

3-3-2006

Gender and Educational and Occupational Choices

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Gender and Educational and Occupational Choices

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NJIT

March 6, 2006

Acknowledgements: This research was funded by grants from NIMH, NSF, and NICHD to Eccles and by grants from NSF, Spencer Foundation and W.T. Grant to Eccles and Barber

Why Do Women and Men Make Such Different Choices for Their Lives?

- In most cultures, women and men are concentrated in quite different occupations and roles.
- Why?
- My goal today is to provide one perspective on this quite complex question – a perspective grounded in Expectancy – Value Models of Achievement-related Choices

Overview

- I began my research work in this area focused on one specific question:
- WHY ARE FEMALES LESS LIKELY TO GO INTO MATH AND PHYSICAL SCIENCE THAN MALES?

Overview 2

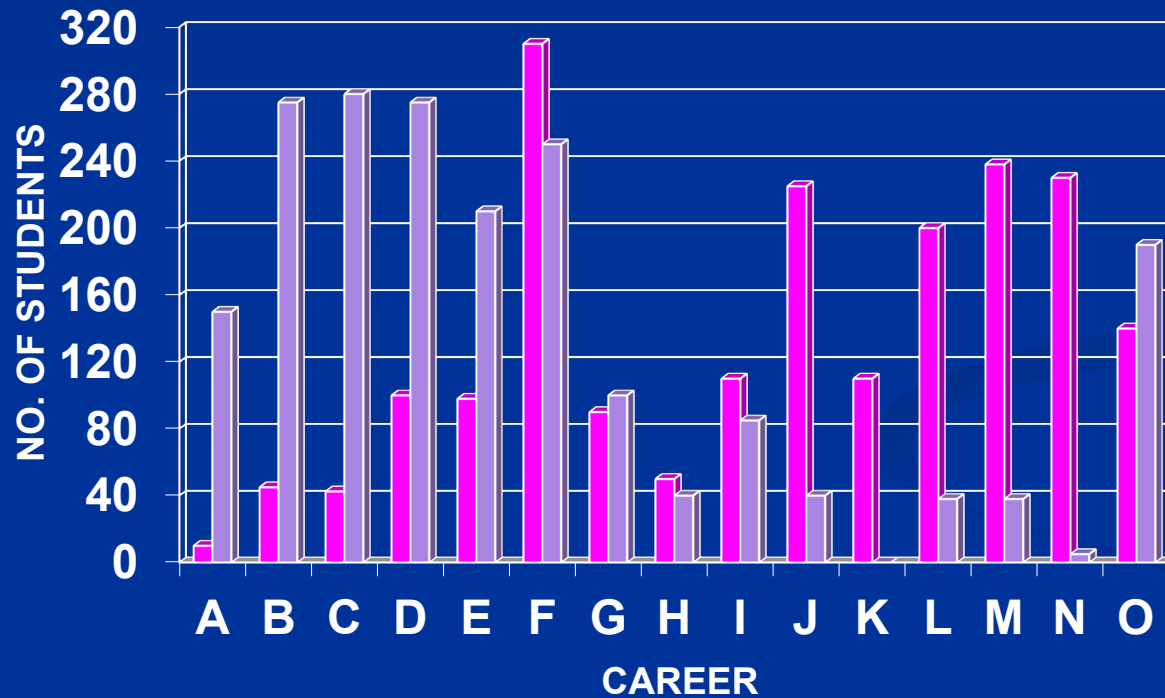
- I became increasingly aware, however, that this question is a subset of two much more general questions:
- WHY DOES ANYONE DO ANYTHING?
- WHAT PSYCHOLOGICAL, BIOLOGICAL, AND SOCIAL FORCES INFLUENCE THE CRITICAL CHOICES PEOPLE MAKE ABOUT HOW TO SPEND THEIR TIME AND THEIR LIVES?

Goals

- Provide an overview of gender differences in occupational plans and choices
- Discuss alternative explanations for these differences – focusing on my Expectancy – Value Model of Achievement-Related Choices
- Summarize our research findings relevant to this question and this model

Student responses to The Job Picture Story and Typical Day When I'm Thirty Essay

K-12 CAREERS



Females
Males

	FEMALE	MALE
A	5%	95%
B	14%	86%
C	13%	87%
D	27%	73%
E	32%	68%
F	55%	45%
G	48%	52%
H	55%	45%
I	61%	39%
J	85%	15%
K	98%	2%
L	85%	15%
M	87%	13%
N	97%	3%
O	42%	58%
N=	1987	N=1962

TOTAL N= 3949

A TRUCKDRIVER, CARPENTER, MECHANIC
 B PROFESSIONAL ATHLETE
 C POLICE, FIREFIGHTER, MILITARY, PILOT
 D SCIENTIST. ENGINEER, COMPUTER SCI.
 E EXECUTIVE, BUSINESSPERSON, BANKER

F DOCTOR, LAWYER, ARCHITECT, ACCT'NT
 G ARTIST, ROCK STAR,SINGER, MUSICIAN
 H REPORTER, WRITER, TV ANNOUNCER
 I VETERINARIAN, FOREST RANGER, FARMER
 J TEACHER

K NURSE
 L MODEL, DESIGNER, MOVIE STAR, DANCER
 M SECRETAR, FLIGHT, ATT. SALES CLERK
 N UNPAID WORKER (HOMEMAKER, PARENT)
 O THER

Participation in M/S/E careers

- In 1997, women represented
 - * 23% of all scientists and engineers
 - * 63% of psychologists
 - * 42% of biologists
 - * 10% of physicists/astronomers
 - * 9% of engineers

Source: National Science Foundation,
2000

Bachelor's degrees in 2000

<i>Percents</i>	Women	Men
Total M/S/E	28.0	36.9
Physical	0.8	1.6
Engineering	1.7	8.8
Math/CS	2.2	6.2
Earth	0.2	0.5
Biological	6.5	6.8
Social	8.6	9.7
Psychology	8.0	3.3

Source:
NSF 02-327

Differences on Academic Indicators

- Females Earn Better School Marks than Males in All Subjects Areas at All Grade Levels
- Males Score Better than Females on Timed Standardized Tests Scores on Many Subject Areas
- Females are Now More Likely than Males to Pursue Many Forms of Advanced Education
- Males are More Likely than Females to be Placed in Remedial Educational Programs, to be Expelled from School, and to Drop Out of School Prematurely

Common Explanations

■ Biological Differences

■ Brain differences –

■ Hemispheric Specialization

- May be linked to verbal and spatial skills

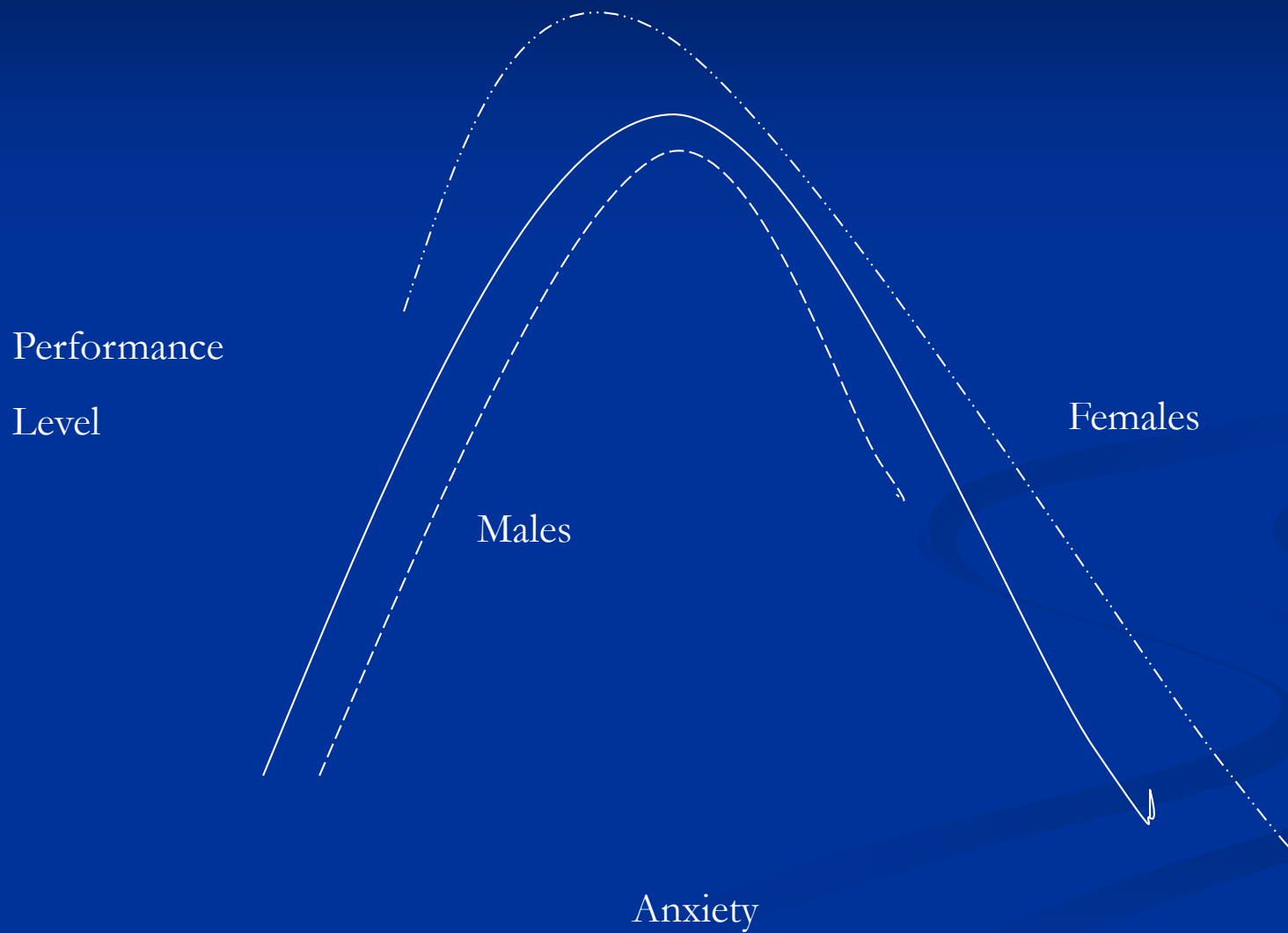
■ Specialized Sensitivities for Learning and Interests

- Such as preferences for speech input and faces versus mechanical objects
- Do not know the actual mechanisms but genetic studies suggest these may be heritable and may be sex-linked

■ Disabilities

- Learning particular types of materials
- Social intelligence
- Anxieties

Anxiety and Performance



Common Explanations

■ Hormonal

■ Prenatal

- Linked to developing organizational structure of brain and other hormonal systems

■ Postnatal

- Right after birth hormonal peaks
- Puberty
- Adulthood
- Activational systems

Psychological Differences

- Ability Self Concepts for Different Skill Areas
- Domain Specific Interests and Preferences
- More General Differences in Values and Goals
- Anxieties

Social Experiences

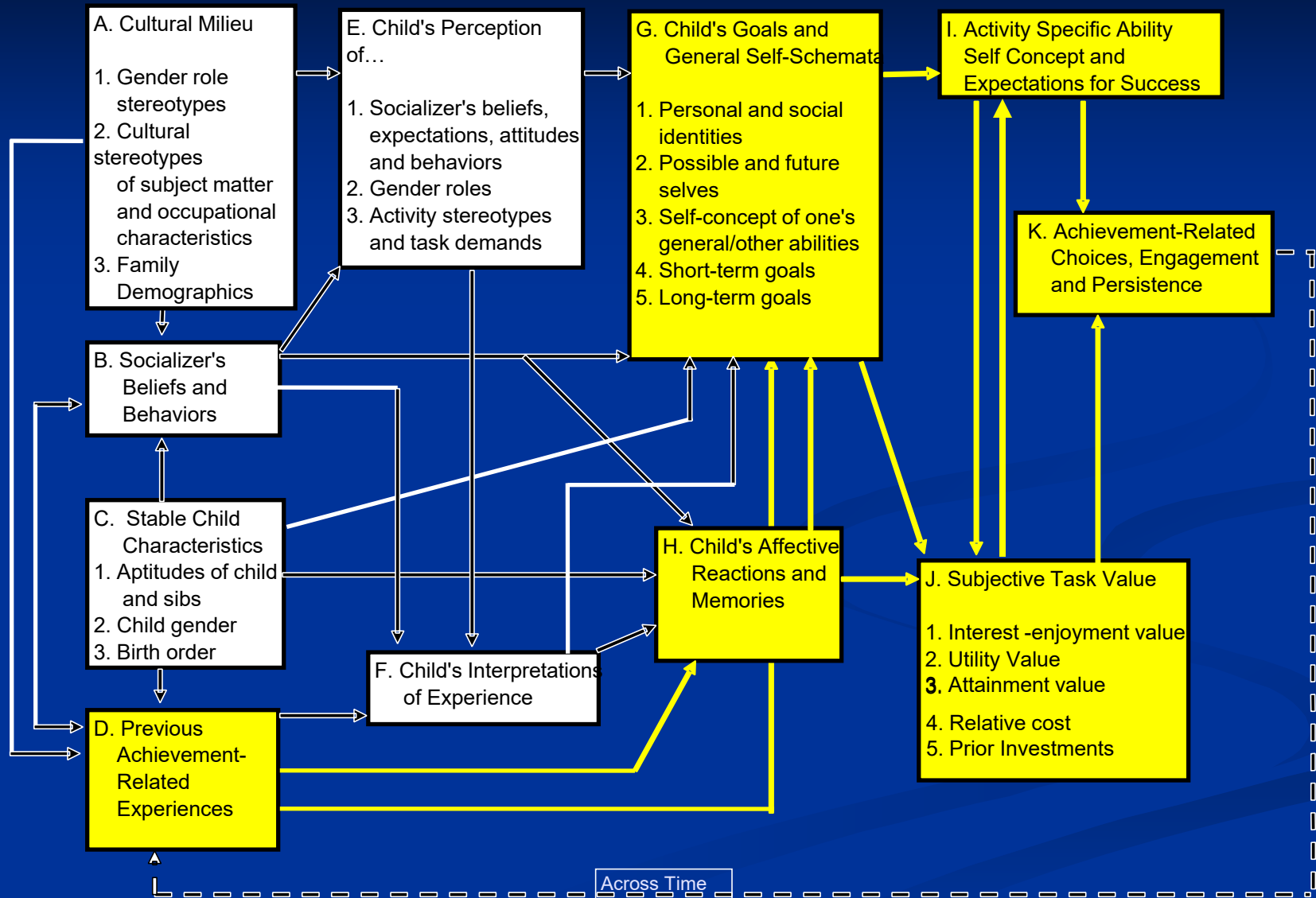
- Family and Peers
 - Role Models
 - Expectations
 - Provision of Differential Experiences
- Schools and Larger Society
 - Differential Treatment
 - Differential Teaching Practices for Different Subject Areas

- Very Difficult to Distinguish These Hypotheses
- All are Likely Influences
- In addition, People Self-Socialize into the Culturally Approved Social Roles and Niches

Final View

- Put the question into a larger perspective –
- Why does anyone do anything?

**Figure 1. General Expectancy Value Model of Achievement Choices:
Yellow Boxes = Proximal Self-Relevant Beliefs**



Subjective Task Value

1. Interest Value – Enjoyment one gets from doing the activity itself
2. Utility Value – Relation of the activity to one's short and long range goal

Subjective Task Value Continued

3. Attainment Value: Extent to which engaging in the activity confirms an important component on one's self-schema or increases the likelihood of obtaining a desired future self or avoiding an undesired future self.
 - a. Individuals seek to confirm their possession of characteristics central to their self-schema.
 - b. Various tasks provide differential opportunities for such confirmation.
 - c. Individuals will place more value on those tasks that provide the opportunities for this confirmation.
 - d. Individuals will be more likely to choose those activities that have high attainment value.

Subjective Task Value Continued

4. Cost —

Psychological Costs

Fear of Success, Fear of Failure,

Anxiety

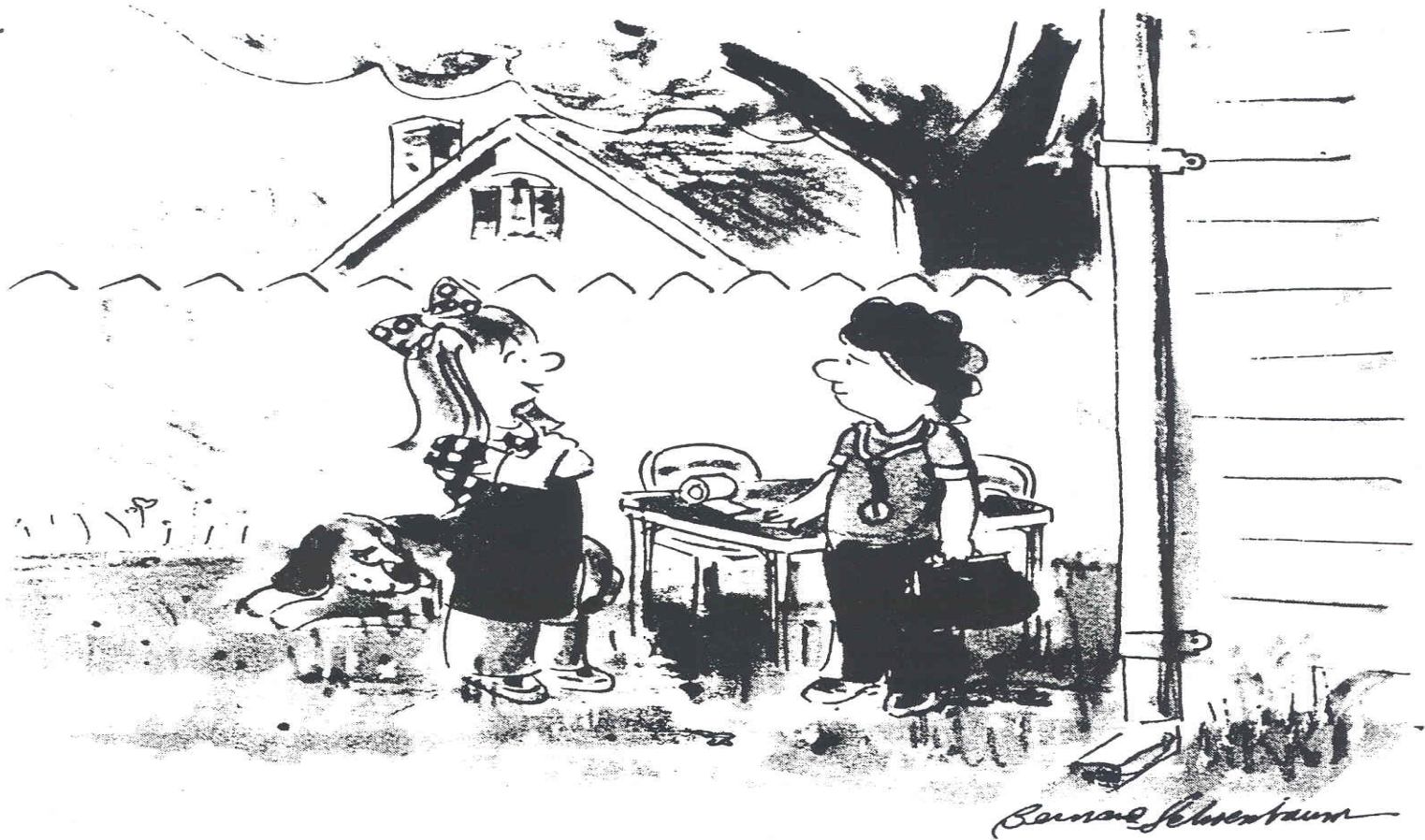
Financial Costs

Lost Opportunities to Fulfill Other Goals
or to do Other Activities

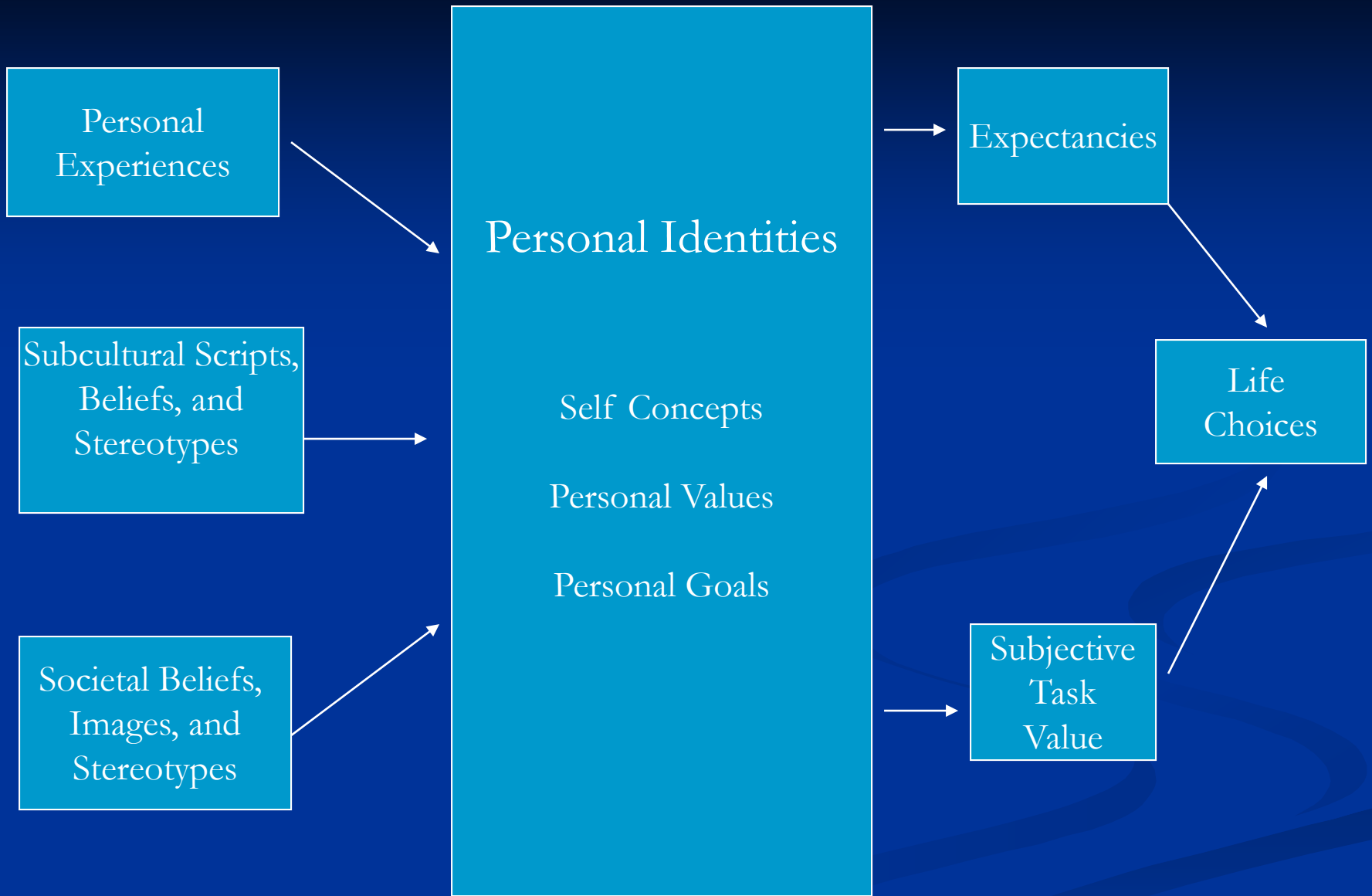
Key Features of Model

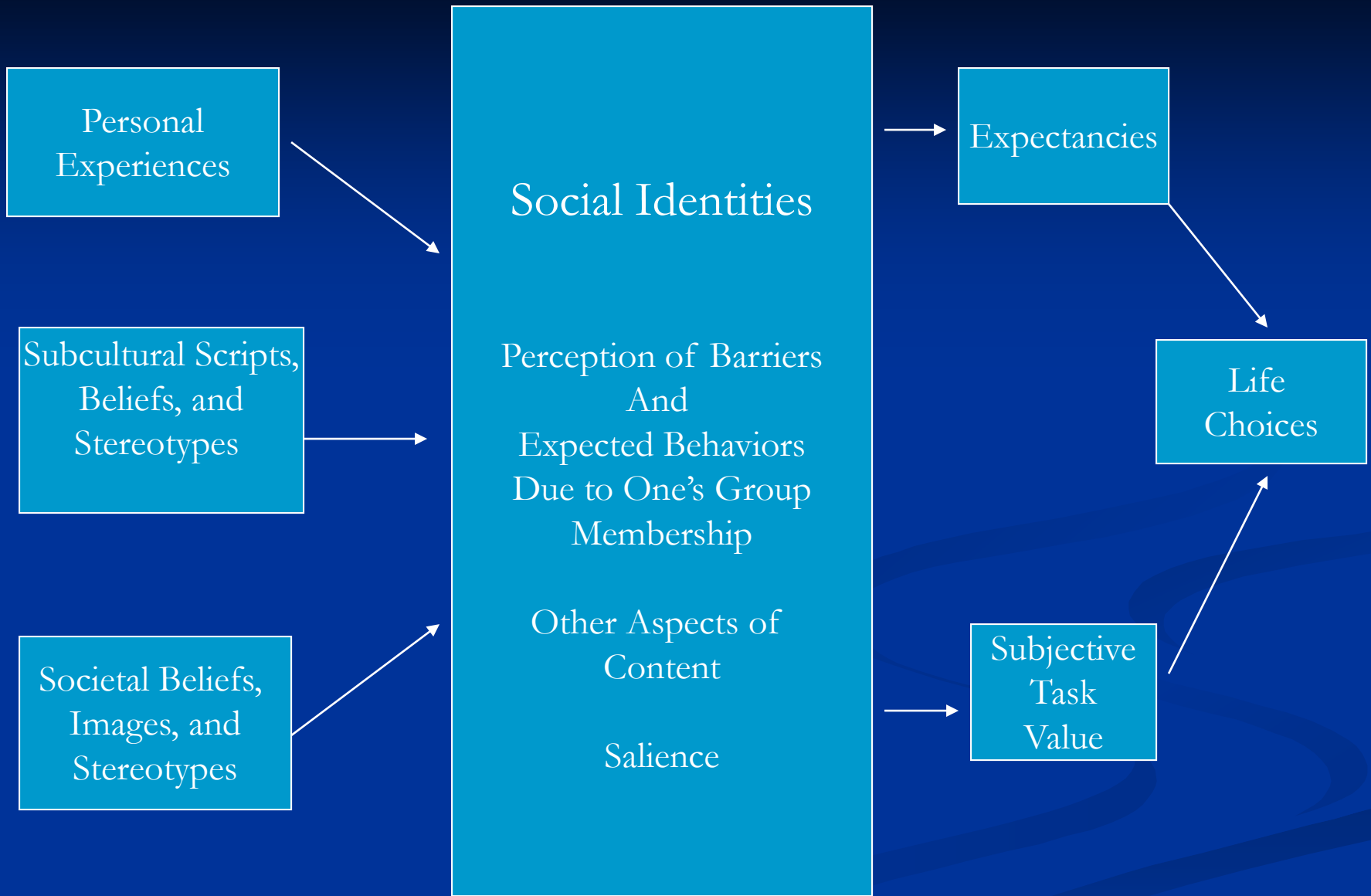
1. Focuses on Choice not on Deficits
2. Points Out Importance of Studying the Origins of Individuals' Perception of the Range of Possible Options
3. Focuses on the Fact that Choices are made from a Wide Range of Positive Options

- How Does This Relate To Gender?



"O.K., you be the doctor, and I'll be the Secretary of Health and Human Services."





Gender and Ability Self Concepts and Personal Expectations

- Cultural Stereotypes about Which Gender is Supposed to be Good at Which Skills
- Extensive Socialization Pressures to Make Sure These Stereotypes are Fulfilled

Gender-Roles and Subjective Task Value

1. Different Hierarchies of Core Personal Values
 - a. Concern with Social Goals versus Concern with Power or Achievement Goals;
 - b. Concern with Social Relationships versus concern with Individual Achievement and Status.
 - c. Interest in Things versus Interest in People.
 - d. Interest in Cooperation versus Interest in Competition
2. Density of Hierarchy
 - a. Single-mindedness versus Diverse Interests

Gender-Roles and Subjective Task Value Continued

3. Different Long Range Goals
4. Different Definitions of Success in Various Goals and Roles.
 - a. What does it take to be a successful father versus a successful mother?
 - b. What does it take to be a successful professional?
 - c. What does it take to be a successful human being?

Gender Differences in Values Among Gifted Children and Youth

1. Activity Interests

- a. Females less interested than males in physics, chemistry
- b. Females more interested in English, foreign languages, music, drama, medical-related majors, and biological sciences
- c. Females more interested in reading, writing and domestic activities and arts and crafts
- d. Females less interested in sports, working with machines, tools, and electronic equipment

Gender Differences in Values Among Gifted Children and Youth

Continued

2. Personal Values

- a. Females score higher on social and aesthetic values
- b. Females score lower on theoretical, economic and political values

3. Density of Values

- a. Females tend to rate a broader range of activities and future roles as important than do males.
- b. Males are more likely to rate a few activities very high and the remaining activities very low.

Michigan Study of Adolescent Life Transitions (MSALT)

U of M Affiliated Investigators:

Waves 1-4

Jacque Eccles

Carol Midgley

Allan Wigfield

Jan Jacobs

Connie Flanagan

Harriet Feldlaufer

David Reuman

Doug MacIver

Dave Klingel

Doris Yee

Christy Miller Buchanan

Waves 5-8

Jacque Eccles

Bonnie Barber

Lisa Colarossi

Deborah Jozefowicz

Pam Frome

Sarah Lord

Mina Vida

Robert Roeser

Laurie Meschke

OVERVIEW OF DESIGN AND SAMPLE: MICHIGAN STUDY OF ADOLESCENT LIFE TRANSITIONS – MSALT

- DESIGN:** On-going Longitudinal Study of One Birth Cohort
Data Collected in Grades 6, 7, 10, 12; and again at Ages 20 and 25
Data Collected from Adolescents, Parents, and School – Most Using Survey Forms
- SAMPLE:** Nine School Districts
Approximately 1,200 Adolescents
Approximately 90% White
Approximately 51% Female
Working/Middle Class Background

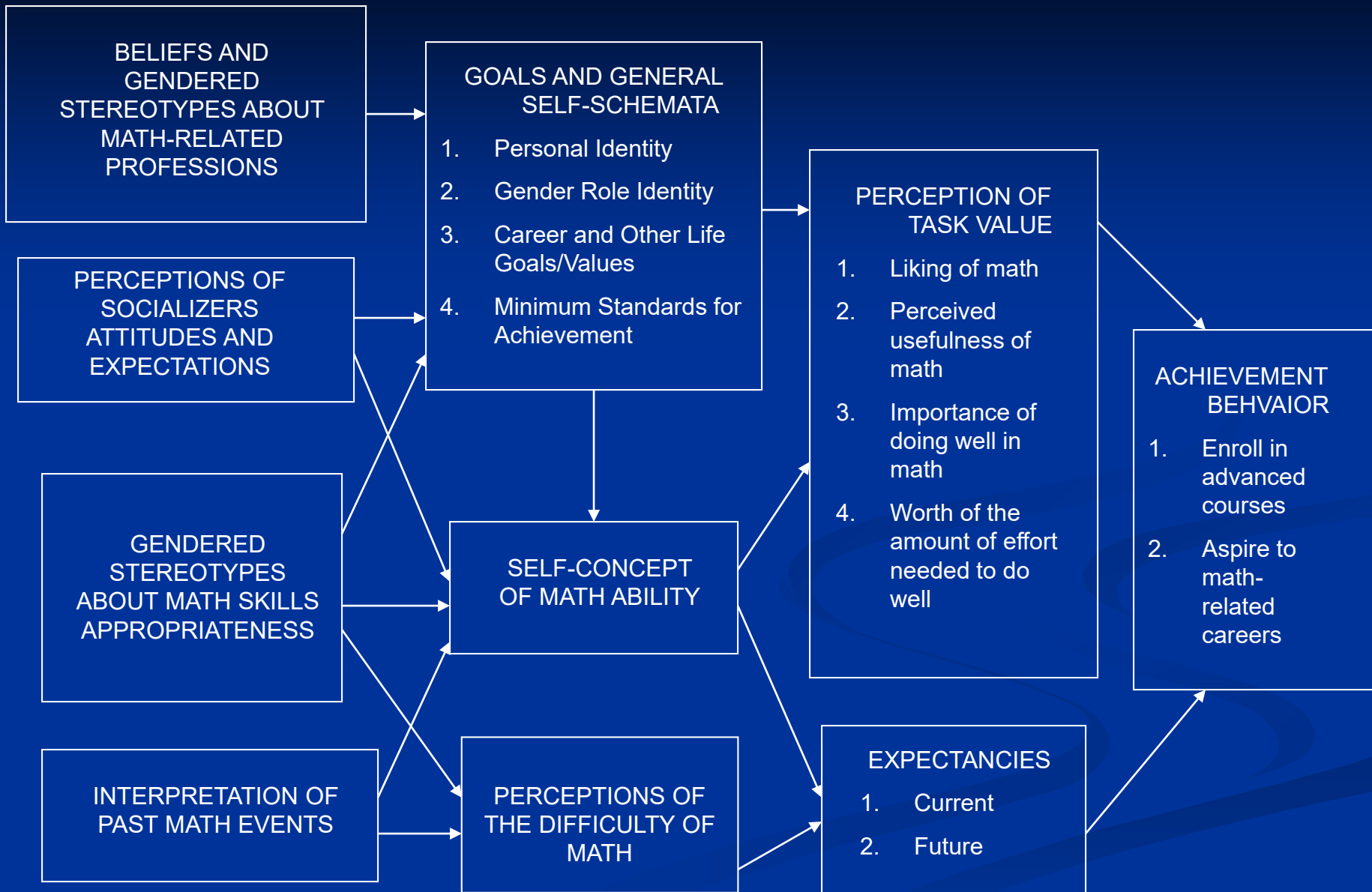
Michigan Study of Adolescent/Adult Life Transitions: MSALT

Time 1 Time 2 Time 3

YEAR	Fall 1983	Spring 1984	Fall 1984	SPRING 1985	1988	1990	1992	1996	2000
GRADE	6th	6th	7th	7th	10th	12th	2 years after H.S.	6 years after H.S.	9 years after H.S.
WAVE	1	2	3	4	5	6	7	8	9
YOUTH SURVEY	ê	ê	ê	ê	ê	ê	ê	ê	ê
PARENTS SURVEY	ê	ê	ê	ê	ê	ê			ê
TEACHER QUESTIONNAIR E	ê	ê	ê	ê					
RECORD DATA	ê	ê	ê	ê	ê	ê			
FACE TO FACE INTERVIEW							ê +		

MSALT Sample General Characteristics

- School based sample drawn from 10 school districts in the small city communities surrounding Detroit.
- Predominantly White, working and middle class families
- Approximately 50% of sample of youth went on to some form of tertiary education
- Downsizing of automobile industry caused major economic problems while the youth were in secondary school



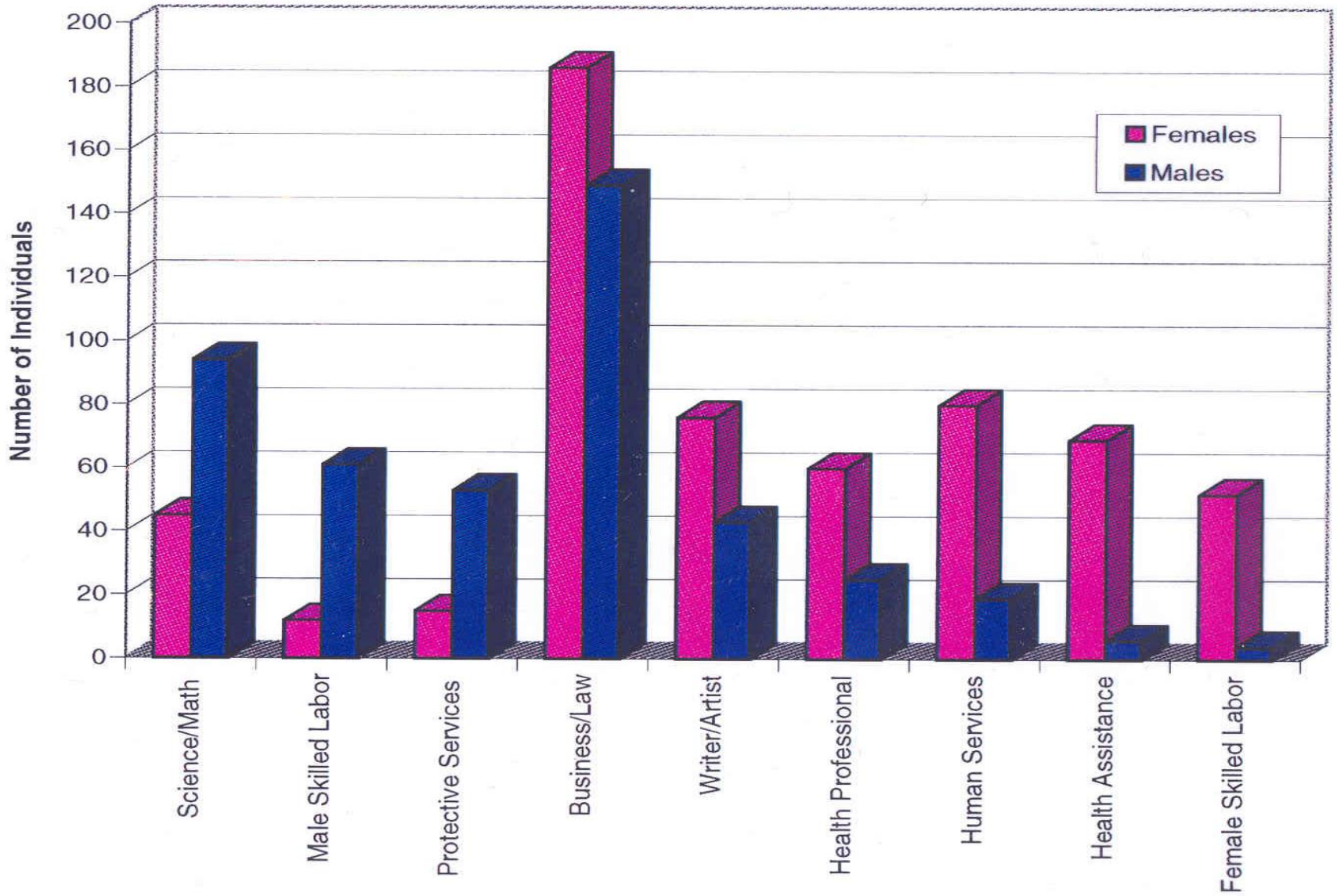
Two Basic Questions

ARE THERE GENDER DIFFERENCES ON
THESE SELF-RELATED BELIEFS?

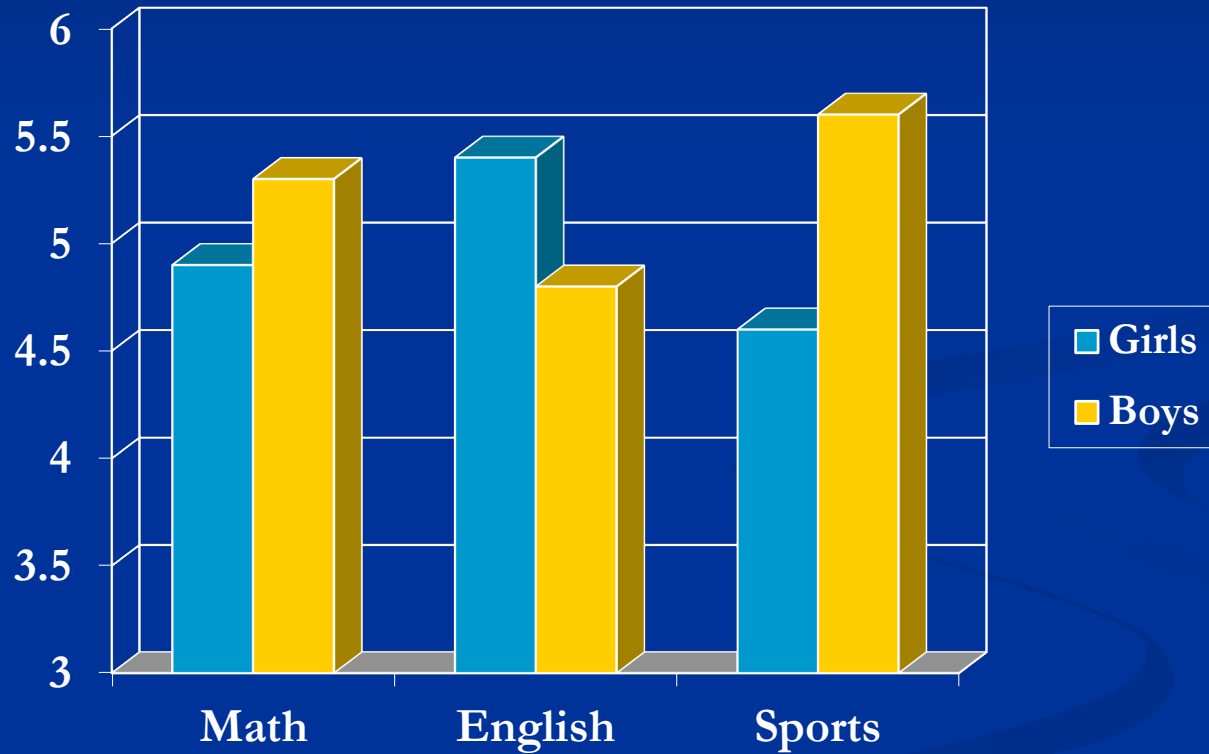
DO THE GENDER DIFFERENCES IN
THESE SELF-RELATED BELIEFS
MEDIATE THE GENDER DIFFERENCES
IN INVOLVEMENT?

BUT FIRST, ARE THERE GENDER
DIFFERENCES IN LONG TERM
OCCUPATIONAL PLANS?

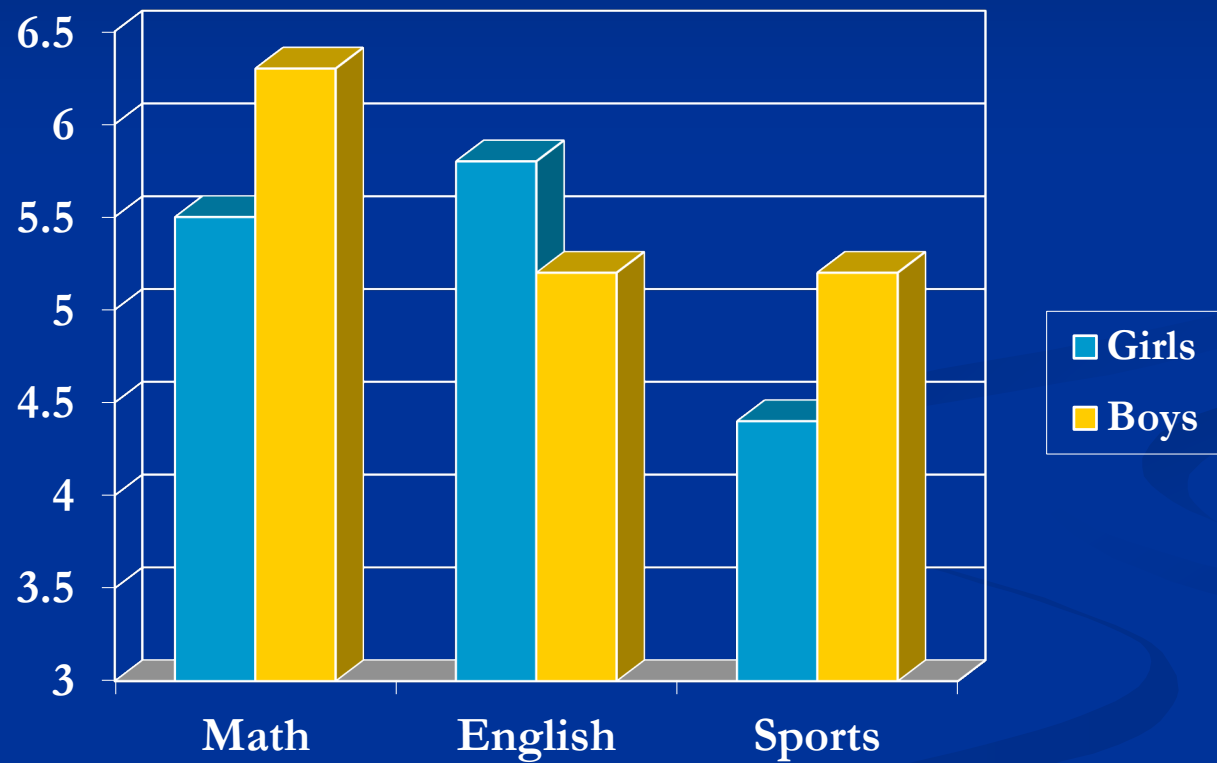
Occupational Aspirations



Gender Differences in Ability Self Concepts – 7th Grade



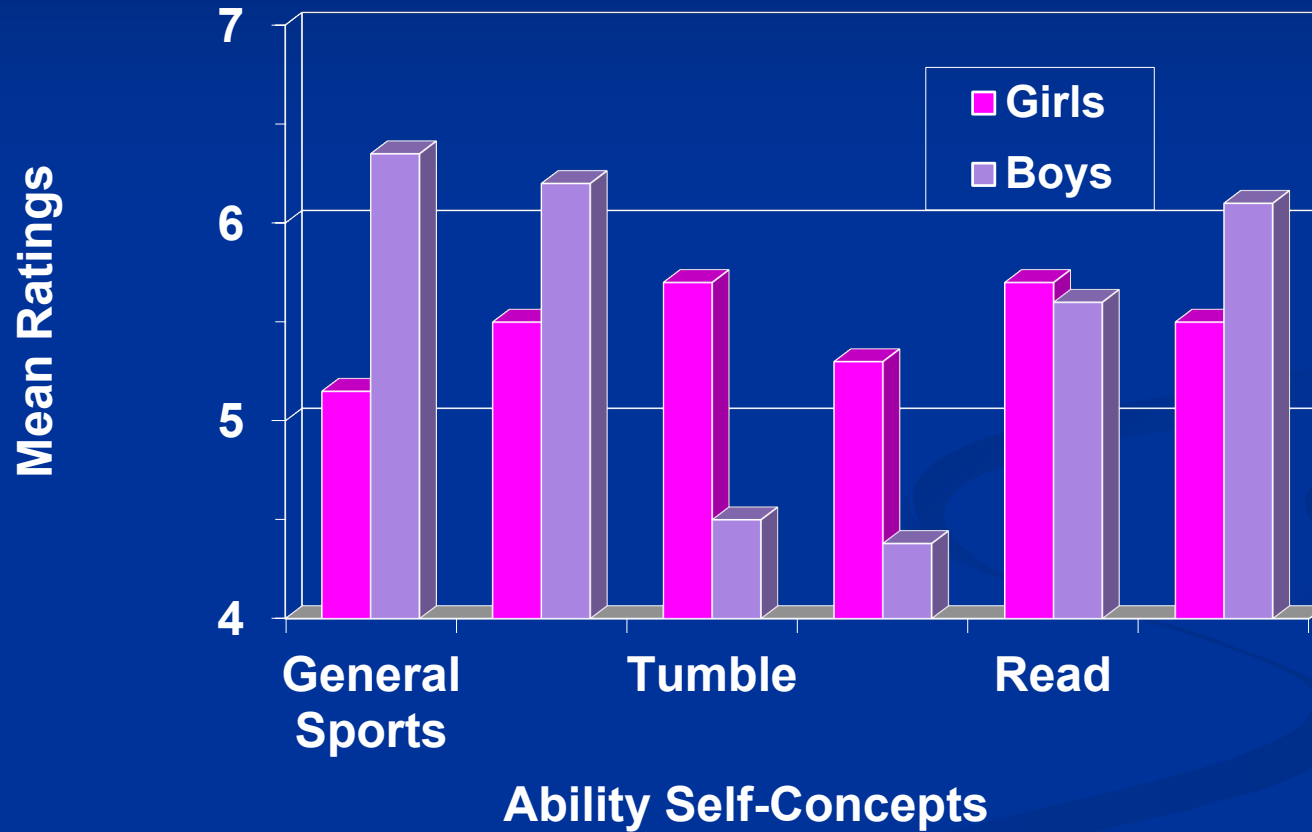
Gender Differences in Subjective Task Value – 7th Grade



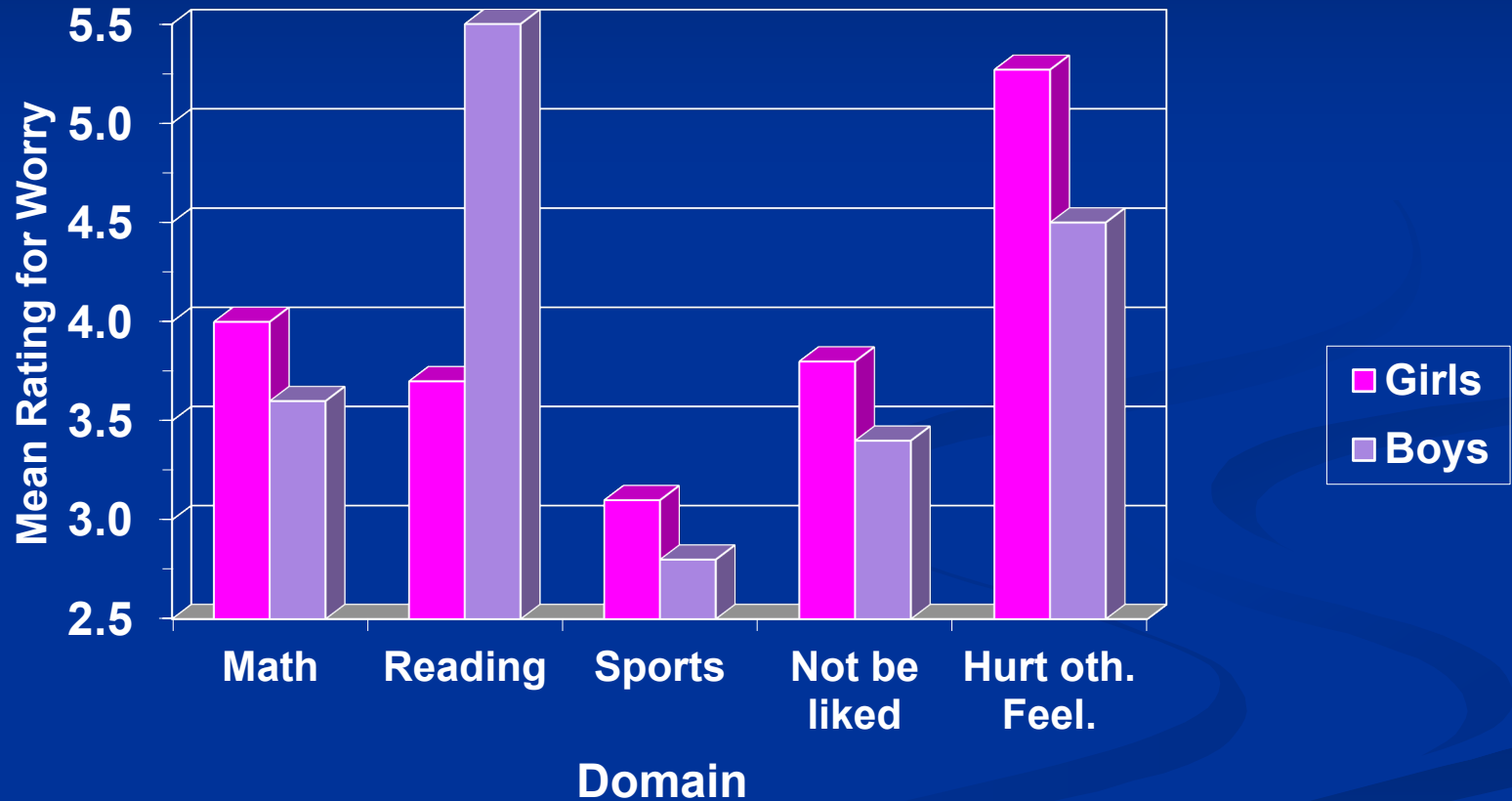
How Young Do These Differences Emerge

- Childhood and Beyond Study
 - Similar Measures
 - Similar Population in Southeastern Michigan
 - 4 Middle Class School Districts
 - Primarily White
 - 3 Cohorts Beginning in 1st, 2nd, and 4th grades
 - Followed Longitudinally until age 22

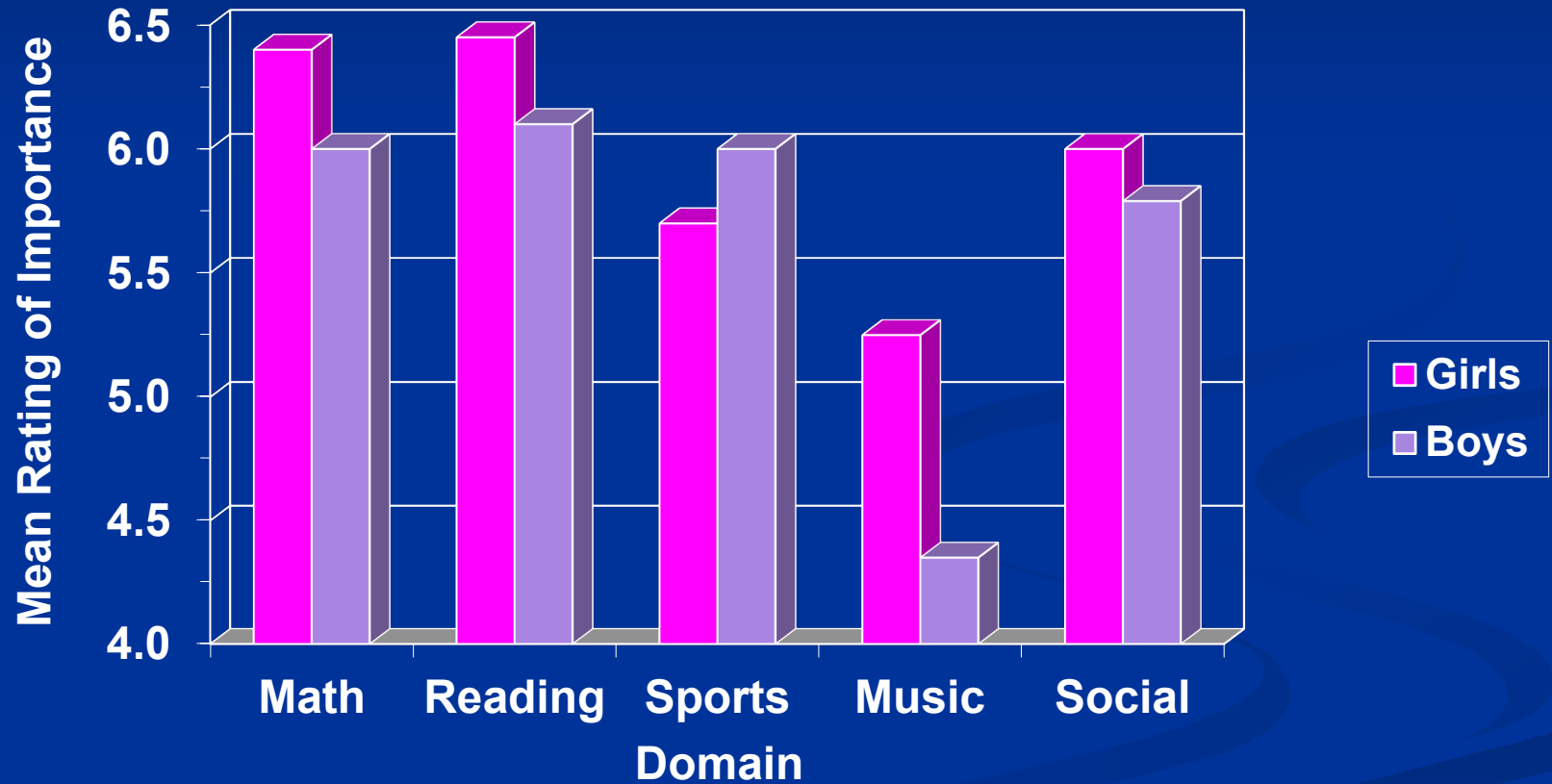
Gender Differences in Ability Self-Concepts: 1st, 2nd, & 4th Graders



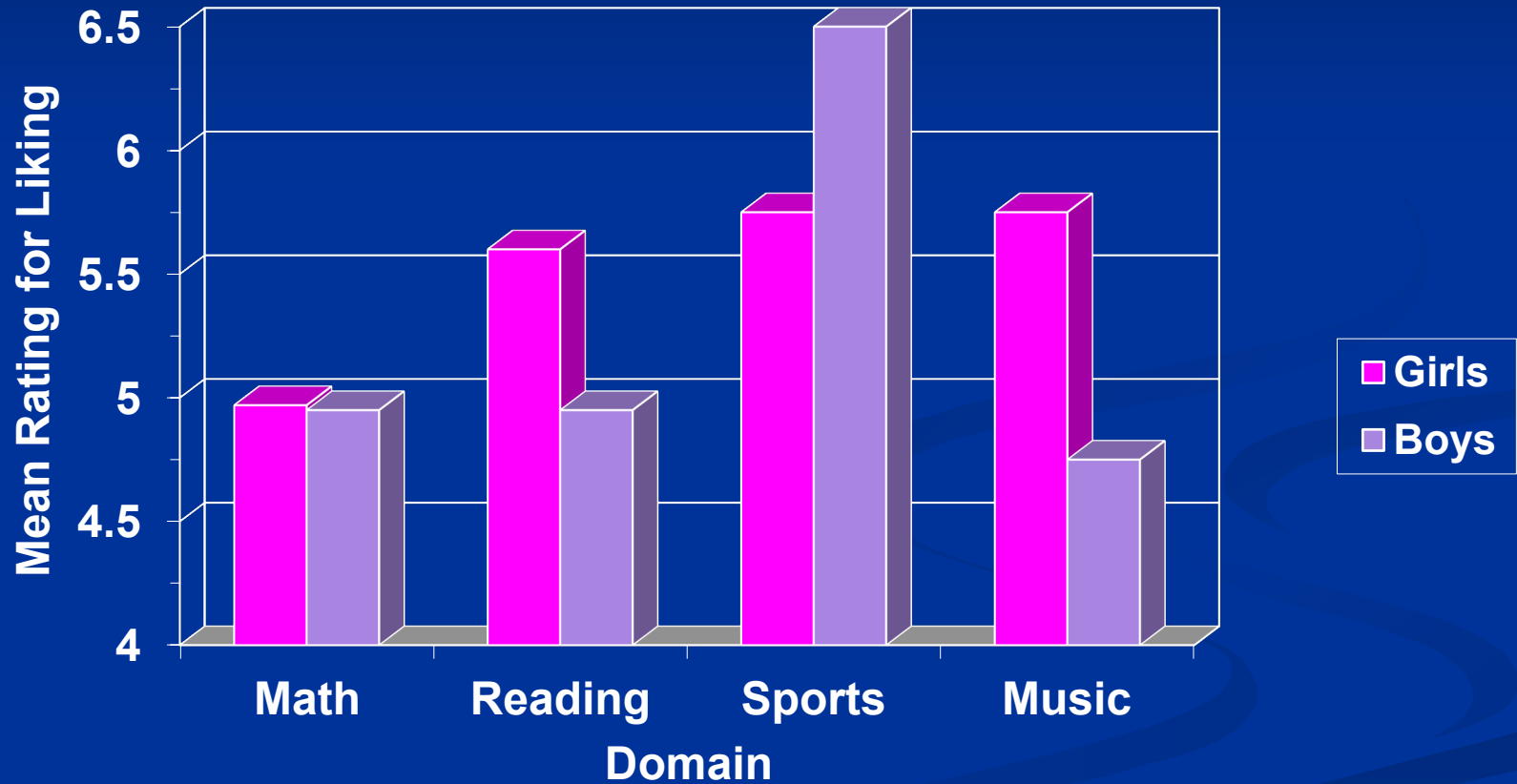
WORRY ABOUT PERFORMANCE ACROSS DOMAINS



IMPORTANCE OF ABILITY IN DIFFERENT DOMAINS



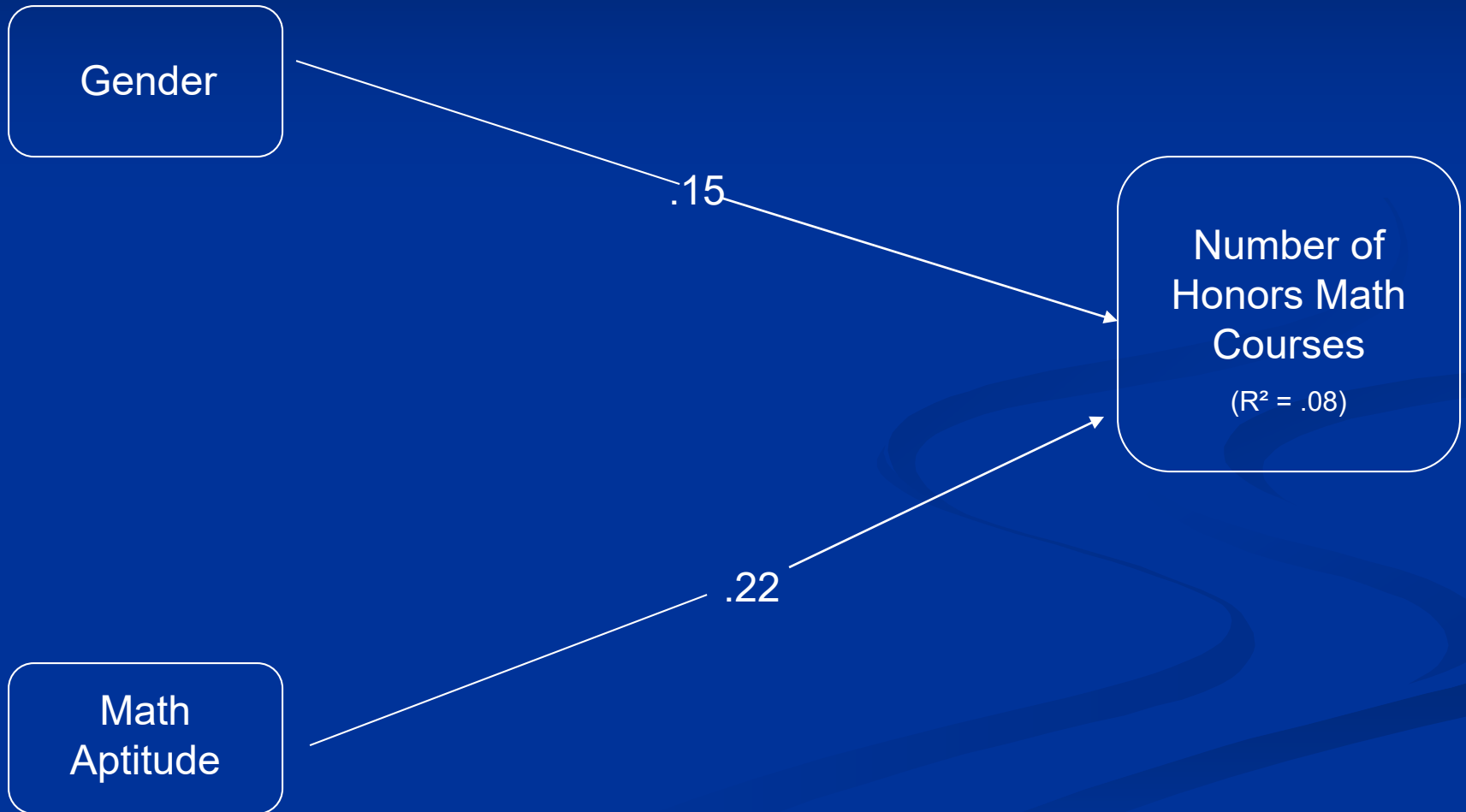
Enjoyment of Different Domains



Conclusion

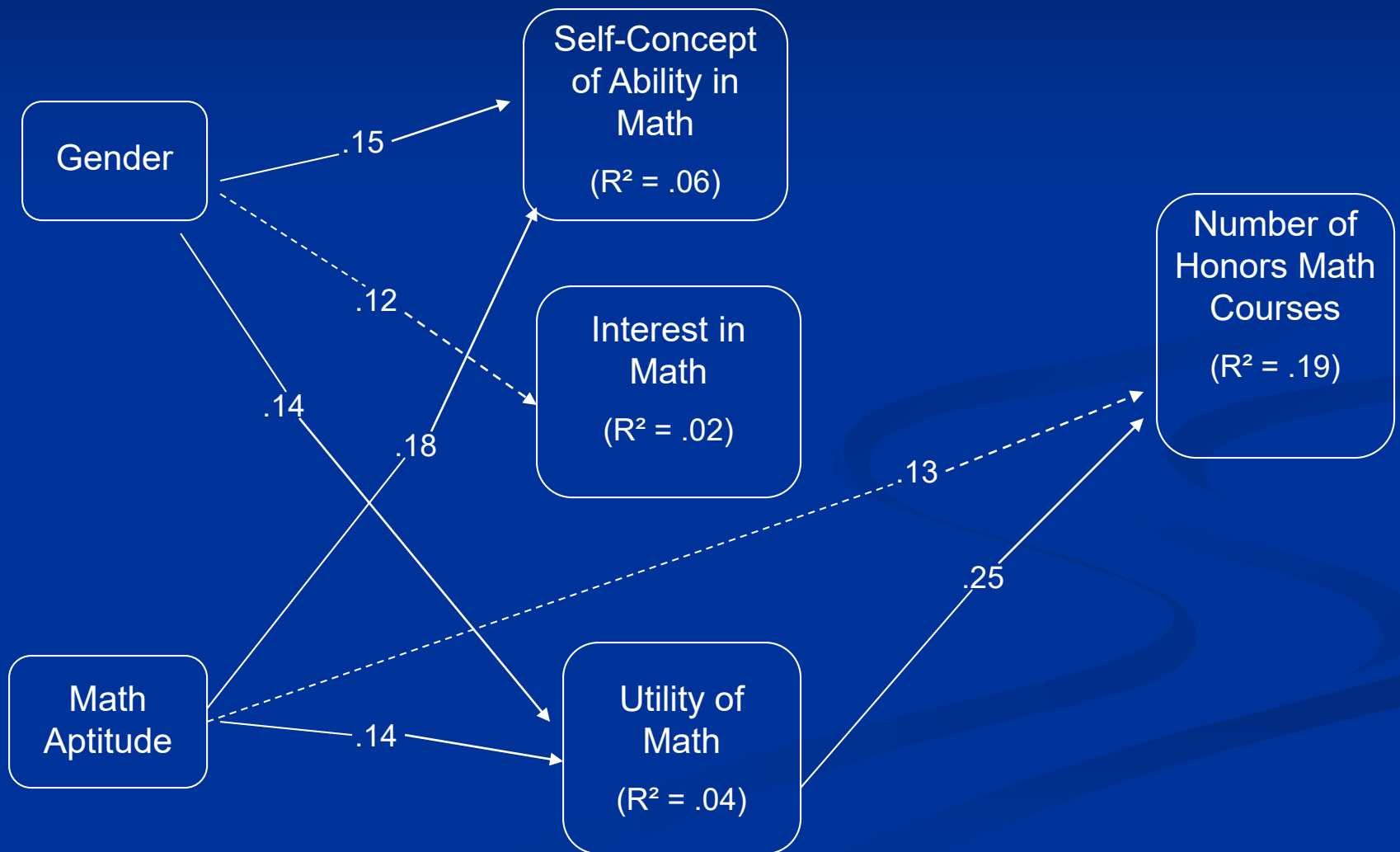
- Gender Differences Occur across Several Domains for Both Ability Self Concepts and Subjective Task Values
- Gender Differences Emerge Quite Young
- Do These Differences Mediate Gender Differences in Course Taking and Activity Involvement?

Predicting Number of Honors Math Classes (sex, DAT)
N = 223 (honors students)

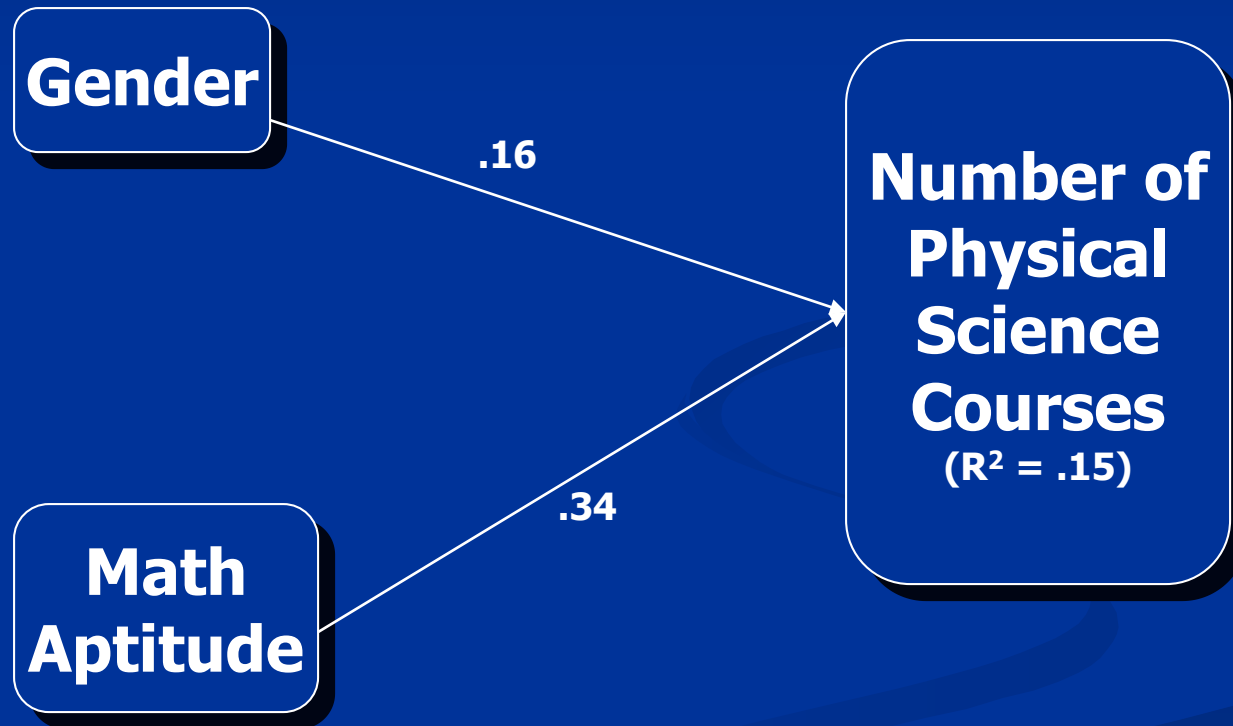


Predicting Number of Honors Math Classes

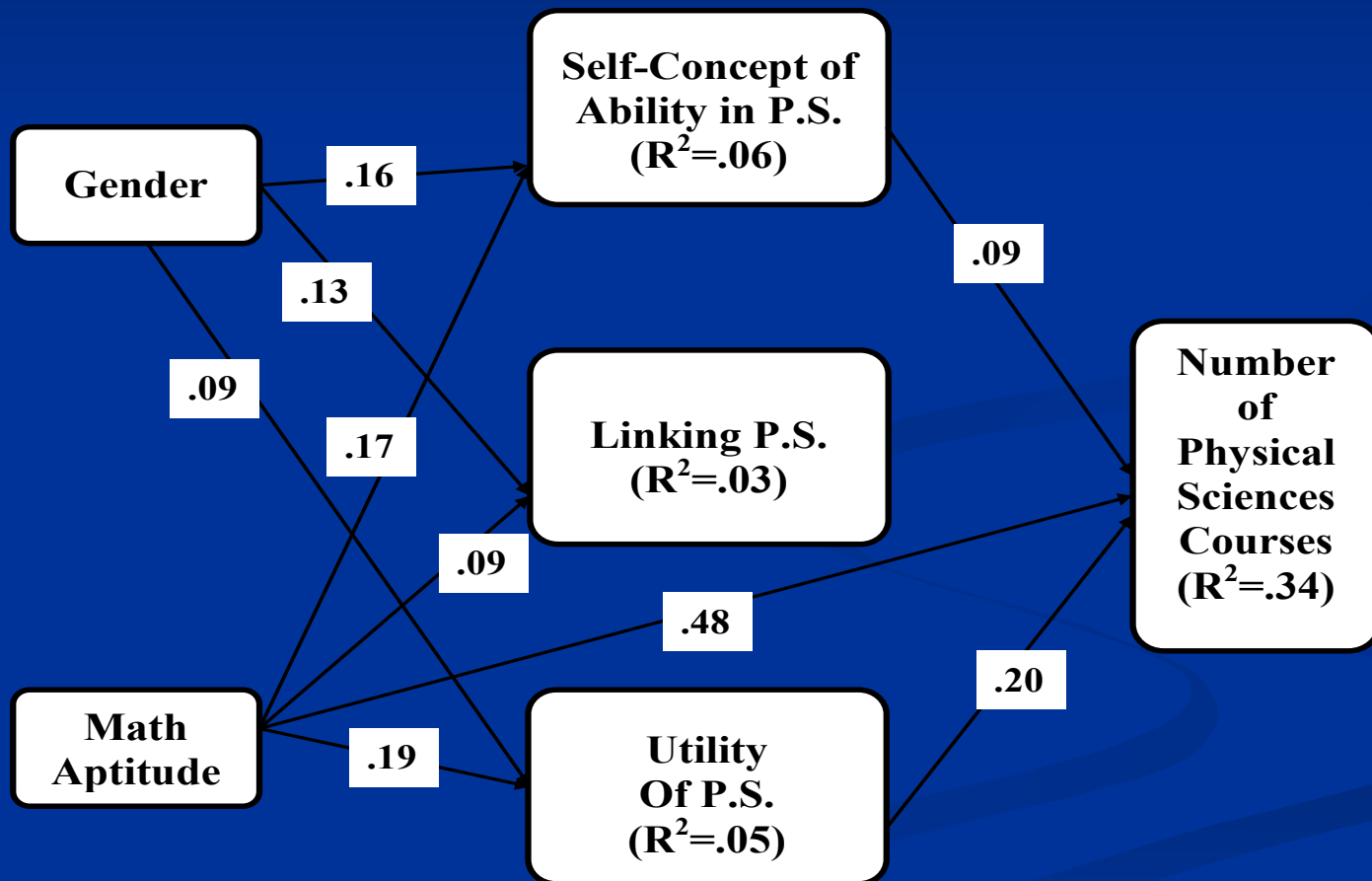
N = 223 (honors students)



Predicting # of Physical Science Classes (sex, DAT)



Predicting # of Physics Classes



Conclusion

- In this sample, the gender differences in utility value were the strongest mediators of gender differences in math and physical science course enrollments.
- A slightly different pattern is emerging for math in the CAB study: Math Ability Self Concept is having a stronger effect.
- In this sample, the gender differences in all three expectancy – value beliefs mediated the gender differences in involvement in sports.

What about College Course Choices?

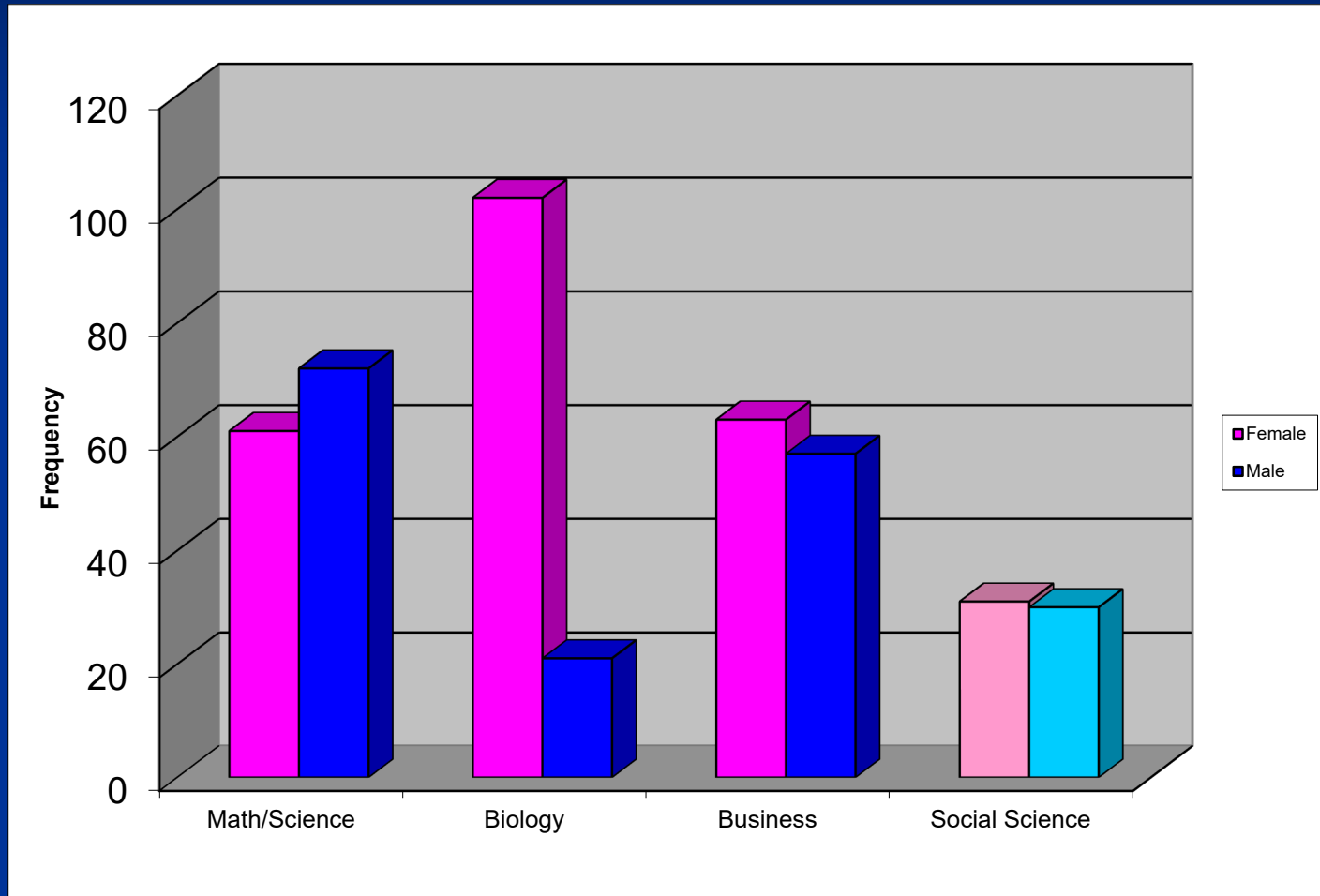
MSALT DESIGN

Wave	1,2	3,4	5	6	7	8	9
Grade	6	7	10	12	12+2	12+6	12+9
Age	12	13	16	18	20	24	27
Year	83-'84	84-'85	88	90	92	96	99

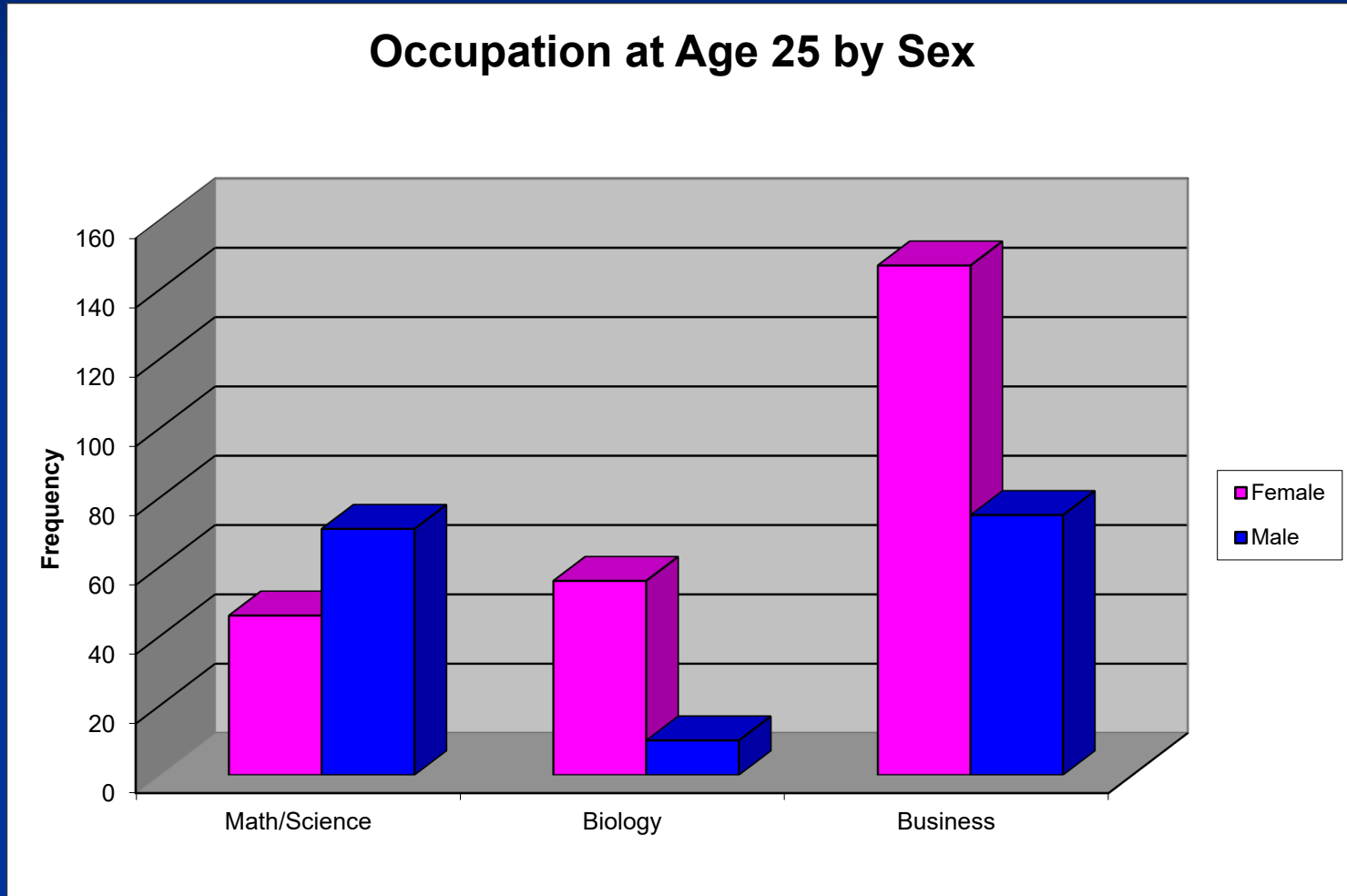
Specific Sample Characteristics for Analyses Reported Today

- Those who participated at Wave 8 (age 25)
 - Female N = 791 Male N = 575
- Those who completed a college degree by Wave 8
 - Female N = 515 Male N = 377

Sex Differences in College Majors



Sex Differences in Occupations



Analyses 1: Between Sex

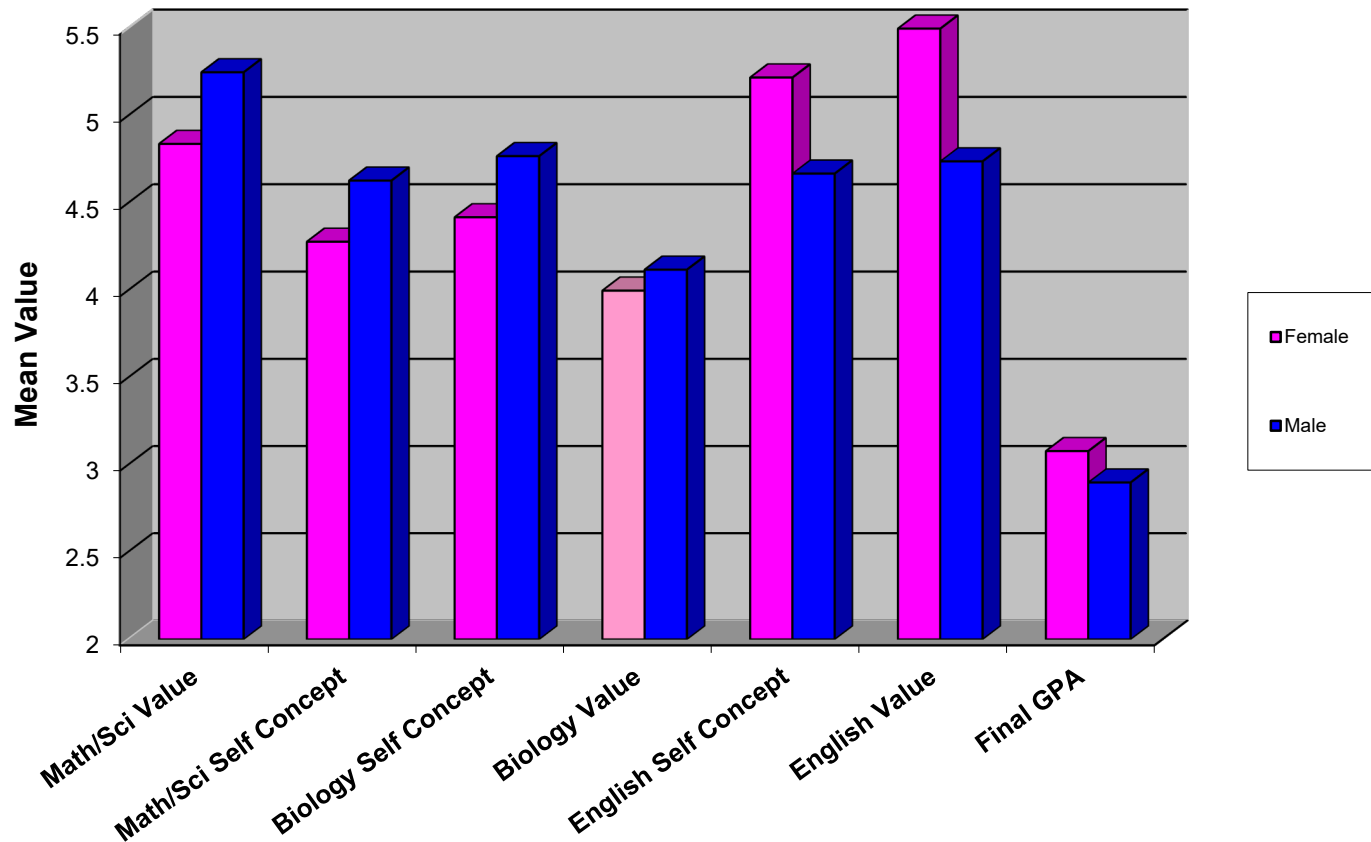
- Logistic regression to test for mediators of sex differences in college Math/Engineering/Physical Science majors

Time 1 Measures: 12th Grade

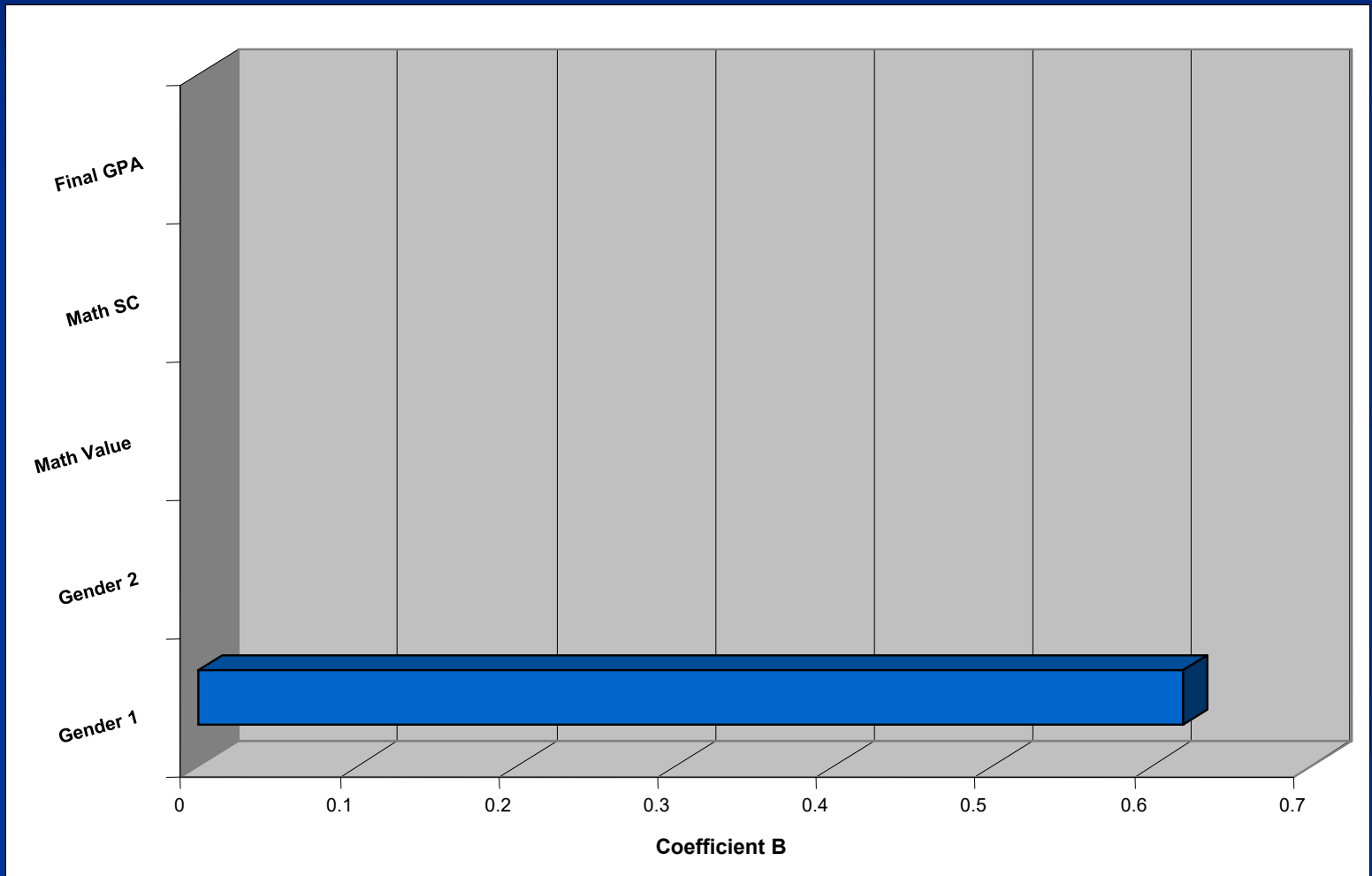
- Math/Physical Science Self-Concept of Ability
- Math/PS Value and Usefulness
- Biology Self-Concept of Ability
- Biology Value and Usefulness
- English Self-Concept of Ability
- English Value and Usefulness
- High School Grade Point Average

Sex Differences in Domain Specific Self Concepts and Values

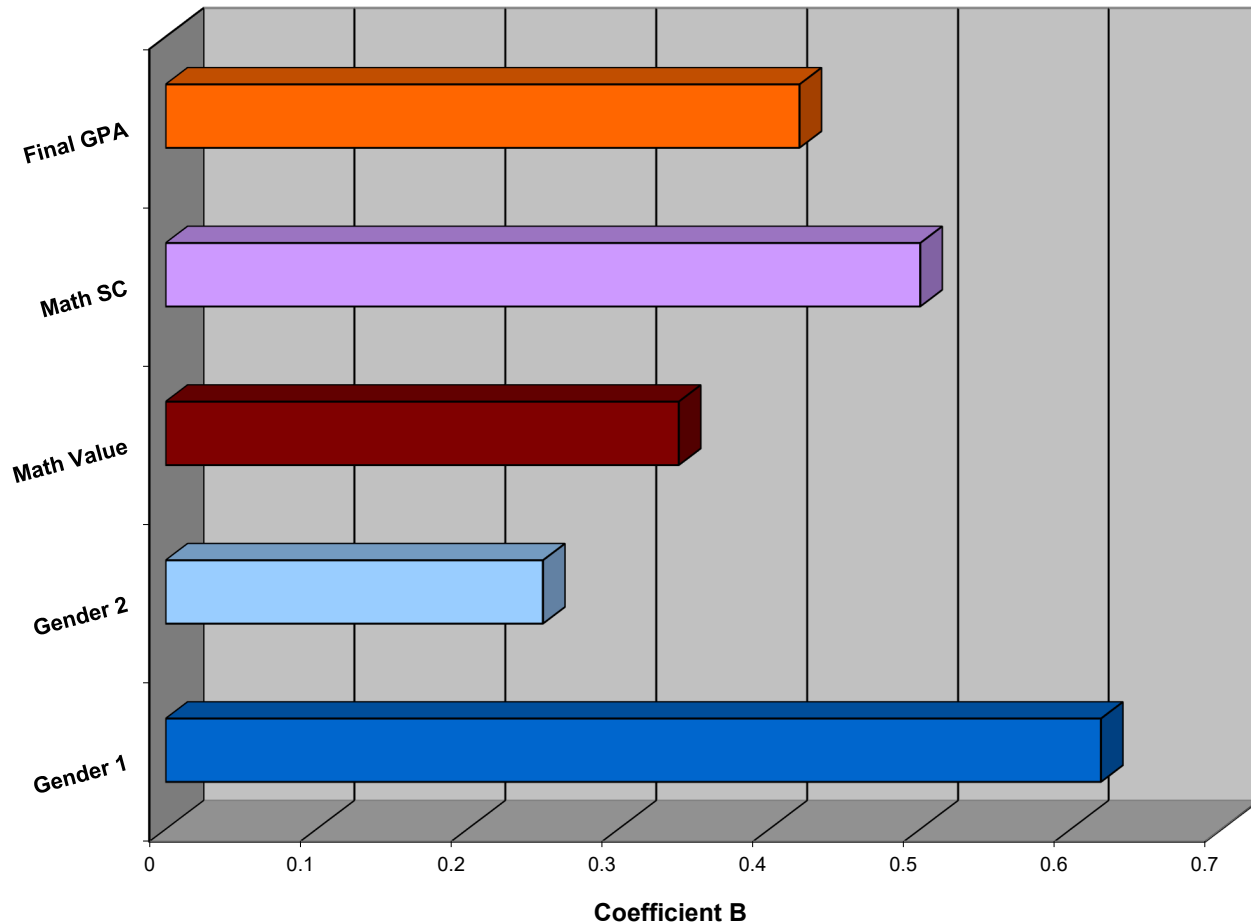
Self Concept and Value at Age 18 by Sex



Time 1 Predictors of Science College Major



Time 1 Predictors of Science College Major



Analyses: Within Sex

Discriminant Function Analyses

- Use 12th grade Domain Specific Ability SCs and Values to predict College Major at age 25

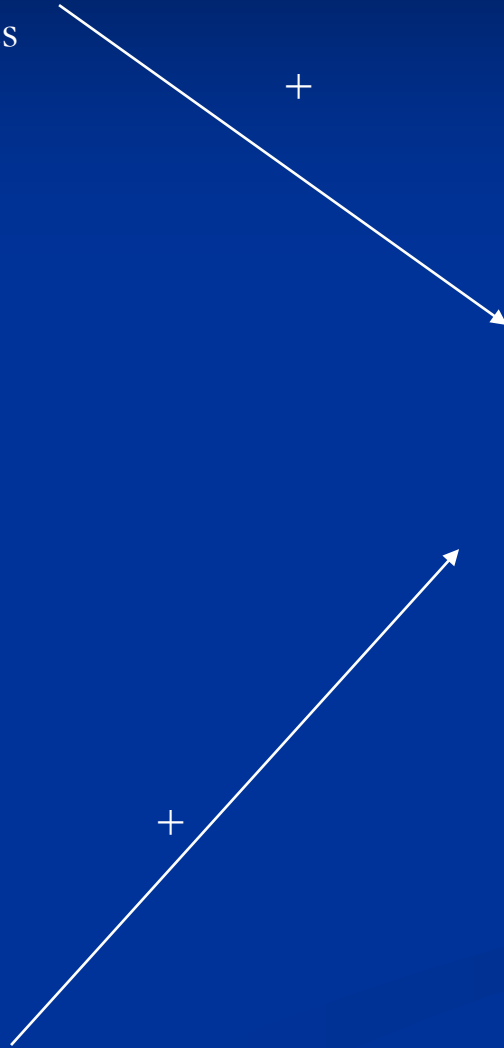
Domain Specific
Attractors: + Self
Concepts and Values

+

Academic Choice

Non-Domain
Attractors:
General
Achievement

+



Domain Specific
Attractors: + Self
Concepts and Values

+

Domain Specific
Detractors:
Anxieties

-

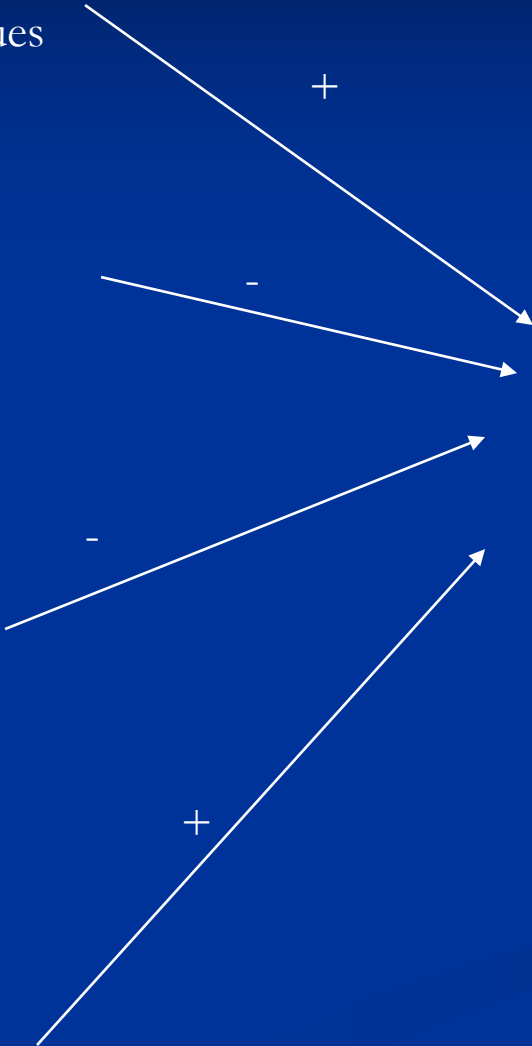
Academic Choice

Non-Domain
Detractors: +
Values and
Self Concepts

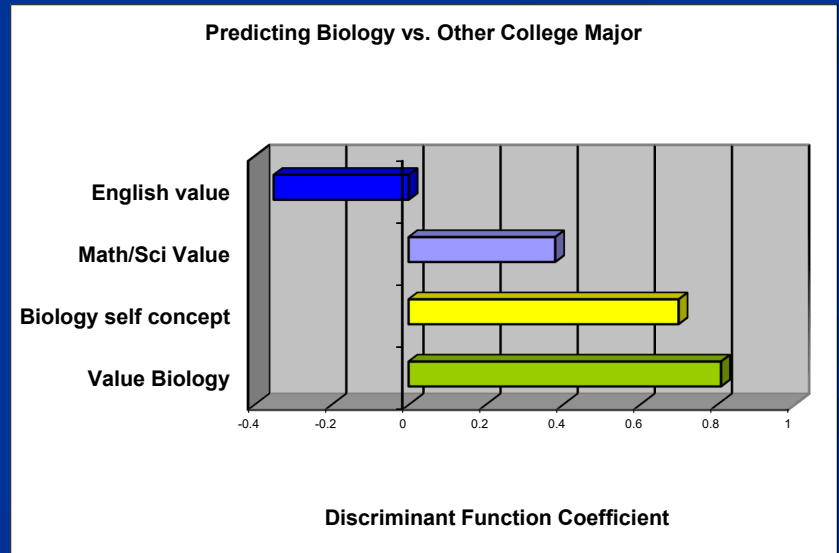
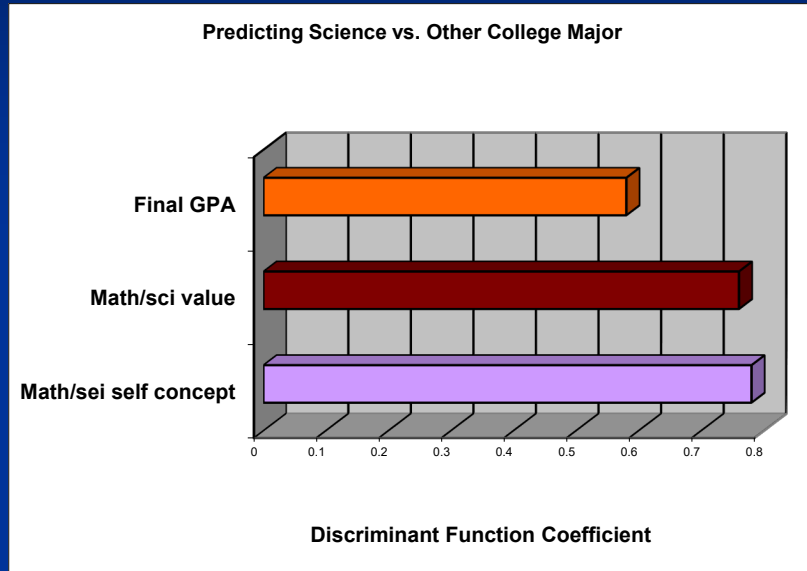
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Non-Domain
Attractors:
General
Achievement

+

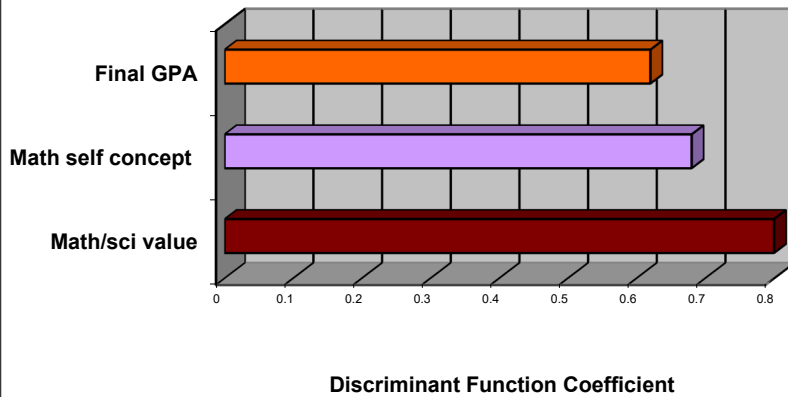


Predicting Women's Math/Engineering/Physical Science (M/E/PS) and Biological Science College Major from Domain Specific SCs and Values at 18

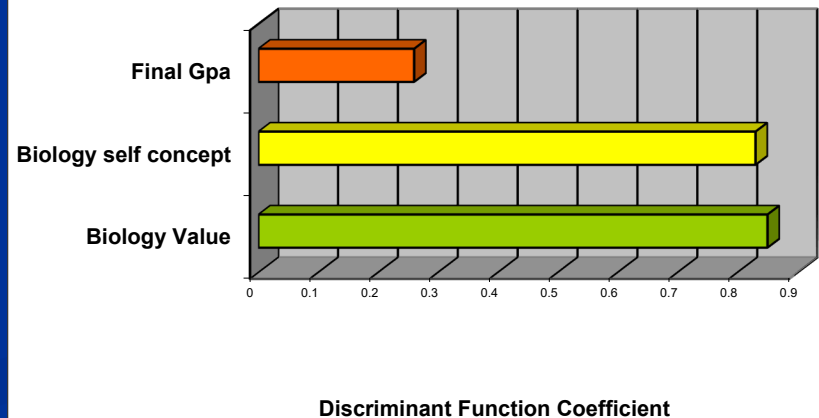


Predicting Men's M/E/PS and Biological Science College Major from Domain Specific SCs and Values at 18

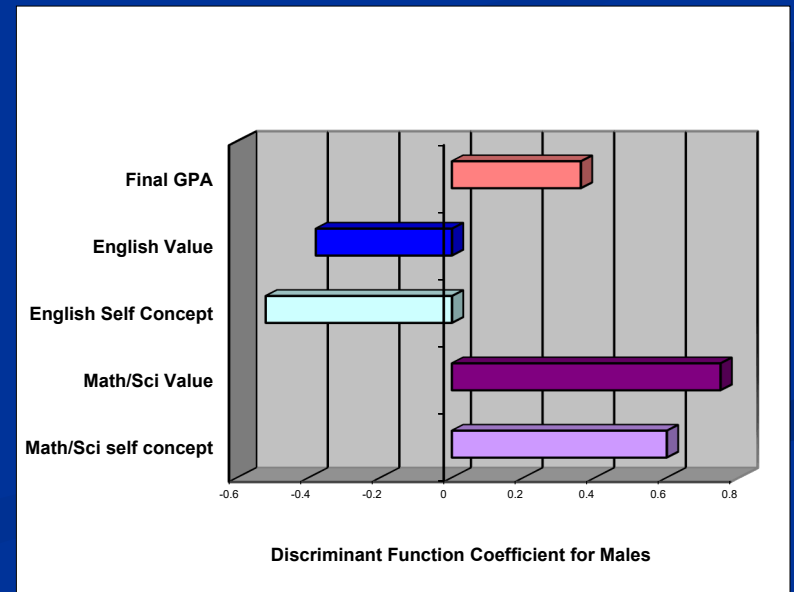
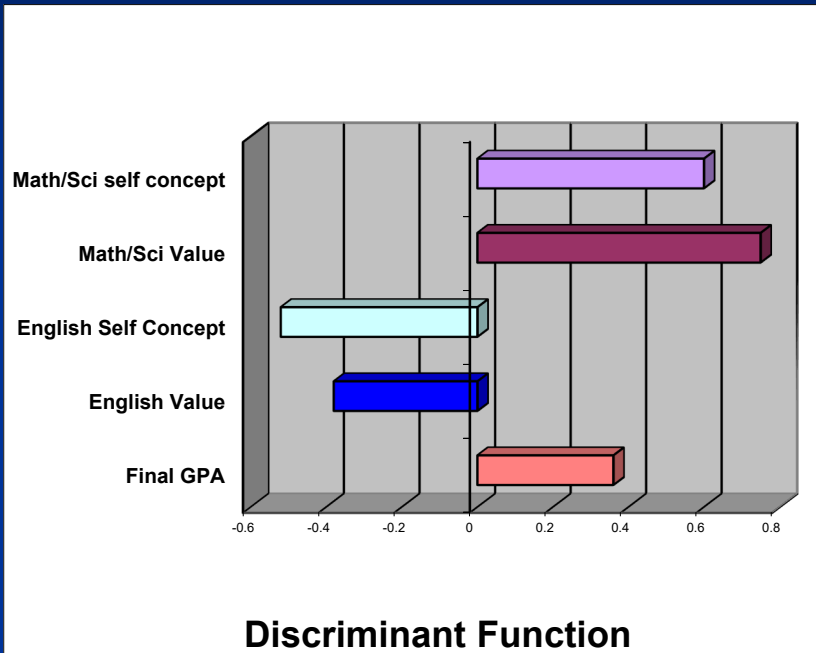
Predicting Science vs. Other College Major



Predicting Biology vs. Other College Major



Predicting M/E/PS vs. Social Science Major From Self-Concepts and Values at 18



Analyses: Within Sex

Discriminant Function Analyses

- Use age 20 General Ability SCs and Occupational Values to predict College Major at age 25

Time 2 Measures: Age 20 Ability-Related

- Math/Science General Ability Self Concept
 - Efficacy for jobs requiring math/science
- Intellectual Ability Self Concept
 - Relative ability in logical and analytical thinking
- High School Grade Point Average

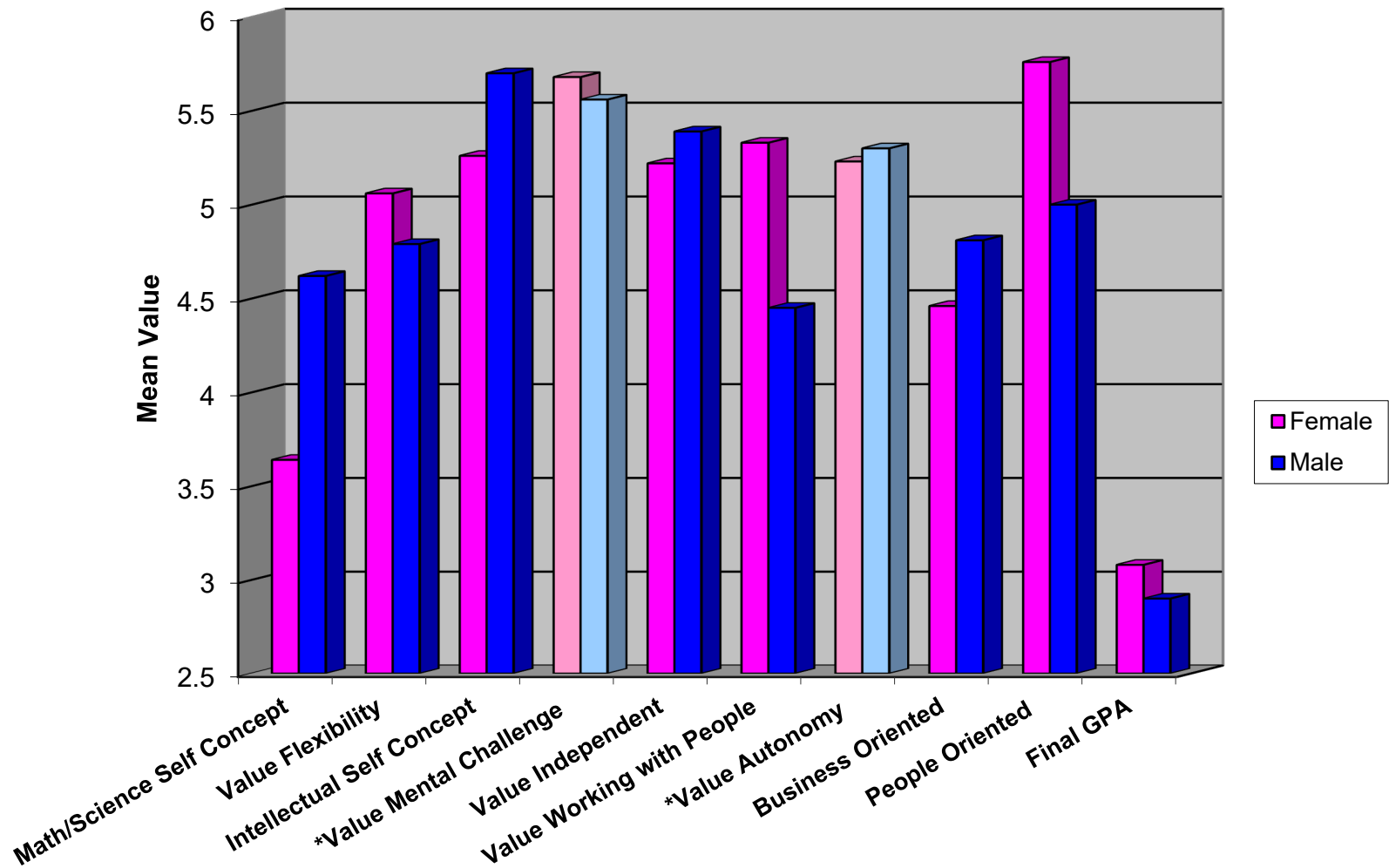
Time 2 Measures: Occupational Values

- Job Flexibility
 - Does not require being away from family
- Mental Challenge
 - Opportunity to be creative and learn new things
- Working with People
 - Working with others
- Autonomy
 - Own Boss

Time 2 Measures: Comfort with Job Characteristics

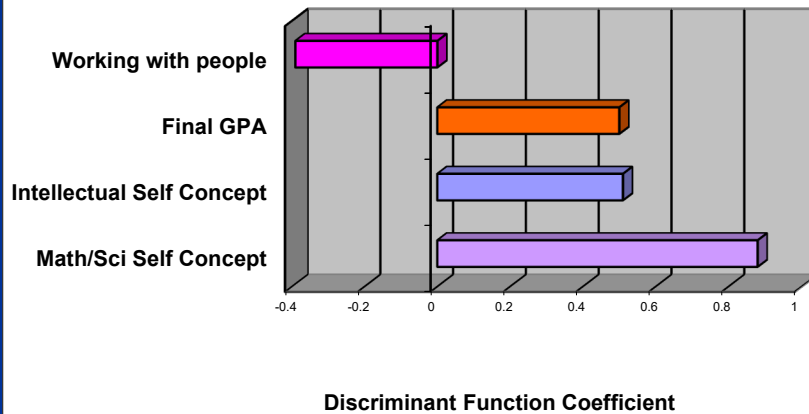
- Business Orientation: Comfort with tasks associated with being a supervisor
- People Orientation: Comfort working with people and children

Sex Differences in Age 20 General Self Concepts and Values

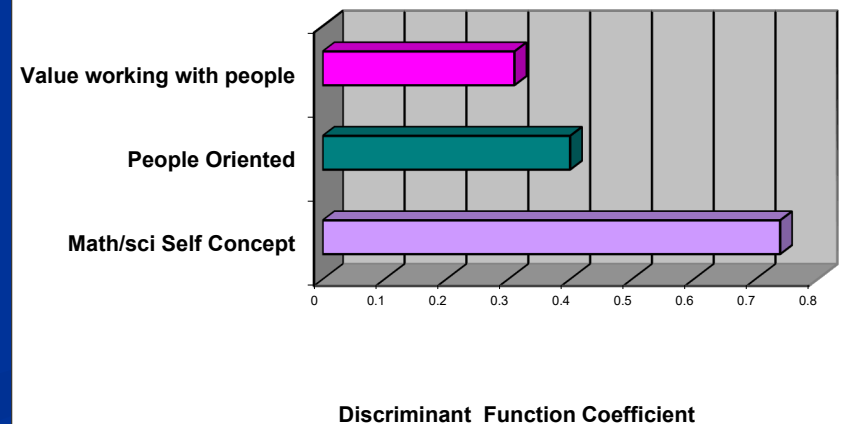


Predicting Women's M/E/PS and Biological Science College Major from General Self-Concepts and Values at 20

Predicting Math /Science vs. Other College Major

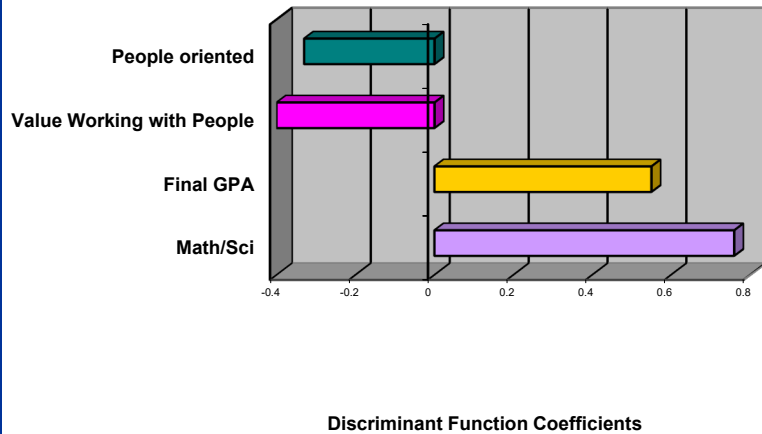


Predicting Biology vs. Other College Major

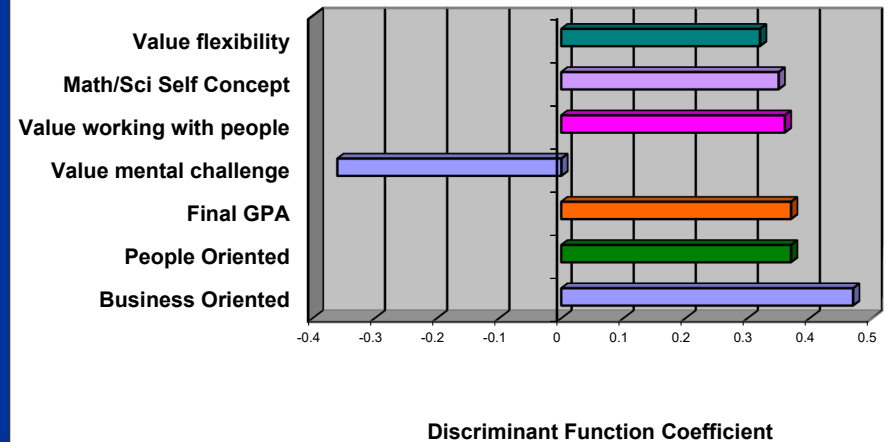


Predicting Men's M/E/PS and Biological Science College Major from General Self-Concepts and Values at 20

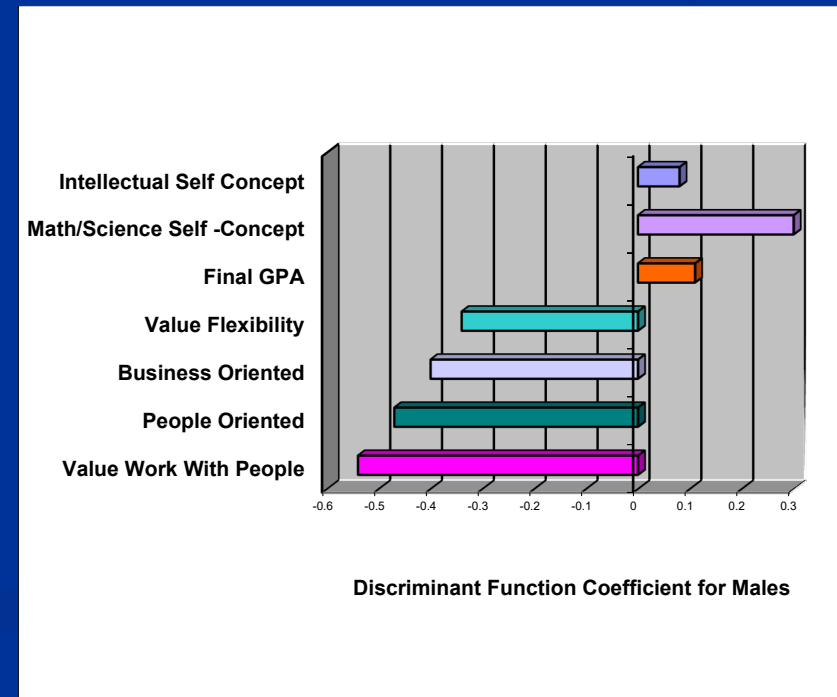
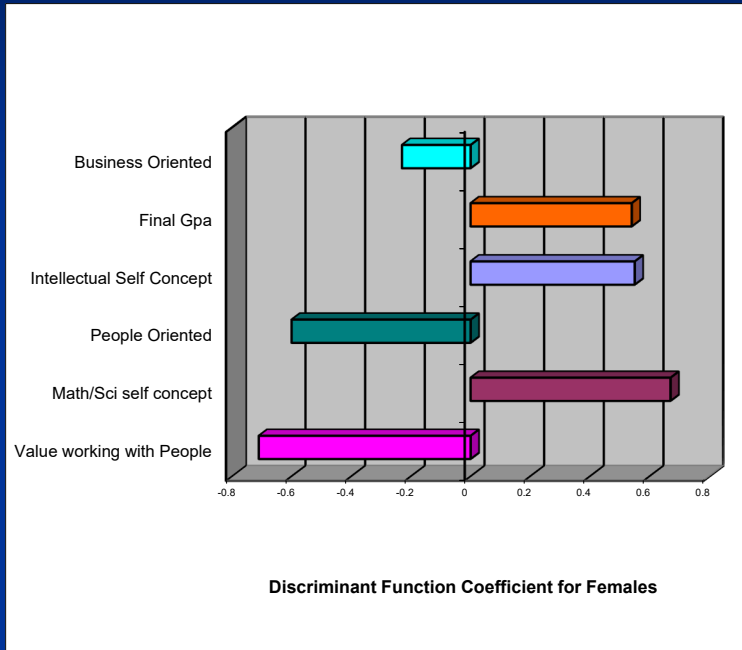
Predicting Math/Science vs Other College Major



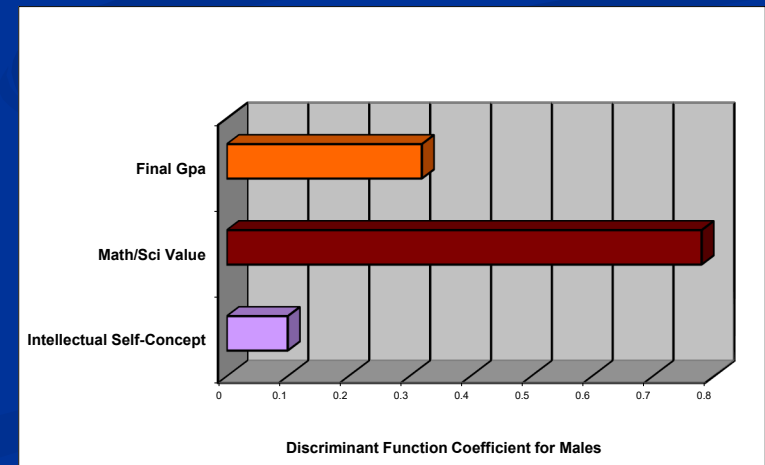
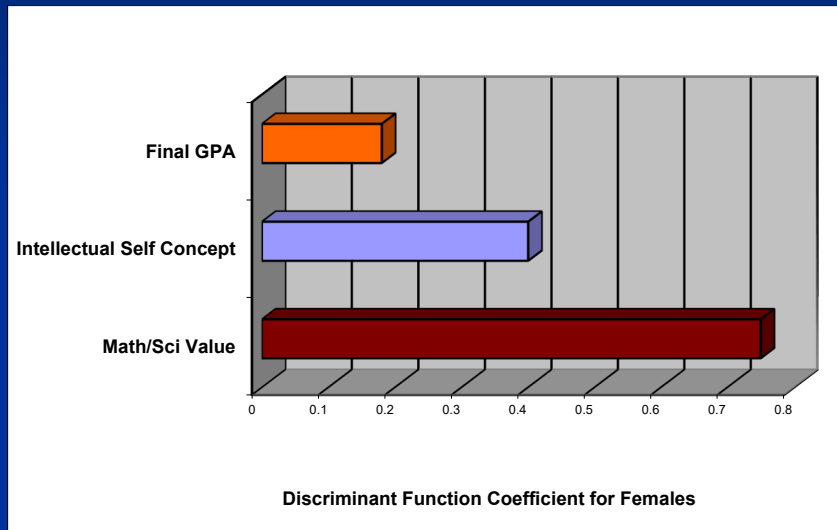
Predicting Biology vs. Other College Major



Predicting M/E/PS vs. Biology Major From General Self-Concepts and Values at 20



Predicting M/E/PS vs. Social Science Major From General Self-Concepts and Values at 20



Conclusions 1:

- Strong support for the predictive power of constructs linked to the Expectancy Value Model.
 - Domain Specific SCs and Values push both women and men towards the related majors
 - Some evidence that more general values can also push people away from M/S/PS majors and towards Biology-Related majors
- Sex differences in selection of M/E/PS college major are accounted for by Expectancy Value Model

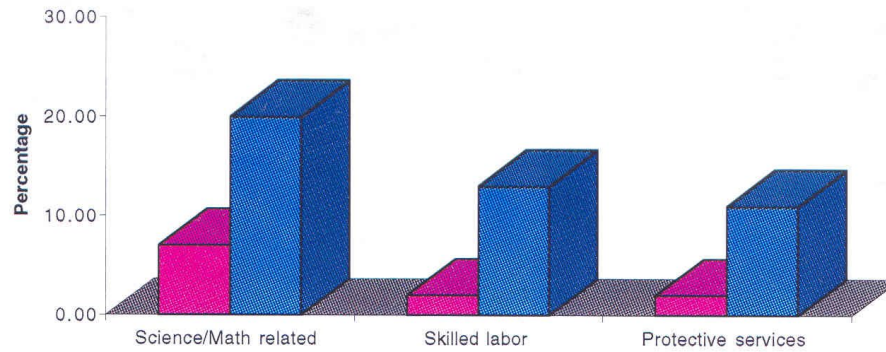
Conclusions 2

- Even stronger support for both the push and pull aspects of the Eccles et al. Expectancy Value Model
- Strong evidence that valuing having a job that allows one to work with and for people pushes individuals away from M/E/PS majors and pulls them toward the Biological Sciences

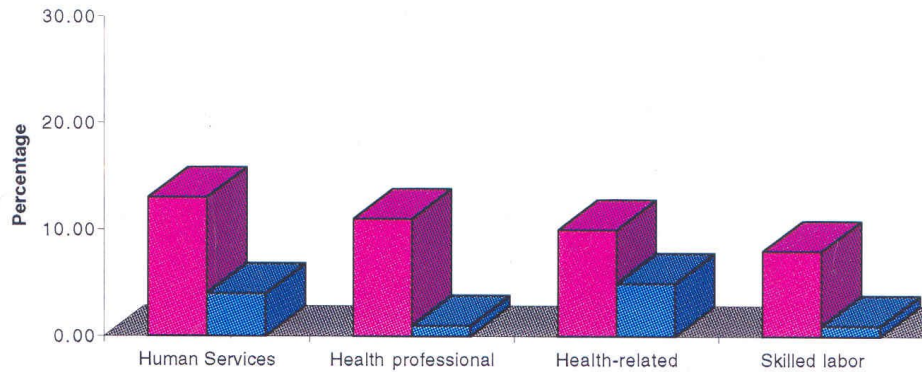
Analyses 3

- Now lets shift to the second set of analyses: those linking self concepts and values from ages 18 and 20 to occupational plans at age 20 and actual occupations at age 25

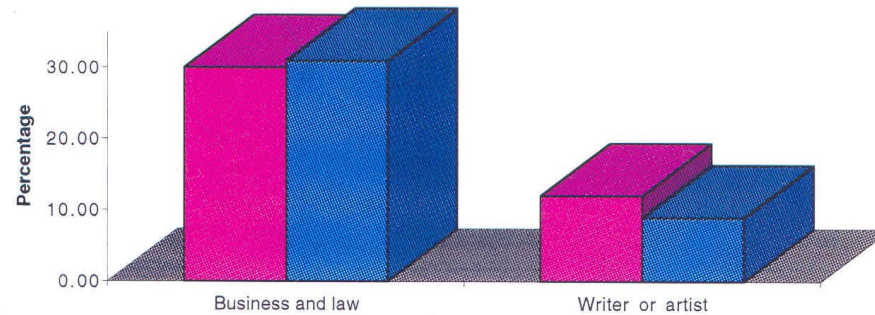
Gender Differences in Occupational Aspirations



Male Typed Occupations

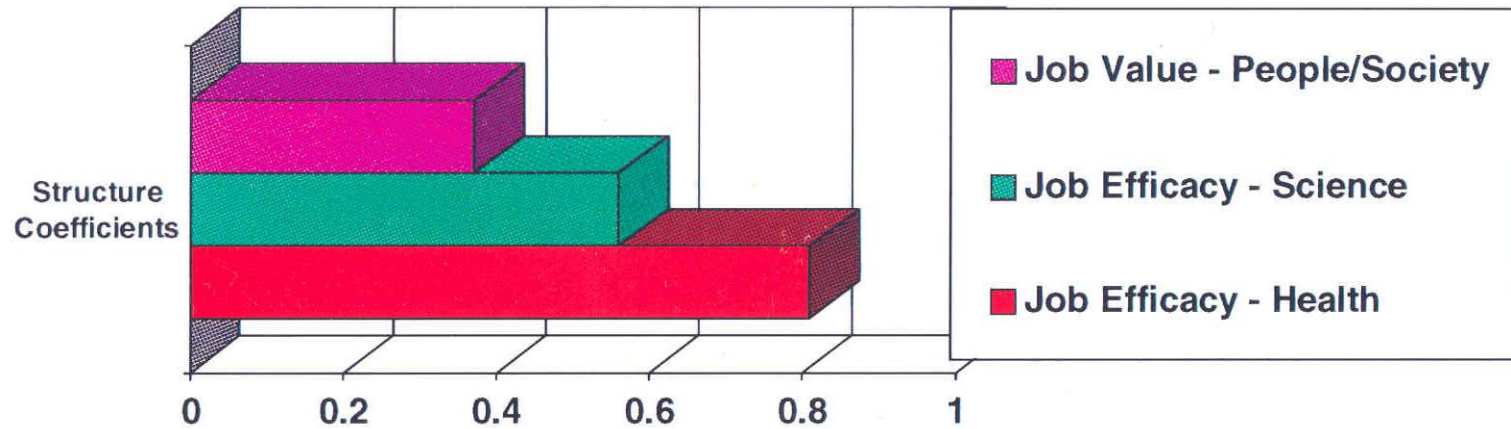


Female Typed Occupations

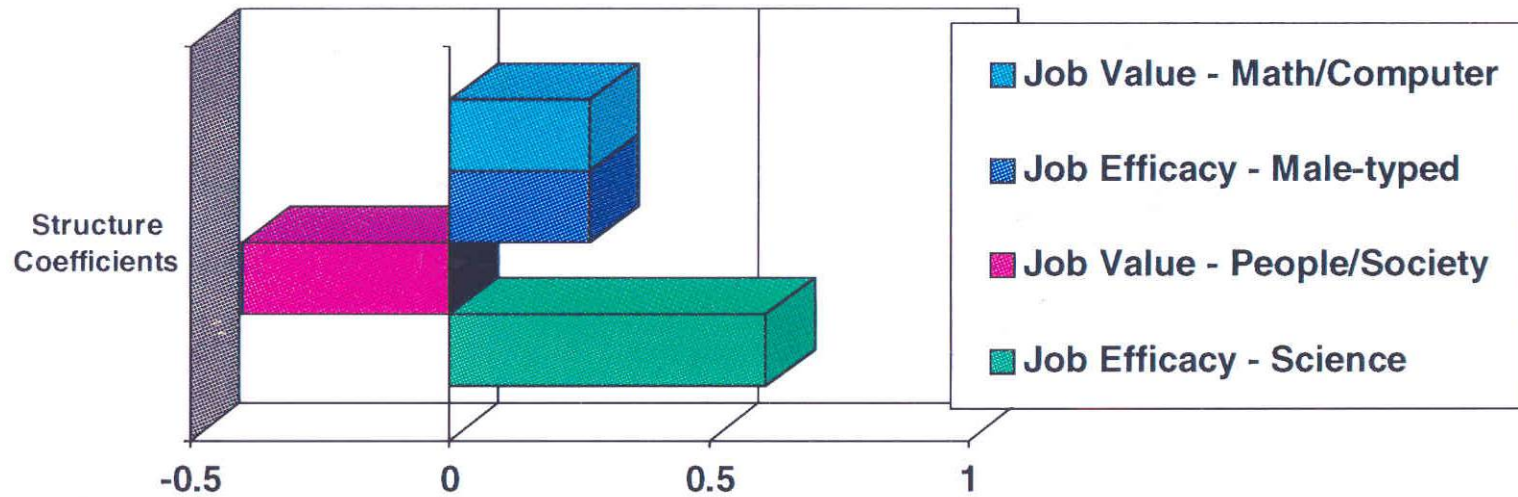


Neutral Occupations

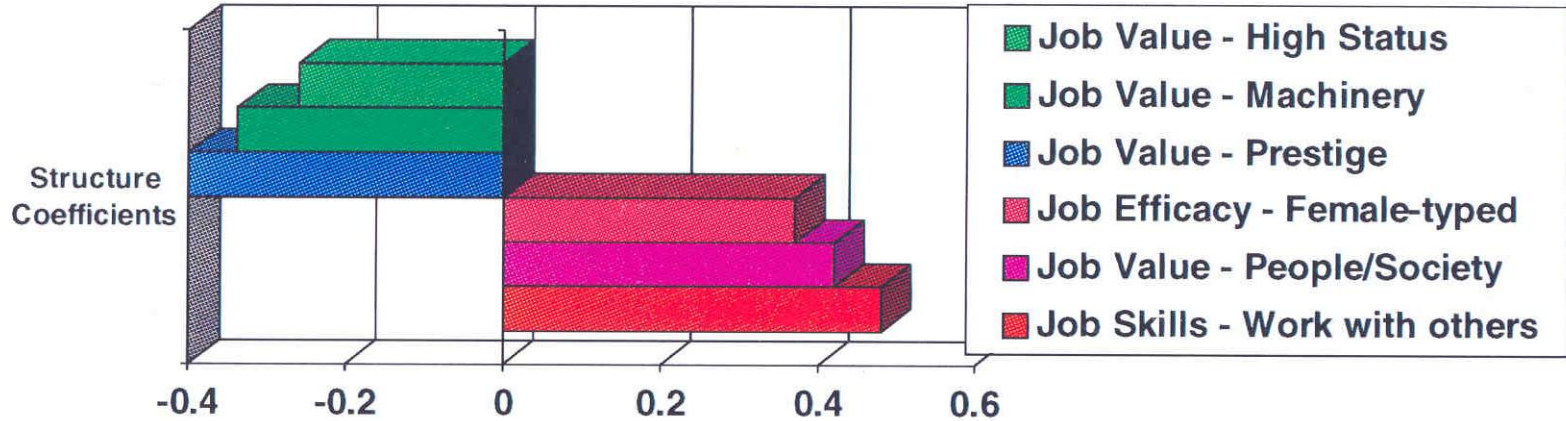
Health-related (N=56/525 females)



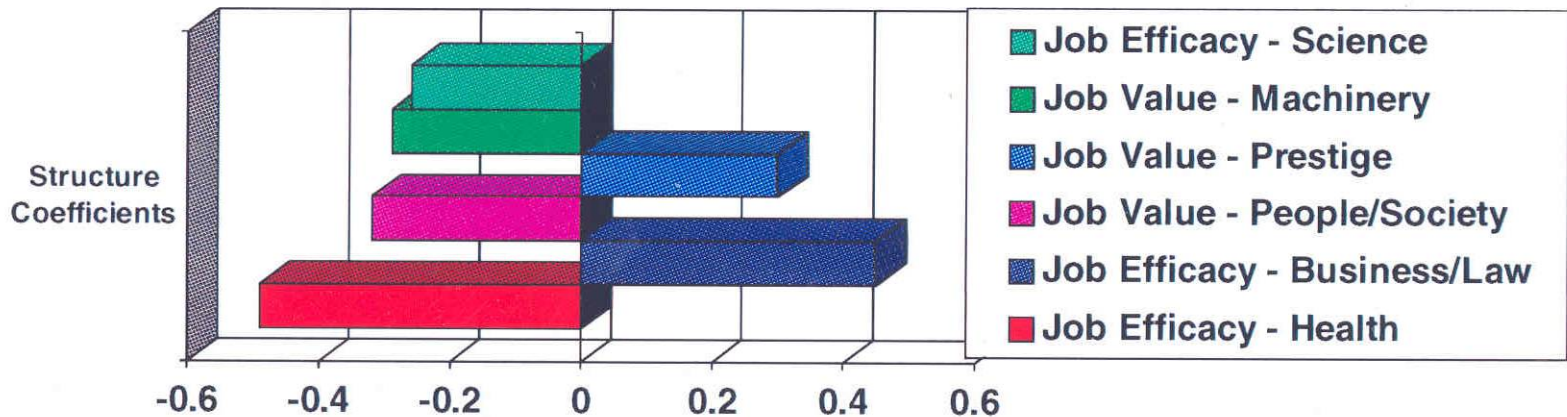
Science-related (N=45/536 females)



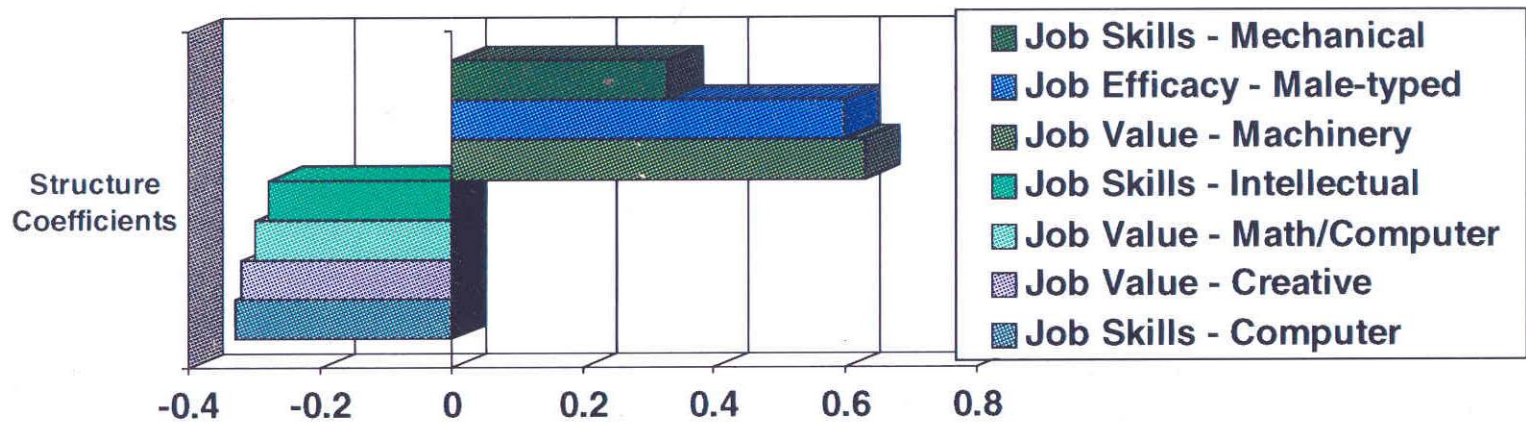
Human Services (N=74/507 females)



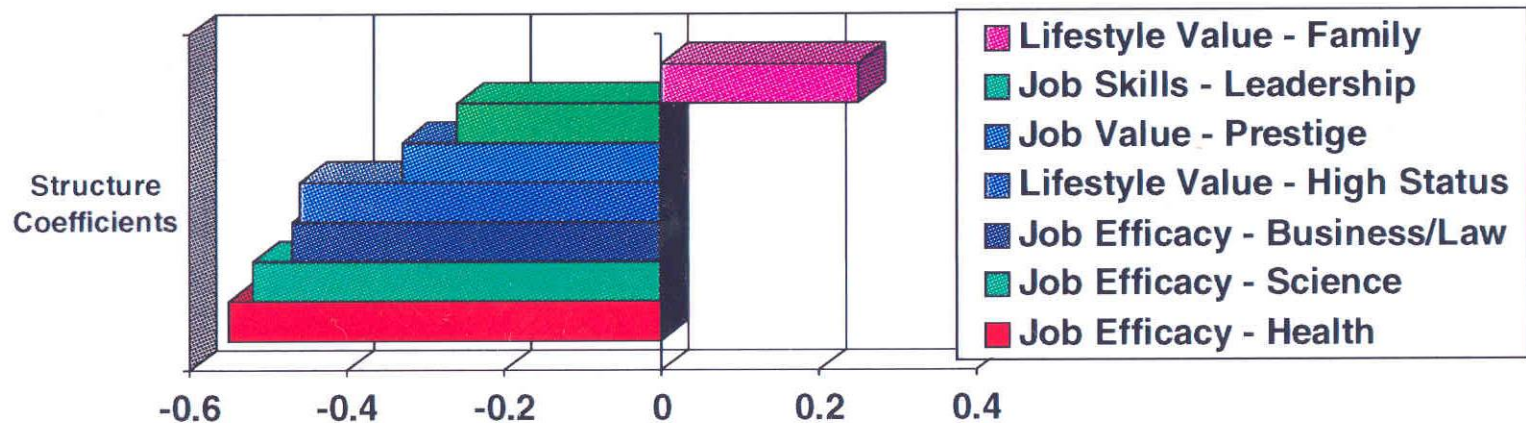
Business/Law (N=174/407 females)



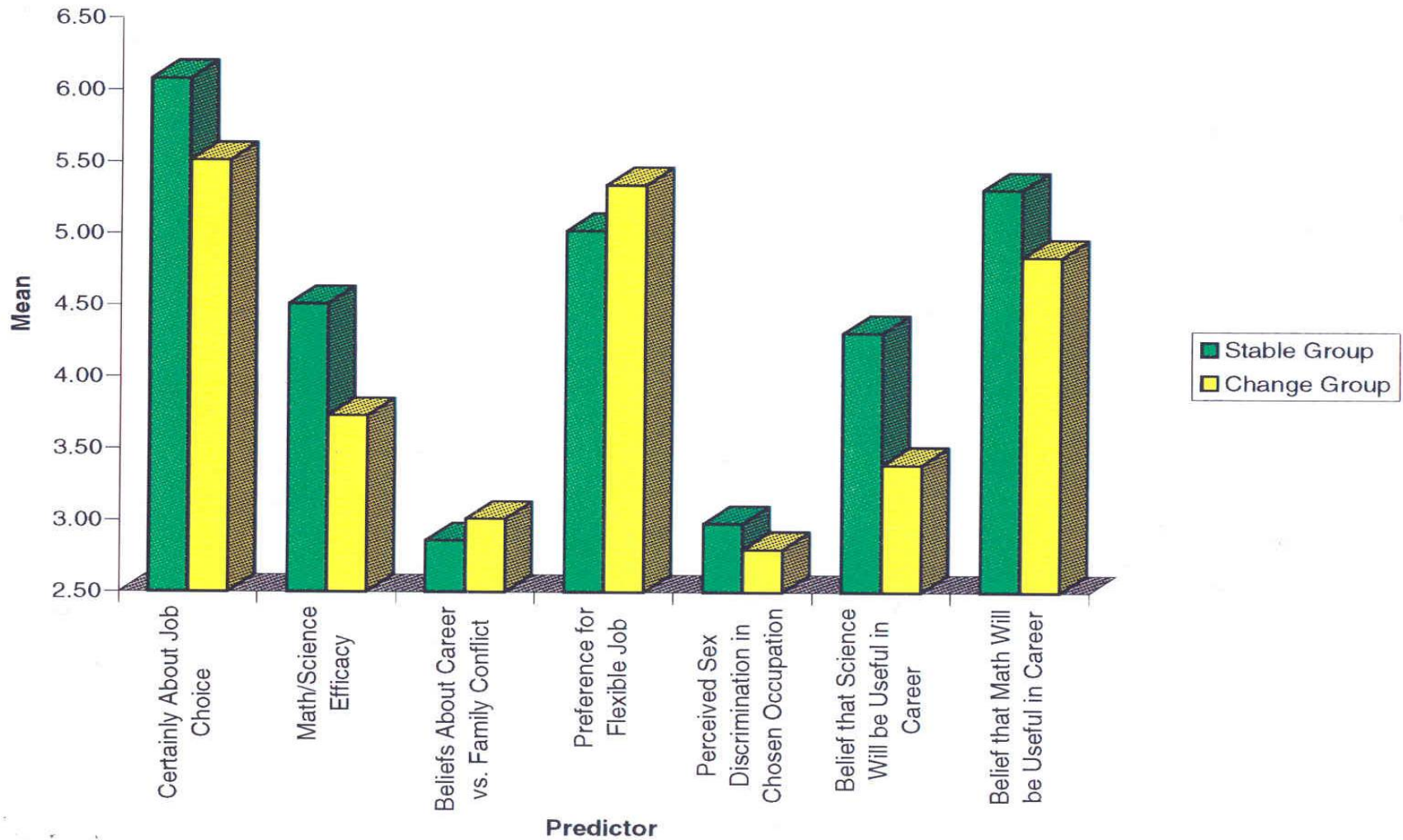
Males: Male-typed Skilled Labor (N= 50/371)



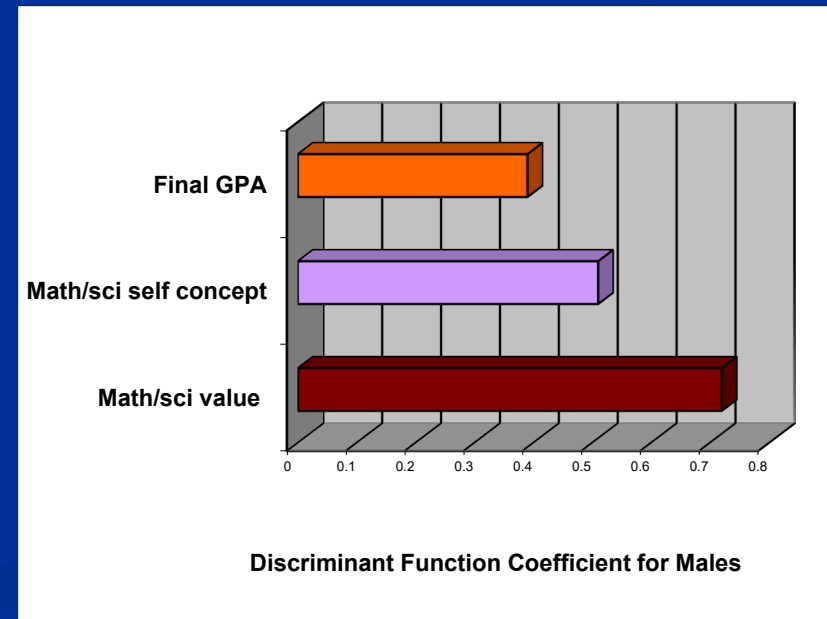
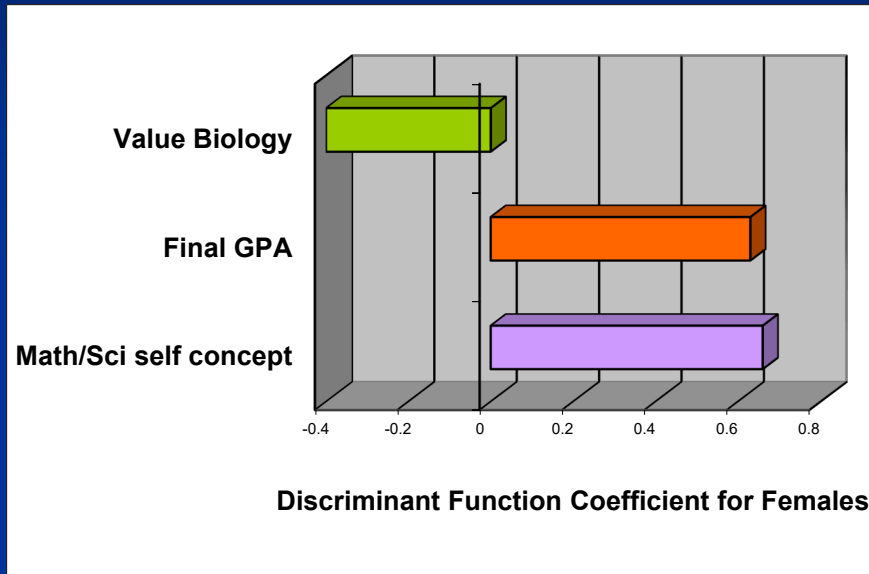
Females: Female-typed Skilled Labor (N=56/525)



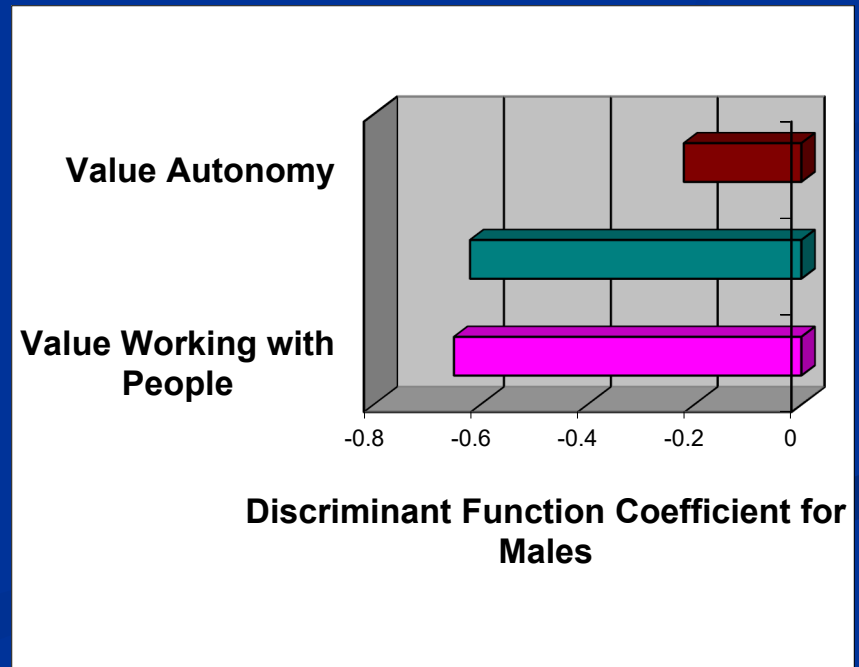
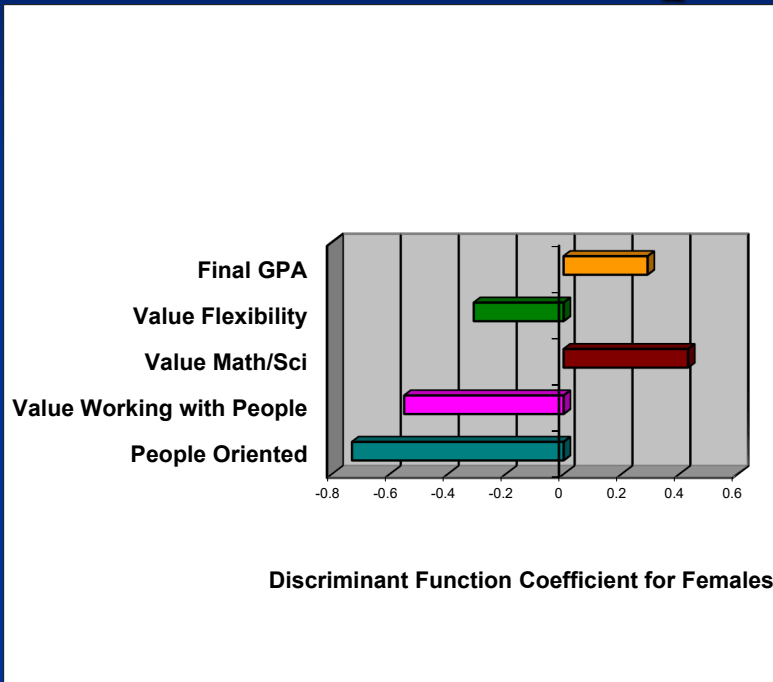
Mean Predictors for Stable and Change Groups



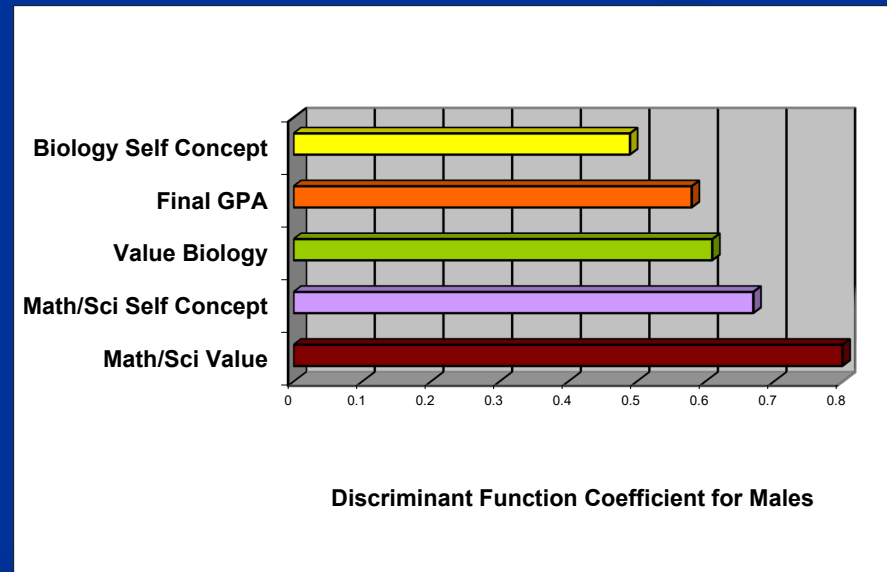
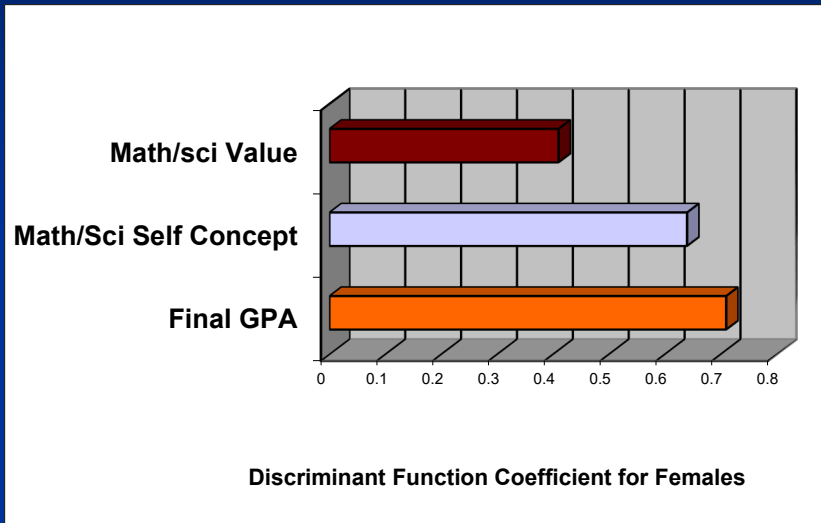
Predicting M/E/PS vs Biology Occupations at 25 from Self Concepts and Values at 18



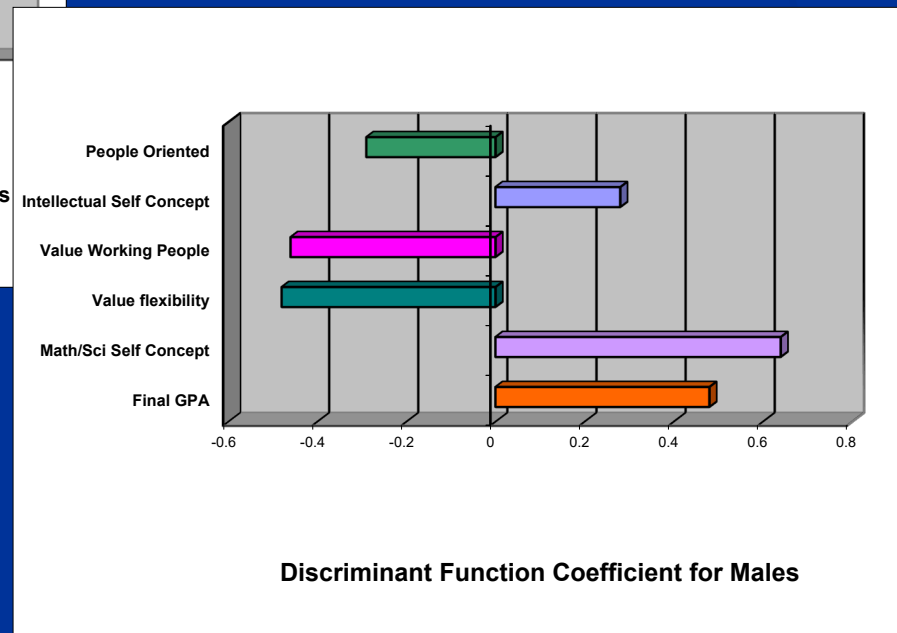
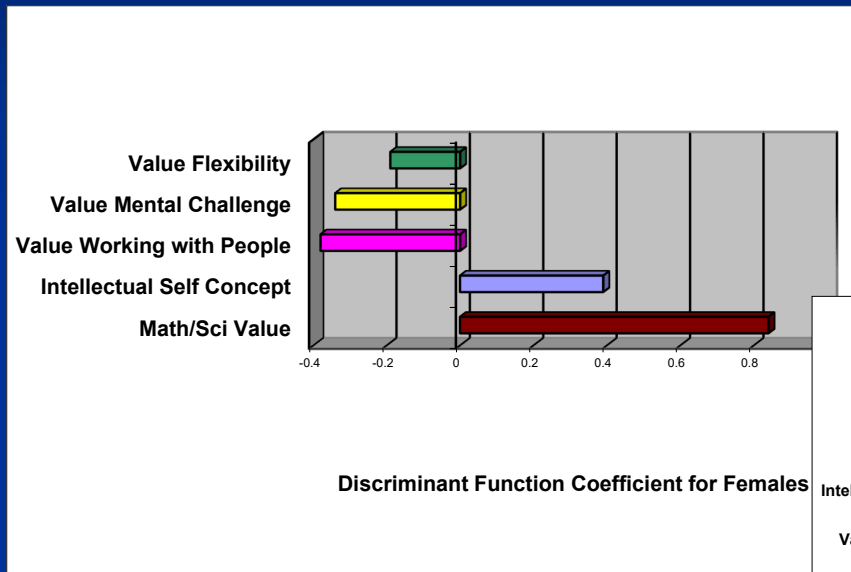
Predicting M/E/PS vs Biology Occupation at 25 from General Self Concepts and Values at 20



Predicting M/E/PS vs Business Occupations at 25 From Self Concepts and Values at 18



Predicting M/E/PS vs Business Occupation at 25 from General Self Concepts and Values at 20



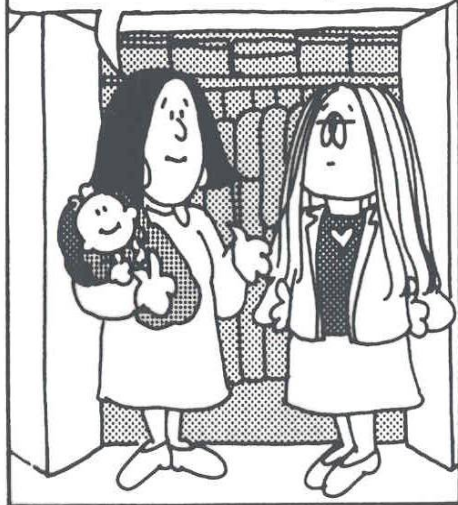
Conclusions

- Expectancy Value Model provides a good explanatory framework for understanding both individual differences and sex differences in educational and occupational choices

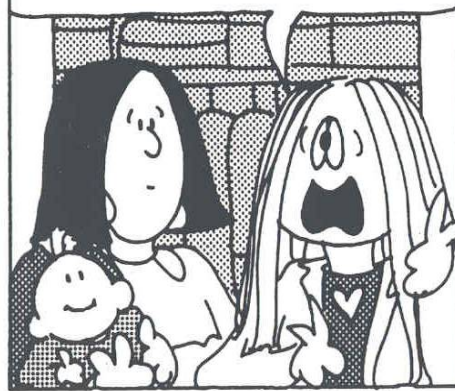
■ What about Gender Roles?

- Role of Traditionality in Terms of Family
- Role of Gender Role Stereotypes of Achievement Domain

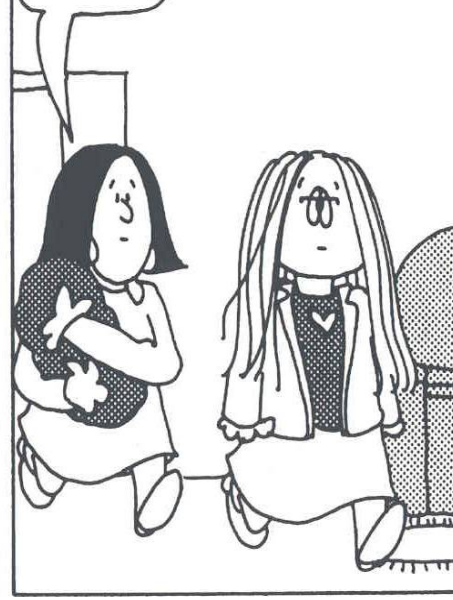
WANT TO BORROW AN OUTFIT OF MINE TO WEAR TO YOUR HIGH SCHOOL REUNION, CATHY?



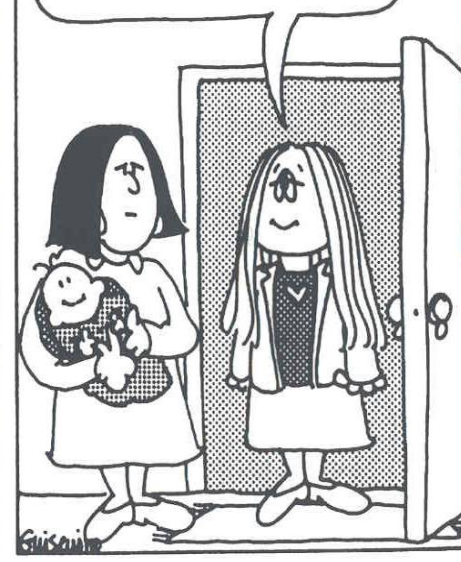
ANDREA, I'M A SUCCESSFUL BUSINESSWOMAN. DO YOU ACTUALLY THINK I'D TRY TO IMPRESS MY EX-CLASSMATES WITH SOME-ONE ELSE'S CLOTHES?!!



SORRY.



MAY I BORROW YOUR HUSBAND AND BABY?



The Impact of Girls' Gender-Role Beliefs on their Educational and Occupational Decisions.

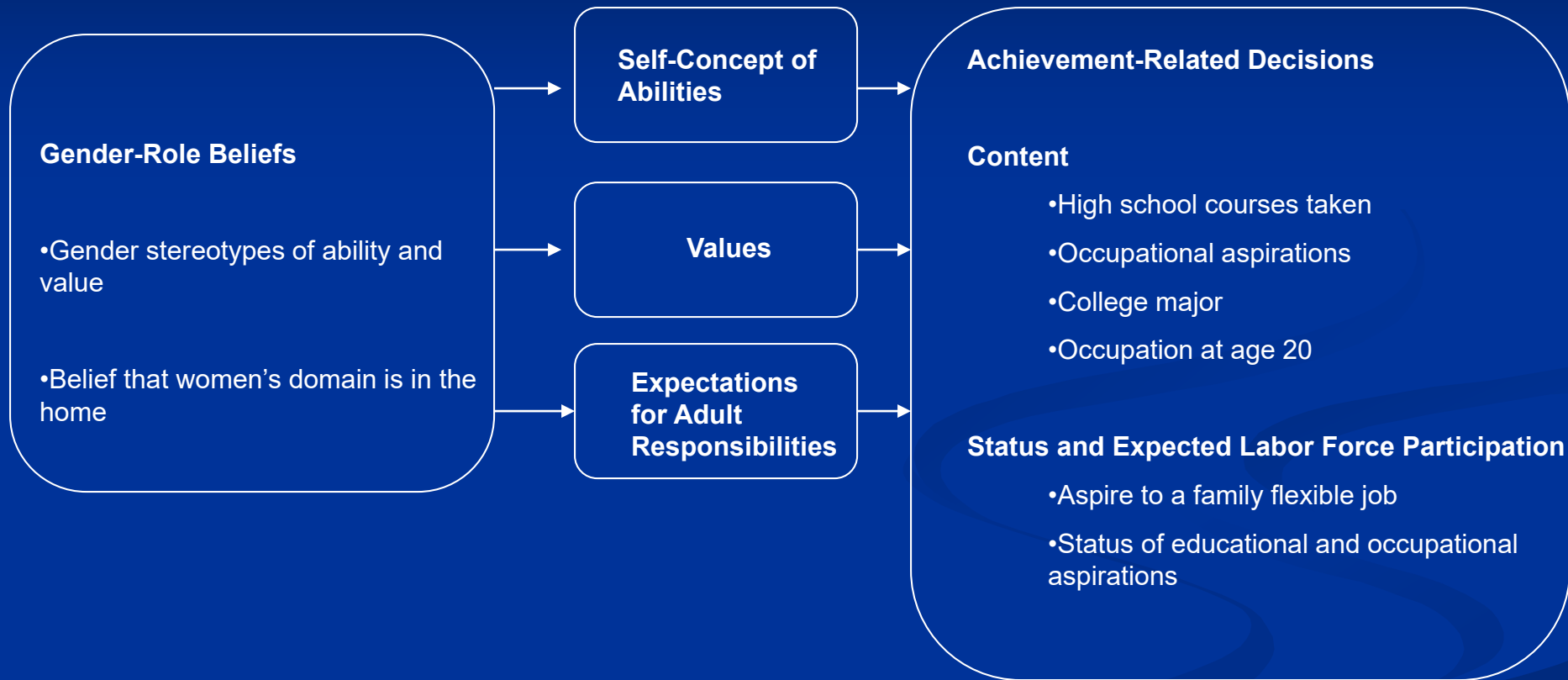


Figure 7. Traditionality, Values, Expectations of Adult Responsibilities, and Aspirations – Theoretical Model.

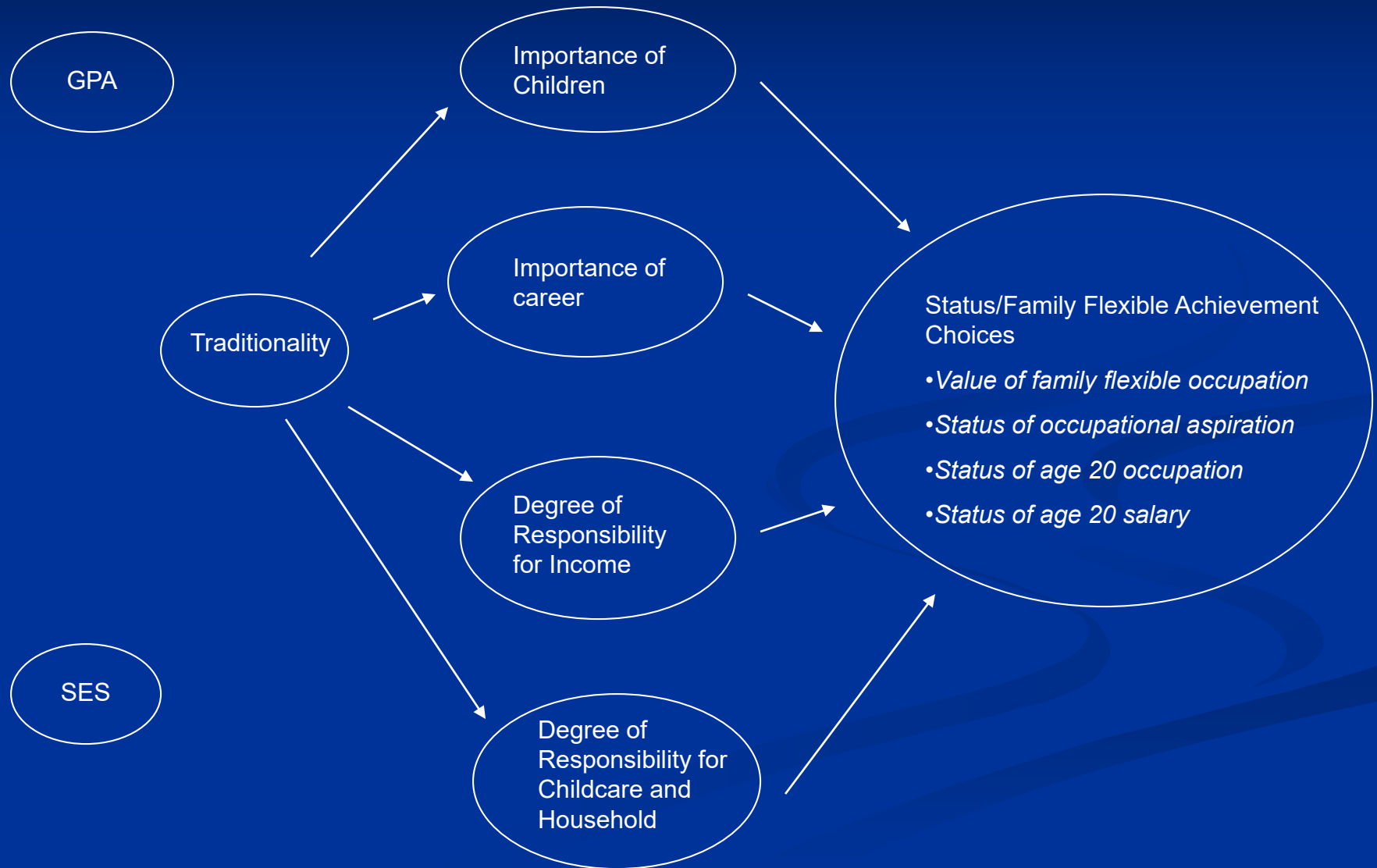
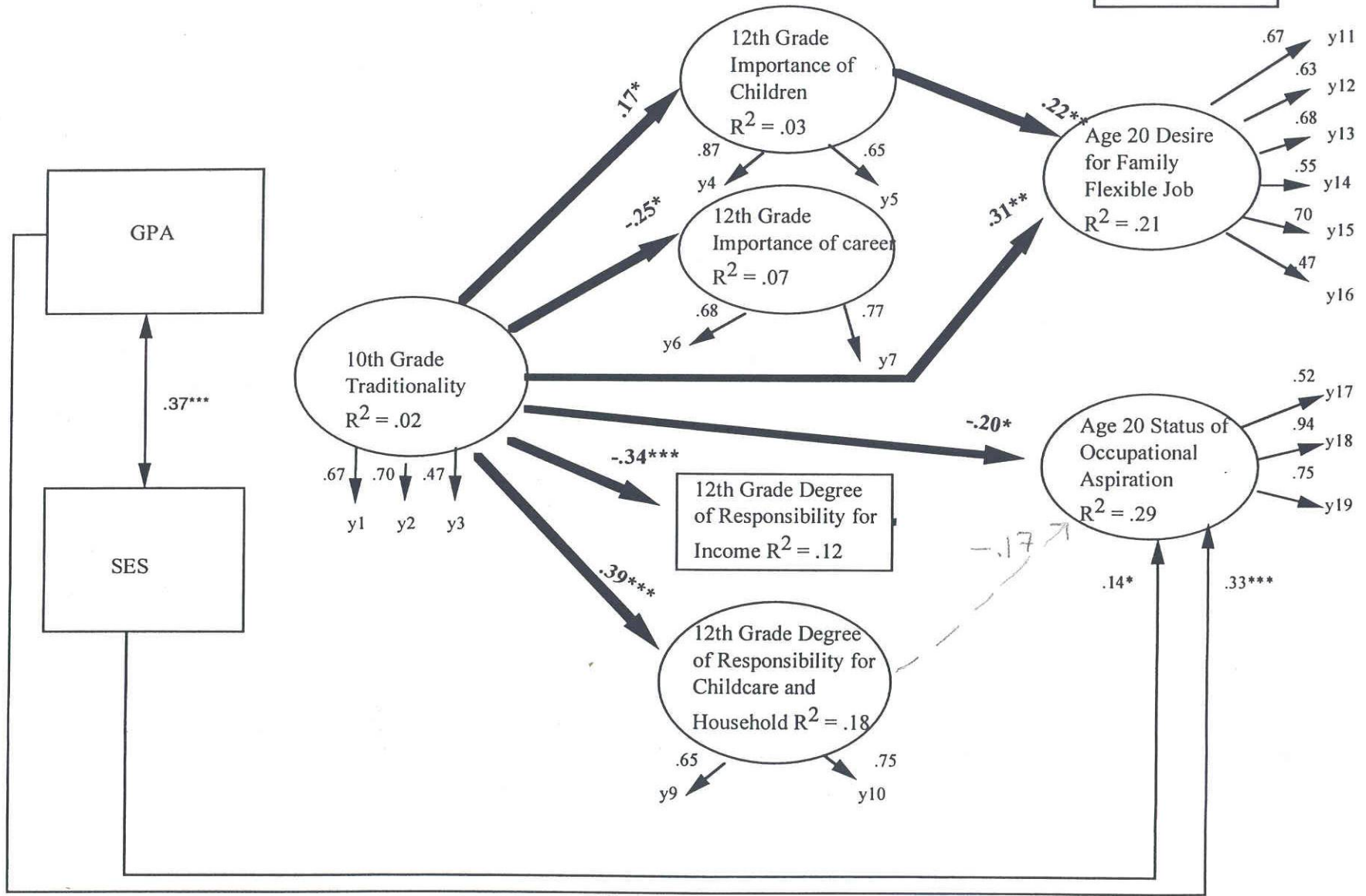


Figure 13. Traditionality Model.

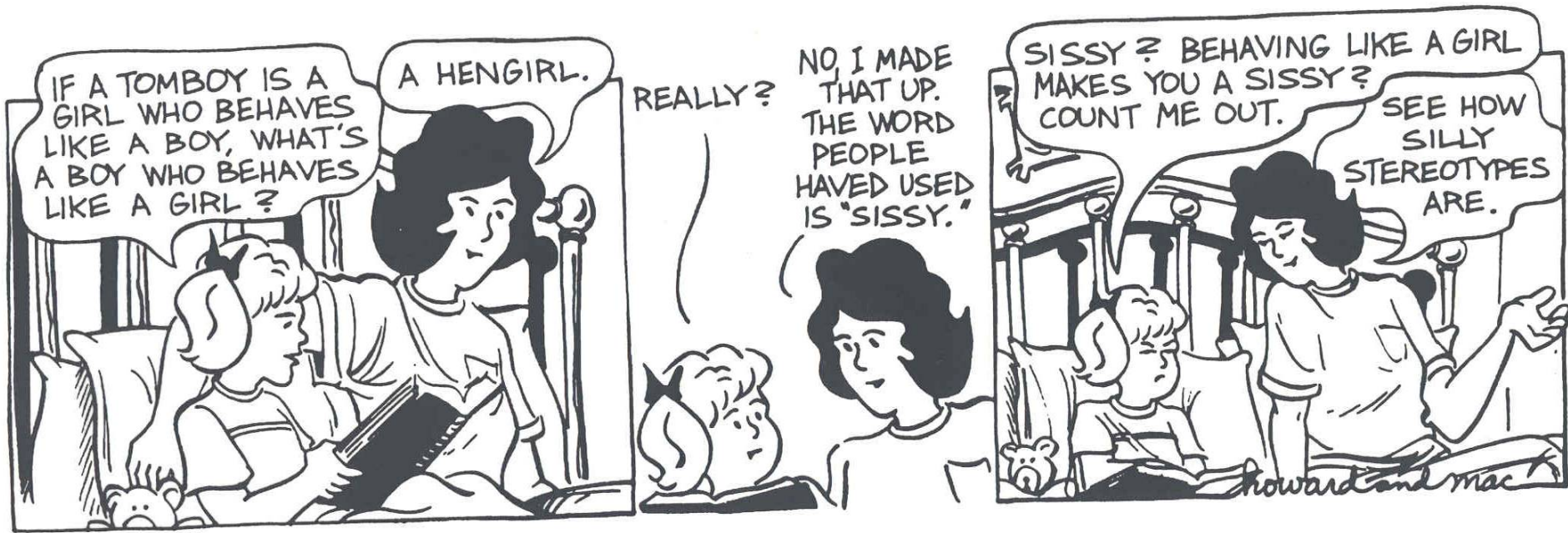
(bolded paths are the ones most relevant to the hypotheses; all path coefficients are completely standardized)

GFI = .92
 CFI = .93
 IFI = .93
 RMSEA = .05
 N = 300



What About Gender Role Stereotypes?





IF A TOMBOY IS A GIRL WHO BEHAVES LIKE A BOY, WHAT'S A BOY WHO BEHAVES LIKE A GIRL?

A HENGIRL.

REALLY?

NO, I MADE THAT UP. THE WORD PEOPLE HAVED USED IS "SISSY."

SISSY? BEHAVING LIKE A GIRL MAKES YOU A SISSY?

COUNT ME OUT. SEE HOW SILLY STEREOTYPES ARE.

Howard and Mac



DO YOU LIKE BEING A GIRL?

ARE YOU THINKING MAYBE BEING A BOY IS EASIER?



MAYBE. I'LL BET BEING A BOY ISN'T AS EASY AS IT LOOKS. WHAT IF YOU JUST WANTED TO BE A PLEASANT YOUNG PERSON, BUT SOCIETY EXPECTED YOU TO BE AN AGGRESSIVE LITTLE TWERP?

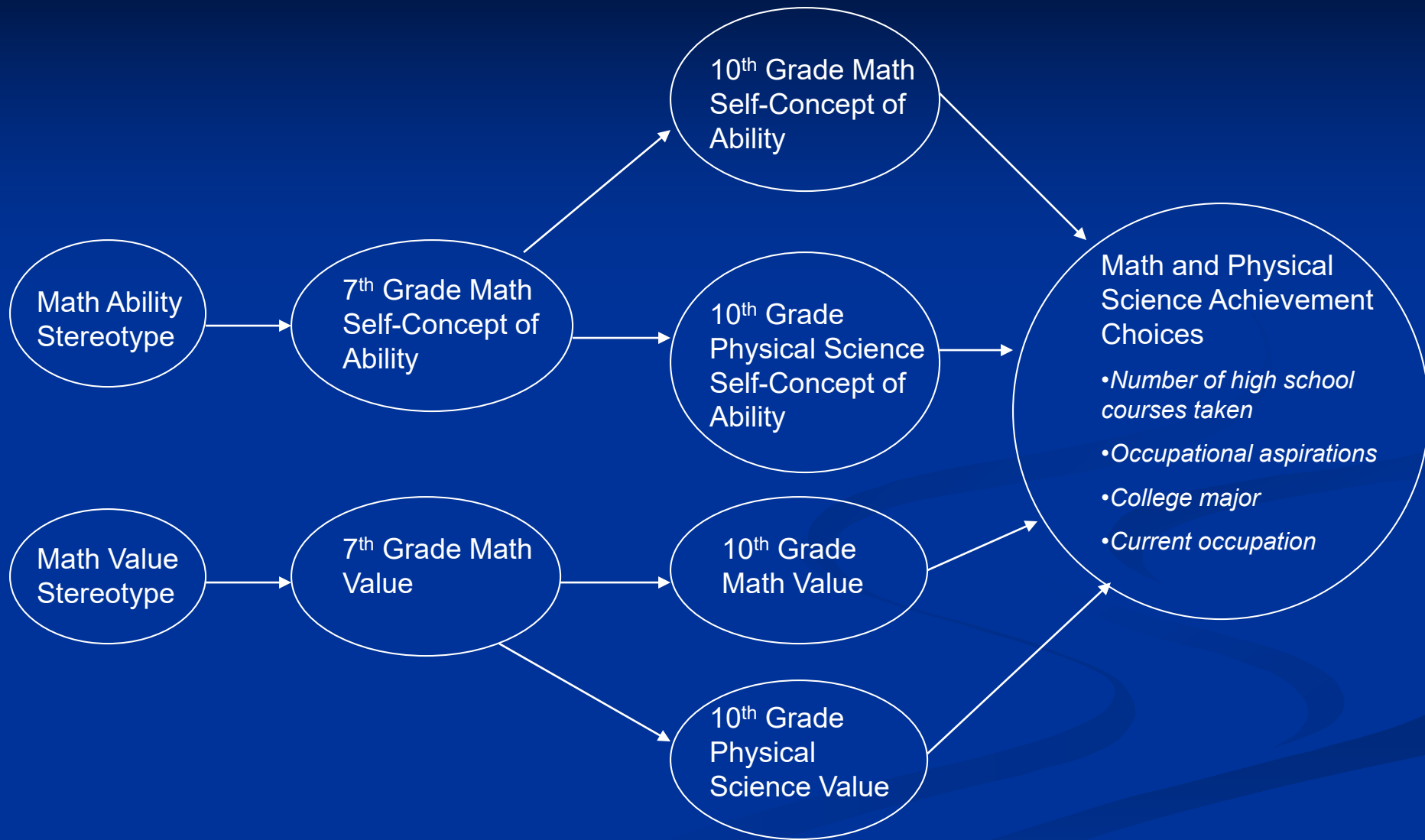


I NEVER THOUGHT OF THAT.

THINK OF THE PRESSURE.

Howard and me

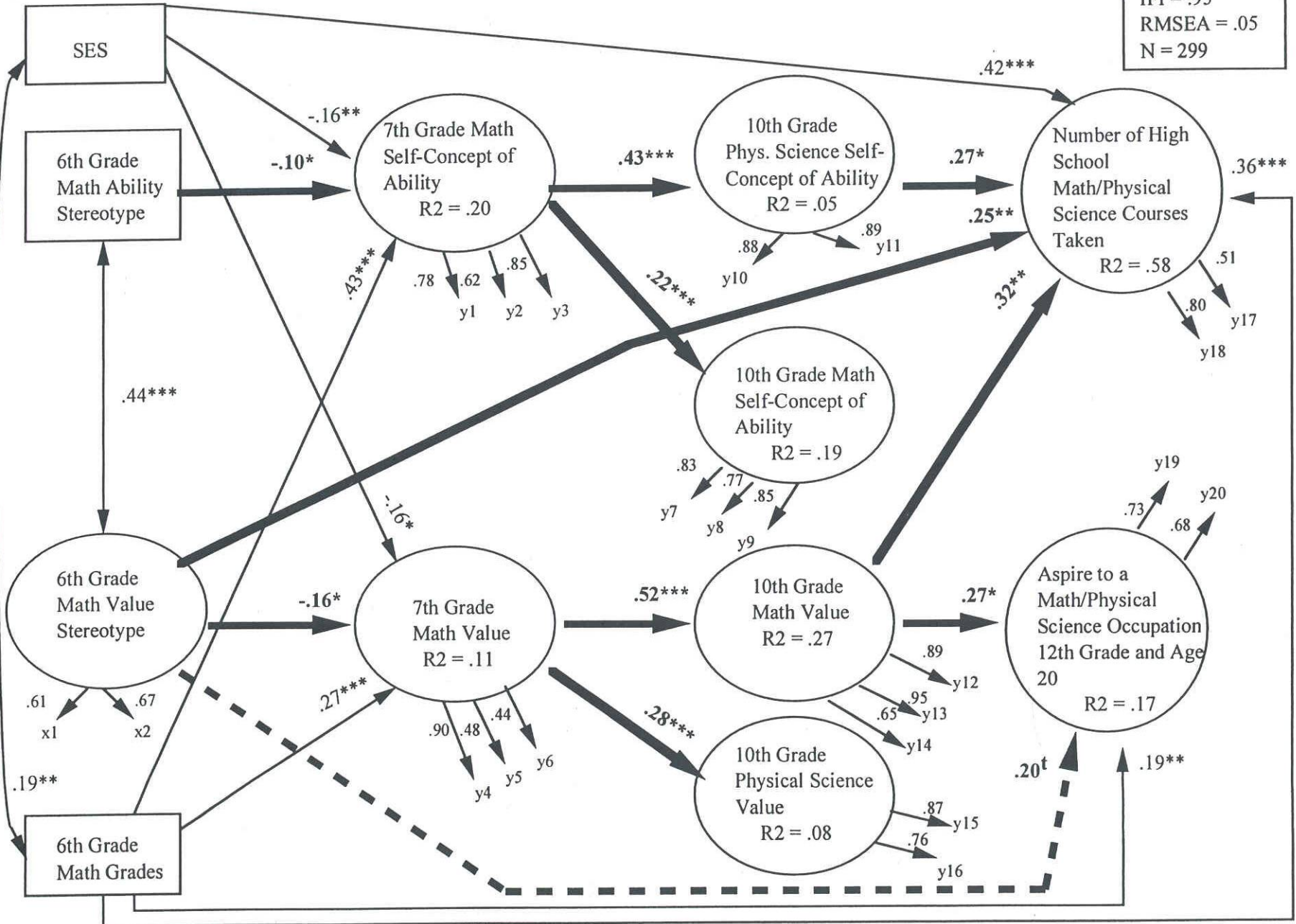
Figure 3. Gender Stereotypes of Math, Self-Concept, Values & Math/Physical Science Outcomes – Theoretical Model.



Note: The paths between the stereotype variables and the outcomes are free.

Figure 9. Gender Stereotype of Math, Self-Concept, Values & Math/Physical Science Outcomes -Structural Equations Model.
 (bolded paths are the ones most relevant to the hypotheses; all path coefficients are completely standardized)

GFI = .90
 CFI = .95
 IFI = .95
 RMSEA = .05
 N = 299



CONCLUSIONS

- General psychological model works very well across domains
- Values are key and yet they are often neglected in studies of gender differences while efficacy/ability self-concepts and over emphasized
- Gender-role ideology is central to acquisition of gendered values
- Gendered values help predict both sex differences and individual differences within sex in activity choice
- Anticipated costs may be critical in long term choices

Applications

- Interventions to increase the participation of females in M/E/PS need to focus on increasing women's understanding that M/E/PS and Informational Technology jobs can help people and do involve working with people as well as increasing their confidence in their ability to succeed in these fields.

Characteristics of Effective Classrooms

- Frequent Use of Cooperative Learning Opportunities
- Frequent Use of Individualized Learning Opportunities
- Infrequent Use of Competitive Motivational Strategies
- Frequent Use of Hands-On Learning Opportunities
- Frequent Use of Practical Problems as Assignments
- Active Career and Educational Guidance Aimed at Broadening Students' View of Math and Physical Sciences
- Frequent Use of Strategies Designed to Create Full Class Participation

Gender-Role Socialization
 Person vs. Thing Orientation
 Interest in Analytic vs Problem-Solving Activities
 Interest in Wholistic vs Compartmentalized Approaches
 Preference for Cooperative Work
 Comfort with Competitive Settings
 Concern with Relation to Teacher
 Confidence
 Assertiveness

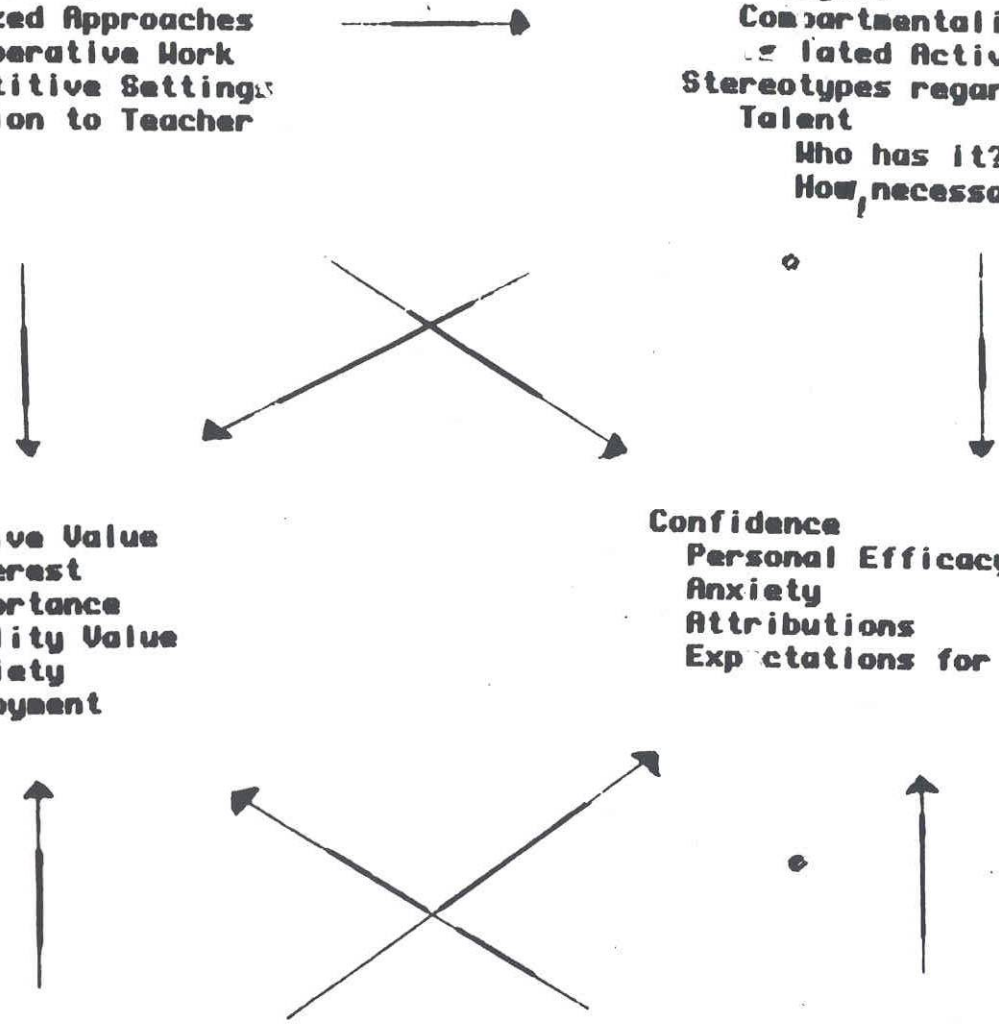
Occupational and Subject Matter Stereotypes
 Math and Physical Sciences as Thing Oriented
 Analytic
 Compartmentalized
 Isolated Activity
 Stereotypes regarding Natural Talent
 Who has it? Males vs Females
 How necessary is it?

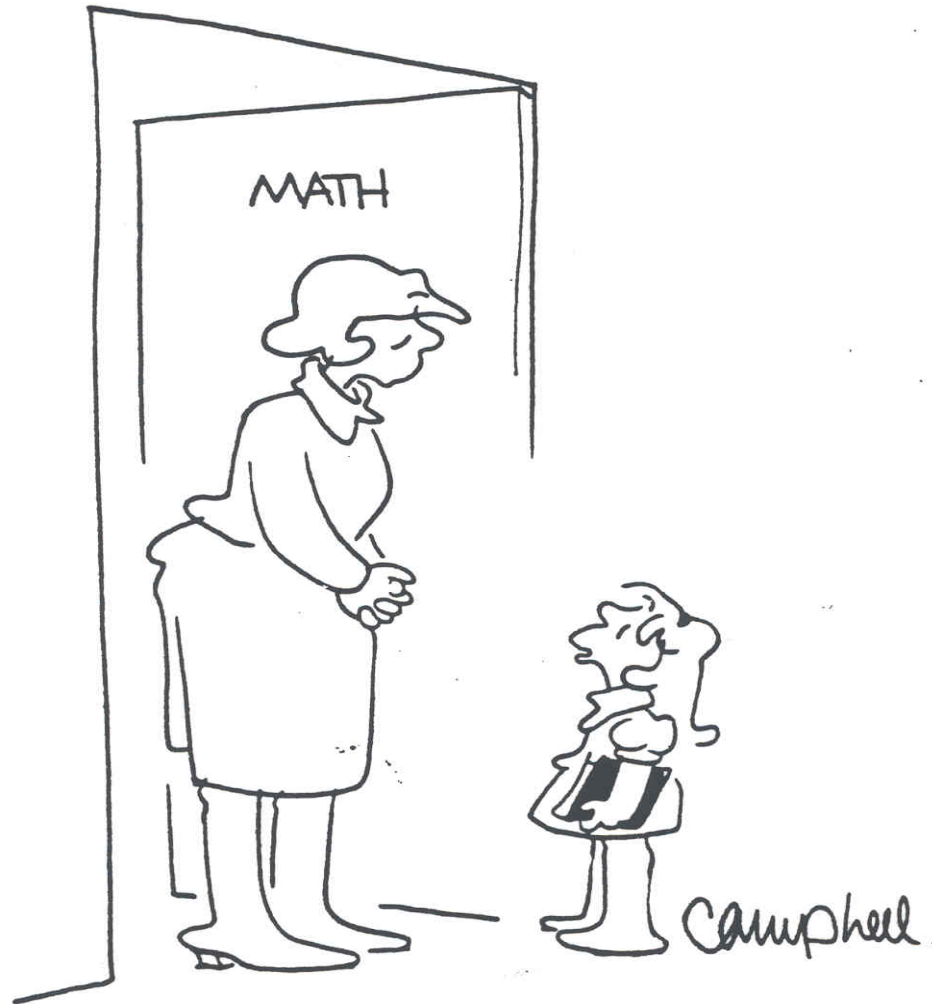
Subjective Value
 Interest
 Importance
 Utility Value
 Anxiety
 Enjoyment

Confidence
 Personal Efficacy
 Anxiety
 Attributions
 Expectations for Success

Instructional Format and Curriculum
 Analytic vs Problem Oriented
 Thing Focused vs Socially Relevant
 Compartmentalized vs Interdisciplinary
 Resocialization of Values and Views

Instructional Climate
 Competitive, Individualistic, or Cooperative
 Positive vs Neutral or Negative Affective Climate
 Confidence in All Students





***“Hello. I’m a beautiful little blond girl, and
I’m here to defy the stereotype.”***

The End

Thank You

More details and copies can be found at
www.rcgd.isr.umich.edu/garp/