About Your Parent(s)

26.	What is your mom's main job?	Works full-time	Works part-time	Currently unemployed	Stay-at- home mom
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
27. My mom is happy with her main job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. I want to be like my mom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. No matter how well I do in school, my mom doesn't think it's good enough.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. My mom takes an interest in my activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. I worry what my mom will say if I don't do well at school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. I like being with my mom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. If I need help with my homework, I can count on my mom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 5 - General Questions About Your Parent(s)

The following questions are about your parent, parents or guardian.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
34. It is important to my parent(s) that I do things for myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. I worry about letting my parent(s) down when I do my schoolwork.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. It is important to my parent(s) that I stick to a job until it is done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. It is important to my parent(s) that I will be able to support myself and a family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. It is important to my parent(s) that I am employed regularly when I finish high school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
39. It is important to my parent(s) that I go on to University or college after high school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. It is important to my parent(s) that I do well in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. It is important to my parent(s) that I have a successful career.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. My parent(s) and I talk about what courses/options I should take in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. My parent(s) and I talk about the future jobs that I might have.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. My parent(s) praise me for doing well.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. My parent(s) encourage me to do the best on everything that I do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 6 - Questions About Math

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
46. I think the math that I will learn this year will be useful for my future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. It is important to me to do well in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. I try to do the best I can in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. I find working on math assignments interesting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Compared to other subjects, math is useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. I like math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
52. I like math compared to other subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. I feel excited and challenged while doing math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. I would take more math courses even if I didn't have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. I feel that a more advanced math course would be too difficult for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. I have to work hard to get good grades in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. I am going to do well in math this year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. I am going to do as well in math this year as my teacher wants me to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. I am going to do as well in math this year as my parent(s) want me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. If I were to rank all the students in a math class, from the lowest to the highest, I would put myself in the highest group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. I am good at math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. I am good at learning something new in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. I would be successful in a career that required mathematical ability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. I get nervous when taking a test in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. My heart beats faster when I take a math test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. No matter how hard I try, I feel I just cannot understand math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
67. I get nervous if I have to explain my answer in front of a math class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. In general, I feel comfortable or okay asking a math teacher for help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. It is important to my parent(s) that I do well in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
70. In general, how much time do you spend on math homework most days?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 7 - Questions About Language Arts/English

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
71. I think the Language Arts/English that I will learn this year will be useful for my future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. It is important to me to do well in Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. I try to do the best I can in Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Compared to other subjects, Language Arts/English is useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. I find working on Language Arts/English assignments interesting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. I like Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. I like Language Arts/English compared to other subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
78. I feel excited and challenged while doing Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. I would take more Language Arts/English courses even if I didn't have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. I feel that a more advanced Language Arts/English course would be too difficult for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. I have to work hard to get good grades in Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. I am going to do well in Language Arts/English this year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. I am going to do as well in Language Arts/English this year as my parent(s) want me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. I am going to do as well in Language Arts/English this year as my teacher wants me to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. If I were to rank all the students in a Language Arts/English class, from the lowest to the highest, I would put myself in the highest group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. I am good at Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. I am good at learning something new in Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. I would be successful in a career that required writing and speaking ability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. While I am taking a test in Language Arts/English I get nervous.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
90. My heart beats faster when I take a Language Arts/English test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. No matter how hard I try, I feel I just cannot understand Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. I get nervous if I have to explain my answer in front of a Language Arts/English class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. I feel comfortable or okay asking a Language Arts/English teacher for help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. It is very important to my parent(s) that I do well in Language Arts/English.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
95. In a typical day, how much spare time do you spend reading books, comic books, or magazines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
96. In general, how much time do you spend on Language Arts/English homework most days?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 8 - Questions About Science

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
97. I think the science I am learning now will be useful for my future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98. It is important to me to do well in science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
99. I try to do the best I can in science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100. Compared to other subjects science is useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101. I find working on science assignments interesting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
102. I like science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103. I like science compared to other subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
104. I feel excited and challenged while doing science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
105. I would take more science courses even if I didn't have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
106. I feel that a more advanced science course would be too difficult for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
107. I have to work hard to get good grades in science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
108. I am good at science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
109. I am going to do well in science this year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110. I am going to do as well in science this year as my parent(s) want me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
111. I am going to do as well in science this year as my teacher wants me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
112.	If I were to rank all the students in science class from the lowest to the highest, I would put myself in the highest group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
113.	I am good at learning something new in science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.	I would be successful in a career that required scientific ability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
115.	When taking a test in science, I get nervous.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
116.	My heart beats faster when I take a science test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
117.	No matter how hard I try, I feel I just cannot understand science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
118.	I get nervous if I have to explain my answer in front of the science class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
119.	Students seem to like the science class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
120.	The science teacher is friendly to us.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
121.	The teacher makes science interesting in this class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
122.	I feel comfortable or okay asking a science teacher for help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
123.	My science teacher is more interested in smart kids than other kids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
124.	My science teacher shows more interest in the progress of boys than of girls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
125.	It is important to my parent(s) that I do well in science.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

126.	In a typical day, how much spare time do you spend doing science activities like collecting rocks, collecting insects, or doing experiments?	Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

127.	In general, how much time do you spend on science homework most days?	Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 9 - Questions About Computers

		Yes	No		
128.	Do you (or your family) own a computer?	<input type="checkbox"/>	<input type="checkbox"/>		

		5 or under	6-10	11-13	14 or over
129.	At what age did you first use a computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		At a friend's house	At school	At a relative's house	At home	At work/ other
130.	Where did you first use a computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
131.	I like computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

132.	I am good at doing things on the computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------	---	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

		Less than 15 min.	About 30 min.	About 45 min.	About an hour	More than an hour
133.	In a typical day, how much time do you spend on the computer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

134. When you are on a computer, how much of the time do you spend doing each of the following activities?

	None of the time	Less than half the time	Half of the time	More than half of the time	All of the time
Email	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surfing the 'net	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assignments/work on the computer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Programming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Playing Games	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 10 - Questions About Your Future and Career Choices

In the future, I would like a job that . . .

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
135. Allows me to earn a great deal of money.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
136. Has high status in society.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
137. Provides enough money to support me and my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
138. Gives me a chance to work on challenging projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
139.	Allows me to be my own boss most of the time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
140.	Gives me a chance to learn new skills and new things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
141.	Gives me an opportunity to make the world a better place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
142.	Gives me the ability to combine career and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

As things stand now, it is likely that I will:

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
143.	Finish high school, then go on to University or College.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
144.	Do more than one University degree (e.g. Master's, PhD. become a medical doctor, lawyer).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
145.	Get married.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
146.	Have children.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

It is likely that I will choose the following as a career option:

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
147.	Service/clerical (like childcare worker, beautician, secretary).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
148.	Trade (like welder, carpenter, plumber).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
149.	Protective or military service (like police, officer, firefighter, military).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
150.	Full-time homemaker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
151.	Farmer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
152.	Artist (like designer, interior decorator musician, actor).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
153.	Healthcare worker (like registered nurse physical therapist, pharmacist).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
154.	Health professional (like doctor, dentist, veterinarian).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
155.	Science or math-related professional (like engineer, architect, geologist).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
156.	Human services (like teacher, social worker, counsellor).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
157.	Environment-related (like forestry, marine biologist, environmental engineer).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
158.	Information Technology (like computer scientist, computer engineer).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
159.	Other professions (like lawyer, accountant, architect, stock broker).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 11 - Questions About Adult Roles in Society

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
160.	Men and women should contribute equally to the family income.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
161.	It is difficult for women to have successful careers and raise a family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
162.	It is difficult for men to have successful careers and raise a family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
163.	In general, men are better than women in science and engineering.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
164.	In general, women are better than men in math.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
165.	Women have better social skills than men do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
166.	All in all, it is better for the family if the husband provides most of the family's income and the wife takes care of the home and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
167.	Babies and young children need to have their mothers around most of the time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
168.	It is okay for mothers of babies and young children to have a full-time job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
169.	Women are better wives and mothers if they also have a paid job outside the home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
170.	If a husband and a wife both work full-time, the husband and wife should share the housework and childcare equally.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
171.	A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
172.	Women can handle the pressure just as well as men when making an important decision on the job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
173.	Having a job gives a wife a better chance to develop herself as a person than staying at home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 12 - Questions About Your Friends

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
174.	My friends influence the courses I will take in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
175.	My friends influence my future job plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
176.	In general, I prefer to do things with one or two friends, rather than with a large group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
177.	For me, being popular with girls is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
178.	I am popular with girls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
179.	For me, being popular with boys is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
180.	I am popular with boys.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
181.	I am good at making new friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
182.	All of my friends are concerned about being popular.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
183.	My friends are very concerned with status in social situations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
184.	All of my friends try hard at their studies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
185.	All of my friends get along well with their parent(s).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
186.	Friends encourage me to do my best in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
187.	I would act dumber than I really am to be popular with my friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
188.	It's ok to let your schoolwork slip or get a lower grade in order to be popular with your friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
189.	To be popular with my friends I sometimes don't try as hard as I could in school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 13 - Questions About Who Raised You

190. Who is the person in your life who raised you – that is, the person who mostly took care of you from the time you were born until age 5. (circle the correct answer):

1. Mother
2. Father
3. Other - _____ (describe the relationship - adoptive mother, grandmother, etc.)

Do you live with this person now? Yes / No

The following statements are about your relationship with that person.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
191.	My parent only seems to notice me when I am angry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
192.	I often feel angry with my parent without knowing why.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
193.	I get annoyed at my parent because it seems I have to demand his/her caring and support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
194.	I'm confident that my parent will listen to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
195.	I'm confident that my parent will try to understand my feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
196.	I talk things over with my parent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
197.	I enjoy helping my parent whenever I can.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
198.	I feel for my parent when he/she is upset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
199.	It makes me feel good to be able to do things for my parent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
200.	When I'm upset, I am sure that my parent will be there to listen to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
201.	I can count on my parent to be there for me when I need him/her.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
202.	My parent is always disappointing me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
203.	I never expect my parent to take my worries seriously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
204.	I think it is unfair to always have to handle problems by myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
205.	I get really angry because I never get enough help from my parent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
206.	I get really angry at my parent because I think he/she could make more time for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
207.	I'm afraid that I will lose my parent's love.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
208.	I have a terrible fear that my relationship with my parent will end.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
209.	I'm certain that my parent will always love me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX D**36 Survey Items Analyzed Through Multivariate Statistics**

- Q21* No matter how well I do in school, my dad doesn't think it's good enough.
- Q22 My dad takes an interest in my activities.
- Q23* I worry about what my dad will say if I don't do well at school.
- Q24 I like being with my dad.
- Q25 If I need help with my homework, I can count on my dad.
- Q27 My mom is happy with her main job.
- Q28 I want to be like my mom.
- Q29* No matter how well I do in school, my mom doesn't think it's good enough.
- Q30 My mom takes an interest in my activities.
- Q31* I worry about what my mom will say if I don't do well at school.
- Q32 I like being with my mom.
- Q33 If I need help with my homework, I can count on my mom.
- Q34 It is important to my parent(s) that I do things for myself.
- Q35* I worry about letting my parent(s) down when I do my schoolwork.
- Q36 It is important to my parent(s) that I stick to a job until it is done.
- Q37 It is important to my parent(s) that I will be able to support myself and a family.
- Q38 It is important to my parent(s) that I am employed regularly when I finish high school.
- Q39 It is important to my parent(s) that I go on to University or college after high school.
- Q40 It is important to my parent(s) that I do well in school.
- Q41 It is important to my parent(s) that I have a successful career.
- Q42 My parent(s) and I talk about what courses/options I should take in school.
- Q43 My parent(s) and I talk about the future jobs that I might have.

- Q44 My parent(s) praise me for doing well.
- Q45 My parent(s) encourage me to do the best on everything that I do.
- Q58 I am going to do as well in math this year as my teacher wants me to.
- Q 59 I am going to do as well in math this year as my parent(s) want me to.
- Q68 In general, I feel comfortable or okay asking a math teacher for help.
- Q69 It is important to my parent(s) that I do well in math.
- Q83 I am going to do as well in Language Arts/English this year as my parent(s) want me to do.
- Q84 I am going to do as well in Language Arts/English this year as my teacher wants me to.
- Q93 I feel comfortable or okay asking a Language Arts/English teacher for help.
- Q94 It is very important to my parent(s) that I do well in Language Arts/English.
- Q95 In a typical day, how much spare time do you spend reading books, comic books, or magazines?
- Q110 I am going to do as well in science this year as my parent(s) want me to do.
- Q111 I am going to do as well in science this year as my teacher wants me to do.
- Q125 It is important to my parent(s) that I do well in science.

*Item recoded for data analysis.

APPENDIX E**Exploratory Question #3: 28 Univariately Significant Survey Items**

- Q21* No matter how well I do in school, my dad doesn't think it's good enough.
- Q22 My dad takes an interest in my activities.
- Q24 I like being with my dad.
- Q25 If I need help with my homework, I can count on my dad.
- Q27 My mom is happy with her main job.
- Q28 I want to be like my mom.
- Q29* No matter how well I do in school, my mom doesn't think it's good enough.
- Q30 My mom takes an interest in my activities.
- Q31* I worry about what my mom will say if I don't do well at school.
- Q32 I like being with my mom.
- Q33 If I need help with my homework, I can count on my mom.
- Q36 It is important to my parent(s) that I stick to a job until it is done.
- Q38 It is important to my parent(s) that I am employed regularly when I finish high school.
- Q39 It is important to my parent(s) that I go on to University or college after high school.
- Q40 It is important to my parent(s) that I do well in school.
- Q41 It is important to my parent(s) that I have a successful career.
- Q44 My parent(s) praise me for doing well.
- Q45 My parent(s) encourage me to do the best on everything that I do.
- Q58 I am going to do as well in math this year as my teacher wants me to.
- Q 59 I am going to do as well in math this year as my parent(s) want me to.
- Q69 It is important to my parent(s) that I do well in math.
- Q83 I am going to do as well in Language Arts/English this year as my parent(s) want me to do.

- Q84 I am going to do as well in Language Arts/English this year as my teacher wants me to.
- Q94 It is very important to my parent(s) that I do well in Language Arts/English.
- Q95 In a typical day, how much spare time do you spend reading books, comic books, or magazines?
- Q110 I am going to do as well in science this year as my parent(s) want me to do.
- Q111 I am going to do as well in science this year as my teacher wants me to do.
- Q125 It is important to my parent(s) that I do well in science.

*Item recoded for data analysis.

APPENDIX F

Item Number and Effect Size

- Q21* No matter how well I do in school, my dad doesn't think it's good enough, ($d = 0.326$: small).
- Q22 My dad takes an interest in my activities, ($d = 0.342$: small).
- Q24 I like being with my dad, ($d = 0.512$: medium).
- Q25 If I need help with my homework, I can count on my dad, ($d = 0.441$: medium).
- Q28 I want to be like my mom, ($d = 0.156$: trivial).
- Q29* No matter how well I do in school, my mom doesn't think it's good enough, ($d = 0.356$: small).
- Q30 My mom takes an interest in my activities, ($d = 0.269$: small).
- Q31* I worry about what my mom will say if I don't do well at school, ($d = 0.192$: trivial).
- Q32 I like being with my mom, ($d = 0.574$: medium).
- Q33 If I need help with my homework, I can count on my mom, ($d = 0.607$: medium).
- Q36 It is important to my parent(s) that I stick to a job until it is done, ($d = 0.119$: trivial).
- Q39 It is important to my parent(s) that I go on to University or college after high school, ($d = 0.154$: trivial).
- Q40 It is important to my parent(s) that I do well in school, ($d = 0.180$: trivial).
- Q41 It is important to my parent(s) that I have a successful career, ($d = 0.253$: small).
- Q44 My parent(s) praise me for doing well, ($d = 0.244$: small).
- Q45 My parent(s) encourage me to do the best on everything that I do, ($d = 0.430$: small).
- Q 59 I am going to do as well in math this year as my parent(s) want me to, ($d = 0.641$: medium).
- Q69 It is important to my parent(s) that I do well in math,

($d = 0.318$: small).

Q83 I am going to do as well in Language Arts/English this year as my parent(s) want me to do, ($d = 0.414$: small).

Q94 It is very important to my parent(s) that I do well in Language Arts/English, ($d = 0.322$: small).

Q110 I am going to do as well in science this year as my parent(s) want me to do, ($d = 0.454$: small).

Q125 It is important to my parent(s) that I do well in science, ($d = 0.228$: small).

*Item recoded for data analysis.