

THE EFFECTS OF GENDER ON THE  
BEHAVIORS AND PERCEPTIONS OF STUDENTS AND  
INSTRUCTORS IN THE COLLEGE CLASSROOM

by

Kristine L. Brady

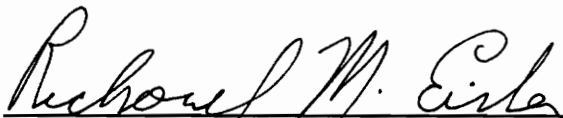
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Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for degree of

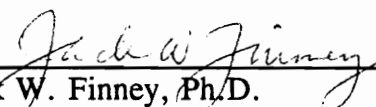
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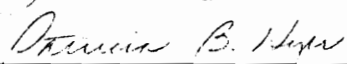
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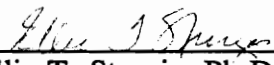
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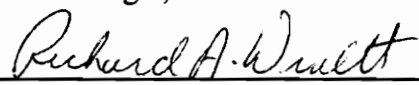
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The Effects of Gender on the  
Behaviors and Perceptions of Students  
and Instructors in the College Classroom

by

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Department of Psychology

(Abstract)

The purpose of this research was threefold: 1) to develop empirically sound measures of classroom interaction including self-report and behavioral assessment instruments, 2) to test a proposed interactional model of classroom interaction patterns by conducting behavioral observations of college classrooms, and 3) to assess for gender inequity at the post-secondary level.

In Study 1, two instruments were developed to tap students' self-report of classroom climate and instructors' sensitivity to gender and cultural issues. Several test administrations of the student self-report measure, the Classroom Atmosphere Questionnaire (CAQ), demonstrated the instrument to be valid and reliable for assessing student appraisal of their classroom environment. The CAQ also evidenced good internal consistency, high test-retest reliability, and the ability to discriminate between classrooms. Furthermore, clear factor structures emerged when factor analyses were performed over multiple administrations. The Instructor Sensitivity Questionnaire (ISQ) was developed to measure the degree to which instructors are

sensitive to cultural and gender issues in the classroom. The ISQ was found to be internally consistent, to discriminate between instructors, and to predict perceived classroom environment.

Using the instruments developed in Study 1, a behavioral assessment of classroom interactions was carried out which included 24 classrooms from 8 different university departments. In order to examine classroom interaction patterns thoroughly and to provide support for the proposed model, Study 2 included the assessment of several independent and dependent variables such as instructor and student sex, instructor sensitivity to gender/race issues, class size, student volunteering, student hand-raising, instructor calling on students and student perceptions of their classroom environment. A behavioral assessment instrument was developed to assess various dimensions of college classroom interactions and evidenced strong inter-rater reliability. The results from study 2 provide support for the proposed model as several instructor, student and classroom environment variables influenced classroom interaction patterns.

Finally, the results indicated that there was no evidence of gender inequity in the classrooms observed. Male and female students evidenced no differences in their classroom interaction behaviors and were not interacted with differentially based on their sex.

## ACKNOWLEDGMENTS

Throughout my graduate school experience of 5 years, my advisor and mentor, Richard Eisler, has greatly impacted my development as a scientist, therapist, and person. He has pushed me to be persistent in my endeavors, to think independently, to assert my ideas, and to think critically. I am grateful to him for his support, encouragement, and conceptual insight throughout my graduate school experience. Committee members Patricia Hyer, Jack Finney, Richard Winett and Ellie Sturgis each provided invaluable knowledge and sources used for the conceptualization and execution of this study. I am especially grateful to Dr. Finney and Dr. Winett for their help in the development and evaluation of my behavioral assessment measures. I am grateful to Dr. Sturgis for her input into the theoretical aspects of this work. Dr. Hyer was always supportive and encouraged me to continue working in an area that can be controversial at times.

Dr. Franchina's input regarding experimental design issues was extremely helpful in writing up the results of this study. Thank you for taking the time to review my work and for providing both verbal and written feedback. I would also like to thank Patricia Hyer and the Provost's office for donating travel money that was used as an incentive for instructors to participate in this study. The Graduate Student Assembly also provided funding for this research to whom I am appreciative.

I would not have been able to carry out this project without the help of my research assistants to whom I would like to acknowledge: Terri Lenhart, Terry Padalino, Jennifer O'Berry, Stacey Sinclair, Jennie Smith, and Celina Williamson.

Each and every one of them provided useful feedback in the development of this project and were reliable, conscientious, and persistent in their data collection.

Dr. Robert Frary and Thresa Vinardi from Measurement and Research Services were extremely helpful in the management of the large amounts of data generated from this study. Their time, patience and help is greatly appreciated. Additionally, Dr. Frary provided invaluable input regarding each step in the scale development of all of self-report instruments used in this study. From the statistics department, I would like to thank Michele Marini, Aleka Kapatou and Kristi Griffiths. They have each contributed greatly to my knowledge of multivariate statistics and the use SAS.

Also, I would like to thank my colleagues, Kerri Augusto, Lisa Curtin, Bonnie Cleaveland and Jon Kies, for their support and encouragement throughout this project. Kerri, thank you for providing me with your conceptual input, for believing in me as a researcher and for your unconditional friendship. Jon, thank you for showing me the importance of balance throughout this endeavor and for reminding me that life is not all about post-hoc analyses and Cohen's Kappa.

Finally, I would like to thank my family for their many years of support and love. My father has contributed greatly in his ability to encourage me and to put the entire dissertation process into perspective. Thanks for reading the endless number of drafts that I have sent you over the years. My mother has been a constant source of support throughout my entire graduate education. Her unconditional love has always been apparent and has never gone unappreciated. My sister Karon, her husband Jeff

and my brother Steven have also provided much needed support while expressing their confidence in me throughout the years. Karon and Steve, I have looked up to you both over the years and have strived to take on a combination of your remarkable characteristics. And Jeff, you can finally call me Dr. Brady now (code 94). I am grateful to have such strong, stable and supportive family.

## TABLE OF CONTENTS

Abstract.....	ii
Acknowledgments.....	iv
Table of Contents.....	vii
List of Tables.....	x
List of Figures.....	xi
The Effects of Gender on the Behaviors and Perceptions of Students and Instructors in the College Classroom.....	1
CHAPTER I: INTRODUCTION AND LITERATURE REVIEW.....	1
Introduction.....	1
Gender Equity in the College Classroom.....	2
Interactional Model of Classroom Interaction Patterns.....	11
Rationale and Clarification of the Problem.....	23
CHAPTER II: STUDY 1 - DEVELOPMENT OF MEASURES AND METHODOLOGY.....	26
Classroom Atmosphere Questionnaire.....	26
Instructor Sensitivity Questionnaire.....	39
Gender Relevance Questionnaire.....	40
CHAPTER III: STUDY 2 - COLLEGE CLASSROOM INTERACTION STUDY..	43
Research Design.....	43
Specific Hypotheses.....	47



Method.....	49
Results.....	60
CHAPTER IV: DISCUSSION AND SUGGESTIONS FOR FUTURE	
RESEARCH.....	95
Measurement Issues.....	95
The Effects of Gender on College Classroom Interaction Patterns.....	97
Directions for Future Research.....	107
References.....	120
Appendices.....	129
Appendix A - Open-ended Survey for Field Study.....	29
Appendix B - Field Study Results.....	136
Appendix C - Preliminary Classroom Atmosphere Questionnaire.....	138
Appendix D - Final Version of Classroom Atmosphere Questionnaire.....	140
Appendix E - Instructor Sensitivity Questionnaire.....	143
Appendix F - Gender Relevance Questionnaire.....	147
Appendix G - Brady Observation Technique for College Classroom Interaction (BOTCCI).....	149
Appendix H - BOTCCI Scoring Sheet.....	160
Appendix I - Recruitment Letter for Instructors.....	161
Appendix J - Follow-up Letter for Instructors.....	162
Appendix K - Informed Consent Form - Instructor Version.....	164

Appendix L - Informed Consent Form - Student Version.....165

Appendix M - Standardized Debriefing Statement for Study 2.....166

Curriculum Vitae.....167

## LIST OF TABLES

Table 1: Factor Loadings for the CAQ - Original Version.....	30
Table 2: Factor Loadings for the CAQ - Final Version.....	34
Table 3: Masculine and Feminine Relevance Difference Scores.....	41
Table 4: Independent Variables for Study 2.....	45
Table 5: Dependent Variables for Study 2.....	46
Table 6: Inter-rater reliability coefficients for the BOTCCI.....	51
Table 7: Sample Characteristics of Classrooms from Study 2.....	53
Table 8: Sample Characteristics of Instructors from Study 2.....	54
Table 9: Multivariate Results for Student Behaviors.....	112
Table 10: Multivariate Results for the First Set of Instructor Behaviors.....	113
Table 11: Multivariate Results for Student Behaviors: Ratio Data.....	114
Table 12: Multivariate Results for the First Set of Instructor Behaviors: Ratio Data.....	115
Table 13: ANOVA Results for Seat Location.....	116
Table 14: Multivariate Results for Classroom Atmosphere.....	117
Table 15: Simple Multiple Regression Results for Predicting Classroom Atmosphere.....	69
Table 16: Means and Standard Deviations for Male and Female Students for Student and Instructor Behaviors.....	118
Table 17: Multivariate Results for the Second Set of Instructor Behaviors.....	119
Table 18: Factor Loadings for CAQ - Study 2.....	93

## LIST OF FIGURES

Figure 1: An Interactional Model for Predicting College Classroom	
Interaction Patterns.....	13
Figure 2: Scree Plot of Eigenvalues - Original Version of CAQ.....	31
Figure 3: Scree Plot of Eigenvalues - Final Version of CAQ.....	35
Figure 4: The Effect of Student Ratio on Supportive Classroom Environment.....	63
Figure 5: The Effect of Student Ratio on Negative Classroom Events.....	64
Figure 6: The Effect of Class Size on Supportive Classroom Environment.....	66
Figure 7: The Effect of Class Size on Negative Classroom Events.....	67
Figure 8: The Effect of Instructor Sensitivity on Supportive Classroom	
Environment.....	74
Figure 9: The Effect of Instructor Sensitivity on Lecture Duration.....	75
Figure 10: The Effect of Instructor Sex on Lecture Duration.....	77
Figure 11: The Effect of Instructor Sex on the Frequency of Questions Asked.....	78
Figure 12: The Effect of Instructor Sex on Supportive Classroom Environment.....	79
Figure 13: The Interaction between Instructor Sex and Class Size on Instructor	
Calling on Students.....	81
Figure 14: The Interaction between Instructor Sex and Class Size on Lecture	
Duration.....	82

Figure 15: The Interaction between Instructor Sex and Class Size on the Frequency of Questions Asked.....	83
Figure 16: The Interaction between Instructor Sex and Class Size on Supportive Classroom Environment.....	84
Figure 17: The Interaction between Instructor Sex and Student Ratio on Lecture Duration.....	86
Figure 18: The Interaction between Instructor Sex and Student Ratio on the Frequency of Questions Asked.....	87
Figure 19: The Interaction between Instructor Sex and Student Ratio on Supportive Classroom Environment.....	88
Figure 20: The Interaction between Instructor Sex and Gender Relevance of the Course on Lecture Duration.....	90
Figure 21: The Interaction between Instructor Sex and Gender Relevance of the Course on Supportive Classroom Environment.....	91
Figure 22: Scree Plot of Eigenvalues - Observation Study.....	94

## **CHAPTER I: INTRODUCTION AND LITERATURE REVIEW**

### **Introduction**

Gender in the classroom has been a topic of interest over the past three decades (Spring, 1991). Given the surplus of research that has been published on sex differences in psychology over the past 30 years (Eagly, 1995), it is not surprising that interest in gender issues in the classroom has also increased. Furthermore, greater numbers of female students are entering college, causing even greater concern regarding the role of gender in the classroom (Hall & Sandler, 1982). Studying the effects of gender in the college classroom is important given that this is where much of the college experience for students takes place. Unfortunately, few studies exist on the effects of gender at the post-secondary classroom compared to secondary classrooms (Sadker & Sadker, 1986; Funderburk, 1994; Fraser & Treagus, 1986).

Much of the literature that has been published on gender in the college classroom has focused on whether men and women are receiving the same quality of education. Several investigators have suggested that a significant number of college instructors engage in gender-biased behaviors in the classroom based on findings that male and female students are often interacted with and responded to based on their sex (Bayne, 1987; Bornstein, 1982; Carelli, 1988; Katz & Vieland, 1993; Sadker & Sadker, 1986). However, there is a considerable lack of empirical research on this topic. Furthermore, most of the studies that have been published in this area have been completed without the use of psychometrically sound self-report instruments to measure gender inequity (Brady & Eisler, in press).

After reviewing the literature in this area and discussing the importance of gender equity in the classroom, a multi-modal model for investigating classroom interaction patterns will be described. This will be followed by a description of the research goals and their respective rationales. Finally, the actual studies and their results will be presented followed by a discussion of findings and implications for future research.

## Gender Equity in the College Classroom

### Background Information

Gender inequity can be defined as the display of inequitable behaviors, often subtle, which occur when men and women are treated or responded to differently based on their sex (Carelli, 1988). While research on teacher-student interactions has been conducted since 1955, researchers did not begin to assess gender-inequitable classroom interactions until the late 70's (Lockheed & Klein, 1985). A greater amount of research has focused on gender inequity in the classroom over the past 15 years (Jacobs & Wigfield, 1989). Historically, the majority of classroom inequity studies have evaluated gender discrimination at the elementary and/or secondary level (Omwig, 1989; Thorne, 1989), while relatively fewer studies have looked at these issues in post-secondary education. Furthermore, most have emphasized how gender inequity effects women as opposed to both men and women.

Much of the interest in this area of study was sparked by Sadker and Sadker (1985) who have done substantial research on classroom equity at the elementary level. Their largest research project (Sadker & Sadker, 1985) took place over a 3

year period, observing over 100 fourth-, sixth- and eighth-grade classrooms.

Although subtle in nature, they uncovered substantial forms of gender inequity. In their 1985 study, they found teachers: 1) talked more to boys, 2) questioned boys more, 3) gave boys more praise and help, 4) criticized boys more and, 5) segregated their co-educational classes by sex 50% of the time. Sadker and Sadker (1985) reported that interactions between students and teachers were short on "quality and equity" (p. 361). These results at the elementary and secondary level of education prompted increased research at the post-secondary level.

Hall and Sandler (1982) suggested that gender inequities also occur at the college level and refer to the experiences of college students in the classroom as the "classroom climate." They suggested that minor inequities in the classroom create a "chilly" environment for women and negatively impact their academic and career development. In 1982, they submitted an influential paper titled, *The Classroom Climate: A Chilly One for Women?*, in which they described everyday micro-inequities that can occur inside and outside of the classroom. Hall and Sandler (1982) also suggested that subtle discrimination in the classroom created a "chilly" environment for women which had negatively impacted their academic and career development. Furthermore, they suggested that more research was needed to understand the variables that influence differential treatment of males and females (e.g. sex of instructor, type of course, and college atmosphere). However, their conclusions were also limited in that many of their citations were not based on empirical studies. Also, most of the inequities described in the paper were thought to



be carried out by instructors as opposed to students. The authors did not propose that certain types of classrooms or institutions were more likely to harbor discriminatory instructors than others. Neither did they describe how frequently or intensely these behaviors occurred. Finally, an important drawback of their review was that it did not include men's experiences of gender inequity.

There is much controversy concerning the extent of gender inequity in the literature. Many authors contend that gender inequity continues unabated at the post-secondary level (Chiosso, & Tizard 1990; Foxley, 1988; Hall & Sandler, 1982; Harvey & Hergert, 1986; Sadker & Sadker, 1986; Sadker, Sadker & Klein, 1986) while others disagree (Constantinople, Cornelius & Gray, 1988; Heller, Puff & Mills, 1985; Williams, 1990). Still other authors argue that empirical evidence is inconsistent and suggest more systematic research of the problem (Jacobs & Wigfield, 1989; Thorne, 1989).

#### Negative Effects of Gender Inequity on Students

Inequitable treatment of men and women in the classroom has been thought to have both short- and long-term effects on students' educational development. Hall & Sandler (1982) suggest that women's academic and career development are negatively affected when they are discouraged from classroom participation, exposed to confining stereotypes, and treated differently than men. They suggest that gender bias against women results in decreased self-confidence, discouragement from intellectual participation, and decreased achievement. Other authors argue that a gender-inequitable environment restricts women's participation in the classroom setting

(Sadker & Sadker, 1988). According to Banks (1988), the classroom environment, course structure and gender-biased language all serve to exclude women or make them feel inferior.

Research has shown that students who actively interact with faculty learn more, enjoy the learning process more and have greater self-confidence than students who do not participate (Sadker & Sadker, 1988). If women are less likely to be encouraged to participate in classroom interactions, their self-confidence, enjoyment and overall learning may not be fostered. Women are thought to participate less in class based on research in the area of gender equity. For example, Banks (1988) reported that men participate more than women in law school classrooms. If gender inequity occurs in the classroom (e.g. if women participate less than men), women may not be receiving the same quality of education as men.

Another proposed negative impact of gender inequity in the classroom is that male and female students may feel confined in their choice of careers (Carelli, 1988; Sadker & Sadker, 1986). Gender inequity may be expressed through the inclusion of gender-role stereotypes in lecture content and subtle remarks made by instructors and students. For example, an instructor may always refer to secretaries as females in their examples while referring to scientists as males. The use of stereotyped examples serves to reinforce confining gender-role stereotypes (Carelli, 1988). Unfortunately, an inequitable classroom in general (e.g. one in which women are often interrupted and men are not) serves to reinforce gender stereotypes which has negative implications for both men and women (Carelli, 1988; Hall & Sandler, 1982).

According to Carelli (1988), gender stereotypes can negatively influence significant aspects of college students' lives, both males and females. According to Sadker et al. (1986), "...sex bias is a two-edged sword; males are also victims" (pg. 221). Males do not benefit from close friendships with other males like females do with other females (Garfinkel, 1989). It has been argued that males are more likely to suffer from anxiety and substance abuse as a result of pressure to "be successful", given the social desirability of conforming to the male sex-role stereotype (Wisdom, 1984). Furthermore, men are similarly limited in their choice of careers because they are not likely to be reinforced for choosing careers associated with females such as nursing, library science, or teaching kindergarten (Carelli, 1988). Additionally, Carelli (1988) feels that female students suffer from gender inequity in athletics because there are fewer opportunities available for them to obtain scholarships or career advancement based on their sports skills.

Another potential effect resulting from classroom inequity includes decreased self-esteem (Sadker & Sadker, 1986) and overall feelings of discouragement for female students (Hall & Sandler, 1982). Additionally, a decrease in self-esteem at the college level is thought to carry over into graduate school and professional life (Krupnick, 1985). Astin (1977, 1993) provides evidence that women's self-esteem is greater when attending a women's college compared to a coeducational college. Women also evidence greater academic achievement, interact more with faculty and engage in more verbal aggressiveness when attending an all women's college (Astin 1993). Similarly, men attending predominantly male co-educational schools also

receive certain benefits. Men are more likely to be satisfied with their overall college experience, their experiences with faculty, and their general education than women (Astin, 1993). Interestingly, a significant disadvantage for male students is often overlooked: males are limited in their choice of colleges. In the population at large, relatively few all male schools exist, compared to all female schools (Astin, 1993). It has also been argued that sexism in the classroom results in income differences between men and women following post-secondary training (Sadker & Sadker, 1986).

In addition to self-esteem being negatively affected by gender inequity, self-efficacy is also thought to be affected. Betz and Hackett (1983) compared the perceptions of self-efficacy of male and female science majors regarding their ability to do well in mathematics. They found that males had significantly higher self-efficacy expectations than females. This has significant implications for females given that self-efficacy is positively related to behavioral initiation, persistence, and coping (Bandura, 1977). Persons with greater self-efficacy are more likely to initiate behaviors in unfamiliar settings and to persist when faced with obstacles and aversive experiences. Persons with low self-esteem are more likely to avoid threatening situations altogether, rather than getting involved in activities and behaving assuredly. Furthermore, persons with low self-efficacy are less likely to engage in coping behaviors when needed (Bandura, 1977). Hackett (1985) also found that performance and self-efficacy in mathematics was positively related to a masculine sex-role orientation.

Arnold and Denny (1985) compared the career aspirations of male and female

valedictorians/salutatorians after tracking them throughout four years of college. The women in their study evidenced a sharp decline in their self-reported, estimated intelligence while the men showed no change. This decline was not related to their actual academic performance. In fact, the women had slightly higher grade point averages than their male comparison group at the end of the four years.

It appears that something is happening during the college years to produce or maintain these differences in male and female students' career aspirations, self-esteem and self-perceptions. Many authors suggest that this is a direct result of gender inequity in the college classroom (Carelli, 1988; Gabriel & Smithson, 1990; Hall & Sandler, 1982; Sadker & Sadker, 1992; Sadker & Sadker, 1986; Schau & Tittle, 1985). However, it should be understood that cause and effect relationships between gender inequity and these negative events cannot be established given the infinite number of variables present throughout one's college experience (e.g. gender discrimination that occurs outside of the classroom) and the correlational nature of Astin's work (1977, 1993).

According to Rowe (1990), gender inequity is harmful because people who are ignored are not allowed to contribute valuable information to the class as a whole. Furthermore, it is presumed that if instructors expect female students to perform poorer than male students, female students are likely to meet the instructors' negative expectations. Rowe (1990) further suggests that gender inequity provokes helplessness and/or frustration in those who experience gender inequities. According to Glazer, Bensimon, and Townsend (1993) female passivity is reinforced in

classrooms that are biased against women. According to Sternglanz & Lyberger-Ficek (1977), gender bias against women results in greater ultimate success for men because they are more likely to obtain doctorates.

### Review of the Evidence for Gender Inequity

Gender inequity research at the post-secondary level tends to be primarily descriptive and relies on two types of studies: 1) behavioral studies - research describing objective observation of apparent discrimination in the ways that men and women are challenged and responded to in the classroom, and 2) self-report studies - research that presents data on how males and females appraise their classroom environment or perceive the existence of inequities in the classroom.

A recent summary of this literature revealed considerable inconsistency as to the nature, extent, and sources of gender bias in this college classroom setting. (Brady & Eisler, in press). Inconsistent findings and significant methodological flaws in the existing literature suggest that more empirical research is needed to investigate the existence of gender inequity in the college classroom.

One of the major problems with the existing literature is the lack of empirically-sound instruments to measure college classroom interaction patterns with respect to gender. According to Brady & Eisler (in press) the major investigators of gender inequity provided little support for the validity of their self-report instruments. Furthermore, there is no evidence that the self-report instruments used to measure student perceptions of classroom events are consistent with actual behaviors that occur in the classroom.

Comparisons across studies were difficult due to the different nature of the instruments used to assess gender inequity and the failure to sufficiently explore differences in class size, subject matter, male-female student ratios, and instructor gender. Regardless of these methodological problems, the majority of the self-report studies evidenced less inequity than the behavioral studies. Either gender inequity in the classroom was so subtle that it was not detected by students' self reports, or the possibility still remains that gender inequity is not perceived by students to be an important factor affecting learning in the college classroom.

Brady & Eisler (in press) reported multiple suggestions for future research in this area. First, they recommend an interactional view of the college classroom which takes into account student behaviors, teacher behaviors, and characteristics of classroom environments. Student and instructor sex make up only a portion of the determinants that influence teacher-student interactions. Second, there is a great need for authors who study this phenomenon to operationally define gender bias and to use similar assessment devices. Thirdly, the establishment of psychometrically reliable and valid instrumentation in this area is needed (e.g. instruments should have high test-retest reliability and common factor structures). This will allow for greater comparisons across studies and for the replication of previous findings. Fourth, they recommend the simultaneous administration of both self-report and objective observations of gender inequity. This would serve to establish the validity of self-report instruments. Finally, more assessment studies should be carried out that include a larger number of classes and instructors from a variety of departments.

This would add greatly to the assessment of the problem and serve to increase external validity.

### Interactional Model of Classroom Interaction Patterns

In terms of assessing for gender equity, most of the reviewed studies advocated a theoretical perspective that describes gender inequity as a function of instructor discriminatory behavior. It is proposed that this "within instructor" model is limited and ignores the complex interactions that take place between students and their instructors. Not only does this perspective blame instructors and increase their defensiveness, but it ignores the potential that students have to change their own environment. However, this has been relatively ignored as most gender bias studies focus on uncovering teacher behaviors that are "biased". Strong data exists to support the idea that student behaviors influence teacher behaviors (Brady, 1993). For example, it has been established that student behaviors influence gender bias in the classroom by influencing instructors. Therefore, the working model for this study is interactional, focusing on the behaviors, cognitions, and psychological characteristics of both students and teachers.

Regarding classroom interaction and student appraisal of the classroom climate, several authors have investigated these phenomena using a small number of variables that differ across studies. However, there are no comprehensive studies that take into account multiple variables that may interact or influence classroom interaction and classroom atmosphere. While some authors have conceptualized the classroom in terms of interactions between students and instructors (Lowman, 1984),



a more refined model for systematically investigating behavior patterns in the classroom has not been developed. As a result, an interactional model of college classroom interaction patterns was developed for the utility of conceptualizing and studying differences in student participation and interactions between students and teachers. The model components were developed based on their relevance to gender issues in the classroom. The specific variables chosen for inclusion in the model were based on previous research. Variables that accounted for a significant amount of classroom interaction patterns and student appraisal of classroom climate in previous studies were included.

The proposed model (See Figure 1) is comprised of three basic components:

1) *instructor determinants*, 2) *student determinants*, and 3) *classroom environment*.

*Instructor determinants* refer to the proportion of variance that instructors contribute to the college classroom through their overt behaviors and attitudes toward the class.

The two instructor determinants thought to be relevant for the current model are instructor sex and instructor sensitivity to gender issues. *Student determinants* refer to the proportion of variance that students contribute to the college classroom through their self-expectations and overt behaviors. The two gender-related student characteristics chosen for the current model are student sex and student initiative.

*Classroom environment* refers to the fixed characteristics of the classroom that concern the academic discipline, course material, class size, and general student composition of the class. The three classroom environment determinants include class

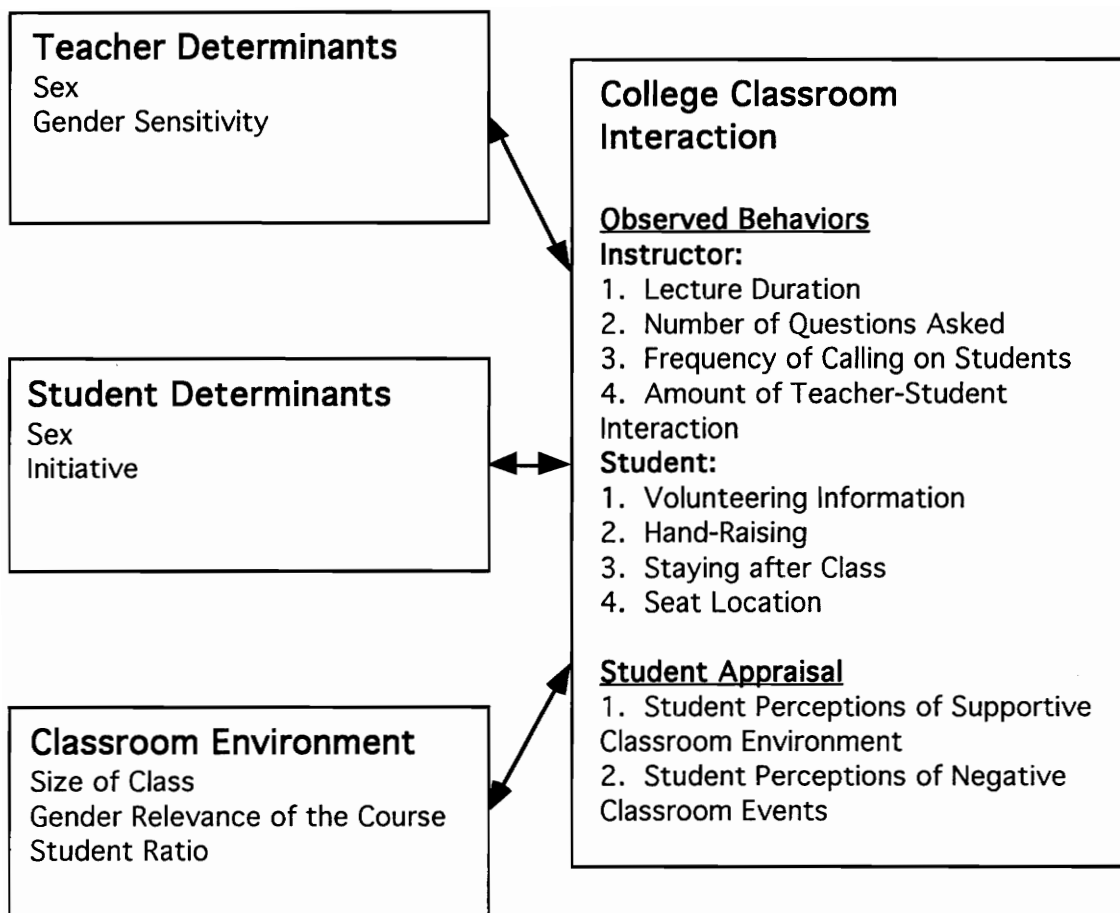


Figure 1. An Interactional Model for Predicting College Classroom Interaction

size, gender ratio of males to females and gender relevance<sup>1</sup> of the class. Please note that student ratio refers to the proportion of males to females in a given class (e.g. male-dominated, female-dominated or non-dominated) while gender relevance refers to the type of material being presented in a particular class (e.g. child development which is considered feminine-relevant or engineering which is considered masculine-relevant).

It is proposed that various elements within each determinant interact (or have an additive effect) to increase or decrease the likelihood of gender differences in teacher-student interactions occurring within a particular classroom. Predictor

### Variables

#### Instructor Determinants

##### Sex

Krupnick (1985) and Constantinople et al. (1988) found differences in classroom interaction between male and female instructors. They reported that students spoke more in classes taught by females than by males. Crawford and MacLeod (1990) found that students in female-led classes reported greater participation than students in male-led classes. Heller et al. (1985) assessed differences between male and female teacher's use of humor. They found that male students perceived a greater amount of sexual humor used by faculty than did female students. Also, male instructors were perceived as using more offensive humor

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1. Gender relevance refers to the description of the course type or field of study in which men or women should excel. A gender relevant course is one in which a specific gender role performance is expected. A masculine relevant course is one in which men should excel, according to the male gender role stereotype. For example, according to the masculine gender role, men are thought to be intelligent, analytical, and rational when it comes to problem solving. Therefore, a masculine relevant course might be mathematics or engineering. A feminine relevant course is one in which women are thought to excel and most likely, surpass men. For example, according to the female gender role, women are thought to be sensitive, communicative, and cooperative. Therefore, a feminine relevant course might be family and child development or women's studies.

in small classes when compared to large classes. This difference was reported by both male and female students.

### Gender Sensitivity

Previous researchers have hypothesized that instructors who are more sensitive to gender and race issues in the class are more likely to promote equitable classrooms (Hall & Sandler, 1982; Sadker & Sadker, 1992; Sandler & Hoffman, 1992).

According to Wood & Lenze (1991), gender-insensitive instruction results in a classroom that is not hospitable to female students.

As a result, several intervention programs have been developed and implemented to "increase instructor sensitivity" to these issues (DiSalvo, 1993; Mobley & Payne, 1992; Wood & Lenze, 1991). Unfortunately, these workshops suffer from multiple problems, one of which is lack of evidence that they are effective. Furthermore, they do not use valid instrumentation to measure instructor sensitivity to gender and race issues. Attempts have been made to measure the knowledge base of instructors regarding gender and race issues using true/false questions of what constitutes sexism or racism (Bayne, 1987; C. Berger, personal communication, September 26, 1994; Elizabethtown Community College, 1987; A. Kilkelly personal communication, October 3, 1994; J. Schoenhals, personal communication, April 20, 1995; O'Neil & Carroll, 1988) but not instructor sensitivity. Knowledge of what constitutes gender inequity does not imply that instructors are sensitive to the issues or attempt to change their behaviors. Given the recent interest in the construct of "gender sensitivity" and the need for more research

in this area, instructor gender sensitivity was included in the model.

### Student Determinants

#### Sex

Several investigators have suggested students are responded to and interacted with differently based on their sex (Bayne, 1987; Bornstein, 1982; Carelli, 1988; Katz & Vieland, 1993; Sadker & Sadker, 1986). In order to assess for sex differences, student sex must be included in the model.

#### Initiative

Student initiative refers to one's confidence and persistence in the classroom setting. Student initiative has been found to influence specific student behaviors in the classroom. For example, student initiative has been positively linked to the number of questions asked by students (Pearson & West, 1991). According to (Wood & Lenze, 1991) students that assert themselves in class are more likely to be rewarded than students who wait their turn.

Student sex is a frequent variable that is studied with respect to assertiveness. For example, Zimmerman & West (1975) found that women were more likely to be interrupted than men in conversations. Assertive speech and behaviors are related to the masculine gender role while un-assertiveness is often associated with the stereotypical feminine role (Gervasio & Crawford, 1989). Some authors have argued that the classroom itself is biased against women because western classrooms favor men's ways of thinking and learning, including assertiveness (Wood & Lenze, 1991). Thus, in addition to student sex, the concept of student initiative should be included in

the model. Specifically, students who take initiative in the classroom are more likely to ask questions, make comments or raise their hands.

### Classroom Environment

#### Class Size

Class size has traditionally been a popular variable of study. Prior to 1967, over 300 studies investigating the effects of class size on education were published (Lindbloom, 1976). Smaller classes are favored by students, associated with increased quality, promote attendance, evidence more in-class activities, promote teacher morale, promote creativity, and provide more meaningful interaction between students and teachers. Long (1986) and Constantinople et al. (1988) have found class size to influence overall participation. Smaller classes tend to result in greater student participation than larger classes. Students tend to be more involved and more emotionally responsive to each other when the class size decreases (Lowman, 1984). Teacher behaviors have also been found to change when the class size changes (Lindbloom, 1976), providing yet another reason to include this measure as a predictor of classroom-interaction patterns.

#### Gender Relevance of the Class

The subject matter being taught in a particular course has been recommended as a potential predictor variable of classroom interaction patterns (Hall & Sandler, 1982). Previous research also suggest that the type of course influences teacher-student interactions (Omvig, 1989; Constantinople, et al. 1988, Vahala and Winston, 1994). Omvig (1989) found that technical courses evidenced greater gender equity in

science classes than non-science courses. Constantinople et al. (1988) found that greater student participation occurs in art classes compared to science classes. Vahala and Winston (1994) found that positive classroom atmosphere differed across academic discipline areas. English classes were perceived as the most intellectually stimulating when compared to behavioral science and laboratory sciences classrooms. Laboratory science classes were perceived as having the most hostile and intimidating environment when compared to behavioral science and english classrooms.

As a result, the subject matter taught in a course was deemed as an important predictor and was included in the model. However, a system for categorizing the various courses available at the post-secondary level (e.g. architecture, engineering, child development) was needed. In order to classify course types into nominal categories, gender relevance was chosen which includes three types of courses: feminine-relevant, masculine-relevant, and androgynous. Feminine-relevant courses refer to subject matter that is perceived by students as requiring significantly more feminine traits than masculine traits. Masculine-relevant courses refer to subject matter that is perceived by students as requiring significantly more masculine traits than feminine traits. Androgynous courses are perceived as requiring equal amounts of masculine and feminine traits.

### Student Ratio

Student ratio refers to the proportion of males to females in the college classroom. Student ratio is one gender-related variable that has not been assessed in the literature and was chosen for this reason. A course that is dominated by a high

proportion of males may impact student behaviors differently than a course that is dominated by a high number of females and vice versa. Similarly, a class that is non-dominated (one that includes equal numbers of men and women) may have yet a different effect on student behaviors.

### Classroom Interaction Variables

#### Behavioral Measures

The major classroom interaction behaviors targeted by the model consist of the various components that make up classroom discussion. Observing classroom discussion presents an opportunity to observe classroom interaction patterns and the presence of gender inequity. Classroom discussion was also chosen because interactive classrooms are important for student learning and increasing interest in the material at hand (Sadker & Sadker, 1986; Lowman, 1984).

**A useful classroom discussion, unlike a dormitory bull session, consists of students comments separated by frequent probes and clarifications by the teacher that facilitate involvement and development of thinking by the whole group.**

**Lowman (1984)**

Discussion can promote independent thinking, student motivation, and student involvement (Lowman, 1984). Classroom discussion includes student participation and teacher-student interaction, both of which are included in the model. Secondly, when gender inequity is reported, authors often state that students are interacted with differently based on their sex or that men and women participate differently. Two basic categories of behaviors were chosen: 1) *instructor behaviors* - lecturing, asking questions to the class, calling on students, interacting with students and 2) *student*



**behaviors** - volunteering information, hand-raising, staying after class, and seat location.

### Instructor Behaviors

Four instructor behaviors were chosen: 1) how often the instructor lectures, 2) how frequently the instructor asks questions to the entire class, 3) how often the instructor calls on students, and 4) how often the instructor interacts with students. Much of the literature discussed thus far have included these two variables (Constantinople et al., 1988; Krupnick, 1985; Crawford and MacLeod, 1990; Heller et al. 1985). As a result, these are considered essential variables for understanding and predicting college classroom interaction patterns.

### Student Behaviors

Student volunteering of information and hand-raising are both considered to be participation and were chosen for several reasons. First, student participation is an integral part of the learning process (Pearson & West, 1991). Students are more satisfied in interactive classrooms that emphasize high student involvement and personal teacher-student relationships (Moos, 1976). Also, increased participation is associated with increased interest in the subject matter and increased enjoyment in the classroom setting (Fraser & Fisher, 1982).

Given that teacher-student interaction is an important facet of the learning environment, it was thought that not all students may interact with the instructor in class. According to Lowman (1984), much student communication with their instructors takes place before or after class. Pearson and West (1991) provide many

reasons why some students do not ask questions in class. For example, some may fear negative repercussions by their instructors while others find it anxiety provoking. Therefore, some students may prefer to ask questions after class rather than assert themselves in front of their fellow classmates.

Finally, the seat location of students was chosen as a means for exploring gender differences. According to Wheldall & Glynn (1989), seating arrangements have a strong impact on classroom behaviors yet few studies have assessed sex differences and seating arrangements. Once students acquire a seat in a particular classroom, they are likely to stay there for the duration of the class (Philpott, 1993). Seat location is an important variable for classroom learning as students who sit in the front of the room, or closer to the teacher, want to participate and feel more at ease than students who sit in the back of the class (Philpott, 1993).

#### Student Appraisal

Student appraisal of classroom atmosphere was chosen as the primary self-report measure in this model due to repeated findings that student perceptions of their classroom influence a variety of educational outcomes such as student learning and self-esteem (Rosenfeld & Jarrard, 1985). The term "classroom atmosphere" is synonymous to "classroom climate" which has been clearly defined by Kindsvatter, Wilen, and Ishler (1988):

**Climate refers to the affective aspects of the classroom, such as the feelings generated by and about the instructor, the students, the subject matter, along with aspects of the classroom itself which contribute positively or negatively to the learning atmosphere.**

Student appraisal of the classroom environment has been found to influence several aspects of student education. Positive classroom atmosphere is not only important to students and teachers (Fraser & Fisher, 1982; Fraser & Treagust, 1986; Funderburk, 1994; Vahala & Winston, 1994) but a positive classroom environment increases attendance (DeYoung, 1977; Walberg, 1979), influences intellectual development (Hadley & Graham, 1987), and is a strong predictor of student achievement (Vahala & Winston, 1994; Fraser & Fisher, 1982; Rosenfeld & Jarrard, 1985). Positive classroom atmosphere is also important for student learning (Funderburk, 1994; Rosenfeld & Jarrard, 1985), for increasing student interest in subject matter, and for overall enjoyment of class (Fraser & Fisher, 1982; Walberg, 1979). Student perceptions of increased cohesiveness, increased satisfaction and decreased friction in their classrooms are positively related to student achievement (Fraser & Treagust, 1986). In previous research, male students have also reported experiencing more negative events in class than female students (Heller et al., 1985; Cranston, 1987). Therefore, both positive and negative classroom atmosphere were considered essential and were included in the model. The questions pertaining to classroom atmosphere should also reflect differences in the way male and female students perceive the classroom.

## Rationale and Clarification of the Problem

The purpose of this research was threefold: 1) to develop empirically sound measures of classroom interaction including self-report and behavioral assessment measures, 2) to test the proposed model by conducting a behavioral observation study of college classroom interaction, and 3) to assess for gender inequity at the post-secondary level.

### 1. Instrumentation Development

A major goal of this study was to develop valid self-report instruments to measure both student appraisal of classroom atmosphere and instructor sensitivity to gender issues in the classroom. The Classroom Atmosphere Questionnaire (CAQ) was developed in order to assess students perceptions of their classroom including positive and negative events. The reliability and validity of the CAQ was established. The Instructor Sensitivity Questionnaire (ISQ) was developed in order to quantify instructors attitudes regarding gender sensitivity. Specifically, this instrument was intended to measure how important instructors feel it is to be sensitive to gender issues in the classroom. This type of instrument has not yet been developed and was assessed for reliability and validity.

### 2. College Classroom Assessment

The second purpose of this project was to observe classroom interaction between students and teachers. Specifically, the comparison of class discussion across a large number of courses across various departments was desired. The overall goal was to provide a test of the interactional model and to determine its predictive utility.

As a result, all of the predictor and criterion variables described in the model were included in the classroom interaction study. Based on the model, specific hypotheses were constructed and tested in order to provide support for an interactional view of the college classroom.

### 3. Assessment of Gender Inequity

The third goal was to assess for gender inequity at the post-secondary level. In order to accurately assess for gender equity, multiple steps were taken. First, a behavioral coding system that specifically codes differences in male and female student behaviors was developed. Second, the classrooms that were observed were also given a self-report measure of classroom atmosphere. The administration of both student self-reports and behavioral observations is a combination that has not been researched in the past. This task was particularly desirable in order to determine if students are accurate in their appraisal of classroom events, thus increasing the validity of the results based on student self-report.

#### Description of Research

In order to accomplish these goals, 2 independent studies were conducted. In the first study, two instruments were developed to tap students' self-report of classroom climate and instructor sensitivity to gender and cultural issues: the Classroom Atmosphere Questionnaire (CAQ) and the Instructor Sensitivity Questionnaire (ISQ). The Gender Relevance Questionnaire (GRQ) was also developed to determine the gender relevance of the courses to be assessed in Study 2. The development and validation of these instruments are described in Study 1.

In Study 2, the college classroom interaction study was designed and implemented which looked at the independent and dependent variables described in the proposed model. Using the instruments developed in the first study, 24 classrooms from 8 different university departments were observed and given a self-report measure of classroom atmosphere. The classroom interaction findings are presented in Study 2.

## CHAPTER II: STUDY 1 - DEVELOPMENT OF MEASURES AND METHODOLOGY

Previous research in this area has failed to demonstrate the reliability and validity of both behavioral and self-report instruments used to assess college classroom behaviors and student perceptions (Brady & Eisler, in press). Therefore, two self-report instruments were developed and empirically tested for assessing the following dimension of college classrooms: the *Classroom Atmosphere Questionnaire* and the *Instructor Sensitivity Questionnaire*. The Classroom Atmosphere was developed to assess students perceptions of their classroom environment. The Instructor Sensitivity Questionnaire was designed to evaluate instructors sympathy to gender and race issues that may occur in college classroom situations. In order to provide an objective measure of gender relevance for categorizing classrooms in Study 2, the *Gender Relevance Questionnaire* was also developed. The gender relevance questionnaire was designed to measure student appraisal of various areas of study (e.g. psychology, economics) in terms of the masculine and feminine traits that they are perceived to require.

### Classroom Atmosphere Questionnaire

The Classroom Atmosphere Questionnaire (CAQ) was developed to evaluate male and female student appraisal of their classroom environment. Student appraisal of classroom atmosphere was divided into two types: 1) students perceiving events in their classroom that are supportive and comfortable in nature and 2) students perceiving events in their classroom that are negative and uncomfortable. The

Classroom Atmosphere Questionnaire was developed and tested in two stages over a 2 year period.

### Scale Development

The first step involved a field study in which open-ended questionnaires were given to 66 students (35 females; 31 males) from various classrooms (see appendix A). The questionnaires contained 16 open-ended questions which asked students to report the experiences they have had in their classrooms related to classroom atmosphere. The results from this field study are summarized in appendix B.

The questionnaire data and group discussions suggested that a notable proportion (21%) of the sampled students have experienced negative classroom events across different educational settings. This suggests students are aware of negative classroom events and that better assessment of student appraisal via self-report is needed.

### Item Generation

Based on field research, a review of the literature, and previous research (Hall & Sandler, 1982; Long, 1986), 20 items were constructed for a self-report instrument to measure classroom atmosphere at the post-secondary level. Each item included different behaviors or events that may occur in a classroom by students or teachers. Ten items were specific to evaluating treatment of female students and 10 were specific to evaluating treatment of male students; the same behaviors were included for both male and female items. Some examples include: "In this class, men students are often called on to participate", "In this class, women students are often



called on to participate, "Women students tend to be interrupted when asking or answering questions", and "Men students tend to be interrupted when asking or answering questions." Approximately half of the items were chosen to reflect events that are supportive in nature, such as students feeling intellectually challenged, and half were chosen to reflect negative events such as students feeling ignored. The scale was structured for students to rate each item in terms of how strongly they agreed with each statement for the particular class that they are rating. Items were rated by respondents on a 4-point scale ranging from "disagree" to "agree".

### Preliminary Validation

The preliminary version of the Classroom Atmosphere Questionnaire (CAQ; see Appendix C) was administered to 824 undergraduate students (males 413; females 411) from 35 introductory psychology laboratory sections during the Fall of 1993. Subjects were verbally informed that their responses were confidential and anonymous. Trained undergraduate and graduate experimenters attended various classrooms and asked subjects to participate after briefly describing the project. Once informed consent was obtained, the experimenters explained, administered, and collected the questionnaires. Subjects were tested in large groups of students, ranging from 15-35 at a time, depending on the size of the classroom. The total length of the classroom survey was approximately 10 to 15 minutes.

### Results

A general-principal factor analysis followed by a varimax factor rotation was performed to examine scale structure. Based on Nunnally & Bernstein's (1994) rules

for determining the number of factors, the rotated factor matrix resulted in a two-factor solution. The items that loaded on the first factor describe negative events or perceptions that students may have. Examples include, "Women students are often ignored in this class" and "I feel that humor is sometimes used at the expense of men in this class". This factor was labeled as Negative Classroom Events and refers to students perceptions of negative behaviors that occur in the classroom by the instructor and/or to male or female students. The items that loaded on the second factor describe supportive events or perceptions that students have. Examples include "I feel that men are intellectually challenged and encouraged in this class." and "I feel that comments and opinions expressed by women students are often taken seriously and respected in this class." Factor 2 was labeled as Supportive Classroom Environment and refers to students feeling comfortable expressing themselves, feeling challenged by instructor and participating in class. The items that loaded on each factor are listed in Table 1. Together, both factors accounted for 51.65% of the total variance (See Figure 2). Each factor evidenced high internal consistency (Cronbach's Alpha: Factor 1 = .9384, Factor 2 = .7137) which suggests a high estimated reliability. Furthermore, a negative relationship between the two factors ( $r = -.28$ ,  $p = .0001$ ) was found suggesting that they are measuring different types of classroom atmosphere. A negative correlation of this magnitude suggests that higher endorsement of a supportive classroom environment is slightly associated with lower endorsement of negative classroom events. However, the supportive and negative scores are orthogonal which suggest that any particular classroom can evidence one of

Table 1

Factor Loadings for the CAQ - Original Version

<b>Factor 1: Negative Classroom Environment</b>	
<u>Items</u>	<u>Factor Loading</u>
1. I feel that men students are sometimes treated harshly or unfairly in this class.	.71
2. Women students tend to be interrupted when asking or answering questions in this class.	.70
4. I have heard women students complain about being treated unfairly or unequally in this class.	.68
6. I have heard negative comments about men in this class.	.73
8. Men students tend to be interrupted when asking or answering questions in this class.	.77
10. I feel that women students are sometimes treated harshly or unfairly in this class.	.78
11. Women students are often ignored in this class.	.76
13. I feel that humor is sometimes used at the expense of women in this class.	.75
15. I have heard men students complain about being treated unfairly or unequally in this class.	.82
16. Men students are often ignored in this class.	.82
18. I feel that humor is sometimes used at the expense of men in this class.	.80
19. I have heard negative comments about women in this class.	.81
<hr/>	
Eigenvalue	7.9
Percentage of Variance	39.59
<b>Factor 2: Positive Classroom Environment</b>	
<u>Items</u>	<u>Factor Loading</u>
3. Men students are often called to participate in this class.	.47
5. I feel that women are intellectually challenged and encouraged in this class.	.68
7. I feel that women students are comfortable asking or answering questions in this class.	.44
9. Women students are often called on to participate in this class.	.61
12. I feel that men students are comfortable asking or answering questions in this class.	.41
14. I feel that the comments and opinions expressed by male students are often taken seriously and respected in this class.	.52
17. I feel that men are intellectually challenged and encouraged in this class.	.71
20. I feel that comments and opinions expressed by women students are often taken seriously and respected in this class.	.58
<hr/>	
Eigenvalue	2.41
Percentage of Variance	12.06

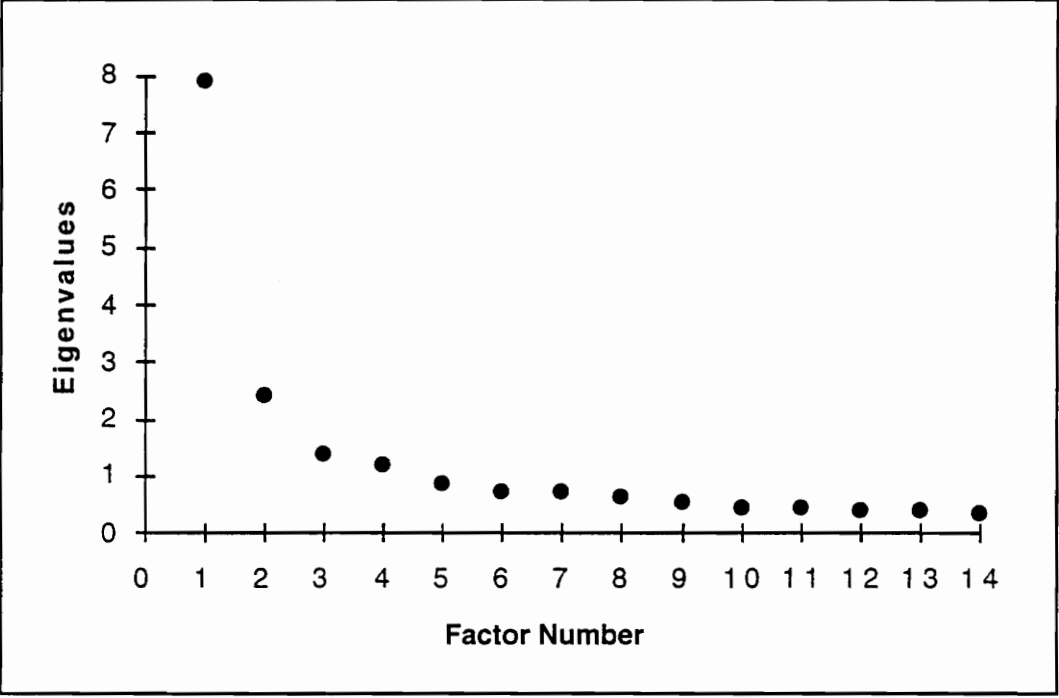


Figure 2: Scree Plot of Eigenvalues - Original Version of CAQ

four combinations: 1) highly supportive environment; few negative events, 2) highly supportive environment; several negative events, 3) non-supportive environment; few negative events or 4) non-supportive environment; several negative events. In other words, a classroom can have positive and negative attributes at the same time or any other combination.

Selection of items for inclusion in the final scale was determined on the basis of item-scale correlations. Using a minimum criteria of .3, item analyses showed that all 20 items were correlated with the overall questionnaire and were obtained in the factor analysis. Therefore, all 20 items were retained for the final CAQ scale.

#### Scale Validation

In order to confirm the existence of the 2 factors and to demonstrate construct validity, the second version of the CAQ was administered to another sample for replication. Two minor changes were made for 2nd versions of the CAQ. Each item was retained and shortened for succinctness. Secondly, the ordering of the items was changed. The final version of the CAQ is listed in Appendix D. Students from multiple classrooms across various departments were included in the sample to increase the sample representativeness of the college population. It was hypothesized that the supportive and negative factor-related scores would discriminate between different types of classrooms.

Seven hundred and thirty undergraduate students (males 398; females 332) from 30 Virginia Tech classrooms participated in this study on a volunteer basis as part of a classroom activity. Only classrooms in which instructors volunteered were

used. Classrooms from the following areas were surveyed in this study: 1) psychology classes (3000-4000 level;  $n = 5$ ), 2) psychology laboratory sections, including social psychology labs and introductory psychology labs (1000 level;  $n = 13$ ), 3) engineering fundamental classrooms (1000 level;  $n = 8$ ), and 4) architecture studios ( $n = 4$ ). Psychology classes were composed of significantly more female students than male students and were classified as "female-dominated". Engineering classes and architecture classes were composed of significantly more male students than female students and were classified as "male-dominated". In order to provide construct validity for the instrument, the following predictions were made: 1) *the factor analysis will result in same 2 factor-split and evidence high internal consistency*, 2) *students will report volunteering more in psychology classes than in engineering classes*, 3) *students will rate male-dominated classrooms more negative than female-dominated classrooms*, 4) *students will rate female-dominated classrooms more supportive than male-dominated classrooms*.

## Results

### **Hypothesis 1**

*The factor analysis will result in same 2 factor-split and evidence high internal consistency.*

A general-principal factor analysis followed by a varimax factor rotation was performed to examine scale structure. The rotated factor matrix resulted in the same, two-factor solution that emerged from the first administration of the CAQ. The items that loaded on each factor are listed in Table 2. Together, both factors

Table 2

Factor Loadings for the CAQ - Final Version

<b>Factor 1: Negative Classroom Environment</b>	
<u>Items</u>	<u>Factor Loading</u>
2. Men students tend to be interrupted when asking or answering questions.	.55
4. I have heard women students complain about being treated unfairly or unequally in this class.	.48
6. In this class, I have heard other students make negative comments about men.	.61
7. I feel that men students are sometimes treated harshly or unfairly in this class.	.58
8. Women students tend to be interrupted when asking or answering questions in this class.	.63
10. Women students are sometimes treated harshly or unfairly in this class.	.60
11. Comments by women students are often ignored or not taken seriously by other students in this class.	.54
13. Humor is sometimes used at the expense of women in this class.	.65
15. I have heard men students complain about being treated unfairly or unequally in this class.	.59
16. Comments that men students make are often ignored or not taken seriously by other students in this class.	.66
18. In this class, humor is sometimes used at the expense of men.	.66
19. In this class, I have heard other students make negative comments about women.	.66
<hr/>	
Eigenvalue	4.68
Percentage of Variance	24.30
<b>Factor 2: Positive Classroom Atmosphere</b>	
<u>Items</u>	<u>Factor Loading</u>
1. Women students frequently ask questions or volunteer information.	.46
3. In this class, men students are often called to participate.	.65
5. I feel that women are intellectually challenged and encouraged by this instructor.	.67
9. In this class, women students are often called on to participate.	.72
12. Men students frequently ask questions or volunteer information in this class.	.62
14. I feel that the comments and opinions expressed by male students are often taken seriously and respected by this instructor.	.56
17. I feel that men are intellectually challenged and encouraged by this instructor.	.71
20. Comments and opinions expressed by women students are often taken seriously and respected by this instructor.	.54
<hr/>	
Eigenvalue	3.22
Percentage of Variance	15.27

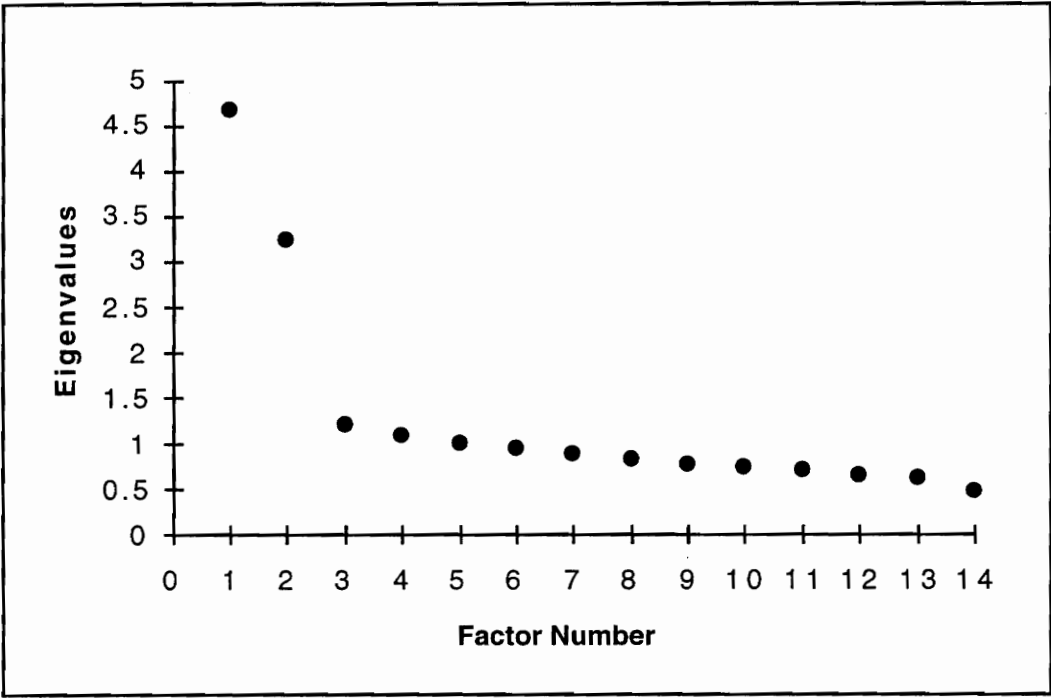


Figure 3: Scree Plot of Eigenvalues - Final Version of CAQ



accounted for 39.58% of the total variance (See Figure 3).

Once again, Cronbach Coefficient Alpha were determined for each factor (Factor 1:  $\alpha = .8389$ ; Factor 2:  $\alpha = .7770$ ) suggesting that the CAQ has good estimated reliability. The replicated factors provide strong evidence for the existence of two dimensions, supportive and negative classroom atmosphere appraisal. Also, the same negative relationship was found between the factors ( $r = -.1177$ ,  $p = .0015$ ).

## **Hypothesis 2**

*Students will report volunteering more in psychology classes than in engineering classes.*

This hypothesis was tested using a 2 (student sex) X 3 (course type) analysis of variance (ANOVA) on items relating to student participation. Students in psychology classes did report volunteering information or asking questions significantly more than engineering students [ $F(2, 716) = 6.72$ ,  $p = .0013$ ], providing support for hypothesis 2.

## **Hypothesis 3**

*Students will rate male-dominated classrooms more negative than female-dominated classrooms.*

A 2 (student sex) X 3 (course type) ANOVA on the factor-related scores from the CAQ revealed that male-dominated classrooms, engineering and architecture, were rated as more negative than were female dominated classrooms, psychology classes [ $F(2, 717) = 3.31$ ,  $p = .0369$ ]. Therefore, hypothesis 3 was supported.

## Hypothesis 4

*Students will rate female-dominated classrooms more supportive than male-dominated classrooms.*

A 2 (student sex) X 3 (course type) ANOVA on the factor-related scores from the CAQ revealed that male-dominated classrooms, engineering and architecture, were rated as less supportive than were female-dominated classrooms, psychology classes [ $F(2, 711) = 16.46, p = .0001$ ]. Therefore, hypothesis 4 was supported.

## Additional Analyses

Finally, additional construct validity was obtained as high inter-correlations (range = .2812 - .3964) were found between individual self-report items of being interrupted (e.g. "How often are you interrupted by other students", item #23) and global ratings of student interruptions ("Women students tend to be interrupted in this class", item #8).

## Test-Retest Reliability

During week 8 of the semester, 12 instructors teaching 2000 and 3000 level courses were contacted and asked to participate in a test-retest reliability study. Nine instructors volunteered and these classrooms (246 students) were included in the study. Research assistants visited each class two times, once during week 9 and once during week 11. During the first visit, students were asked to sign an informed consent form. They were given the CAQ and asked to code their responses on a scantron. They were asked to use the last 5 digits of their social security number as their identification number. During the second visit, 2 weeks later, students who

completed the CAQ previously were asked to repeat this task. They were reminded to use the last 5 digits of their social security number as their identification number so that matching of the responses could take place. After students finished their second test the purpose of the study was explained.

### Results

Due to a large number of pairs that could not be matched, only 180 student responses could be used in the analysis. Pearson's correlation coefficients were calculated for each factor's pre- and post-test score. The test-retest reliability coefficient for Factor 1 ( $r=.7153$ ,  $p=.0001$ ) and Factor 2 ( $r=.7736$ ,  $p=.0001$ ) were significant, suggesting that the CAQ is a reliable instrument over time.

### Discussion

From a psychometric perspective, the CAQ appears to be a valid and reliable instrument for assessing student appraisal of their classroom atmosphere. The reliability of the instrument has been demonstrated through the repeated occurrences of internal consistency and a strong test-retest reliability coefficient. Construct validity has been demonstrated on the CAQ by clear and distinct factor structures that have emerged when the instrument was administered to college students on two different occasions. The cross-structure of the instrument is supported as the supportive and negative factors are orthogonal and can discriminate between different types of classrooms (Nunnally & Bernstein, 1994).

### Instructor Sensitivity Questionnaire

The Instructor Sensitivity Questionnaire (ISQ; see Appendix E) was developed to evaluate instructors' sensitivity to gender and cultural issues that may occur in college classroom situations. This questionnaire was also constructed for use in the classroom interaction study in order to determine if instructor sensitivity to gender/race issues influence classroom interaction patterns. Most of the questionnaires used for gender sensitivity workshops are based on facts or knowledge of what constitutes sexism. According to Joan Schoenhals (personal communication, April 21, 1995), the associate director of *Visions*<sup>1</sup>, there are questionnaires available that tap sensitivity to race issues but not to gender issues.

Based on a review of the literature and previous research (Hall & Sandler, 1982; Long, 1986), 24 items were constructed for a self-report instrument to measure instructor sensitivity to gender and race issues in the college classroom. Each item included different behaviors or events that instructors may exhibit in a college classroom. Some examples include, "How important is it for faculty to encourage minority students to participate?" and "How important is it for faculty to include achievements of outstanding women in your field?". The scale was structured for instructors to rate each item in terms of how important they believe it is for faculty to engage in the given behavior. Items were rated by respondents on a 6-point scale ranging from "extremely unimportant" to "extremely important".

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1. <sup>1</sup> Visions is a company that specializes in providing gender and cultural sensitivity workshops for public and private industries.

Seven of the items pertained to gender issues; 7 items pertained to issues of race. Given the controversial nature of the material presented in this questionnaire, 10 distractor items were included in the questionnaire in order to control for social desirability.

### Results

An item analysis was performed in which inter-factor correlations were performed. Results revealed that 3 items (#1, #6 and #11) should be omitted from this scale as they did not correlate with their respective factors. The Cronbach's Alpha for the 13 items (both race and gender) was .8857. The race and gender items were also separated and analyzed. Cronbach's Alpha was .7465 for the race items and .8212 for the gender items. This suggests that instructor sensitivity should include questions pertaining to both race and gender issues that occur in the classroom. They should not be separated since this would decrease the internal consistency of the instrument. The final instrument resulted in 8 distractor items, 6 race-related items and 7 gender-related items.

### Gender Relevance Questionnaire

In order to determine the gender relevance of various courses that were used in the behavioral assessment study, a survey was developed to tap the student populations' perceptions of various areas of study (See Appendix F). This *Gender Relevance Questionnaire (GRQ)* was given to two hundred forty-seven undergraduates at Virginia Tech. The GRQ included 20 disciplines of study (e.g. engineering and agriculture) that the subjects are asked to rate on both masculinity and femininity. In

order to determine subjects' perception of how masculine and feminine they perceive each discipline to be, each branch of study was rated twice on a 7 point scale. The masculine and feminine rating scale developed for use in the GRQ is based on the *Personal Attributes Questionnaire* by Spence, Helmreich & Stapp (1974). A mean masculine and feminine rating was calculated for each discipline on the GRQ. Disciplines that were rated as requiring more masculine than feminine traits were classified as masculine-relevant. Disciplines that were rated as requiring more feminine than masculine traits were classified as feminine-relevant. Disciplines that were rated as requiring equal amounts of feminine and masculine traits were classified as androgynous. The difference between the masculine and feminine ratings was used to determine the gender relevance of the discipline (See Table 3).

Table 3

Masculine and Feminine Relevance Difference Scores

Field of Study	Difference Score
Engineering	-2.38
Economics	-1.23
Marketing	-.65
Physical Education	-.07
Forestry	.55
Curriculum & Instruction	1.85
Psychology	1.89
Family & Child Development	2.68

Note: A score in the negative direction indicates a rating of masculinity that is greater than the feminine rating while a score in the positive direction indicates the opposite.

The following disciplines were classified as masculine relevant: engineering and economics. The feminine relevant disciplines included: family and child development, psychology, and curriculum & instruction. The androgynous disciplines included marketing, physical education, and forestry.

### **Chapter III: Study 2 - College Classroom Interaction Study**

Using the instruments that were developed and described in Study 1, the purpose of Study 2 was to evaluate student and teacher factors which contributed to classroom interaction patterns and consequently, student perceptions of their classroom environment. The second goal was to evaluate whether these influences differed for male compared to female students indicating gender inequity. For example, if men and women did not participate equally, gender inequity would be evident.

Independent and dependent measures were chosen based on the proposed model of classroom interaction patterns (See Table 4).

#### **Research Design**

##### **Independent Variables**

The independent variables (See Table 4) included: 1) Student measures: student gender 2) Instructor measures: instructor sex, instructor sensitivity to gender and race issues, 3) Classroom variables: class size, student ratio, gender relevance of course (e.g. masculine relevant such as engineering).

##### **Dependent Variables**

The dependent measures included behavioral observations and student appraisal of classroom atmosphere (See Table 5). The behavioral measures were placed into two categories: 1) student behaviors and 2) instructor behaviors. The **student**



**behaviors** included: 1) duration<sup>1</sup> of information volunteered, 2) the frequency<sup>2</sup> of hand raising, 3) the frequency of staying after class to interact with the instructor, and 4) seat location of the students. The **teacher behaviors** included: 1) the duration of teacher-student interaction, 2) the frequency of calling on students, 3) the duration of lecturing, and 4) the frequency of questions asked. Student appraisal of classroom atmosphere was measured using the supportive and negative scores from the Classroom Atmosphere Questionnaire (CAQ).

### Definition of Gender Inequity

The operational definition for gender inequity is defined as significant differences in the way male and female students: 1) perceive their classroom atmosphere, 2) participate in class, and 3) interact with their instructor.

Specifically, gender-inequitable *student behaviors* are defined as: 1) one sex perceiving the classroom as more supportive or negative than the other, 2) one sex initiating more verbal exchanges than the other, 3) one sex raising their hand(s) more than the other, and 4) one sex staying after class to interact with the instructor more frequently than the other. Gender-inequitable *instructor behaviors* are defined as: 1) the instructor initiating more verbal interactions with one sex than the other, 2) the instructor interacting with one sex more often than the other.

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1. Duration refers to the number of times a behavior occurred during the coding interval. Because this data was collected using an interval coding system, only an estimate of duration was obtained.

2. Frequency refers to the number of times a behavior occurred during the coding interval.

Table 4

Independent Variables for Study 2

**Instructor Variables**

A. Sex

1. **Male**
2. **Female**

B. Gender Sensitivity

1. **High** (scored above 60 on the ISQ)
2. **Medium** (scored between 54 and 60 on the ISQ)
3. **Low** (scored below 45 on the ISQ)

**Student Variables**

A. Sex

1. **Male**
2. **Female**

**Classroom Variables**

A. Class Size

1. **Large** (35 - 55 students)
2. **Medium** (21 - 35 students)
3. **Small** (5 - 20 students)

B. Gender Relevance of Course

1. **Masculine Relevant** - included courses that were rated by Virginia Tech students as requiring more masculine characteristics than feminine characteristics
2. **Feminine Relevant** - included courses that were rated by Virginia Tech students as requiring more feminine characteristics than masculine characteristics
3. **Androgynous** - included courses that were rated by Virginia Tech students as requiring similar amounts of feminine characteristics and masculine characteristics

C. Student Ratio of Male to Female Students

1. **Non-Dominated** - If there were less than a 20% discrepancy between the number of male and females students
2. **Male-Dominated** -  $M > F$   
\*If there were at least 20% more males than females
3. **Female-Dominated** -  $F > M$   
\*If there were at least 20% more females than males

Table 5

Dependent Variables for Study 2

**Behavioral Measures**

A. Student Behaviors

1. **Volunteering of Information** - any verbal expression that was made by a student in class (included questions, comments, responding to instructor questions, responding to another student)
2. **Hand-Raising** - the frequency of hands that were raised by students
3. **Staying After Class** - the number of students who stayed after class to interact with the instructor
4. **Seat Location** - the proportion of male to female students that sat in the first two rows of the class

B. Instructor Behaviors

1. **Teacher-Student Interaction** - the amount of time that instructors verbally interacted with students (included asking a question directed to an individual person, acknowledging a student comments, expanding on a students comment, asking a follow-up question)
2. **Calling on Students** - the frequency count of instructors that called on students in class (included impromptu calling on students or responding to students that have raised their hands)
3. **Lecture** - Duration of lecturing exhibited
4. **Questions** - The frequency of questions posed to the entire class (not individual students)

**Student Appraisal of Classroom Atmosphere**

- A. Supportive Classroom Environment: Factor-related scores derived from the CAQ
- B. Negative Classroom Events: Factor-related scores derived from the CAQ

## Specific Hypotheses

### Predictions for Behavioral Observations of Classroom Interaction

**HYPOTHESIS 1:** *Small classrooms will evidence significantly more teacher-student interaction and student participation than will medium and large classrooms.*

**HYPOTHESIS 2:** *There will be significantly less teacher-student interaction and student participation in male-dominated classrooms than in female- and non-dominated classrooms.*

**HYPOTHESIS 3:** *Men will participate more than women in male-dominated classrooms and in non-dominated classrooms. Women will participate more than men in female-dominated classrooms.*

**HYPOTHESIS 4:** *Male students will participate more than female students in masculine-relevant courses and in androgynous courses. Female students will participate more than male students in feminine-relevant classrooms. Thus, an interaction between gender relevance and student sex is predicted.*

**HYPOTHESIS 5:** *Female students will stay after class more frequently than male students when the class is male-dominated and non-dominated. Male students will stay after class more frequently than female students when the class is female-dominated. Thus, an interaction between student ratio and student sex is predicted.*

**HYPOTHESIS 6:** *More female students than male students will sit in the front two rows when the class is female-dominated. More male students than female students will sit in the front two rows when the class is male-dominated. No differences were expected when the class is non-dominated. Thus, an interaction between student ratio*

*and student sex is predicted for seat location.*

#### Predictions for Student Perceptions of Classroom Atmosphere

**HYPOTHESIS 7:** *Students in male-dominated classrooms will rate their classrooms as less supportive than students in female- and non-dominated classrooms. Students in male-dominated classrooms will rate their classrooms as more negative than students in female- and non-dominated classrooms.*

**HYPOTHESIS 8:** *Larger classes will be rated more negative than smaller classes. Larger classes will be rated less supportive than smaller classes.*

**HYPOTHESIS 9:** *The strongest predictors of supportive and negative classroom atmosphere will be gender relevance of the course and gender sensitivity of the instructor.*

#### Prediction for Gender Equity

**HYPOTHESIS 10:** *No overall sex differences are predicted for student behaviors or instructor-student interaction. Specifically, no main effects for student sex are predicted.*

## Method

### Subjects

Twenty-four classrooms from 8 departments at Virginia Tech were used in this study. These departments included *Curriculum and Instruction*, *Economics*, *Engineering*, *Family and Child Development*, *Forestry*, *Marketing*, *Physical Education*, and *Psychology*. Department heads were contacted to provide access to various classrooms. All instructors and students were asked to participate on a volunteer basis. Instructors were compensated with \$25 and were placed in a lottery to win \$500 in travel funds. Two instructors were randomly chosen and received \$500 in their travel accounts.

### Apparatus and Measures

Self-Report Measures. The following measures were used for this study and are included in Appendices D & E.

*Classroom Atmosphere Questionnaire (CAQ)*

*Instructor Sensitivity Questionnaire (ISQ)*

#### Behavioral Measures

The following behavioral observation method was used in this study (See Appendices G and H):

*Brady Observation Technique for College Classroom Interactions*  
(BOTCCI)

Each classroom was observed by an undergraduate research assistant who recorded 8 operationally defined behaviors using the interval coding system, the

BOTCCI. All observers were blind to the experimental hypotheses. The specific behaviors that are coded with the BOTCCI include: 1) Lecture, when the instructor speaks to the entire class; 2) Questions, when the instructor asks a question to the entire class; 3) Calling on Students, when the instructor calls on a specific student; 4) Teacher-Student Interaction, when an instructor verbally interacts with a specific student; 5) Student Volunteered Information, when an individual student speaks up in class; 5) Hand Raising, when an individual student raises his/her hand in class; 6) Seat location, the proportion of male to female students that sit in the first two rows of the class; and 7) Staying After Class Interaction, the number of students that stay after class to talk with the instructor.

Inter-rater reliability was established for the BOTCCI during this study in which approximately 20% of the behavioral ratings were assessed using two classroom observers. The data for reliability checks was obtained from research assistants who were required to bring a secondary observer to 20% of their classrooms. The reliability for each dependent measure ranged from .95 to .99. In order to provide a more stringent test of the instrument's reliability, Cohen's Kappa was also computed to take into account inter-rater agreement that may have occurred by chance. The Cohen's Kappa for each dependent measure ranged from .70 - .93. However, it should be noted that Cohen's Kappa could not be computed for some pairs of data due to a limitation in the formula that occurs when the chance agreement is 1.0. Kappa cannot be computed under these circumstances as the denominator

Table 6

Inter-rater reliability coefficients for the BOTCCI

<b>Behavioral Observation</b>	<b>Actual Agreement</b>	<b>Number of Pairs<sup>1</sup></b>	<b>Cohen's Kappa</b>	<b>Number of Pairs</b>
Lecture	.95	28 (19.4%)	.75	28 (19.4%)
Questions	.97	28 (19.4%)	.75	(19.4%)
Interaction with Males	.98	28 (19.4%)	.89	26 (18.1%)
Interaction with Females	.99	28 (19.4%)	.89	23 (15.9%)
Male Hand Raising	.99	28 (19.4%)	.70	21 (14.6%)
Female Hand Raising	.99	28 (19.4%)	.82	15 (10.4%)
Interaction with Females	.99	28 (19.4%)	.89	23 (15.9%)
Male Volunteering	.99	28 (19.4%)	.93	23 (15.9%)
Female Volunteering	.99	28 (19.4%)	.84	22 (15.3%)
Instructor Calls on Males	.99	28 (19.4%)	.83	25 (17.4%)
Instructor Calls on Females	.99	28 (19.4%)	.85	16 (11.1%)

1. These numbers refer to the number of observations in which two raters visited the classroom out of a total of 144. The percentage of classrooms visited for inter-rater reliability is also listed, the most ideal being 20%.



becomes zero. See Table 6 for a summary of inter-rater reliability.

### Procedure

During the Summer of 1994, 8 department heads were contacted to gain permission for the recruitment of classrooms and instructors under their jurisdiction. During the first week of classes in the Fall of 1994, 100 instructors were randomly selected from 8 departments. Equal numbers of masculine-relevant, feminine-relevant, and androgynous classrooms were desired for the sample. Eight departments were chosen based on these criteria. Two departments were masculine-relevant (e.g. economics), three were androgynous (e.g. physical education), and three were feminine-relevant (e.g. family and child development). One hundred formal letters of recruitment were sent out to randomly selected instructors which informed them of the nature of the study, the requirements and the compensation for participating (see Appendix I). Approximately 25% ( $n = 28$ ) of the instructors agreed to participate and were sent informed consent forms with more detailed information (see Appendixes J and K). Four classrooms were not appropriate for this study and were taken out of the sample. Two classes were taught in a foreign language, one instructor used only group work, and one class had no female students. Because of the nature of the BOTCCI, classroom interaction patterns could not be coded accurately in these classrooms. The total sample consisted of 10 female instructors and 14 male instructors. For a more in-depth description of the sample characteristics, see Tables 7 and 8.

During weeks 1-4 of the classes, the primary researcher visited the

Table 7

Sample Characteristics of Classrooms from Study 2

		MASCULINE RELEVANT				FEMININE RELEVANT				ANDROGYNOUS				TOTAL
		♂	♀	Non-		♂	♀	Non-		♂	♀	Non-		
		Dom	Dom	Dom		Dom	Dom	Dom		Dom	Dom	Dom		
NUMBER OF														
CLASSES		6	0	2		0	7	1		2	1	5		24
INSTRUCTOR														
GENDER														
Male														
Number		5	-	1		-	2	1		2	1	2		14
Female														
Number		1	-	1		-	5	0		0	0	3		10
STUDENTS														
Number		14-55	-	10		-	17-51	35		24-30	29	21-34		10-55
Range		35.6	-	8		-	31.2	35		27	29	30		23.9
Mean														
CLASS SIZE														
Small		2	-	2		-	3	0		1	0	0		8
(5-15)														
Medium		2	-	0		-	2	1		1	1	5		12
(16-30)														
Large		2	-	0		-	2	0		0	0	0		4
(31-55)														

Table 8

Sample Characteristics of Instructors from Study

	INSTRUCTOR SEX		TOTAL
	Male	Female	
<b>NUMBER</b>	14	10	24
<b>AVERAGE AGE</b>	44.8	42.6	43.8
<b>ACADEMIC LEVEL</b>			
Instructor	1	1	2
Assistant Professor	6	6	12
Associate Professor	4	2	6
Full Professor	3	1	4
<b>CLASS SIZE</b>			
Small	4	3	7
Medium	8	4	12
Large	2	3	5
<b>GENDER RELEVANT COURSES</b>			
Masculine	6	2	8
Androgynous	5	3	8
Feminine	3	5	8
<b>STUDENT RATIO OF CLASSES</b>			
Male-Dominated	7	1	8
Female-Dominated	3	5	8
Non-Dominated	4	4	8

participating classes and informed students about the study. Written informed consent was obtained from students at this time (See Appendix L). Additional informed consent forms were given to the instructors for students who did not attend class on that day. No information regarding the nature of the study was provided at this time in order to prevent biased responding.

Also during the first 4 weeks of the semester, six undergraduate research assistants were trained to use the BOTCCI. Based on the training protocol recommended by Hartman (1984), the following steps were taken:

1. Observers received a general orientation of observational research.
2. Observers were taught the observation method
  - a) operational definitions were given in verbal and written forms
  - b) vignettes were given along with paper and pencil tests
3. Analogue observation training. A video tape of an interactive classroom was used as the observers coded the video together. Responses were reviewed in group format. Correct and incorrect answers were discussed.
4. In vivo observations. Observers were sent into live classrooms to practice coding. Inter-rater reliability was checked and problems that arose were discussed.
5. Retraining-recalibration. Continual training was provided throughout the project.

Research assistants were assigned 3 - 5 primary classrooms to observe. Between weeks 5 and 11, the behavioral observations were performed. Each classroom was observed approximately once a week for a total of 6 observations. In addition to observing their primary classroom, they were required to bring a secondary observer to 20% of their classrooms for inter-rater reliability. The observers were kept blind to the experimental hypotheses throughout the entire study. During the 14th week of classes, the self-report measures were collected from the

classrooms. Each observer was responsible for administering the survey to their primary classes.

Through inter-departmental mail, instructors were asked to complete the ISQ. In order to increase confidentiality, only subject numbers were used on the questionnaires. All instructors returned their questionnaires by the end of the semester. During week 15, the research assistants visited their classrooms and explained the purpose of the study (See Appendix M). The classrooms were debriefed. Upon completion of the study, each instructor was mailed a more detailed description of the study and a check for \$25. Two instructors were randomly drawn and received \$500 each in travel funds.

### Data Analysis

All statistical analyses were conducted on the Statistical Analysis System (SAS Institute Inc., 1990). For the analysis of main and interaction effects, two approaches to data analyses were employed: Multivariate Analyses of Variance (MANOVA) and Analyses of Variance (ANOVA). Due to the large number of independent and dependent variables in this study, the use of MANOVA was the preferred analysis for several reasons. The first advantage of using MANOVA over ANOVA, is protection against Type I error. Second, the MANOVA can sometimes be a more powerful test than separate ANOVA's while retaining its robustness to violations of normality. A third advantage is that it may reveal differences not shown in separate ANOVA's (Stevens, 1992; Tabachnick & Fidell, 1983).

In order to further decrease the probability of Type I errors, all of the

independent variables were entered into their respective models at one time resulting in a series of 2 (Student Sex) X 2 (Instructor Sex) X 3 (Student Ratio) X 3 (Gender Relevance) X 3 (Instructor Sensitivity) X 3 (Class Size) or 2 (Instructor Sex) X 3 (Student Ratio) X 3 (Gender Relevance) X 3 (Instructor Sensitivity) X 3 (Class Size) MANOVA's. However, no 3-, 4-, 5- or 6-way interactions were assessed. This type of model allows for the testing of 5 or 6 main effects as well as selected 2-way interactions for each group of dependent variables (multivariate analyses) as well the separate univariate analysis of each dependent variable.

Two separate MANOVA analyses were performed for the behavioral observation data. The first set used the original scores from the BOTTCI. The second set used transformed BOTTCI scores. Because of the uneven distribution of males and females in the sampled classrooms, ratio scores were calculated in order to accurately assess for sex differences. In order to provide a standard for comparison, the frequency of male behaviors were divided by the number of males in the class while the frequency of female behaviors was divided by the number of females in the class.

Univariate analyses of variance (ANOVA) and post-hoc analyses were only interpreted when the MANOVA effect was significant. However, when *a priori* hypotheses were made for univariate analyses or if the p-value approached significance,  $\alpha$  was relaxed to .10 and the ANOVA results were interpreted.

According to Stevens (1992), grouping all of the dependent measures into a particular model is not necessarily the best approach, unless they fit together

conceptually. He recommends that dependent variables be included together in a model based on an empirical or theoretical rationale. Based on the proposed interaction model, the dependent variables were grouped into three categories: 1) *Student Behaviors* - Volunteering, Raising Hands, Staying after Class 2) *Instructor Behaviors* - Instructor Calling on Students, Instructor interacting with students, and 3) *Classroom Atmosphere* - Supportive Classroom Environment and Negative Classroom Events.

Although lecture and questions are both instructor behaviors, they could not be included in the original instructor MANOVA model because they cannot be assessed for student sex differences. Male and female students always receive equal amounts of lecture and questions being posed to the entire class. If included in the model, the MANOVA tests could not be computed. Therefore, they were placed together in a 3 (Instructor Sensitivity) X 3 (Gender Relevance) X 3 (Student Ratio) X 2 (Instructor Gender) X 3 (Class Size) MANOVA and are referred to as the second set of instructor behaviors. Similarly, student seat location is a student behavior that could not be included in the MANOVA model for statistical reasons. The percentage of males to females that sit in the front two rows cannot be assessed independently of student sex. Thus, the remaining 5 main effects cannot be assessed for this dependent measure. In order to assess for sex differences in student's seat location across different types of classrooms, a 2 (Student Gender) X 3 (Gender Relevance) X 3 (Student Ratio) ANOVA was performed.

Prior to carrying out the MANOVA and ANOVA tests, two steps were taken

to ensure statistical validity. First, the residuals from the raw data were plotted and assessed for normality using the Wilks'-Shapiro test. Second, a series of Multivariate Analyses of Variance (MANOVA) with repeated measures were computed to determine if the various dependent variables changed significantly over time. Collapsing across days for the assessment of main and interaction effects for use in a between-groups MANOVA or ANOVA would be inappropriate when an independent measure interacts with time. Therefore, only combinations of variables that did not significantly interact with time, or were co-directional interactions with time, should be entered into their respective Multiple Analysis of Variance (MANOVA) and Analysis of Variance (ANOVA) models. Given that there were only 7 situations out of 84 possible combinations in which specific variables significantly interacted with time, it was determined that under most circumstances, the combinations of variables did not significantly interact with time. Furthermore, repeated measurements were collected in order to gain aggregated measures of various classroom interaction patterns. Therefore, all possible sources were deemed appropriate for use in MANOVA and ANOVA tests.

The Duncan Multiple Range Test was used for all post-hoc comparisons. This method was chosen because it is a statically powerful test that allows for un-equal  $n$ 's while controlling for experimenterwise (Montgomery, 1991; Winer, Brown & Michels, 1991) and comparisonwise error (SAS Institute Inc., 1989). Other analyses performed on the behavioral and self-report data include correlational analyses (Pearson  $r$  and Spearman  $r$ ), and simple multiple regression.



## Results

### **HYPOTHESIS 1**

*Small classrooms will evidence significantly more teacher-student interaction and student participation than will medium and large classrooms.*

The MANOVA test for class size was non-significant for student behaviors [Wilks'  $\lambda$   $F = 1.98$ ,  $p = .1465$ ]. MANOVA test for class size approached significance for the first set of instructor behaviors [Wilks'  $\lambda$   $F = 2.82$ ,  $p = .0655$ ] which includes teacher-student interaction and instructor calling on students. However, the ANOVA results indicated no significant main effects for class size on instructor interacting with students [ $F(2,8) = .29$ ,  $p = .7572$ ] or instructor calling on students [ $F(2,8) = .84$ ,  $p = .4684$ ]. See Tables 9 and 10. Therefore, hypothesis 1 was not supported.

### **HYPOTHESIS 2**

*There will be significantly less teacher-student interaction and student participation in male-dominated classrooms than in female- and non-dominated classrooms.*

The MANOVA test for student ratio was non-significant for the first set of instructor behaviors [Wilks'  $\lambda$   $F = 1.04$ ,  $p = .4195$ ] and student behaviors [Wilks'  $\lambda$   $F = .44$ ,  $p = .8356$ ]. Therefore, hypothesis 2 was not supported.

### **HYPOTHESIS 3**

*Men will participate more than women in male-dominated classrooms and in non-dominated classrooms. Women will participate more than men in female-*

*dominated classrooms.*

The MANOVA test for the interaction between student sex and student ratio was not significant for student behaviors [Wilks'  $\lambda$   $F = .3562$ ,  $p = .9020$ ] suggesting that male and female students participated at similar rates, regardless of the student gender ratio of the class. See Tables 11 and 12. Therefore, hypothesis 3 was not supported.

#### **HYPOTHESIS 4**

*Male students will participate more than female students in masculine-relevant courses and in androgynous courses. Female students will participate more than male students in feminine-relevant classrooms. Thus, an interaction between gender relevance and student sex is predicted.*

The MANOVA test for the interaction between Student Sex and Gender Relevance was not significant for the student behaviors [Wilks'  $\lambda$   $F = .5179$ ,  $p = .7912$ ] suggesting that men and women participate at similar rates, regardless of the gender relevance of the class. Therefore, hypothesis 4 was not supported.

#### **HYPOTHESIS 5**

*Female students will stay after class more frequently than male students when the class is male-dominated and non-dominated. Male students will stay after class more frequently than female students when the class is female-dominated. Thus, an interaction between student ratio and student sex is predicted.*

The MANOVA test for interaction between student sex and student ratio was not significant for the student behaviors [Wilks'  $\lambda$   $F = .3562$ ,  $p = .9020$ ], suggesting

that men and women stay after class at similar rates, regardless of the student ratio. Therefore, hypothesis 5 was not supported.

## **HYPOTHESIS 6**

*More female students than male students will sit in the front two rows when the class is female-dominated. More male students than female students will sit in the front two rows when the class is male-dominated. No differences were expected when the class is non-dominated. Thus, an interaction between student ratio and student sex is predicted for seat location.*

The ANOVA test for an interaction between student sex and student ratio was not significant for seat location [ $F(2, 28) = 1.36, p = .2731$ ], suggesting that men and women are equally likely to sit in the front two rows, regardless of student ratio of the class. See Table 13. Therefore, hypothesis 6 was not supported.

## **Student Appraisal of Classroom Atmosphere**

## **HYPOTHESIS 7**

*Students in male-dominated classrooms will rate their classrooms as less supportive than students in female- and non-dominated classrooms. Students in male-dominated classrooms will rate their classrooms as more negative than students in female- and non-dominated classrooms.*

The MANOVA test for student ratio was significant for classroom atmosphere [Wilks'  $\lambda F = 4.54, p = .0036$ ]. See Table 14.

Student ratio of the class had an effect on student appraisal of supportive classroom environment [ $F(2,24) = 6.75, p = .0047$ ] but not on the student appraisal of

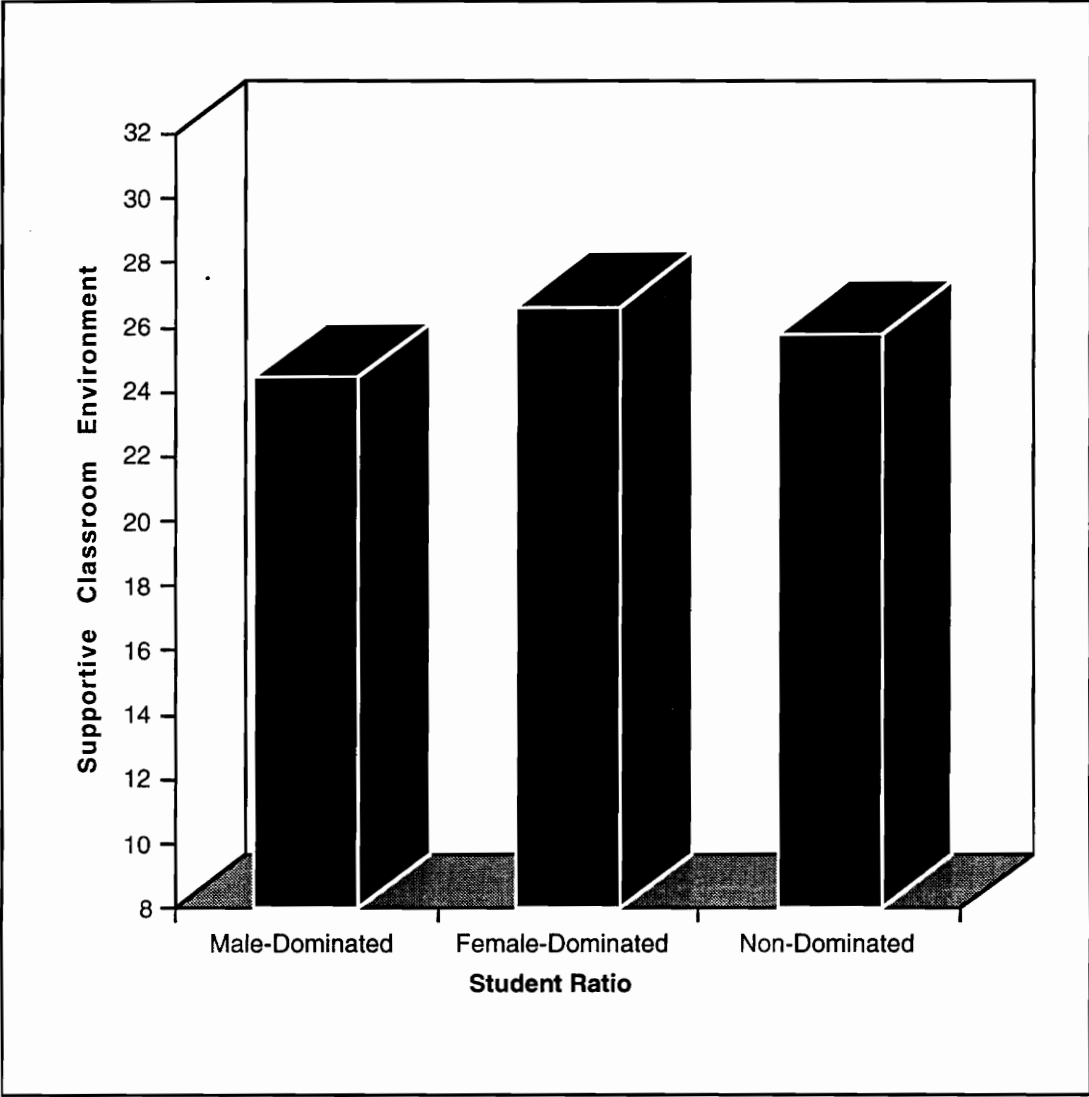


Figure 4: The Effect of Student Ratio on Supportive Classroom Environment

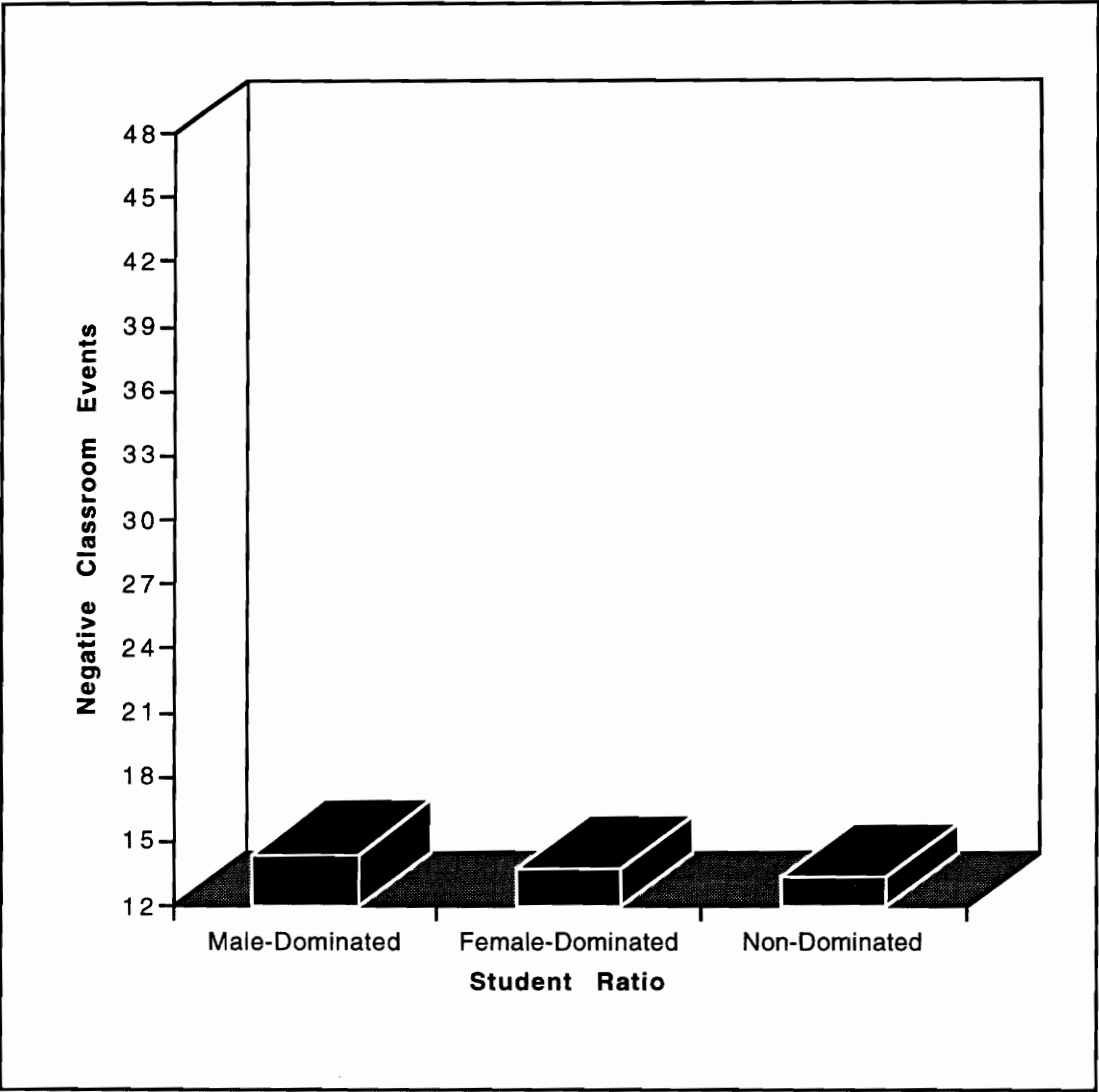


Figure 5: The Effect of Student Ratio on Negative Classroom Events

negative classroom events [ $F(2,24) = 1.73, p=.1979$ ]. See figures 4 and 5. Male-dominated classrooms were rated significantly less supportive than female-dominated classrooms and non-dominated classrooms [ $CD(3,24) = 1.33, p < .01$ ]. No differences were found between female-dominated and non-dominated classrooms. Therefore, hypothesis 7 was partially supported for supportive classroom environment, but not for negative classroom events.

## **HYPOTHESIS 8**

*Larger classes will be rated more negative than smaller classes. Larger classes will be rated less supportive than smaller classes.*

The MANOVA test for Class Size approached significance for classroom atmosphere [Wilks'  $\lambda F = 2.06, p = .1004$ ] and the univariate main effect for Class Size on supportive classroom environment was significant [ $F(2, 24) = 4.03, p=.0309$ ]. See Table 14. Small classrooms were rated significantly more supportive than both medium and large classrooms [ $CD(3, 24) = 1.41, p<.05$ ]. The univariate main effect for Class Size on negative events was extremely insignificant [ $F(2, 24) = .01, p=.9428$ ], thus explaining the MANOVA p-value of only .10 and providing a strong rationale for the interpretation of the univariate analysis for supportive environment. See Figures 6 and 7.

Pearson-product moment correlations also revealed a trend toward the hypothesized negative relationship between class size and supportive classroom environment. The larger the class, the less supportive it was rated [ $r = -.2181, p = .1363$ ] and the more negative it was rated [ $r = .2137, p = .1446$ ] by the students.

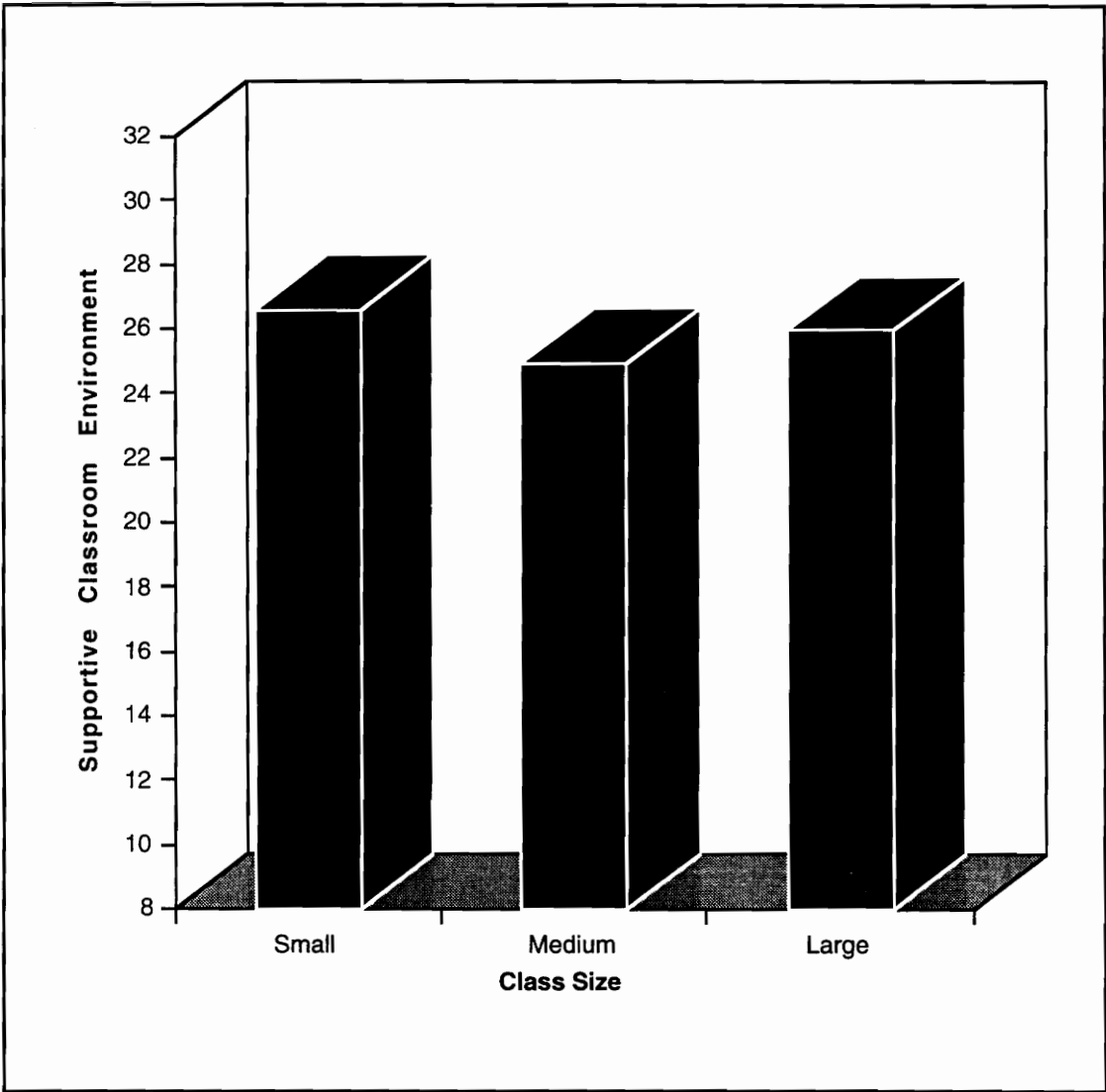


Figure 6: The Effect of Class Size on Supportive Classroom Environment

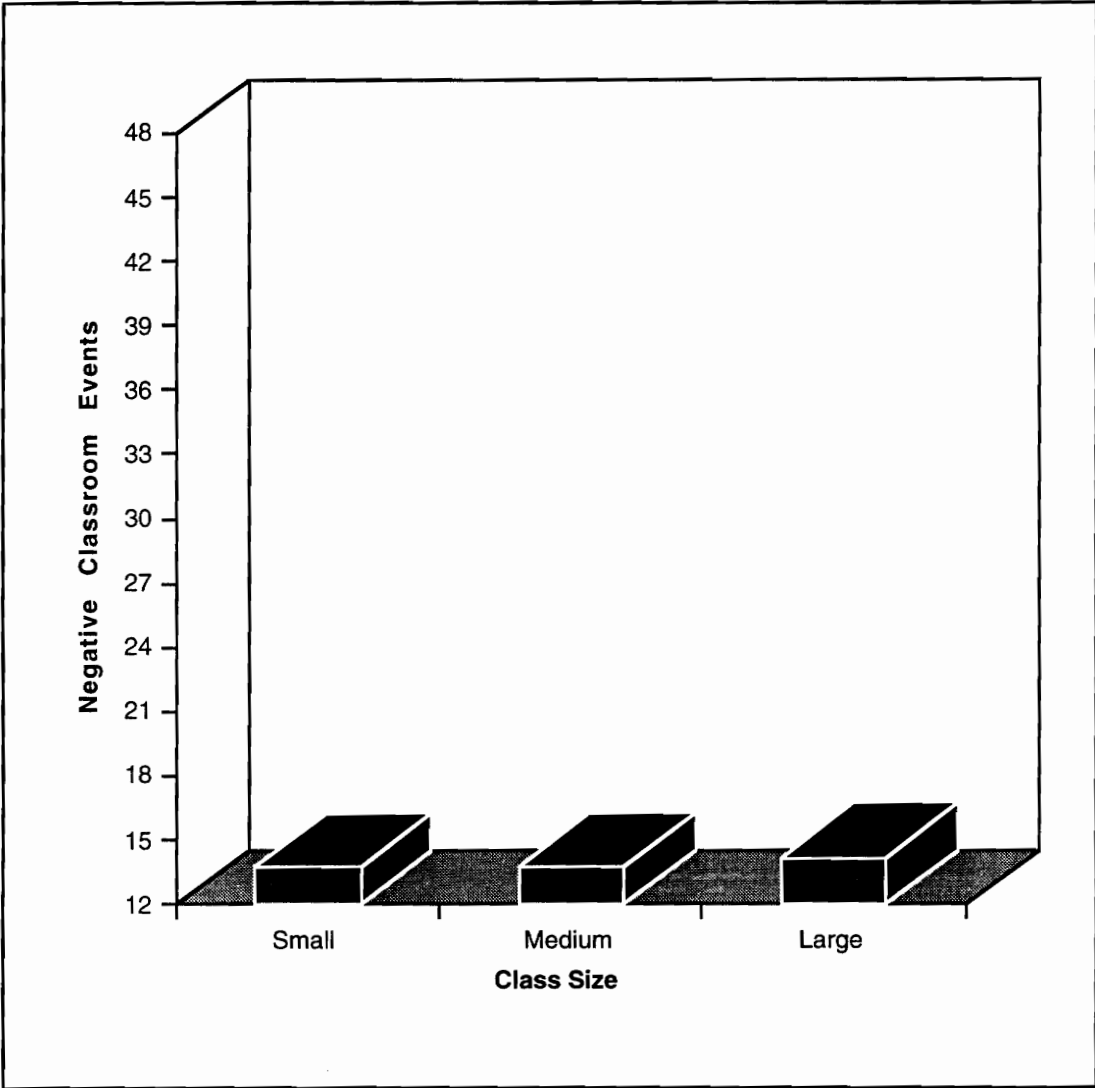


Figure 7: The Effect of Class Size on Negative Classroom Events



The findings from the regression analyses described under hypothesis 9 provide additional support. Small class size was found to be a strong predictor of supportive classroom environment. Therefore, hypothesis 8 was supported.

## **HYPOTHESIS 9**

*The strongest predictors of supportive and negative classroom atmosphere will be gender relevance of the course and gender sensitivity of the instructor.*

A multiple linear regression was performed using all 6 independent variables to predict the supportive and negative scores from the CAQ. Given that two of the variables, gender relevance and student ratio were categorical, each variable was partitioned into 2 indicator variables prior to being placed in the regression equation. Assessment of collinearity diagnostics for the predictor variables revealed no violations for multicollinearity. Next, a Wilks'-Shapiro test for normality was performed on the supportive and negative scores to test for normality. The null hypothesis for a non-normal sample was not rejected for the supportive scores ( $p=.2893$ ) but was rejected for the negative scores ( $p=.0001$ ). Using the Box-Cox transformation, attempts to transform the negative scores to a normal distribution were successful when the data was raised to the power of  $-4.55$ . The Wilks'-Shapiro test for normality was performed on the transformed data and the null hypothesis was not rejected ( $p=.1807$ ), thus meeting the assumptions needed to perform a simple multiple regression analysis.

The model used in the regression to predict the supportive classroom environment scores resulted in an R-square of .5260, suggesting a good fit with the

Table 15

Simple Multiple Regression Results for Predicting Classroom Atmosphere

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<b><u>POSITIVE CLASSROOM ATMOSPHERE</u></b> (R-Square = .5260)		
<u>Predictor Variables</u>	<u>Standardized Beta Weights</u>	<u>p-value</u>
Class Size	-.2718	.0266
Gender Relevance		
Z1	-.3888	.1106
Z2	-.6164	.0028
Student Sex	.0109	.9206
Instructor Sensitivity	.5411	.0002
Student Ratio		
Z1	-.0645	.6869
Z2	-.2487	.2030
<b><u>NEGATIVE CLASSROOM ATMOSPHERE</u></b> (R-Square = .2944)		
<u>Predictor Variables</u>	<u>Standardized Beta Weights</u>	<u>p-value</u>
Class Size	-.2371	.1076
Gender Relevance		
Z1	-.0028	.9922
Z2	-.2212	.3552
Student Sex	-.0582	.6642
Instructor Sensitivity	.1890	.2526
Student Ratio		
Z1	-.4406	.0285
Z2	-.3344	.1617

---

transformed data. Of the 6 variables, the strongest predictor of negative classroom events was Instructor Sensitivity ( $p=.0002$ ,  $\beta=.5411$ ), Gender Relevance of the course ( $p=.1106$  for the first partition,  $\beta=-.3888$ ;  $p=.0028$  for the second partition,  $\beta=-.6164$ ) and Class Size ( $\beta=-.2718$ ,  $p=.0266$ ). See Table 15. The remaining predictor variables were found non-significant.

The model used in the regression to predict the transformed negative classroom events scores resulted in an R-square of .2944, suggesting a moderate fit with the transformed data. Of the 6 variables, the strongest predictor of negative classroom events was student ratio ( $p=.0285$  for the first partition,  $\beta=-.4406$ ;  $p=.1617$  for the second partition,  $\beta=-.3344$ ). The remaining predictor variables were insignificant and are also presented in Table 11.

These results provide strong support for hypothesis 3. The more sensitive the instructors were, the more likely that class was to be rated as supportive. The indicator variables for gender relevance of the course revealed that feminine relevant courses were the most likely to be rated as supportive, followed by masculine-relevant and androgynous classrooms, respectively.

Class size was not originally hypothesized as a strong predictor yet was found to be influential. The smaller the class, the more likely it will be rated as supportive by the students. Similarly, student ratio of the course was not hypothesized to be a strong predictor of classroom atmosphere yet was the strongest predictive of negative classroom events. The indicator variables for student ratio of the class revealed that male-dominated classrooms were most likely to be rated as negative, followed by

female-dominated and non-dominated classrooms, respectively.

### Analysis of Gender Equity

#### **HYPOTHESIS 10**

*No overall sex differences are predicted for student behaviors or instructor-student interaction. Specifically, no main effects for student sex are predicted.*

The MANOVA test for the main effect of Student Sex on student behaviors was insignificant [Wilks'  $\lambda$   $F = 1.57$ ,  $p = .2261$ ]. Men and women did not participate differently because they volunteered at similar rates [ $F(1,22) = .45$ ,  $p = .5081$ ] and raised their hands in class with similar frequencies [ $F(1,22) = 1.70$ ,  $p = .2055$ ]. There was a trend for men to stay after class more often than women, but this difference only approached significance [ $F(1,22) = 3.18$ ,  $p = .0885$ ]. See Table 16.

In terms of instructor behaviors, The MANOVA test for the main effect of Student Sex on the first set of instructor behaviors was also insignificant [Wilks'  $\lambda$   $F = .69$ ,  $p = .4139$ ]. Men and women were not called on differently based on their sex [ $F(1,22) = .71$ ,  $p = .4131$ ]. Furthermore, instructors did not interact with their students based on their sex [ $F(1,22) = .55$ ,  $p = .5078$ ]. See Table 16.

When men and women were compared on their perceptions of classroom atmosphere, no sex differences emerged. The MANOVA test for the main effect of Student Sex on Classroom Atmosphere was not significant [Wilks'  $\lambda$   $F = .46$ ,  $p = .6364$ ].

Therefore, hypothesis 10 was supported as no gender differences in student

behaviors were found. Similarly, instructors were not found to treat students differently based on their sex. Finally, no gender differences were found for student appraisal of classroom atmosphere.

#### Integration of Behavioral and Self-report Measures

Spearman's correlations were assessed for 4 behavioral variables: 1) the amount of information volunteered by males (**MVOL**), 2) the amount of information volunteered by females (**FVOL**), 3) the number of times the instructor calls on male students (**ICALLM**), and 4) the number of times the instructor calls on female students (**ICALLF**) and 4 items from the CAQ: 1) **Item 12** - "Men students frequently ask questions or volunteer information"; 2) **Item 1** - "Women students frequently ask questions or volunteer information"; 3) **Item 3** "In this class, men students are often called on to participate"; and 4) **Item 9** - "In this class, women students are often called on to participate."

Results indicate that student's appraisal of volunteering information was consistent with the actual behaviors that occurred in the classroom. The duration of **MVOL** was highly correlated with students' perception of males volunteering ( $r = .62, p = .0021$ ). Similarly, the duration of **FVOL** was highly correlated with students' perception of females volunteering ( $r = .73, p = .0001$ ).

The results also indicate that student's appraisal of who was called on by the instructor was consistent with the actual behaviors that occurred in the classroom. The frequency of **ICALLM** was highly correlated with students' perception of males being called on by their instructor ( $r = .55, p = .0065$ ). Similarly, the duration of

ICALLF was highly correlated with students' perception of instructors calling on females ( $r = .71, p = .0001$ ).

### Additional Findings

Further assessment of the data revealed some interesting findings that were not included in the original hypotheses. Most of these findings include instructor sensitivity and instructor sex as influential variables and are described below. Also, a factor analysis was performed on the Classroom Atmosphere Questionnaire (CAQ) in order to provide additional support for the instrument's validity.

#### Instructor Characteristics in the Classroom

MANOVA test for various instructor characteristics were significant for classroom atmosphere and both sets of instructor behaviors. See Tables 10, 14, and 17. In particular, Instructor Sensitivity and Instructor Sex had significant effects on various classroom interaction patterns.

#### Instructor Sensitivity

Instructor Sensitivity was significant for the MANOVA main effect for both classroom atmosphere [Wilks' $\lambda$   $F = 8.21, p = .0001$ ] and the second set of instructor behaviors which included lecture and questions [Wilks' $\lambda$   $F = 3.81, p = .0001$ ; Wilks' $\lambda$   $F = 8.75, p = .0001$ ]. Instructor sensitivity had an effect on the supportive classroom atmosphere ratings by students [ $F(2,24) = 18.77, p = .0001$ ]. Classrooms that were taught by instructors high in gender sensitivity were rated as significantly more supportive on the CAQ than instructors with medium and low sensitivity [ $CD(2,24) = 1.32, p < .05$ ]. No significant differences were found

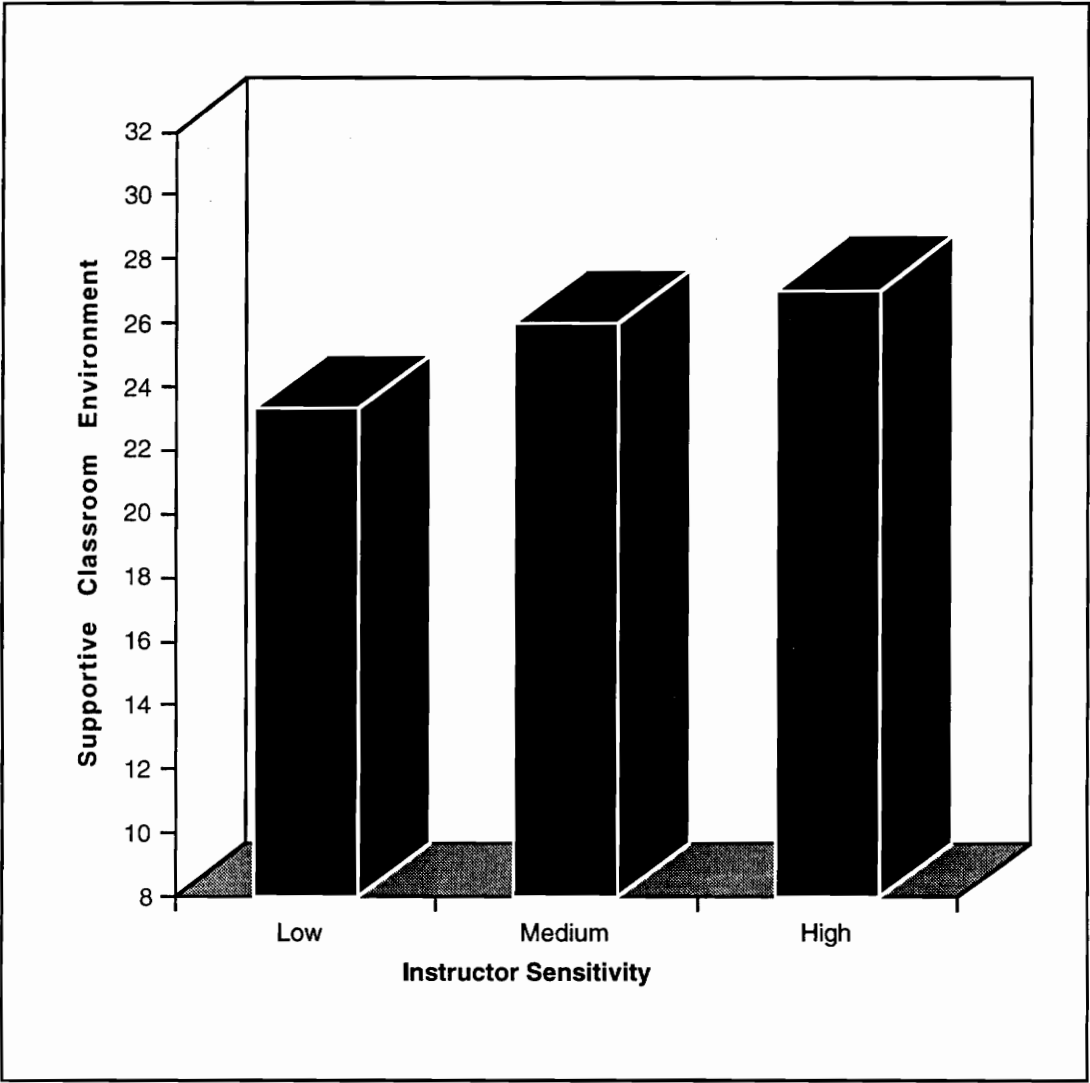


Figure 8: The Effect of Instructor Sensitivity on Supportive Classroom Environment

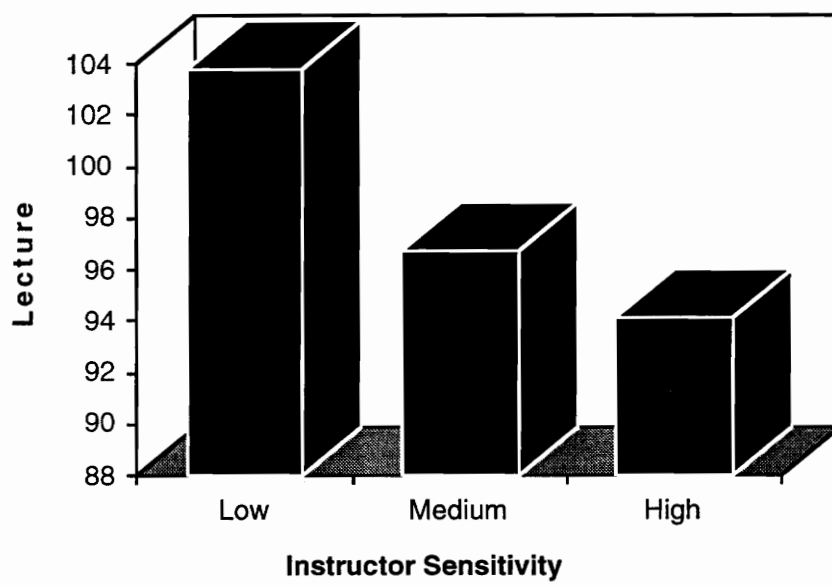


Figure 9: The Effect of Instructor Sensitivity on Lecture Duration



between instructors with medium and high sensitivity. See Figure 8. Furthermore, instructor sensitivity had an effect on the amount of time instructors lecture [ $F(2,22) = 14.4, p=.0001$ ]. Instructors with low sensitivity lectured significantly more than Instructors with medium and high sensitivity [ $CD(2,24) = 1.32, p<.05$ ]. No differences were found when instructors with medium and high gender sensitivity were compared. See Figure 9.

An analysis of the instructors responses on the ISQ also revealed interesting findings. In particular, instructors responses to item 28 were notable:

**"You are invited to a 2-hour, gender sensitivity workshop. Assuming that the workshop is being offered by well respected leaders, does not cost anything to you and you have enough time in your schedule, would you attend?"**

Only 29% of the sample said that they would attend a gender sensitivity workshop.

In response to the open-ended question that asked them to explain their response, 69% of the instructors reported that they felt they were competent in this area or "already sensitive to gender issues". Furthermore, a greater percent of male instructors (36%) men said they would attend a gender sensitivity workshop than women (20%).

#### Instructor Sex

Differences between male and female instructors were also found as the MANOVA effect for second set of instructor behaviors were significant [ $Wilks'\lambda F = 14.02, p = .0001$ ]. Male instructors lectured more [ $F(1,22) = 21.27, p=.0001$ ] and asked fewer questions [ $F(1,22) = 4.22, p=.0521$ ] than female instructors. See Figures 10 and 11. Furthermore, classes led by female instructors were rated as more supportive by students than classes led by male instructors [ $F(1,22) = 11.96,$

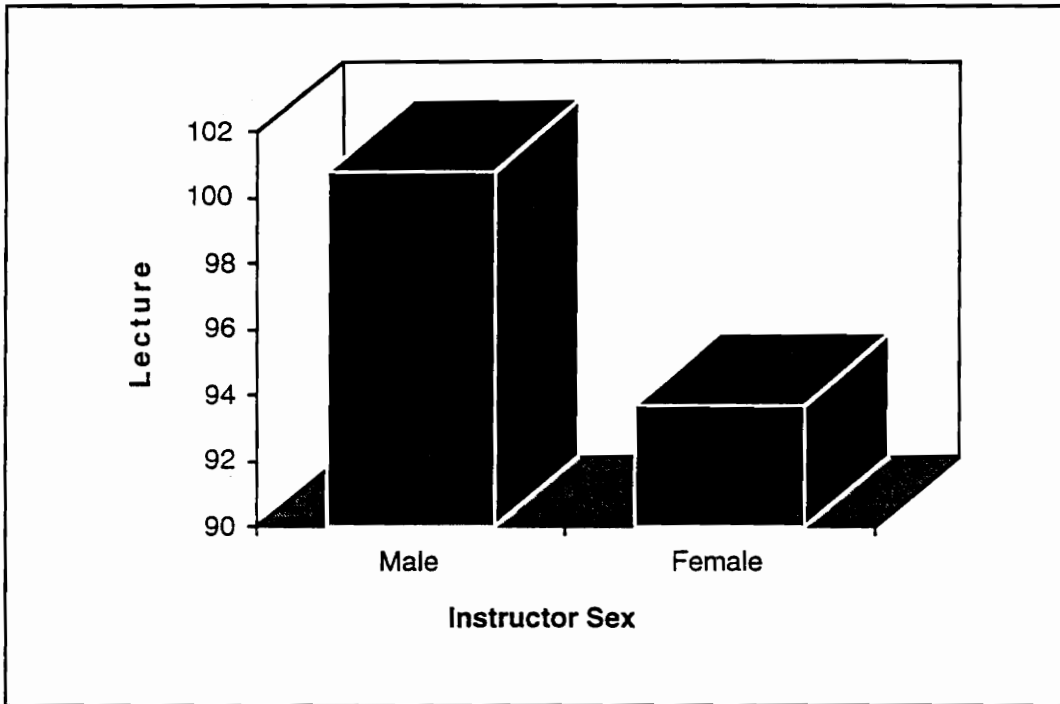


Figure 10: The Effect of Instructor Sex on Lecture Duration

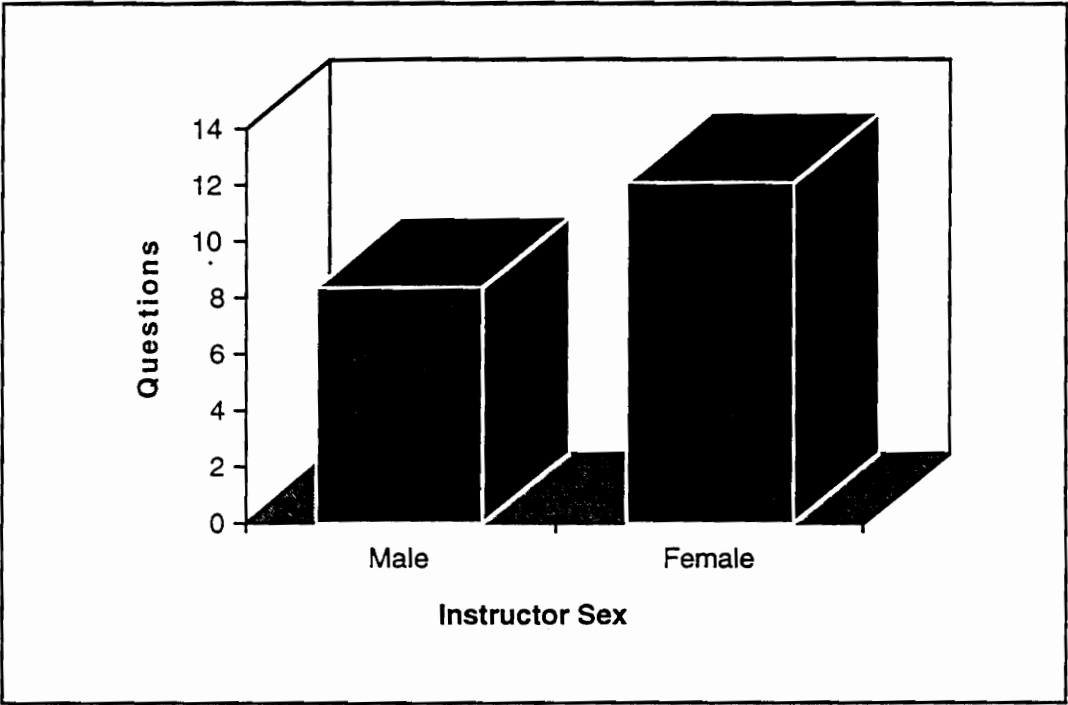


Figure 11: The Effect of Instructor Sex on the Frequency of Questions Asked

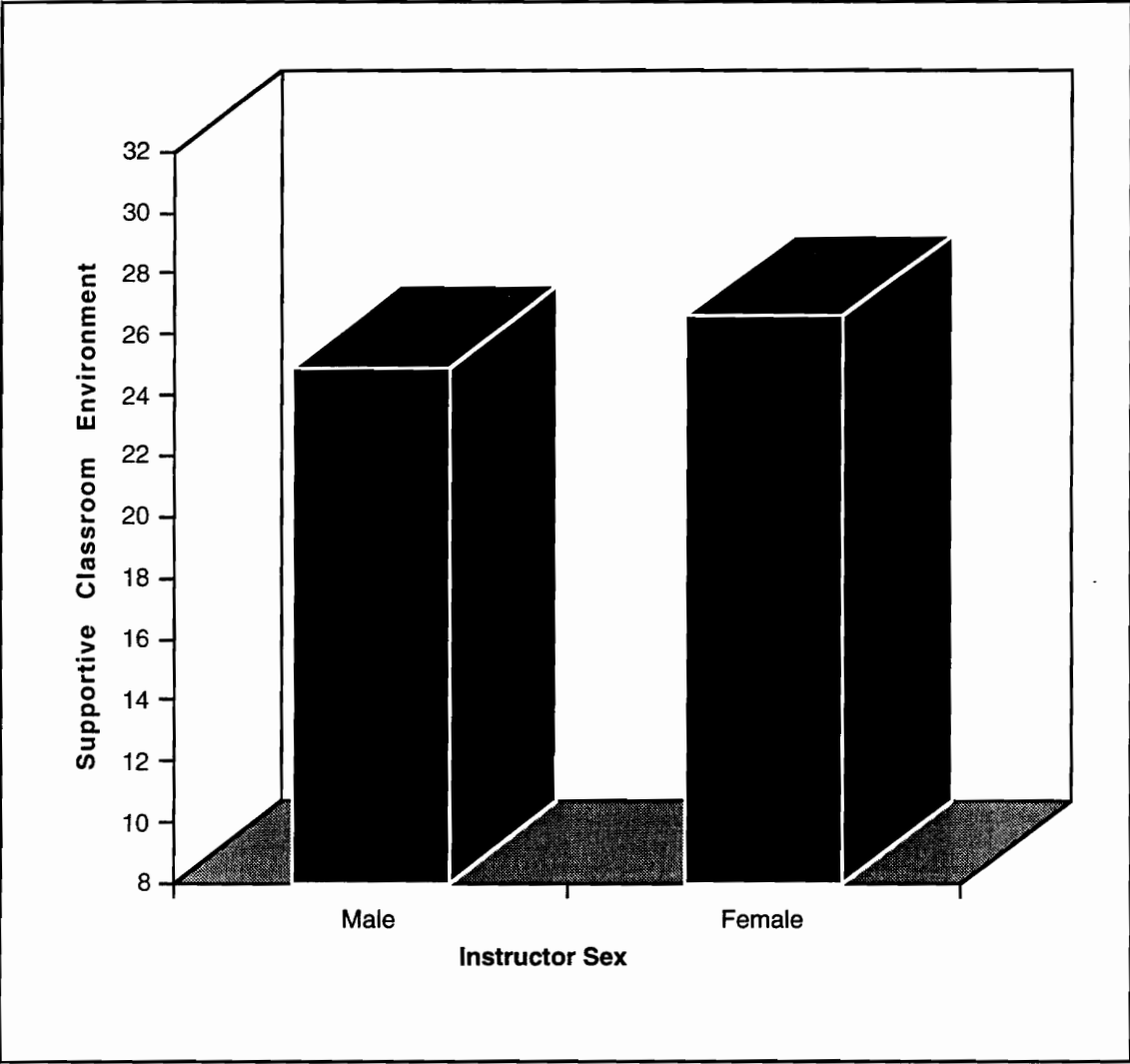


Figure 12: The Effect of Instructor Sex on Supportive Classroom Environment

$p=.0001$ ]. See Figure 12.

### Instructor Sex by Class Size

Further assessment of the MANOVA effects revealed an interaction trend between instructor sex and class size. A significant MANOVA effect for this interaction emerged for the first and second sets of instructor behaviors [Wilks'  $\lambda$   $F = 2.93$ ,  $p = .0589$ ; Wilks'  $\lambda$   $F = 13.61$ ,  $p = .0001$ ] and for classroom atmosphere [Wilks'  $\lambda$   $F = 5.92$ ,  $p = .0006$ ].

The class size and sex of the instructor were found to interact across three different behaviors: instructor calling on students [ $F(2,8) = 5.01$ ,  $p = .0389$ ], the amount of lecture [ $F(2,22) = 22.82$ ,  $p = .00001$ ], and the frequency of questions asked [ $F(2,22) = 4.83$ ,  $p = .0182$ ]. See Figures 13, 14 and 15. The trend was similar across all three situations. Men and women instructors tended to behave similarly in small and medium size classes. However, differences emerged in larger classrooms. In large classrooms, female instructors called on students more [ $CD(2,22) = .22$ ,  $p < .05$ ], lectured less [ $CD(2,22) = 6.1$ ,  $p < .01$ ], and asked the class more questions [ $CD(2,22) = 7.3$ ,  $p < .01$ ]. No differences between men and women were significant in small and medium classrooms. A similar interaction trend emerged for students' perceptions of their supportive classroom environment [ $F(2,24) = 5.08$ ,  $p = .0019$ ]. Large and small classes that were female-led were perceived as more supportive than classes led by males [ $CD(2,22) = 2.1$ ,  $p < .01$ ]. However, no differences in supportive environment were reported by students in medium size classrooms. See Figure 16.

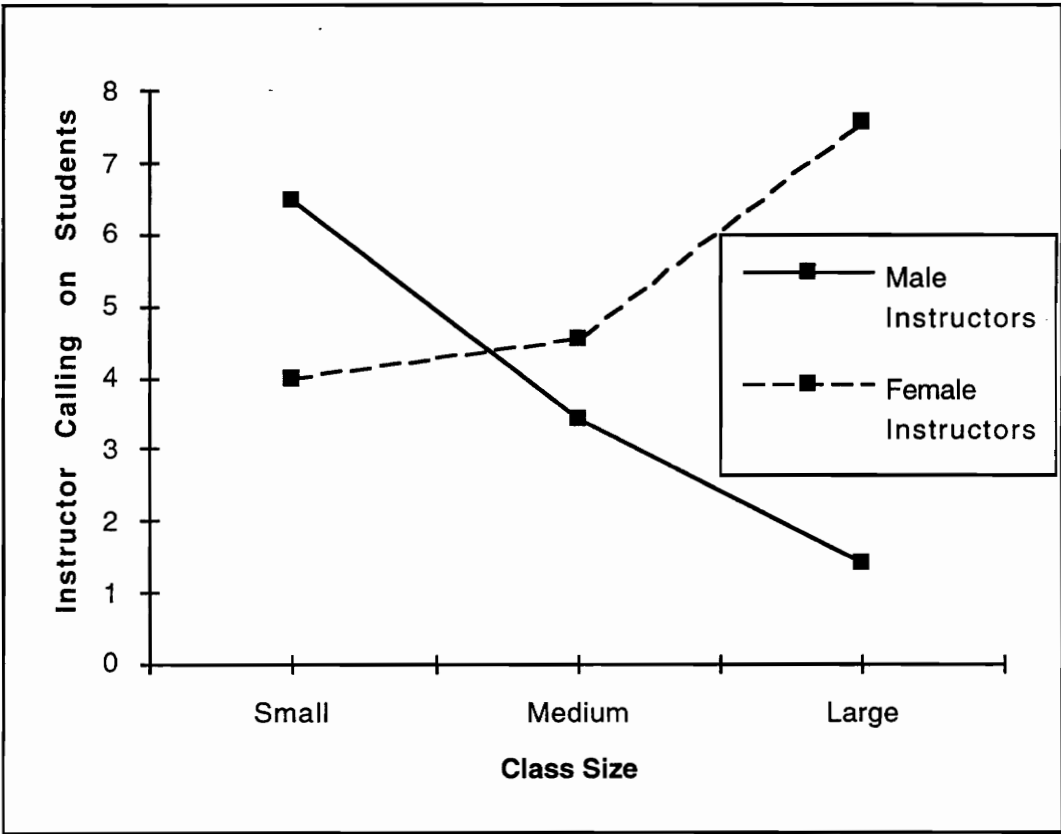


Figure 13: The Interaction between Instructor Sex and Class Size on Instructor Calling on Students

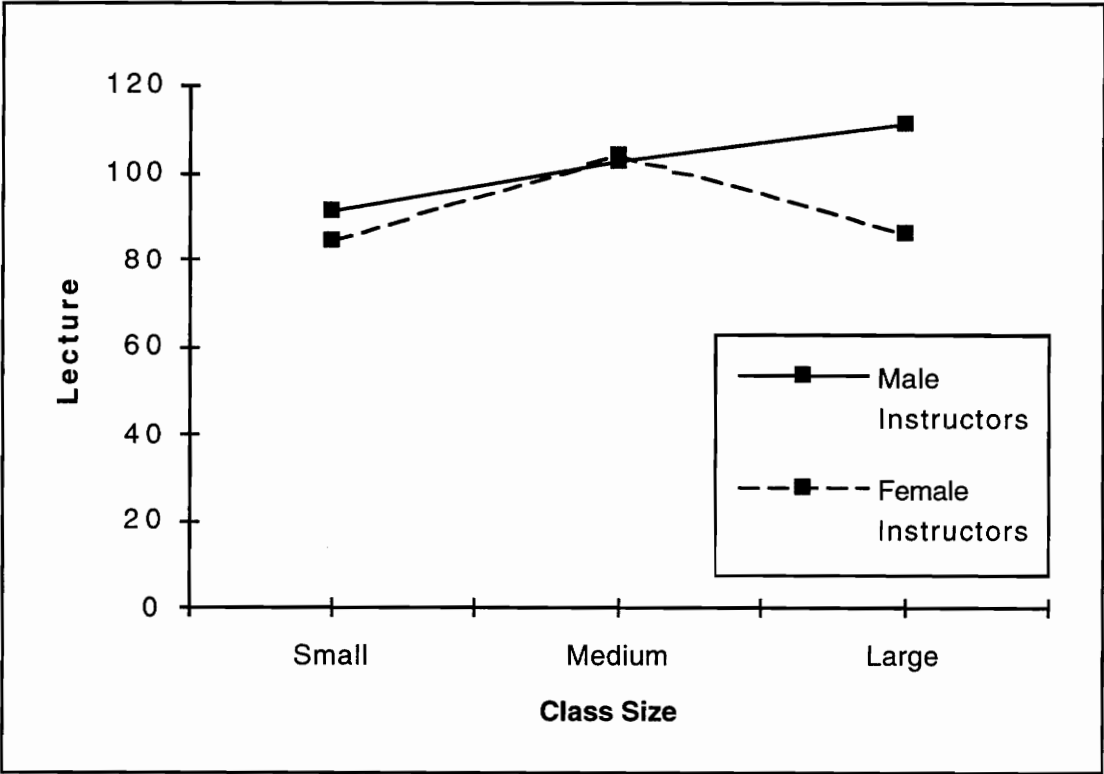


Figure 14: The Interaction between Instructor Sex and Class Size on Lecture Duration

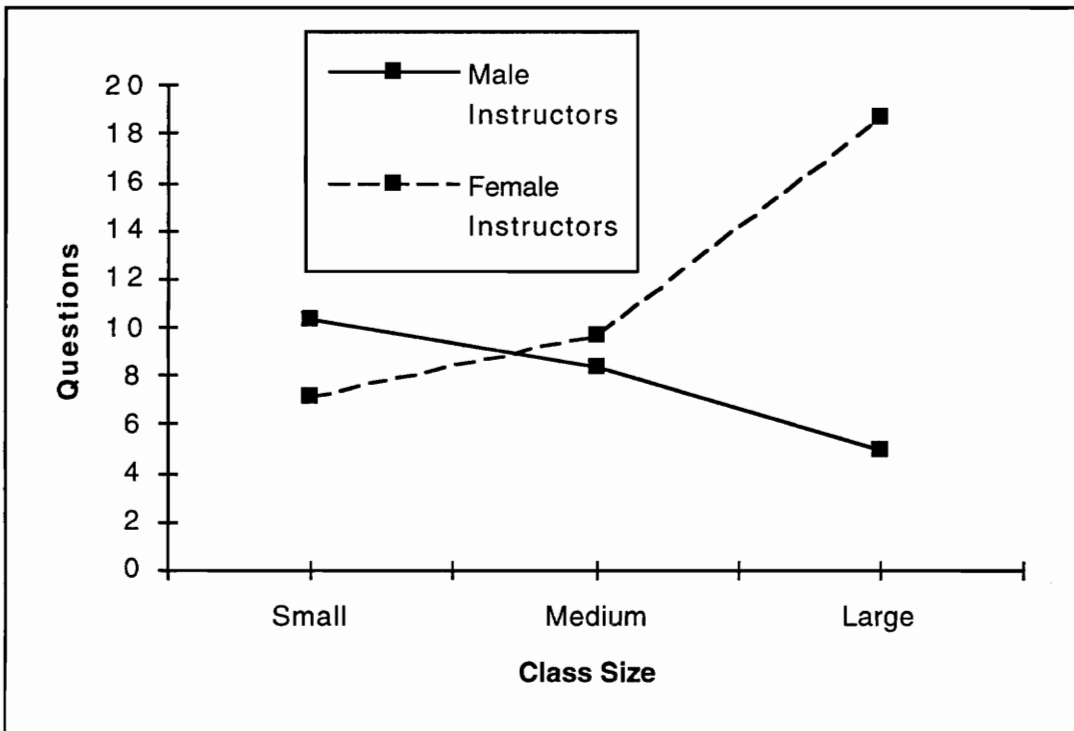


Figure 15: The Interaction between Instructor Sex and Class Size on the Frequency of Questions Asked



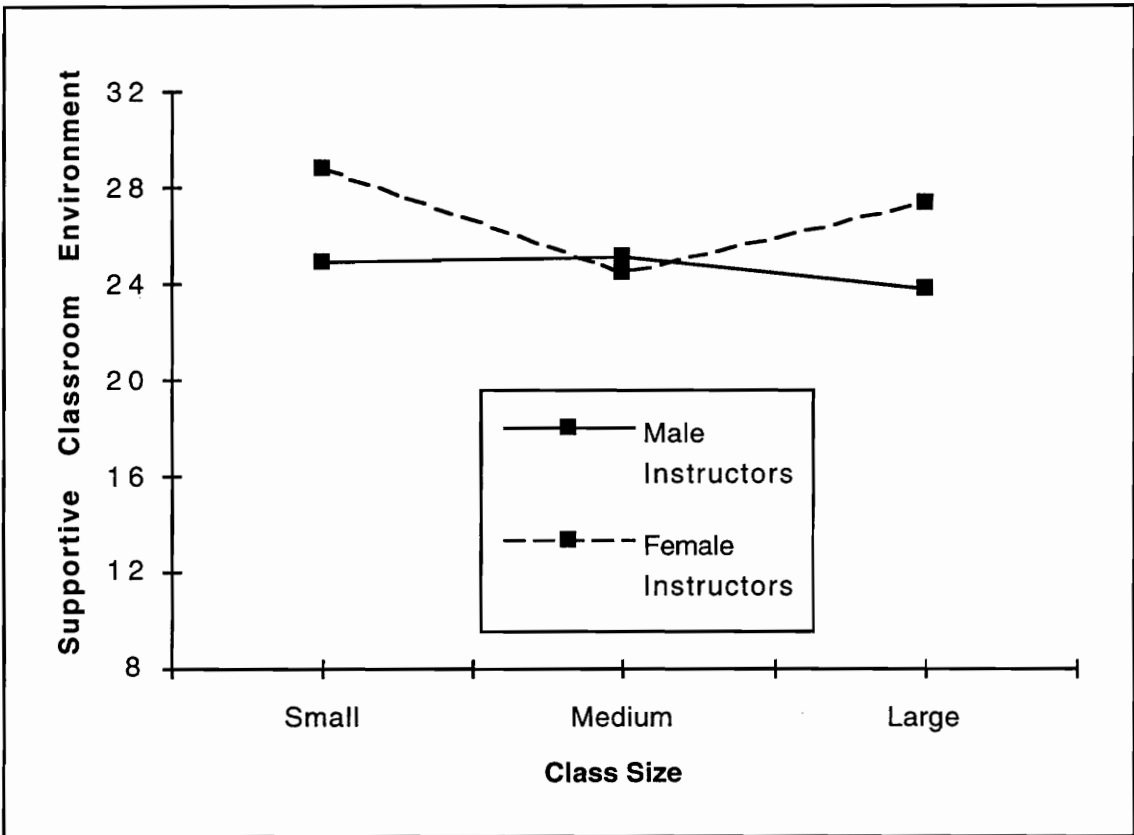


Figure 16: The Interaction between Instructor Sex and Class Size on Supportive Classroom Environment

### Instructor Sex by Student Ratio

Another interaction trend that emerged involved instructor sex and student ratio of the class. The MANOVA interaction effect was significant for the second set of instructor behaviors [Wilks'  $\lambda$   $F = 14.11$ ,  $p = .0001$ ] and was marginally significant for classroom atmosphere [Wilks'  $\lambda$   $F = 2.39$ ,  $p = .0637$ ].

The student ratio and sex of the instructor were found to interact across two different behaviors: lecture [ $F(2,22)=18.41$ ,  $p=.0001$ ] and questions [ $F(2,22)=9.29$ ,  $p=.0012$ ]. See Figures 17 and 18. The trend was similar across both situations. Men and women instructors tended to behave similarly in non-dominated classrooms. However, differences emerged in male-dominated and female-dominated classrooms. In female-dominated classrooms, female instructors lectured less [ $CD(2,22) = 6.76$ ,  $p < .05$ ] than male instructors. However, in male-dominated classrooms, male instructors lectured more [ $CD(2,22) = 6.76$ ,  $p < .05$ ] and asked fewer questions [ $CD(2,22) = 10.35$ ,  $p < .01$ ] than women instructors. No significant differences between male and female instructors were noted for any of these behaviors in non-dominated classrooms. The student ratio and instructor sex also had an interactive effect for supportive classroom environment [ $F(2,24)=5.08$ ,  $p=.0145$ ]. In female-dominated classrooms, female-led classrooms were rated as more supportive than male-led classrooms. No differences between male and female instructors were found in male-dominated and non-dominated classrooms. See Figure 19.

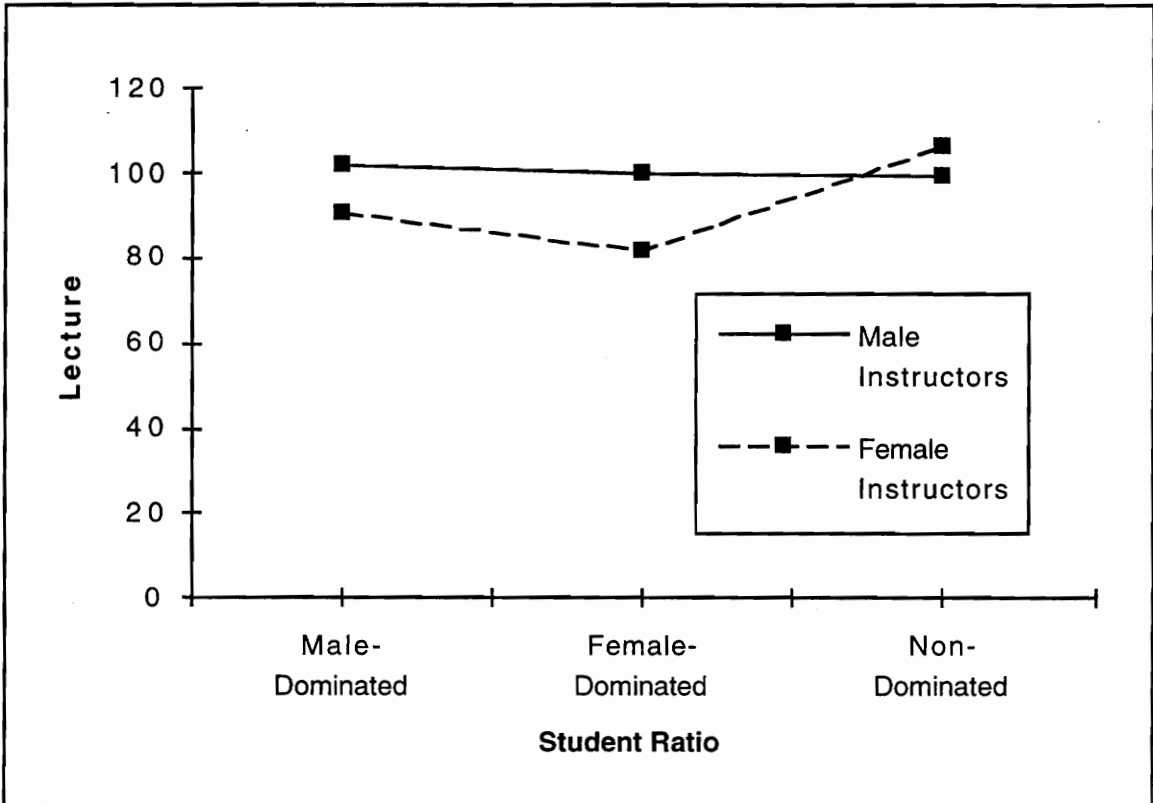


Figure 17: The Interaction between Instructor Sex and Student Ratio on Lecture Duration

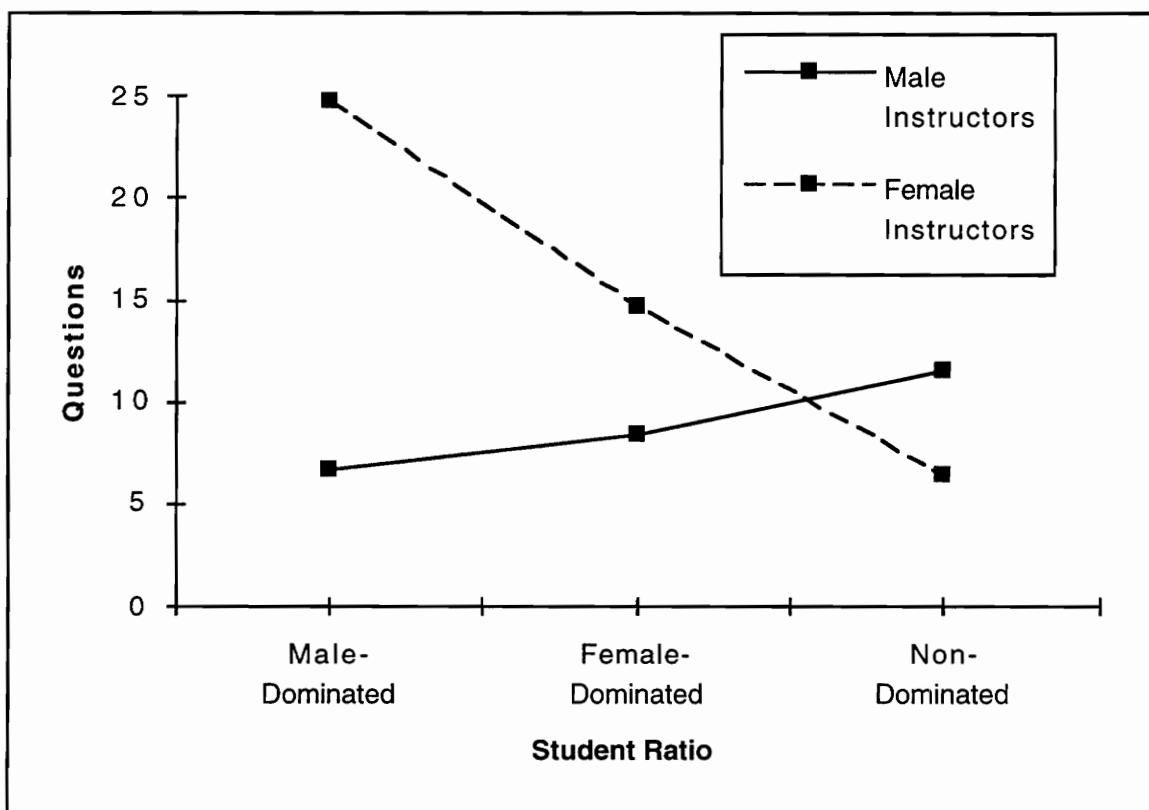


Figure 18: The Interaction between Instructor Sex and Student Ratio on the Frequency of Questions Asked

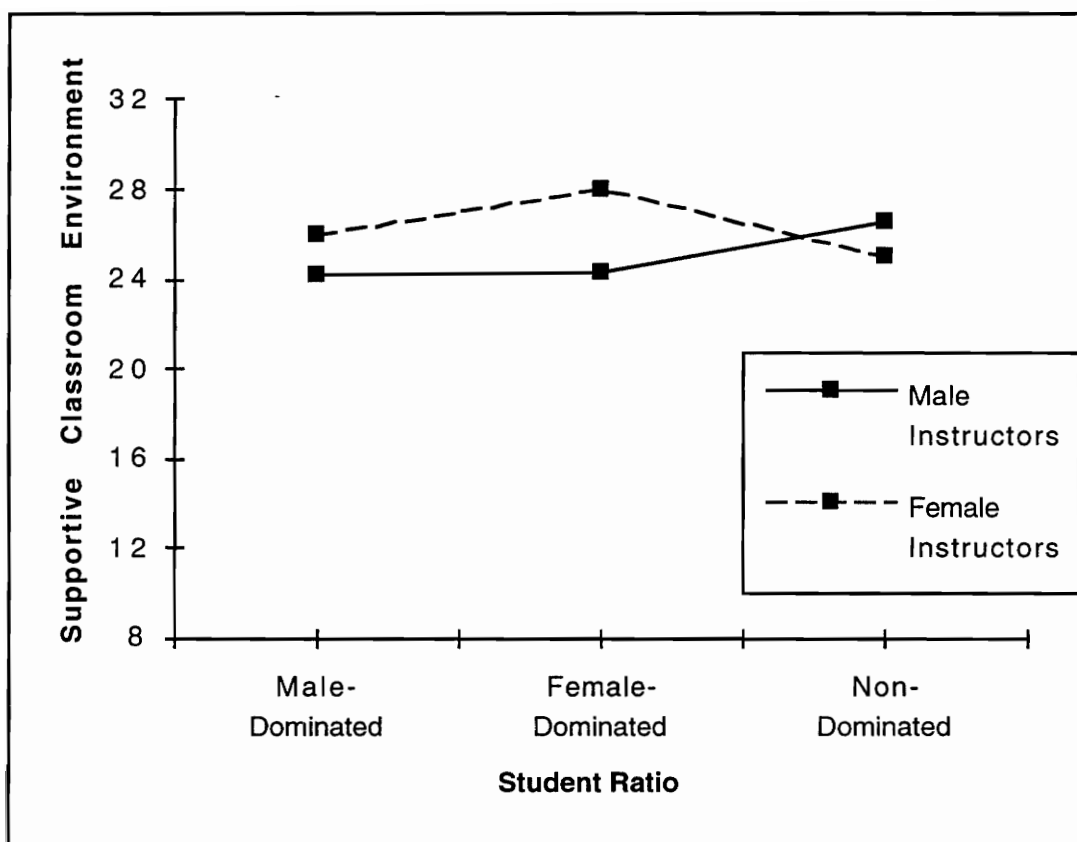


Figure 19: The Interaction between Instructor Sex and Student Ratio on Supportive Classroom Environment

### Instructor Gender by Gender Relevance

Another interaction trend that emerged involved instructor sex and gender relevance of the course. The MANOVA interaction effect was significant for the second set of instructor behaviors [Wilks'  $\lambda$   $F = 17.50$ ,  $p = .0001$ ] and was marginally significant for classroom atmosphere [Wilks'  $\lambda$   $F = 2.39$ ,  $p = .0637$ ].

Gender relevance and sex of the instructor were found to interact for the amount of lecture [ $F(2,22)=31.04$ ,  $p=.0001$ ]. See Figure 20. Instructor sex differences were evident across all three types of courses. In masculine-relevant courses and feminine-relevant courses, male instructors lectured longer than female instructors. In androgynous classrooms, female instructors lectured longer than male instructors [ $CD(2,22) = 6.14$ ,  $p < .05$ ]. Also, feminine-relevant courses led by female instructors were rated as more supportive than the respective courses taught by men [ $CD(2,22) = 2.07$ ,  $p < .05$ ]. Once again, this difference was not found in masculine-relevant or androgynous classrooms. See Figure 21.

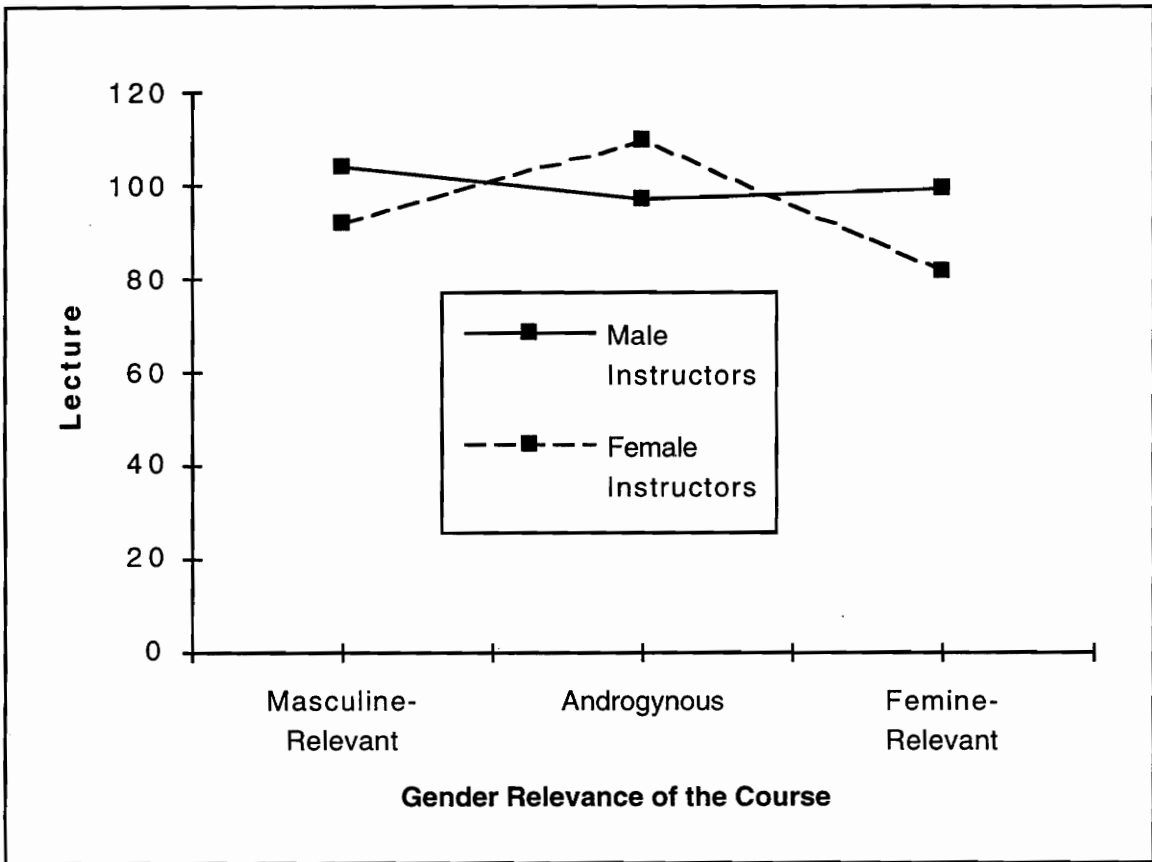


Figure 20: The Interaction between Instructor Sex and Gender Relevance of the Course on Lecture Duration

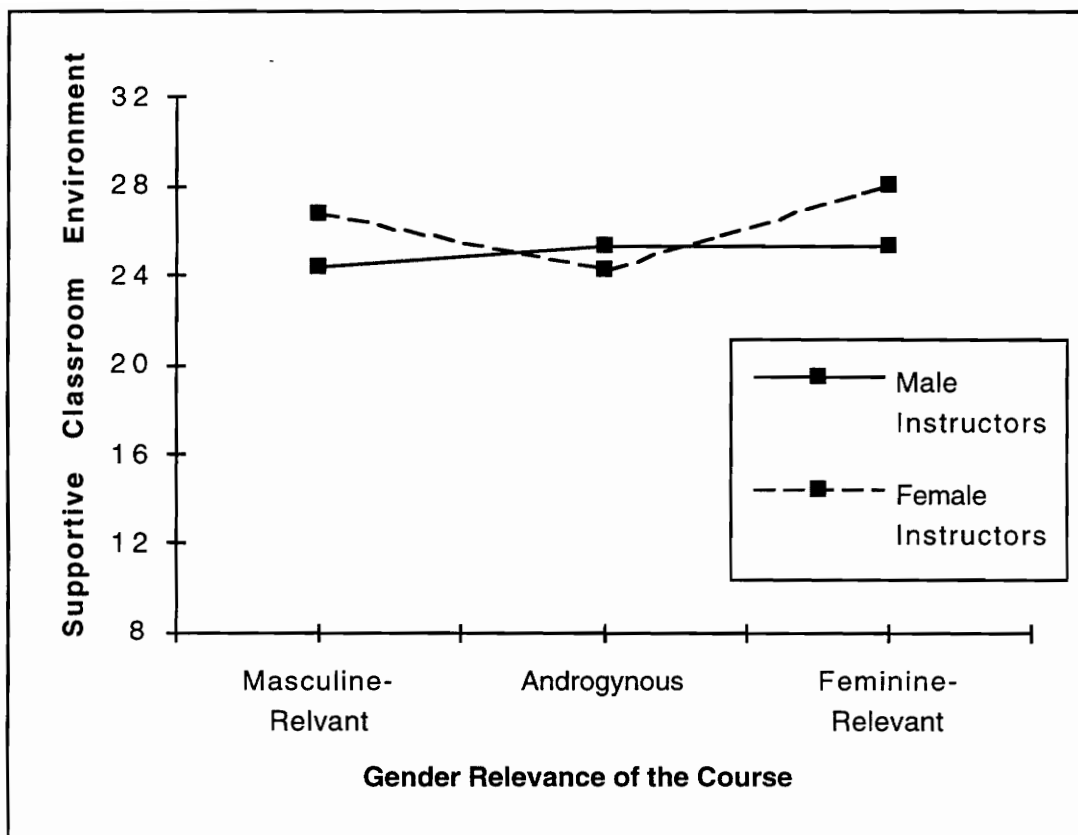


Figure 21: The Interaction between Instructor Sex and Gender Relevance of the Class on Supportive Classroom Environment



### Classroom Atmosphere Questionnaire

In order to replicate the findings from the first two studies on the Classroom Atmosphere Questionnaire (CAQ), a general-principal factor analysis followed by a varimax factor rotation was performed to examine scale structure. The rotated factor matrix resulted in the same, two-factor solution that emerged from the first and second administration of the CAQ. The items that loaded on each factor are the same as those listed in Table 18. Together, both factors accounted for 40.92% of the total variance (See Figure 30).

Once again, a Cronbach Coefficient Alpha was determined for each factor (Factor 1:  $\alpha = .7884$ ; Factor 2:  $\alpha = .7574$ ) suggesting that the CAQ has good estimated reliability. The replicated factors provide strong evidence for the existence of two dimensions, supportive and negative classroom atmosphere appraisal. Also, the two factors were found to be relatively un-correlated, exhibiting a slight negative relationship ( $r = -.09$ ,  $p = .0138$ ), which suggests orthogonality (Nunnally & Bernstein, 1994).

Table 18

Factor Loadings for CAQ - Study 2**Factor 1: Negative Classroom Environment**

<u>Items</u>	<u>Factor Loading</u>
2. Men students tend to be interrupted when asking or answering questions.	.56
4. I have heard women students complain about being treated unfairly or unequally in this class.	.36
6. In this class, I have heard other students make negative comments about men.	.50
7. I feel that men students are sometimes treated harshly or unfairly in this class.	.62
8. Women students tend to be interrupted when asking or answering questions in this class.	.50
10. Women students are sometimes treated harshly or unfairly in this class.	.57
11. Comments by women students are often ignored or not taken seriously by other students in this class.	.51
13. Humor is sometimes used at the expense of women in this class.	.48
15. I have heard men students complain about being treated unfairly or unequally in this class.	.52
16. Comments that men students make are often ignored or not taken seriously by other students in this class.	.70
18. In this class, humor is sometimes used at the expense of men.	.57
19. In this class, I have heard other students make negative comments about women.	.53

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Eigenvalue	3.94
Percentage of Variance	19.74

**Factor 2: Positive Classroom Atmosphere**

<u>Items</u>	<u>Factor Loading</u>
1. Women students frequently ask questions or volunteer information.	.44
3. In this class, men students are often called to participate.	.61
5. I feel that women are intellectually challenged and encouraged by this instructor.	.67
9. In this class, women students are often called on to participate.	.71
12. Men students frequently ask questions or volunteer information in this class.	.59
14. I feel that the comments and opinions expressed by male students are often taken seriously and respected by this instructor.	.52
17. I feel that men are intellectually challenged and encouraged by this instructor.	.72
20. Comments and opinions expressed by women students are often taken seriously and respected by this instructor.	.51

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Eigenvalue	2.84
Percentage of Variance	14.22

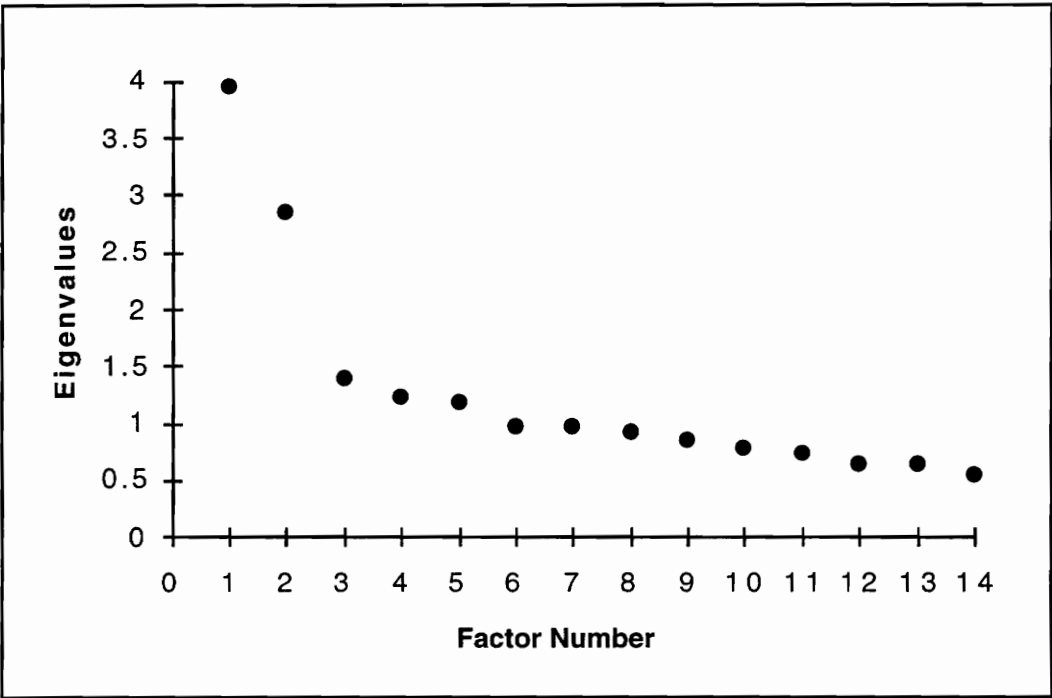


Figure 22: Scree Plot of Eigenvalues - Observation Study

## **CHAPTER IV: DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH**

### **Measurement Issues**

#### **Brady Observation Technique for College Classroom**

##### **Interactions (BOTCCI)**

The observational coding system used in this study was specifically designed to unobtrusively observe traditional, college classrooms for teacher-student interactions. The BOTCCI is based on an interval coding system which demonstrates exceptionally high inter-rater reliability. This instrument allows for the coding of 8 specific behaviors including 4 teacher behaviors and 4 student behaviors. Most importantly, 6 of the 8 behaviors are coded for men and women separately which allows for the assessment of gender differences in behavior and interactions. This makes the BOTCCI an ideal research measure for studying college classroom interaction patterns, especially with regard to gender.

However, this instrument does have limitations that warrant discussion. First, a pure duration or frequency measure of the coded behaviors cannot be obtained from this measure. Because it is an interval system, only estimates of duration and frequency measures can be derived. However, it does allow for the comparison across classrooms which is another reason for its utility as a research instrument. Secondly, this instrument does not reveal which students were responsible for the amount of interaction or volunteering in the class. It only gives you the average amount of interaction/participation in the class for a 20 minute period.

### Classroom Atmosphere Questionnaire

A large portion of this research was dedicated to the development and testing of multiple measurements to assess college classroom interaction patterns. The Classroom Atmosphere Questionnaire (CAQ) was tested on three different occasions, each time more than 500 subjects were given the questionnaire. Factor analyses repeatedly demonstrated a clear 2-factor split in which all of the supportive items loaded on one factor and all of the negative items loaded on the second factor. Item-scale correlations and internal consistency remained high across all three administrations. The results from Study 1 and Study 2 further demonstrate the utility of the CAQ in terms of discriminating between college classrooms on these factor-related scores. Finally, the supportive and negative factors appear to be measuring different constructs, as demonstrated by their orthogonality and by the results derived from Study 2.

The supportive classroom atmosphere factor refers to events in which students feel challenged, respected, and comfortable participating in class. Overall, students tend to rate their classroom experiences as supportive. The negative classroom events factor refers to specific, negative events that may occur in a particular classroom. These include being interrupted, hearing negative comments about other students, feeling ignored, feeling as if humor is used at the expense of students, or hearing other students complain about being treated unfairly. Overall, students tended to rate their classrooms on the low end of this scale. This suggests that students perceive these negative events happening infrequently, if at all.

## The Effects of Gender on College Interaction Patterns

### Interactional View of the Classroom

Differences in student participation, teacher-student interactions, and perception of classroom atmosphere were found across different settings. However, these were often due to a combination of several variables, such as class size and gender relevance. The large number of significant main effects from different independent variables including class size, instructor gender, and student ratio suggest that multiple factors influence classroom interaction. Furthermore, interactions between these variables provide support for the proposed interactional model. The regression analysis on the supportive scores of the CAQ yielded interesting findings that are also consistent with an interactional view of classroom interaction patterns. The regression analyses found multiple factors that influenced the perception of students. In particular, class size, instructor sensitivity and gender relevance were all strong predictors of how students feel comfortable, respected and encouraged in the classroom.

Overall, the current results provide support for an interactional view of college classroom interaction patterns and gender equity which includes three factors: student determinants, instructor determinants, and the classroom environment itself. Specific predictions based on this model were empirically tested and confirmed, providing support for the validity and utility of the model.

### Integration of Behavioral and Self-report Measures

The integration of behavioral and self-report measures resulted in strong correlations between student self-report of classroom behaviors and actual behaviors that occurred. This provides additional construct validity for the CAQ. Secondly, this information is useful since it provides more confidence in the self-report method of students for this area of study. Since multiple authors have assessed the complex phenomena of classroom interactions and gender equity using only self-report instruments, the establishment of their validity should not be under-estimated. While this study provides preliminary evidence that suggests male and female students appraise their classroom environment accurately, the results are limited. First, the analysis only included the comparison of 4 self-report measures with 4 behavioral measures. Secondly, the results are based on correlational analysis. Thus, we can only show a positive relationship between student self-report and actual behavioral occurrences. A more detailed, experimental study is needed to answer this particular question. In particular, the manipulation of specific behaviors is needed to establish a cause and effect relationship between behavioral events and student perceptions.

#### Gender Inequity in the Classroom

Overall, gender inequity was not present in the classrooms assessed in this study as evidenced by equal participation of students across all classrooms. Furthermore, instructors did not interact with students differently based on their sex. One important issue to consider when interpreting these results is the external validity of the study. While the sample selected in this study is not representative of all potential college classrooms, 25% of a randomly selected set of classrooms

participated in this study allowing for modest generalizations to the post-secondary setting. Furthermore, several steps were taken in order to decrease volunteer bias, thus increasing external validity. For example, monetary incentives were offered to the potential instructors and they were not told the nature of the study. It is believed that these measures were helpful in recruiting a more representative sample of instructors and college classrooms. For example, one research assistant was told by an instructor during the questionnaire session "If I would have known this study was about gender in the classroom, I wouldn't have participated". Another example that suggests different types of instructors were included in this sample comes from their responses to receiving financial compensation. First, 2 instructors sent back their \$25 checks stating that they did not want compensation for participating in a research project. They further reported that they felt it was their academic responsibility to participate as faculty members of this university. Three different instructors spent their money on the class (e.g. one instructor bought snacks while another gave each student a one dollar bill).

While efforts were made to obtain a representative sample, it should be noted that the instructors in this study could not be randomly selected and consisted only of volunteers. Therefore, the results of this study cannot be generalized to all college classrooms.

Regardless of generalizability, the findings from this study stand in contrast to the reports of several authors including Foxley (1988), Hall & Sandler (1982), Harvey & Hergert (1986), and Sadker & Sadker (1986) who reported that women are



treated differently than men in terms of interacting with the instructor. Similarly, the current results are in contrast with the more empirical studies carried out by Constantinople et al. (1988), Long (1986), and Krupnick (1985) who found that males participated more than females. The men and women in this sample did not evidence differences in student participation, including volunteering information, raising their hands, staying after class, and seat location. On the other hand, the current results are consistent with the empirical study carried out by Omvig (1989) who found no evidence of inequitable interactions when male and female students were compared.

How are such contradictory findings explained? One possible explanation is that this study utilized a more representative sample than previous research.

Similarly, this study included valid and reliable instruments while including a large number of independent/predictor variables. None of the previous studies have included all of these components. Therefore, it is possible that the current results are more accurate and reflective of the real world situation than the results of previous research. This is the most likely explanation given the series of meta-analyses that have been performed on sex-difference research in general. According to Eagly (1995), inconsistencies in sex differences most commonly occur when methodological dissimilarities exist across studies. A review of the gender inequity research (Brady & Eisler, in press) listed inconsistent methodologies across studies as a significant problem in the literature. Thus, a strong possibility exists that gender differences in the college classroom are not nearly as pronounced as people have originally purported.

A second possible explanation is that the previous research is outdated. Perhaps times are changing and college classrooms have evolved into a more equitable environment in which male and female students feel equally comfortable expressing themselves. The studies that were reviewed by Brady & Eisler (in press), although relatively recent in terms of their publication dates, may be over 7 years old. It is possible that over the past decade, students and teachers have changed their perceptions of themselves and changed their behaviors based on our society's changing expectations for men and women. Fortunately, both of the possible explanations suggested thus far provide a positive outlook on today's college classroom in relationship to gender equity.

In terms of self-report studies on classroom atmosphere, once again, the results from this study are in contrast with previous research. Cranston (1987) and Heller et al. (1985) found that males perceived more instances of negative classroom events than women. In this study, men and women did not evidence differences in how they perceive their classroom environment. In particular, men and women did not differ in their appraisal of supportive or negative classroom events as measured by the Classroom Atmosphere Questionnaire. One explanation of this finding is that men and women are actually having similar experiences in the college classroom. Once again, this suggests that gender inequity is less of a problem at the college level than previous authors reported.

However, it could be argued that students are not aware of actual negative events that may occur in the classroom because they are too subtle. In this study,

behavioral and self-report measures were compared for this reason. The results provided preliminary evidence to suggest that student perceptions of classroom events are consistent with the actual behaviors that occur in class. This suggests that students are aware of specific behaviors that occur in the class. Furthermore, they are accurate in their assessment of the frequency of these behaviors. However, the reader should be aware that these results are tentative due to limitations that were previously discussed. It is possible that other classroom behaviors may not be as easily, or accurately, perceived by students.

In summary, differences in classroom interaction patterns were found across various settings including different class sizes, different departments and different types of instructors (e.g. men and women). However, these differences were not related to student sex. No sex differences in student behaviors were found in this study nor were instructors found to treat students differently based on their sex.

### Instructor Variables

#### Instructor Sensitivity

Classrooms that were taught by instructors high in gender sensitivity were rated as significantly more supportive on the CAQ than instructors with medium and low sensitivity. Gender sensitivity was one of the strongest predictors of supportive classroom environment in the regression analyses. Furthermore, gender sensitivity had an effect on the amount of time instructors lecture. Instructors with low sensitivity lectured significantly more than instructors with medium and high sensitivity. No differences were found when instructors with medium and high

gender sensitivity were compared. The gender sensitivity factor on the ISQ is strongly related to the race sensitivity factor. In fact, a more reliable measure of "sensitivity" is obtained when the gender and race items are combined. Perhaps instructors that are sensitive to gender and race issues in the class are also more responsive to students in general, thus increasing classroom discussion and eliciting higher supportive classroom environment ratings.

### Instructor Sex

Male instructors lectured more and asked fewer questions than female instructors. Also, courses led by female instructors were rated as more supportive than courses led by male instructors. This was an unexpected finding yet seems compatible with existing research on sex differences in communication. Tannen (1990) provides an excellent summary of sex differences in reference to the way men and women communicate. One sex difference she points out is that men feel more comfortable engaging in "public speaking" while women are more comfortable engaging in "private speaking". According to Tannen (1990), language is a means to building rapport for women while for men, it is a means to preserving independence. Men communicate as a means to exhibit knowledge while women emphasize making connections with other people.

It is possible that in the academic setting, male instructors feel more comfortable in the role of lecturing while women are more prone to engage in discussion. Since classroom discussion increases student learning and provides additional stimulation, it makes sense that students rated classes led by female

instructors more supportive than male-led classrooms. In fact, several items on the supportive classroom environment factor refer to classroom discussion. Does this difference occur because women value discussion more than men or because they feel more comfortable engaging in discussion? On the ISQ, male and female instructors placed equal importance on facilitating classroom discussion (item #15). The average response for men was 5.1 while the average response for women was 5.3 on a 6-point scale. Similarly, when asked if they would attend a workshop on facilitating classroom discussion, 86% of the men and 90% of the women said yes. This suggests that both men and women value classroom discussion yet classes led by women are more likely to engage in classroom interaction.

Another possibility is that students have expectations about their instructors that are based on gender stereotypes. They may expect women to be more communicative and may ask more questions, raise their hands more frequently, and volunteer more information. It is not possible to determine where the discussion originates because student participation is highly correlated with teacher-student interaction and instructor calling on students. Sandler (1993) provides evidence that students have gender-related expectations of their instructors. According to Sandler (1993), students expect women faculty to be more supportive, personal, and forgiving than male faculty. Thus, it is possible that students feel more comfortable speaking up in classes led by women than by men. The most likely explanation for this finding is a combination of teacher and student expectations.

### Interaction between Instructor Sex and Class Size

Men and women instructors tended to behave similarly in small and medium size classes. However, differences emerged in larger classrooms. In large classrooms, female instructors called on students more, lectured less, and asked the class more questions. No differences between men and women were significant in small and medium classrooms. A similar interaction trend emerged for students' perceptions of their supportive classroom atmosphere. Large and small classes that were female-led were perceived as more supportive than classes led by males. However, no differences in supportive environment were reported by students in medium size classrooms.

There is a quality about a large class (more than 35 students) which changes the way in which men and women teach. In small classes, men and women call on students frequently and engage in less lecture than in medium and large classes. Perhaps in a small class (15 or less students), instructors feel a need to interact more with the students simply because of the class size. Yet in the larger classrooms, the differences between men and women's communication styles may emerge. In large classrooms, the situation is more representative of "public speaking" making men feel more comfortable to lecture more. In this same situation, women call on students more and classroom interaction increases. Students also rated large classrooms that were led by female instructors more supportive than large classroom led by males. This difference is not surprising given the greater amount of discussion in large classrooms led by women.

## Interaction between instructor Sex and Student

### Ratio of the Class

Another interaction trend that emerged involved instructor sex and student ratio of the class. Men and women instructors tended to behave similarly in non-dominated classrooms. However, differences emerged in male-dominated and female-dominated classrooms. In female-dominated classrooms, female instructors lectured less than male instructors. However, in male-dominated classrooms, male instructors lectured more and asked fewer questions than female instructors.

These results are consistent with previous research on group types in the work place. Kanter (1977) discusses the effects of sex ratios in the work place and how they predict a number of behavioral phenomena. For example, she refers to groups that have a preponderance of one sex or race as "skewed" while those that are relatively equal are called "balanced". The skewedness of a particular group effects employees' feeling of belonging (or isolation), gender stereotypes and the forming of social relationships.

When teaching classrooms that were skewed in the direction of female students (female-dominated), more teacher-student interaction occurred in female-led classes compared to male-led classes. Perhaps, both women instructors and students feel more comfortable interacting when there is a preponderance of the female sex in the class. Similarly, when the class was skewed in the direction of male students (male-dominated), more teacher-student interaction occurred in male-led classes compared to female-led classes. In this case, male students and instructors may feel more

comfortable interacting due to the preponderance of male students in the class. Consistent with this explanation, no instructor sex differences emerged when the classes were balanced (non-dominated).

#### Interaction between instructor Gender and Gender

##### Relevance of the Course

In masculine-relevant courses and feminine-relevant courses, male instructors lectured longer than female instructors. In androgynous classrooms, female instructors lectured longer than male instructors. Also, feminine-relevant courses led by female instructors were rated as more supportive than the respective courses taught by men. Once again, this difference was not found in masculine-relevant or androgynous classrooms.

In masculine-relevant courses, men would not be expected to engage in discussion as this is not consistent with gender role expectations. Similarly, it is inconsistent for male instructors to elicit a great amount of discussion in feminine-relevant courses, an area that men may not feel comfortable. Perhaps men feel more comfortable engaging in discussion in androgynous courses, where gender-role stereotypes allow more flexibility.

#### Directions for Future Research

This research has produced the following results: 1) the development of psychometrically sound instruments for assessing college classroom interaction patterns, 2) the support of an interactional model of college classroom interaction patterns, and 3) a large-scale behavioral assessment study that found no evidence of



gender inequity. Recommendations for future research include the extension and progression of these findings.

### Issues of Validity

First, the model should be refined and tested for its validity under different circumstances. For example, additional factors that were not originally assessed may be important contributors to college classroom interaction patterns. Some examples may include assessing student assertiveness and measuring the quality of feedback given to students by their instructors (e.g. criticism versus praise). While the predictor variables in the current model were useful for discriminating between classrooms and predicting classroom atmosphere, the regression analyses suggest that other variables are needed to account for the remaining variance.

Second, replication of the present behavioral study is necessary to establish the reliability of these findings (Barlow & Hersen, 1984). A replication study would also provide additional support for the interactional model of classroom interactions. In particular, the utility and comprehensiveness of the model could be verified through the generation and confirmations of additional predictions.

### Theoretical Issues

Finally, a more extensive understanding of classroom interactions is needed which would serve as a complement to the proposed interactional model. Previous research has focused on the instructor as the sole provider of interaction and gender equity. The current model has social utility in that it places the responsibility of classroom environment and interaction onto both instructors and students. This model

is helpful in decreasing the negative associations that have been paired with the terms "gender-bias" and "gender sensitivity". According to Mobley & Payne (1992), people in the work place are resistant to diversity and sensitivity training. They suggest that sensitivity training can cause "backlash" as resistant participants may sabotage efforts to increase sensitivity. DiSalvo (1993), Murray (1993), and Wold (1991) also provide evidence that sensitivity/diversity training may do more harm than good. Evidence for resistance to gender issues in the classroom can also be drawn from remarks made by instructors in this study. For example, as reported earlier, one instructor stated, "If I would have known this study was about gender, I wouldn't have participated." Furthermore, when the instructors were asked if they would attend a gender sensitivity workshop, only 29% of the sample said yes. Finally, written comments on the ISQ suggest resistance to the issue of gender sensitivity in the classroom. For example, one instructor wrote next to item 24 ("How important is it for instructors to use texts written by women?"), "This is a silly question!". Other written comments regarding the gender sensitivity workshop include "I fear that such sessions are too often filled within the propaganda of political correctness rather than useful information" and "I have attended such workshops, and I feel they promote more bias than defeat it". Another instructor stated "They usually turn into a bitch session where the men complain because the women get too much and the women complain because they do not get enough."

An interactional view of the classroom is greatly needed to decrease the stigma of research on gender in the classroom and to facilitate the understanding of what

makes an interactional, supportive classroom environment. By placing an equal amount of responsibility on students, instructors are not targeted as the sole providers of gender equity or classroom discussion.

### Student Outcomes

Another issue that should be addressed is the overall effect of classroom interaction patterns and classroom atmosphere on student learning, motivation, and self-esteem outcomes. Clear differences on these dimensions have emerged across different types of classrooms and under different circumstances. However, the importance of these differences hinges on the relationship between the classroom environment and student outcomes. If the type of classroom environment has no effect on student outcomes, the study of this phenomenon becomes less meaningful. While there is much research that has shown correlational relationships between various classroom environments and student outcomes (Fraser & Fisher, 1982; Fraser & Treagust, 1986; Funderburk, 1994; Vahala & Winston, 1994), there is a lack of causal research in this area. Of course the applied setting of education severely limits the possibility for pure, experimental research. However, these issues should not be overlooked. There are a multitude of quasi-experimental designs that could serve as an alternative to experimental research (Cook & Campbell, 1979) which could be used in this particular area to establish causality. In summary, future research should attempt to establish more cause and effect relationships between the classroom environment and student outcomes.

### Concluding Remarks

The results from Study 1 and Study 2 provide strong support for an interactional view of college classroom interaction. Differences in students' experiences and perceptions cannot be explained with only a few variables. Rather, researchers and educators must take into account instructor characteristics, student characteristics, and the fixed classroom environment when attempting to describe or predict classroom interaction. Another important finding from this research is the strong correlation between instructor behaviors and student behaviors. Because instructors are likely to interact with students who participate, and students are likely to volunteer when called on by their instructors, the study of classroom interaction must include both student and instructor behaviors. Finally, no sex differences were found for student behaviors or teacher-student interaction, providing no evidence for gender inequity. Furthermore, male and female students perceived their classroom climate similarly, providing further confirmation of gender equity.

Overall, these results provide an alternative view of the college classroom which de-emphasizes the role of the instructor as the main provider of discussion and gender equity. Students have been found to exercise remarkable influence in the classroom, a finding that has received little attention. The social utility of this perspective is notable as it serves to increase the understanding of classroom interaction and decrease resistance to gender equity research.

Table 9

Multivariate Results for Student BehaviorsMANOVA MODEL: Hand Stay Vol = IS GR SR IG CS IG\*CS IG\*SR IG\*GR<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' $\lambda$
IS	6	12	.5355	.7717
GR	6	12	.3209	.9136
SR	6	12	.4442	.8356
IG	3	6	.8733	.5052
CS	6	12	1.988	.1465
IG*CS	6	12	1.522	.2518
IG*SR	3	06	1.257	.3698
IG*GR	3	06	.3866	.7670

**1. KEY****GR** - Gender Relevance of the Course**CS** - Class Size**IS** - Instructor Sensitivity**IG** - Instructor Gender**SR** - Student Ratio of the Class**HAND** = Raising Hands**STAY** = Staying After Class**VOL** = Student Volunteering

Table 10

Multivariate Results for the First Set of Instructor Behaviors

MANOVA MODEL: ISS ICALL = IS GR SR IG CS IG\*CS IG\*SR IG\*GR<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' λ
IS	4	14	1.201	.3533
GR	4	14	1.018	.4314
SR	4	14	1.044	.4195
IG	2	07	3.628	.0829
CS	4	14	2.826	.0655
IG*CS	4	14	2.936	.0589
IG*SR	2	07	.1031	.9033
IG*GR	2	07	2.821	.1263

1. KEY

GR - Gender Relevance of the Course

CS - Class Size

IS - Instructor Sensitivity

IG - Instructor Gender

SR - Student Ratio of the Class

ICALL = Instructor Calling on Students

ISS = Instructor Interacting with Students

Table 11

Multivariate Results for Student Behaviors: Ratio Data

MANOVA MODEL: Hand Stay Vol = IS GR SR IG CS SEX GR\*IG SR\*IG IG\*CS GR\*SEX  
SR\*SEX CS\*SEX IG\*SEX<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' λ
IS	6	40	.8237	.5584
GR	6	40	2.428	.0427
SR	6	40	1.806	.1223
IG	3	20	2.258	.1129
CS	6	40	7.175	.0001
SEX	3	20	1.577	.2261
GR*IG	6	40	2.017	.0858
SR*IG	6	40	2.278	.0552
IG*CS	6	40	1.811	.1213
GR*SEX	6	40	.5179	.7912
SR*SEX	6	40	.3562	.9020
CS*SEX	6	40	.6902	.6587
IG*SEX	3	20	.8571	.4793

1. KEY

GR - Gender Relevance of the Course

CS - Class Size

IS - Instructor Sensitivity

IG - Instructor Gender

SR - Student Ratio of the Class

SEX - Student Sex

HAND = Raising Hands

STAY = Staying After Class

VOL = Student Volunteering

Table 12

Multivariate Results for the First Set of Instructor Behaviors: Ratio Data

MANOVA MODEL: ICALL ISS = IS GR SR IG CS SEX GR\*IG SR\*IG IG\*CS GR\*SEX SR\*SEX CS\*SEX IG\*SEX<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' λ
IS	4	42	3.816	.0001
GR	4	42	2.058	.0001
SR	2	22	3.320	.0549
IG	1	22	.7061	.4098
CS	4	42	36.58	.0001
SEX	1	22	.6960	.4131
GR*IG	4	42	53.82	.0001
SR*IG	4	42	4.915	.0001
IG*CS	4	42	36.90	.0001
GR*SEX	2	22	1.119	.3443
SR*SEX	2	22	1.217	.3151
CS*SEX	2	22	.2428	.7865
IG*SEX	1	22	.4353	.5162

1. KEY

- GR - Gender Relevance of the Course
- CS - Class Size
- IS - Instructor Sensitivity
- IG - Instructor Gender
- SR - Student Ratio of the Class
- SEX - Student Sex
- ICALL = Instructor Calling on Students
- ISS = Instructor Interacting with Students



Table 13

ANOVA Results for Seat LocationANOVA MODEL: ROW = SEX GR SR SEX\*GR SEX\*SR GR\*SR SEX\*GR\*SR <sup>1</sup>

SOURCE	DF	F Value	P Value <sup>2</sup>
Model	13	3.22	.0024
SEX	2	1.65	.2101
GR	2	2.03	.1498
SR	2	.93	.4073
SEX*GR	2	1.20	.3158
SEX*SR	2	1.36	.2731
GR*SR	2	.61	.5494
SEX*GR*SR	2	.95	.3971

1. KEY

GR - Gender Relevance of the Course

SR - Student Ratio of the Class

SEX - Student Gender

ROW - The Proportion of male to females that were sitting in the front two rows of the class

2. These p-values are based the Type III estimable function which is considered to be the most desirable (SAS Institute Inc., 1990)

Table 14

Multivariate Results for Classroom Atmosphere

MANOVA MODEL: CAQPOS CAQNEG = IS GR SR IG CS SEX GR\*IG SR\*IG IG\*CS GR\*SEX SR\*SEX CS\*SEX IG\*SEX<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' λ
IS	4	46	8.211	.0001
GR	4	46	3.947	.0001
SR	4	46	4.542	.0036
IG	2	23	6.335	.0064
CS	4	46	2.068	.1004
SEX	2	23	.4608	.6364
GR*IG	4	46	1.028	.4028
SR*IG	4	46	2.398	.0637
IG*CS	4	46	5.923	.0006
GR*SEX	4	46	.9384	.9384
SR*SEX	4	46	.4640	.7610
CS*SEX	4	46	2.545	.0520
IG*SEX	2	23	5.139	.0143

1. KEY

GR - Gender Relevance of the Course

CS - Class Size

IS - Instructor Sensitivity

IG - Instructor Gender

SR - Student Ratio of the Class

SEX - Student Sex

CAQPOS = Positive Classroom Atmosphere

CAQNEG = Negative Classroom Atmosphere

Table 16

Means and Standard Deviations for Male and Female Students for Student and Instructor Behaviors

	STUDENT SEX	
	Male Students	Female Students
<b>STUDENTS BEHAVIORS</b>		
Volunteering	1.1000 <sup>1</sup> (1.0615)	.9548 (1.3027)
Hand-Raising	.1835 (.1469)	.1334 (.1155)
Staying after Class	.1400 (.0534)	.1066 (.0612)
<b>INSTRUCTOR BEHAVIORS</b>		
Instructor Calling on Students	.2480 (.2425)	.2034 (.2608)
Instructor Interacting with Students	1.3278 (1.2999)	1.5622 (1.6247)

1. These means are in ratio form. Each female student mean is based on averages of the female response divided by the number of females in the class. Each male student mean is based on averages of the male response divided by the number of males in the class. Men and women are compared based on their actual participation rates compared to what is of their sex expected given the proportion of men to women in the class.

Table 17

Multivariate Results for the Second Set of Instructor Behaviors

MANOVA MODEL: L Q = IS GR SR IG CS GR\*IG SR\*IG IG\*CS<sup>1</sup>

SOURCE	Num DF	Den DF	F Value	Wilks' λ
IS	4	58	8.758	.0001
GR	4	58	14.64	.0001
SR	4	58	13.51	.0001
IG	2	29	14.02	.0001
CS	4	58	19.18	.0001
GR*IG	4	58	14.11	.0001
SR*IG	4	42	4.915	.0001
IG*CS	4	58	13.61	.0001

1. KEY

GR - Gender Relevance of the Course

CS - Class Size

IS - Instructor Sensitivity

IG - Instructor Gender

SR - Student Ratio of the Class

L = Lecture

Q = Questions

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Appendix A: Open-ended Survey for Field Study

STUDENT QUESTIONNAIRE

Thank you for taking the time to complete this questionnaire. Your time and energy will be helping us to better understand the experiences of Virginia Tech students in their classes. Please take your time in answering these questions as you may have never thought about them before. Your honesty will be appreciated and your anonymity will be respected. Feel free to add any other comments on the back of this questionnaire.

**Age:** **Year in School:**

**Sex:** **Marital Status:**

**Major:** **Race:**

**Religious Affiliation:**

1. In a few sentences, describe the way in which the men and women treat each other in this class (use additional space on back page if needed)?

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2. Do you think that members of the opposite sex listen to and value your opinions in class? Please describe below what they do that makes you feel this way (use additional space on back page if needed).

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3. Have you ever noticed that men and women are treated differently in your classroom by other students? If so, please describe below (use additional space on next page if needed).

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4. Have you ever noticed that men and women are treated differently in your classroom by the instructor? If so, please describe below (use additional space on back of page if needed).

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5. Do you think the environment in this class is free of racial, ethnic, and sexist discriminatory practices? Yes No

Please explain.

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6. Do you think that the instructor in this class shows any evidence of racist, ethnic, sexist or discriminatory biases or practices? Yes No

Please explain.

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7. Do you feel that you have the same chance as anybody else to do well in this class because of your racial, ethnic, or gender status? Yes No

Please explain.

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8. Do you feel that your racial, ethnic, or gender status could affect the grade you might get in this class? Yes No

Please explain.

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9. Have you heard any sexual jokes in this class that are at all derogatory to men or to women? Yes No

Please explain.

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10. Have you ever been treated rudely or been disparaged by the instructor in this class? Yes No

Please explain.

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11. Have you ever been treated rudely or been disparaged by students in this class  
Yes No

Please explain.

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12. Have you ever felt that your racial, ethnic, or gender status has affected the amount or quality of guidance or support that you might get in this class?  
Yes No

Please explain.

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13. Do you feel that the instructor in this class shows signs of gender/or racial stereotyping (e. g. Women students are not regarded as having sufficient mathematical or logical reasoning skills; White males are more likely to be serious about the class)  
Yes No

Please explain.

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14. Do you feel that the atmosphere in this classroom is open to the views of students of both sexes from different racial, and ethnic backgrounds ? Yes No

Please explain.

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15. Do you feel that the instructor in this classroom is open to the views of students of both sexes from different racial and ethnic backgrounds?

Please explain.

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16. What would you do if you felt that there were signs of sexist or racist attitudes in this class?

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17. Would you be interested in having more discussions in this class about gender, racial, and ethnic issues? Yes No

Please explain.

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**FEMALE STUDENTS:**

18a.How do you think men contribute to the class?

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What would you like to see men do more of:

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What would you like to see men do less of:

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**MALE STUDENTS:**

18b.How do you think women contribute to the class?

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What would you like to see women do more of:

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What would you like to see women do less of:

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Questions 5 & 6 from page 3 of The Study of the UCLA Campus Environment for Diversity

Questions 7-18 from Student Survey on Business Classroom Environment

## Appendix B: Field Study Results

Some examples of questions asked in the open-ended survey included, "Have you ever been treated rudely by your instructor or fellow students?" and "Do you think that members of the opposite sex listen to and value your opinions in class?". Overall, students had a tendency to report one word answers such as "no" or "not sure" on the questionnaires or to report positive experiences in their classrooms. However, Items #1 ("In a few sentences, describe the way in which the men and women treat each other in this class") and #2 ("Do think that members of the opposite sex listen to and value your opinions in class?") evoked the greatest responses and differences across students. 65% of the students indicated that men and women interact in a positive manner and respect each others opinions. Frequent responses included "we get along well", "we treat each other with respect" , "men and women treat each other as equals". 14% of the students reported that there was little or no interaction in their classes. However, 21% (6 males; 8 females) did report negative experiences that were gender related. Several students reported gender differences in behavior such as women being more respectful or quiet than the men. Consistent with the literature on gender inequity, the men reported the most extreme examples of negative behaviors. For example, one male student reported, "Men often throw out sexist comments" while another stated "In my english class, the men were extremely rude to the women." The women reported more subtle examples such as "men are more free in the way they sit" and "the men don't seem as interested in hearing what the females have to say."

Also, small discussion groups ranging from 5 to 8 students were held to discuss students' perceptions regarding inequity in the classroom. In discussion groups, students were more expressive. This was especially the case when students were prompted regarding what constitutes a negative classroom event (e.g. being interrupted, not being taken seriously). In particular, several males reported being treated harshly by female instructors or having their comments not taken seriously when discussing "feminist" topics. Several females also shared stories of having trouble with instructors during office hours (e.g. not giving them help), particularly in science or technical courses. Students also reported reluctance to share information or to give personal opinions in class as they perceived their fellow students would not take them seriously or would ignore their comments.

## Appendix C: Preliminary Classroom Atmosphere Questionnaire

### CLASSROOM ATMOSPHERE QUESTIONNAIRE

The purpose of this questionnaire is to help us understand how men and women students feel about their classroom atmosphere at Virginia Tech. Each of the following statements describes how a student might think or feel about the way men and women students are encouraged or discouraged from participation and learning in a particular class.

Please indicate the extent to which you agree or disagree with each statement with respect to how students are treated in this class as well as other classes you have had here at Virginia tech.

1	2	3	4
Disagree	Disagree Somewhat	Agree Somewhat	Agree
<hr/>			
1. I feel that men students are sometimes treated harshly or unfairly in this class.			
2. Women students tend to be interrupted when asking or answering questions in this class.			
3. Men students are often called to participate in this class.			
4. I have heard women students complain about being treated unfairly or unequally in this class.			
5. I feel that women are intellectually challenged and encouraged in this class.			
6. I have heard negative comments about men in this class.			
7. I feel that women students are comfortable asking or answering questions in this class.			
8. Men students tend to be interrupted when asking or answering questions in this class.			
9. Women students are often called on to participate in this class.			
10. I feel that women students are sometimes treated harshly or unfairly in this class.			
11. Women students are often ignored in this class.			
12. I feel that men students are comfortable asking or answering questions in this class.			
13. I feel that humor is sometimes used at the expense of women in this class.			
14. I feel that the comments and opinions expressed by male students are often taken seriously and respected in this class.			
15. I have heard men students complain about being treated unfairly or unequally in this class.			
16. Men students are often ignored in this class.			
17. I feel that men are intellectually challenged and encouraged in this class.			
18. I feel that humor is sometimes used at the expense of men in this class.			
19. I have heard negative comments about women in this class.			
20. I feel that comments and opinions expressed by women students are often taken seriously and respected in this class.			
<hr/>			
1	2	3	4
Disagree	Disagree Somewhat	Agree Somewhat	Agree
<hr/>			

**Please answer the following questions about yourself by marking the appropriate number on your op-scan.**

21. Your Gender:

1 = male

2 = female

22. Your Race:

1 = Caucasian/White

2 = Asian

3 = African-American

4 = Hispanic

5 = American Indian

23. Your Year in school:

1 = Freshman

2 = Sophomore

3 = Junior

4 = Senior

24. Your Age:

1 = 18 or younger

2 = 19 - 20

3 = 21 - 24

4 = 25 - 30

5 = over 30

25. How many gender studies courses have you taken? (e.g. women's studies, gender relations)

1 = one

2 = two

3 = three or more

4 = none

26. The majority of my classmates are:

1 = Male

2 = Female

3 = Equal numbers of each

27. The instructor of this course is:

1 = Male

2 = Female

28. The grade I expect in this course is:

1 = A

2 = B

3 = C

4 = D

5 = F

Overall, I rate my experiences here throughout the university (including health services, library services, administrative services, extra-curricular activities) as:

29.

1	2	3	4	5	6	7
Extremely Harsh			Somewhat Harsh			Not at all Harsh



## Appendix D: Final Version of the Classroom Atmosphere Questionnaire

### CLASSROOM ATMOSPHERE QUESTIONNAIRE

The purpose of this questionnaire is to help us understand how men and women students feel about their classroom atmosphere at Virginia Tech. Each of the following statements describes how a student might think or feel about the way men and women students are encouraged or discouraged from participation and learning in a particular class.

Please indicate the extent to which you agree or disagree with each statement with respect to how students are treated in this class.

1	2	3	4
Disagree	Disagree Somewhat	Agree Somewhat	Agree
1.	Women students frequently ask questions or volunteer information.		
2.	Men students tend to be interrupted when asking or answering questions.		
3.	In this class, men students are often called to participate.		
4.	I have heard women students complain about being treated unfairly or unequally in this class.		
5.	I feel that women are intellectually challenged and encouraged by this instructor.		
6.	In this class, I have heard other students make negative comments about men.		
7.	I feel that men students are sometimes treated harshly or unfairly in this class.		
8.	Women students tend to be interrupted when asking or answering questions in this class.		
9.	In this class, women students are often called on to participate.		
10.	Women students are sometimes treated harshly or unfairly in this class.		
11.	Comments by women students are often ignored or not taken seriously by other students in this class.		
12.	Men students frequently ask questions or volunteer information in this class.		
13.	Humor is sometimes used at the expense of women in this class.		
14.	I feel that the comments and opinions expressed by male students are often taken seriously and respected by this instructor.		
15.	I have heard men students complain about being treated unfairly or unequally in this class.		
16.	Comments that men students make are often ignored or not taken seriously by other students in this class.		
17.	I feel that men are intellectually challenged and encouraged by this instructor.		
18.	In this class, humor is sometimes used at the expense of men.		
19.	In this class, I have heard other students make negative comments about women.		
20.	Comments and opinions expressed by women students are often taken seriously and respected by this instructor.		

1	2	3	4
Disagree	Disagree Somewhat	Agree Somewhat	Agree

**Please answer the following questions about yourself by marking the appropriate number on your op-scan.**

21. In the above items, several questions asked about negative experiences **men** may have had in this class (e.g. not being respected, being ignored, being interrupted). How often do you think these negative experiences happen to **male** students in other classes here at Virginia Tech?
- |               |                 |
|---------------|-----------------|
| 1. Frequently | 3. Rarely       |
| 2. Sometimes  | 4. Almost Never |
22. In the above items, several questions asked about negative experiences **women** may have had in this class (e.g. not being respected, being ignored, being interrupted). How often do you think these negative experiences happen to **female** students in other classes here at Virginia Tech?
- |               |                 |
|---------------|-----------------|
| 1. Frequently | 3. Rarely       |
| 2. Sometimes  | 4. Almost Never |
23. How often do you volunteer to answer questions or make a comment in this class?
- |                                    |                           |
|------------------------------------|---------------------------|
| 1. Almost Never                    | 4. At least once a class  |
| 2. A few times during the semester | 5. More than once a class |
| 3. At least once a week            |                           |
24. In this class, how often are you interrupted by other students?
- |               |   |
|---------------|---|
| 1. Frequently | 4. Almost Never                                       |
| 2. Sometimes  | 5. I don't participate enough to answer this question |
| 3. Rarely     |   |
25. In this class, how often are you interrupted by your instructor?
- |               |   |
|---------------|---|
| 1. Frequently | 4. Almost Never                                       |
| 2. Sometimes  | 5. I don't participate enough to answer this question |
| 3. Rarely     |   |
26. Your Gender:
- |           |  |
|-----------|--|
| 1. male   |  |
| 2. female |  |
27. Your Race:
- |                     |                    |
|---------------------|--------------------|
| 1. Caucasian/White  | 4. Hispanic        |
| 2. Asian            | 5. American Indian |
| 3. African-American | 6. Multi-racial    |
28. Your approximate year in school:
- |              |                            |
|--------------|----------------------------|
| 1. Freshman  | 4. Senior                  |
| 2. Sophomore | 5. Non-traditional student |
| 3. Junior    | 6. Graduate Level          |

29. Your age:

1. 18 or younger
2. 19 - 20
3. 21 - 24

4. 25 - 30
5. 31 - 35
6. over 35

30. How many gender studies courses have you taken? (e.g. women's studies, gender relations)

1. one
2. two

3. three or more
4. none

31. The instructor of this course is:

1. male
2. female

32. The grade I expect in this course is:

1. A
2. B
3. C

4. D
5. F

33. I find the subject matter in this course to be:

---

1	2	3	4	5	6	7
Not at all						Extremely
interesting						interesting

---

34. As a lecturer, I find the instructor of this course to be:

---

1	2	3	4	5	6	7
Not at all						Extremely
entertaining						entertaining

---

35. Overall, I rate my experiences here throughout the university  
(including health services, library services, administrative  
services, extra-curricular activities) as:

---

1	2	3	4	5	6	7
Not at all						Extremely
supportive						supportive

---

**THANK YOU FOR TAKING THE TIME TO FILL OUT THIS QUESTIONNAIRE!**

## Appendix E: Instructor Sensitivity Questionnaire

### Part I

**Please provide the following demographic information.**

Subject # \_\_\_\_\_ Date Questionnaire Completed: \_\_\_\_\_  
Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Academic Level (Please Circle):

- |                        |                        |
|------------------------|------------------------|
| 1. INSTRUCTOR          | 3. ASSOCIATE PROFESSOR |
| 2. ASSISTANT PROFESSOR | 4. FULL PROFESSOR      |

### Part II

**Please assess each question based on how important you believe it is for students' education.**

**All of your responses will be held confidential.**

EXTREMELY UNIMPORTANT	MODERATELY UNIMPORTANT	MILDLY UNIMPORTANT	MILDLY IMPORTANT	MODERATELY IMPORTANT	EXTREMELY IMPORTANT
1	2	3	4	5	6

**How important is it for faculty to:**

- \_\_\_\_\_ 1. Deliver well-prepared lectures?
- \_\_\_\_\_ 2. Avoid using racially-offensive language.
- \_\_\_\_\_ 3. Divide students into discussion groups?
- \_\_\_\_\_ 4. Actively call on students of both sexes in the classroom?
- \_\_\_\_\_ 5. Include examples that break down gender stereotypes (e.g. Jason is a house-husband...)?
- \_\_\_\_\_ 6. Take attendance?
- \_\_\_\_\_ 7. Avoid using language based on gender-stereotypes (e.g. referring to teachers and nurses as "she" and doctors and engineers as "he")?

EXTREMELY UNIMPORTANT	MODERATELY UNIMPORTANT	MILDLY UNIMPORTANT	MILDLY IMPORTANT	MODERATELY IMPORTANT	EXTREMELY IMPORTANT
1	2	3	4	5	6

### How important is it for faculty to:

- \_\_\_\_\_ 8. Include achievements of outstanding non-white individuals in your field?
- \_\_\_\_\_ 9. Conduct mid-year evaluations?
- \_\_\_\_\_ 10. Screen audio-visual materials for biases with regard to gender?
- \_\_\_\_\_ 11. Use texts written by minorities.
- \_\_\_\_\_ 12. Be on time?
- \_\_\_\_\_ 13. Avoid using repeated gender-specific analogies to explain concepts (e.g. child-rearing or sports analogies)?
- \_\_\_\_\_ 14. Be aware of students with different cultural backgrounds?
- \_\_\_\_\_ 15. Maintain control of the topics discussed in class?
- \_\_\_\_\_ 16. Facilitate classroom discussion?
- \_\_\_\_\_ 17. Encourage minority students to participate?
- \_\_\_\_\_ 18. Include writing assignments in their curriculum?
- \_\_\_\_\_ 19. Encourage men to participate if women are volunteering most of the information?
- \_\_\_\_\_ 20. Call students by name in the classroom?
- \_\_\_\_\_ 21. Include achievements of outstanding women in your field?
- \_\_\_\_\_ 22. Avoid calling on specific minority students to share their views on race-related issues?

- \_\_\_\_\_ 23. Invite guest speakers on a regular basis.
- \_\_\_\_\_ 24. Avoid using language based on cultural-stereotypes (e.g. referring to blacks as "athletes")?
- \_\_\_\_\_ 25. Use texts written by women.

### Part III

I am interested in finding out what types of teaching workshops you find valuable and worthy of your time. While answering each of the following questions, please assume the following three things:

- \* **The workshop is being offered by well respected leaders**
- \* **It does not cost anything to you**
- \* **You have enough time in your schedule to attend**

21. You invited to a 2 hour, teaching workshop on new teaching strategies for increasing discussion. Would you attend?
1. YES
  2. NO

WHY OR WHY NOT?

---

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22. You are invited to a 2 hour, cultural sensitivity workshop. Would you attend?
1. YES
  2. NO

WHY OR WHY NOT?

---

---

23. You are invited to a 2 hour workshop on creative writing assignments. Would you attend?
1. YES
  2. NO

WHY OR WHY NOT?

---

---

24. You are invited to a 2 hour, gender sensitivity workshop. Would you attend?

1. YES
2. NO

WHY OR WHY NOT?

---

---

## Appendix F: Gender Relevance Questionnaire

Please rate the following disciplines according to scale below. If you feel this requires **compassion, good communication skills, sympathy** and/or **sensitivity to others**, you would rate it a 5 or 6. If you feel this requires few of these characteristics, you would rate it a 1 or 2.

1	2	3	4	5	6
No		Some		Many	
Characteristics		Characteristics		Characteristics	
<hr/>					
1. Engineering					
2. Psychology					
3. Veterinary Medicine					
4. Mathematics					
5. Teacher Education					
6. Chemistry					
7. Music					
8. Forestry					
9. Biology					
10. Architecture					
11. Business					
12. Family and Child Development					
13. Women Studies					
14. Computer Science					
15. Physics					
16. Theater Arts					
17. Sociology					
18. English					
19. Communications					
20. Philosophy					

Continued Next Page



Please rate these same disciplines according to the scale below. If you feel this requires **aggressiveness, leadership, self-sufficiency, competitiveness** and/or **analytical** skills you would rate it a 5 or 6. If you feel this requires few of these characteristics, you would rate it a 1 or 2.

1	2	3	4	5	6
No		Some		Many	
Characteristics		Characteristics		Characteristics	

- 
21. Engineering
  22. Psychology
  23. Veterinary Medicine
  24. Mathematics
  25. Teacher Education
  26. Chemistry
  27. Music
  28. Forestry
  29. Biology
  30. Architecture
  31. Business
  32. Family and Child Development
  33. Women Studies
  34. Computer Science
  35. Physics
  36. Theater Arts
  37. Sociology
  38. English
  39. Communications
  40. Philosophy

41. What is your Gender?

1. male
2. female

42. What year are you in school?

1. Freshman
2. Sophomore
3. Junior
4. Senior
5. Non-traditional student
6. Graduate Student

---

TEACHER GENDER: M F  
NUMBER OF MALE STUDENTS: \_\_\_\_\_  
NUMBER OF FEMALE STUDENTS: \_\_\_\_\_  
TOTAL NUMBER OF STUDENTS: \_\_\_\_\_  
INTERRATER: YES NO


149

OBSERVATIONS BEGIN AT: \_\_\_\_\_ AM PM

1	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
2	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
3	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
4	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
5	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
6	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
7	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
8	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
9	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
10	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
11	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
12	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
13	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

14	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
15	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
16	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
17	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
18	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
19	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
20	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
21	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
22	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
23	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
24	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
25	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
26	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

27	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
28	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
29	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
30	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
31	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
32	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
33	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
34	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
35	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
36	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
37	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
38	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF
39	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS      FS ⇌ FS MS⇌ FS		ICALLM	ICALLF



53	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
54	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
55	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
56	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
57	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
58	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
59	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
60	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
61	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
62	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
63	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
64	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
65	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ ······	FVOLUNTEER FØ ······
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

66	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
67	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
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68	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
69	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
70	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
71	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
72	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
73	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
74	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
75	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
76	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
77	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF
78	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS	FS ⇌ FS MS ⇌ FS	ICALLM	ICALLF



79	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
80	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
81	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
82	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
83	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
84	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
85	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
86	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
87	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
88	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
89	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
90	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
91	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

92	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
93	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
94	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
95	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
96	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
97	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
98	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
99	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
100	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
101	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
102	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
103	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
104	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER MØ *****	FVOLUNTEER FØ *****
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

105	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
106	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
107	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
108	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
109	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
110	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
111	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
112	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
113	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
114	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
115	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
116	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
117	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

118	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
119	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF
120	L	I ⇌ MS	I ⇌ FS	MVOLUNTEER M♂ .....	FVOLUNTEER F♂ .....
	Q	MS ⇌ MS MS ⇌ FS	FS ⇌ FS	ICALLM	ICALLF

TIME OBSERVATIONS END: \_\_\_\_\_ AM PM

NUMBER OF MALES STAYED AFTER CLASS: \_\_\_\_\_

NUMBER OF FEMALES STAYED AFTER CLASS: \_\_\_\_\_

COMMENTS:

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**SCORING SHEET FOR CODING SYSTEM**

L	_____
Q	_____
I-MS	_____
MS-MS	_____
FS-FS	_____
MS-FS	_____
MVOLUNTEER	_____
MHAND	_____
ICALLM	_____
FVOLUNTEER	_____
FHAND	_____
ICALLF	_____

## Appendix I: Recruitment Letter for Instructors



Department of Psychology

College of Arts and Sciences  
Blacksburg, Virginia 24061-0436  
(703) 231-6581 Fax: (703) 231-3652

September 8, 1994

Dear Instructor,

This letter is an invitation to participate in a research project on college classroom interaction patterns. I am a 5th year graduate student in clinical psychology and am seeking out instructors and their classrooms for participation in my dissertation study. What will this study entail? If you agree to participate, the following will be required of you and your classroom: 1) a survey will be given toward the middle to end of the semester which will take approximately 20 - 25 minutes, 2) your classroom will be observed 6 times, approximately 30 minutes per visit (these observations will be as unobtrusive as possible and will not take up class time), and 3) you will be asked to fill out a brief survey at your convenience. You will also be paid \$25 for participating and your name will be entered into a drawing for \$500 in travel funds (1 person will be chosen for every 20 participants). Also, if you are interested in obtaining personal feedback from the classroom observations, special arrangements can be made. However, confidentiality must be waived under these circumstances. This project has been approved by the Human Subjects Committee in the psychology department and by the Internal Review Board of Virginia Tech.

Your help in this research project would be greatly appreciated. If you would like to participate in this study or would like more information, please return this letter via inter-departmental mail to KRISTINE BRADY #0436 or via e-mail to KRISTINE@VTVM1.CC.VT.EDU. My faculty advisor is Richard Eisler (231-7001) if you should have any questions that pertain to him.

- \_\_\_\_\_ Yes, I would like to participate in your study.
- \_\_\_\_\_ I would like more information about your study.
- \_\_\_\_\_ No, I am not interested in participating in your study.

Sincerely,

Kristine Brady, M.S.

## Appendix J: Follow-up Letter for Instructors

Dear Instructor,

I would like to take a minute to thank you for participating in my study. As you all know, obtaining an adequate number of subjects for a dissertation can be a task in and of itself. Your cooperation is greatly appreciated! Enclosed is an informed consent form for you to sign. I am asking instructors to mail this back to me via inter-department mail along with a copy of their syllabus. This will help me in avoiding scheduling observations during test days, special projects, etc.. A campus mailing address label is enclosed.

More about the study...

1. I plan to start observations during week 3 or 4 of the semester. However, I must obtain informed consent from your students prior to collecting data. Myself and another researcher would like to come to your class to briefly explain the study and pass out informed consent forms for them to sign. If there is a day that you would like this occur in the next week or so, please let me know.
2. If there are any times that you do not want your class observed, once again, please let me know. I am more than happy to accommodate you as best I can.
3. Most likely, your classroom will be observed once a week, or once every other week, throughout the semester.
4. If you have any problems with the observations or questions about the procedures, please call me at **951-3982** or e-mail me at **KRISTINE@vtvm1.cc.vt.edu** (e-mail is the most efficient way to get a message to me)
5. I would like to meet all of the participants in person at some point in the next week. Once I obtain your syllabus, I will try to catch you in your office during your office hours.
6. The questionnaire will be given around week 12 of the semester. This will take no more than 20 minutes. I will likely send out reminders via e-mail during week 11. You will also be given a questionnaire in your mailbox around this time.
7. The lottery will take place as soon as the funds arrive to me (the Provost's office is sponsoring this portion of the study). A check for \$25 will be sent to you soon after data collection.

8. Many of you have been curious about the nature of this project. While I cannot disclose my hypotheses and specific research questions due to potential biasing of the results, I can tell you in general terms what I'm studying. I am developing a model of classroom interaction patterns that takes into account student behaviors (e.g. volunteering information), teacher behaviors (e.g. asking questions) and classroom determinants (e.g. class size). The classroom observation data will be compared with student self-report regarding the types of interactions that occur in classrooms.
9. The classroom observers will be coding classroom behaviors using an interval coding system. This system requires them to be prompted every 10 seconds. In order to keep their presence as unobtrusive as possible, they will be using walkman's to listen to the prompts.
10. In case of a problem with the coding, your classroom will be audio-taped as a **backup only**.
11. In order to obtain inter-rater reliability, 20% of the classrooms will be observed by two observers. One of your classes may be included in this.
12. A brief summary of my objectives and findings will be sent to you at some point in the Spring (as soon as I finish my data analysis and preliminary write-up).
13. Richard Eisler is my dissertation chair if you should have any questions that pertain to him (231-7001).

Once again, thank you for your participation. I hope that this study will be helpful in gaining better understanding of student-teacher interactions. I wish you the best in the year to come.

Sincerely,

Kristine Brady



## Appendix K: Informed Consent Form for Observation Study - Instructor Form

You are invited to participate in a dissertation study that will be used to evaluate Virginia Tech students' experiences in their classrooms. In this study, you will be asked to fill out a questionnaire which will take about 10 -15 minutes to complete. Your responses will be anonymous and your honesty in answering all questions would be greatly appreciated. In addition to the questionnaire, your classroom will be observed on a random basis throughout the semester. Your classroom will be observed approximately 6 times for 30 minute periods. We will be looking at basic classroom interaction patterns of students and teachers. We will observe how your students interact with you and with each other. **However, we will not analyze or look at your specific behavior.** Several instructors will be observed in your department and collectively, the data will be analyzed. For example, we may compare the amount of participation in your department classes with other departments. There is no way in which a particular behavior can be traced to you or any particular student. As a back up, the observer will be tape recording your class when observing interactions. A coding system will be used to identify classrooms in order to maintain anonymity. Only the primary researcher will know the coding system; not even members of the researcher's dissertation committee will be able to identify individual instructors. At the end of the project, the exact purpose and preliminary results will be presented to you and your class upon your request.

The information accumulated by this research may be used for scientific or education purposes and information relating to your responses may be presented at scientific meetings and/or published and republished in professional journals or books, or used for any other purpose which Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge or research. However, your responses on the questionnaires will be kept strictly confidential as your responses on the questionnaire will be anonymous. This experiment does involve minimal risk as some of the questions on the questionnaire may be of a sensitive nature. However, an expected benefit of this study involves the progression of science and improved educational experiences for college students.

Participation is voluntary and you may withdraw your consent to participate at any time during the questionnaire. This project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

I have read and understand the above description of this project, had an opportunity to ask questions and had them all answered, and hereby acknowledge the above and give my voluntary consent for participation in this study. I understand that I am participating freely in full understanding that I need not participate if I do not wish to, and if I participate I may withdraw at any time without penalty. I understand that if I should have any questions about this research and its conduct, I may contact any of the following:

Researcher:	<u>Kristine Brady</u>	phone: 951-3982
Faculty Advisor:	<u>Richard Eisler, Ph.D.</u>	phone: 231-7001
Chair, HSC:	<u>R.J. Harvey, Ph.D.</u>	phone: 231-7030
Chair, IRB:	<u>Ernest Stout, Ph.D</u>	phone: 231-9359

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix L: Informed Consent Form for Prediction Study - Student Form

You are invited to participate in a questionnaire study that will be used to evaluate Virginia Tech students' experiences in their classrooms. In this study, you will be asked to fill out a questionnaire which will take about 20 minutes to complete. Your responses will be anonymous and your honesty in answering all questions would be greatly appreciated. In addition to the questionnaire, your classroom will be observed on a random basis throughout the semester. Your classroom will be observed approximately 6 times for 30 minute periods. We will be looking at basic classroom interaction patterns of students and teachers. We will observe how students interact with their instructor and with each other. However, we will not record information about you specifically. For example, we may count the number of students that volunteer information. There is no way in which a particular behavior can be traced to you or any other particular student. As a back up, the observer will be tape recording your class when observing interactions. A coding system will be used to identify classrooms in order to maintain anonymity. Only the primary researcher will know the coding system. At the end of the project, the exact purpose and preliminary results will be presented to your class.

The information accumulated by this research may be used for scientific or education purposes and information relating to your responses may be presented at scientific meetings and/or published and republished in professional journals or books, or used for any other purpose which Virginia Tech's Department of Psychology considers proper in the interest of education, knowledge or research. However, your responses on the questionnaires will be kept strictly confidential as your responses on the questionnaire will be anonymous. This study involves minimal risk as some of the questions may be sensitive in nature. However, an expected benefit of this study involves the progression of science and improved educational experiences for college students.

Participation is voluntary and you may withdraw your consent to participate at any time during the questionnaire. This project has been approved by the Human Subjects Committee of the Department of Psychology and by the Institutional Review Board of Virginia Tech.

I have read and understand the above description of this project, had an opportunity to ask questions and had them all answered, and hereby acknowledge the above and give my voluntary consent for participation in this study. I understand that I am participating freely in full understanding that I need not participate if I do not wish to, and if I participate I may withdraw at any time without penalty. I understand that if I should have any questions about this research and its conduct, I may contact any of the following:

Researcher:	<u>Kristine Brady</u>	phone: 951-3982
Faculty Advisor:	<u>Richard Eisler, Ph.D.</u>	phone: 231-7001
Chair, HSC:	<u>R.J. Harvey, Ph.D.</u>	phone: 231-7030
Chair, IRB:	<u>Ernest Stout, Ph.D</u>	phone: 231-9359

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix M: Standardized Debriefing Statement for Study 2

Thank you for participating in this study! 25 classrooms were observed from multiple departments including engineering, psychology, education, marketing, family and child development, economics and forestry. There were three parts to this study. Overall, the goal of this study is to predict classroom interactions patterns based on several variables including type of course,

### **Part I: Classroom Observations**

This portion of the study was the longest and the most time-consuming. The goal was to observe each class for a total of 6 observations. This many observations were collected in order to obtain a representative sample of classroom interactions and to allow your class to "adapt" to the observer. Several behaviors were recorded including: how many students raised their hands, how many students volunteered information, how many students were called on by the instructor, how long the instructor lectured and how many questions the instructor asked. Several of these behaviors were broken down by gender, to allow us to see if differences in the way male and female students participate occur. This is a major dependent measure in the study and will be used to assess classroom interaction patterns across classrooms.

### **Part II: Student Questionnaire**

As you know, you filled a questionnaire that asked about several aspects of yourself and your college experiences. One part of the questionnaire gave us an idea about how you think men and women feel about participating in class. We also asked how you think men and women are treated by their instructors. Similarly, we asked you how men and women behaved in class (e.g. men students frequently volunteer information). We are looking for differences between the way students perceive their classrooms. The CAQ will yield two scores: a positive atmosphere score and a negative atmosphere score. These can be compared across departments, student gender and many other variables.

### **Part III: Instructor Questionnaire**

Your instructor was also asked to fill out a questionnaire that asked them to rate how important various behaviors were for faculty to carry out (e.g. delivering structured lectures, using non-sexist language, avoiding racial stereotypes).

### **Conclusions**

We hope that the results to this study will help us understand the factors that predict different types of classrooms (e.g. classes with much student participation vrs. no participation, positive atmospheres vrs. negative atmosphere). Given the large amount of data and multiple variables involved, the data analysis will take a considerable amount of time. As a result, the conclusions of this study complete until after the semester. However, if you would like to find out the results, or if you would like more information about the procedures of the study, please call Kristine at 951-3982.

Once again, thank you for agreeing to participate in this study. Classroom observations are difficult to carry out given that not all people like to be observed. Without your help, this study would not have been possible.

**CURRICULUM VITAE**  
**May, 1995**  
**KRISTINE LYNN BRADY**

**PERSONAL INFORMATION**

Born: October 25, 1967  
Birthplace: Mesa, Arizona

Business Address: Department of Psychology  
Virginia Polytechnic Institute  
and State University  
Blacksburg, Virginia 24061

Home Address: 33101 Big Sur  
Dana Point, CA 92629  
(714) 496-4533

**EDUCATION**

**Ph.D., Clinical Psychology.**  
Virginia Polytechnic Institute and State University  
Blacksburg, VA  
Area of Specialization: Adult Clinical  
Ph.D. expected May 1996

**M.S., Clinical Psychology.**  
Virginia Polytechnic Institute and State University  
Blacksburg, VA  
Area of Specialization: Adult Clinical  
M.S. awarded January 1993

**B.A., Psychology.**  
University of California  
Irvine, CA  
Major: Psychology  
B.A. awarded May 1989

## **HONORS/AFFILIATIONS**

- American Psychological Association, Student Affiliate
  - Division 12, Clinical Psychology
  - Division 15, Educational Psychology
  - Division 43, Family Psychology
- American Association of Behavior Therapy, Student Affiliate
- Psychology Club President, 1988-1989, UCI, Irvine, CA
- Honors in Psychology, UCI, Irvine, CA
- President's Undergraduate Fellowship, Awarded 1989
- The Order of Merit, School of Social Sciences, UCI, Awarded 1989
- Dean's List, 1987-1989

## **GRANTS**

### **Grants Submitted**

Brady, K., Eisler, R. & Sturgis, E. (February, 1993). Development of a Sexual Harassment Workshop. Submitted to the Women's Resource Center, Virginia Polytechnic Institute & State University (VPI & SU), \$2,500.

Brady, K. (October, 1992). The Stages of Behavior Change Model: Targeting Men for Interventions to Reduce Discrimination Against Women. Submitted to the National Institute of Health in the amount of \$201,733.

### **Grants Received**

Brady, K. (June, 1995). Assessment of College Classroom Interaction Patterns, \$420, awarded by the Graduate Student Assembly at VPI & SU.

Brady, K., Eisler, R. & Sturgis, E. (June, 1993). Development and Evaluation of a Psychological Program on Gender Awareness, \$2,500, awarded by the Affirmative Action Incentive Grants Committee at VPI & SU.

Brady, K. (January, 1989). Assessment of Social Skills in Conduct-Disordered and Depressed Adolescents, \$250, awarded by the Dean of Undergraduate Studies at the University of California at Irvine.

## **PUBLICATIONS AND PAPERS**

### **Publications**

Brady, K. L. & Eisler, R. M. (in press). Gender Bias in the College Classroom: A Critical Review of the Literature and Implications for Future Research. *Journal of Research and Development in Education*.

### **Papers**

Brady, K., Eisler, R., & Sturgis, E. (August, 1994). Assessing Gender Bias in the College Classroom: Psychometric Instrumentation Development. Summary of research findings submitted to the Affirmative Action Incentive Grants Program and VPI & SU, Blacksburg, VA.

## **EXPERIENCES**

### **Administrative**

Administrative Assistant, Psychological Services Center,  
VPI & SU August 1993 - December 1993  
Supervisor: Richard M. Eisler, Ph.D.

- organization of testing equipment and self-report measures
- development and facilitation of chart review evaluations for graduate clinicians
- development and facilitation of clinical skills training program for graduate clinicians

Graduate Student Committee Liaison, Department of Psychology, VPI & SU  
August 1993 - August 1994

- provided input to Director of Graduate Programs regarding concerns of graduate students
- development of academic support for graduate students
- development of GTA and GTA supervisor evaluations

### **Research**

Dissertation Development, VPI & SU, Blacksburg, VA  
January 1994 - Present  
Faculty Supervisor: Richard M. Eisler, Ph.D.

- Designed and piloted a behavioral observation coding system to be used in college classrooms
- Designed and piloted three questionnaires to be used in future research

- Recruited 30 instructors from 8 different departments at VPI & SU
- Designed and carried out multiple data collection from these classrooms throughout the semester

Research Supervisor, VPI & SU, Blacksburg, VA

May 1994 - Present

Faculty Supervisor: Richard M. Eisler, Ph.D.

- interview and selection of 10 undergraduate assistants
- organization and implementation of weekly research meetings
- training research assistants to use a behavioral observation coding system
- ongoing supervision of research tasks including inter-rater reliability checks, test-retest, questionnaire administration and debriefing

Research Supervisor, VPI & SU, Blacksburg, VA

August 1993 - May 1994

Faculty Supervisor: Richard M. Eisler, Ph.D.

- interview and selection of undergraduate assistants
- organization and implementation of weekly research meetings
- ongoing supervision of 4-8 undergraduates working on various research projects related to gender issues and psychology including questionnaire administration, debriefing and behavioral observations

Research Assistant, Center for Research and Health Behavior, VPI & SU, Blacksburg, VA

January 1993 - January 1994

Faculty Supervisor: Richard A. Winett, Ph.D.

- Grant sponsored by the National Cancer Institute
- Applied research in the area of nutrition
- Recruiting and training of participants
- Data coding
- Data entry
- Weekly meetings

Research Assistant, Center for Research and Health Behavior, VPI & SU, Blacksburg, VA

May 1992 - August 1992

Faculty Supervisor: Richard A. Winett, Ph.D.

- Grant sponsored by the National Cancer Institute
- Applied research in the area of skin cancer prevention
- Recruiting and training of participants
- Data collection and coding in multiple field sites
- Data entry
- Weekly meetings
- Trained for inter-rater reliability

Master's Thesis Development, VPI & SU, Blacksburg, VA

August 1991 - 1992

Faculty Supervisor: Richard M. Eisler, Ph.D.

- Designed and conducted experiments on the effects of masculine gender role stress (MGRS), gender relevance and opponent gender on men in competition
- Trained research assistants, experimenters and confederates
- Multivariate statistical analyses using the Statistical Analysis System (SAS)

Research Assistant, National Institute of Mental Health,

Blacksburg, VA August 1990 - May 1991

Faculty Supervisor: Thomas H. Ollendick, Ph.D.

- Administered and scored the Diagnostic Interview for Children and Adolescents (DICA) at St. Albans Psychiatric Hospital
- Attended two local/regional conferences on disturbance in serious emotionally disturbed children
- Weekly meetings

Research Assistant, University of California, Irvine, CA

August 1988 - May 1989

Faculty Supervisor: Vincent Van Hasselt, Ph.D.

- Designed and conducted experiments to assess the social skills of conduct disordered and depressed adolescents
- Multivariate statistical analyses using the Statistical Package for Social Sciences (SPSS-X)

## **Clinical**

Clinical Practicum, Department of Psychology, VPI & SU, Blacksburg, VA

September 1993 - present

Supervisors: Richard Eisler, Ph.D.  
Peg Warren, M.S.



- School visits and teacher conferences
- individual, couples and family therapy
- Supervision of first and second year graduate students
- Formal case presentations

Graduate Clinician, Psychological Services Center,  
VPI & SU, Blacksburg, VA  
May 1993 - August 1993  
Supervisor: Richard Eisler, Ph.D.

- Carried an ongoing case-load of 6-8 clients including child therapy, individual therapy, marital/couples therapy and family therapy
- developed and led women's support group
- performed psychological evaluations for priesthood candidates

Clinical Practicum, Southwestern Virginia Mental Health  
Institute, Marion Virginia May 1992 - May 1993  
Supervisors: Jay Harper, Ph.D.  
Richard Mears, Ph.D.  
Trudy Teel, Psy.D.

- SWVMHI is a Joint Commission Accredited psychiatric inpatient hospital with 266 beds
- Worked on an acute admissions ward for 8 months
- Psychological assessment and evaluation of inpatients for diagnostic and treatment purposes
- Individual, group and family therapy
- Ongoing seminar in neuropsychological testing
- Ongoing seminars regarding medical issues in psychiatric populations
- Assistance in forensic evaluations including court ordered evaluations in the areas of competency to stand trial and mental status during the time of the offense
- Personality (projective and objective), intelligence and neuropsychological evaluations
- Development of behavior modification treatment plans for individual clients

Clinical Practicum, Department of Psychology, VPI & SU, Blacksburg, VA  
September 1991 - May 1992  
Supervisors: Russell Jones, Ph.D.  
Robert Stephens, Ph.D.

- School visits and teacher conferences
- ADHD testing and evaluations
- family, individual and couples therapy
- Co-family therapy with a licensed clinical psychologist
- Formal case presentations

Testing, Rosemead School of Professional Psychology  
Rosemead, CA.  
May 1991 - August 1991  
Supervisor: Thomas Brady, Ph.D.

- Psychological and intelligence testing for missionary applicants

Clinical Practicum, Department of Psychology, VPI & SU, Blacksburg, VA  
September 1990 - May 1991  
Supervisors: Jack Finney, Ph.D.  
Ross Greene, Ph.D.

- Co-therapy with two licensed clinical psychologists
- Child behavioral therapy
- Planned and led parent training groups for ADHD/ADD children
- Family therapy
- Formal case presentations

## Teaching

Adjunct Faculty, Department of Psychology, Ferrum College, Ferrum, VA  
Spring, 1995  
Course: *History and Systems of Psychology*

- Development of syllabus, course content, media supplements and written assignments
- Development of lecture material and class demonstrations
- Primary lecturer
- Test development and administration
- Grading of tests, papers and multiple written assignments

Course Instructor, Department of Psychology, VPI & SU,  
Blacksburg, VA  
Fall 1994, Spring 1995  
Course: *Principles of Psychological Research*

- Development of syllabus, course content, media supplements and written assignments
- Development of lecture material and class demonstrations
- Primary lecturer
- Test development and administration
- Grading of tests, papers and multiple written assignments

Course Instructor, Department of Psychology, VPI & SU, Blacksburg, VA  
Spring 1994

Course: *Abnormal Psychology*

- Development of syllabus, course content and media supplements
- Development of lecture material and class demonstrations
- Primary lecturer
- Test development and administration
- Grading of tests, journals and papers

Teaching Assistant, Department of Psychology, VPI & SU,  
Blacksburg, VA August 1992 - May 1993

Instructors: David Lombard, M.S.  
Russell Jones, Ph.D.

- Guest lecturer for Abnormal Psychology courses on a regular basis
- Test development and administration
- Responsible for holding review sessions for mid-term and final examinations

Laboratory Instructor, Department of Psychology, VPI & SU, Blacksburg, VA  
January 1992 - June 1992

- Taught three laboratory sections for undergraduate introductory psychology course
- Developed course content and classroom activities
- Developed and graded quizzes and essays

Laboratory Instructor, Department of Psychology, VP&SU, Blacksburg, VA  
August 1991 - December 1991

- Taught one laboratory section for undergraduate Introductory Psychology course
- Developed course content and classroom activities
- Developed and graded quizzes and essays

Teaching Assistant, Department of Statistics, VPI & SU,  
Blacksburg, VA

August 1991 - December 1991

Professor: Bob Schulman, Ph.D.

- organized computer help sessions for the computer statistical package, SAS

## References

Richard M. Eisler, Ph.D.  
Full Professor  
Director of the Psychological Services Center  
Department of Psychology  
Virginia Polytechnic Institute and State University  
703-231-7001

Jack Finney, Ph.D.  
Professor of Psychology  
Director of Graduate Programs  
Department of Psychology  
Virginia Polytechnic Institute and State University  
703-231-6670

Ellie Sturgis, Ph.D.  
Professor of Psychology  
Department of Psychology  
Virginia Polytechnic Institute and State University  
703-231-4005

Richard W. Mears, Ph.D.  
Licensed Clinical Psychologist  
Director of Psychology Services  
Southwestern Virginia Mental Health Institute  
703-783-1200 x805

David Trafimow, Ph.D.  
Professor of Psychology  
New Mexico State University  
Department of Psychology  
505-646-4023