Summer 1998

Does Wisdom Really Come with Age?: Cognitive Differences Between Traditional and Nontraditional Aged College Women

Kelli Jean England
Old Dominion University

DOES WISDOM REALLY COME WITH AGE?:

COGNITIVE DIFFERENCES BETWEEN TRADITIONAL AND

NONTRADITIONAL AGED COLLEGE WOMEN

by

Kelli Jean England
B.S. May 1995, Old Dominion University, Norfolk, VA

A Thesis submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirement for the Degree of

MASTER OF SCIENCE

PSYCHOLOGY

OLD DOMINION UNIVERSITY
August, 1998

Approved by:

Elaine M. Justice (Director)

Thomas F. Cash (Member)

Robin F. Lewis (Member)

ABSTRACT

DOES WISDOM REALLY COME WITH AGE?:
COGNITIVE DIFFERENCES BETWEEN TRADITIONAL AND
NONTRADITIONAL AGED COLLEGE WOMEN

Kelli Jean England
Old Dominion University, 1998
Director: Dr. Elaine M. Justice

Nontraditional aged (age 25 and over) college women outperform traditional aged (age 18-24) college women academically. This research reviewed areas of differences in the two groups and proposed that differences in two main areas contribute to performance: motivation and cognitive maturation. One hundred and twelve female traditional and nontraditional aged students completed Mehrabian's Achieving Tendency Scale (MATS), the Watson-Glaser Critical Thinking Appraisal (WGCTA), and the Learning Environment Preferences measure (LEP). Students were identified as traditional aged (18-24 years), younger nontraditional aged (25-31 years), and older nontraditional aged ($\geq$ 32 years). Grade point average (GPA) was used as a measure of performance. Developmental differences were found in that both nontraditional aged groups had higher GPAs and scored higher on the Assumptions subscale of the WGCTA than the traditional group. Regression analyses revealed that the WGCTA Inference subscale and the MATS were significant predictors of GPA. The variable that varied developmentally—recognition of assumptions—did not predict GPA. Further research is needed to investigate additional factors contributing to nontraditional aged women's success in college.

For my parents, Barbara and Dallas.

ACKNOWLEDGMENTS

There are many people who deserve recognition for assisting in the successful completion of this thesis. I extend many, many thanks for their efforts.

- I am forever grateful to my committee director, Dr. Justice, for her patience, untiring effort, and excellent mentoring during my years in this program.
- I extend special thanks to my committee members for their patience and hours of guidance and editing, and for their insightful suggestions.
- I also thank Lori Schultz for assisting in scoring and entering the data.
- Thanks to Dr. William Moore, Dr. Albert Mehrabian, and the Psychological Corporation for the use of their measures.
- I thank my boss and friend, Dr. Bryan Porter, for his advice and assistance, and for pretending not to notice when I'd disappear for half the day for an impromptu thesis meeting.
- I thank the many professors and friends at O.D.U. who helped me find participants.
- I am thankful for my family's help collating and stuffing packets, and for their general support (both financially and emotionally) throughout the project.
- Finally, I could not forget to thank Kevin for his support and love, and for being so understanding when I needed to stay home and work—even on Friday nights.

Thanks again to everyone.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

TABLE Page

CHAPTER I

INTRODUCTION

College classrooms have become increasingly heterogeneous in the past few decades, particularly with the sharp increases in nontraditional aged student enrollment (Apps, 1981; Cross, 1981; Klein, 1990). A growing number of individuals over age 25, especially women, are choosing to break from their established roles as parents, spouses, and workers to juggle yet another role as students. One-third or more of today's undergraduate population may be comprised of nontraditional aged students (Yarbrough & Schaffer, 1990). In 1990, a College Board survey (as cited in Chartrand, 1990) found that 45% of the 6 million individuals who attend college were students over 25 years of age, and that 60% of these students were women. Nontraditional students, also referred to as returning or re-entry students, are generally defined as students who are 25 years old or older or who have been out of school a few years before returning. Traditional students, on the other hand, are aged 18 to 24 years and went to college directly after or within a year after high school (Apps, 1981; Cross, 1981; O'Conner, 1994).

While older students attend college to further their education, just as traditional students do, their underlying motivations and emotions about going to college have been shown to be quite different from the typical student who has just graduated from high school (Bauer & Mott, 1990; Justice & Dornan, 1995; Klein, 1990). In his comparison of 759 older and younger undergraduates, Nunn (1994) found older (≥25)

This thesis adheres to the journal style specifications of the fourth edition of the *Publication Manual of the American Psychological Association.*

students to be more achievement oriented than were younger undergraduates on the Assessment of Learning Temperament scale. Older students experience increased stressors and decreased support, yet in many cases are better able to cope with anxiety and perform better in school than their traditional aged counterparts (Bauer & Mott, 1990; Justice & Dornan, 1995; Klein, 1990; Leavitt, 1988; Spaulding & Kleiner, 1991; Yarbrough & Schaffer, 1990). Yarbrough and Schaffer (1990) suggest that the life experience of the nontraditional student may reduce both school and test specific anxiety.

Academic Performance

The re-entry student does appear to have certain advantages over the typical traditional student. There has been a limited amount of research thus far devoted to comparing traditional and nontraditional aged students' academic performance differences. The research that exists, though, supports the case that nontraditional students perform well in college despite their being out of the "school mode" for an extended period of time (Apps, 1981; Astin, 1976; Johnson, 1995; Leavitt, 1988; Skinner, 1996). Although they have multiple role demands, nontraditional students' grades are reliably as good as, and often better than, those of traditional students (Astin, 1976; Leavitt, 1988; Skinner, 1996). While many returning women attend school part-time, their grades maintain superiority over traditional students' grades regardless of the course load (Leavitt, 1988; Skinner, 1996).

Leavitt (1988) used questionnaires and interviews to investigate the personal life of 35 married women returning to college. Her results suggest that, "Despite the multiple demands they face, these women are performing better than their more

traditionally-aged counterparts as they achieve at higher than average levels academically" (p. 307). Only six of Leavitt's 35 participants were receiving average ("C") or below average (below "C") grades (Leavitt, 1988).

A recent study of returning women students at Old Dominion University (Dodd & Skinner, 1996; Skinner, 1996) confirmed that this university's nontraditional women outperformed traditional women on average. Returning women comprise 28% of the overall student population at the university, and 56% of the female population. In comparing cumulative grade point average (GPA) of 4,909 nontraditional women and 3,787 traditional women, mean GPAs (scale range of 0.00-4.00) were 3.04 and 2.66, respectively (Dodd & Skinner, 1996). Specifically, 43% of returning women had a GPA of 3.50 to 4.00, compared to only 12% of traditional aged women. Another 20% of the nontraditional women fell in the 3.00 to 3.49 GPA range, compared to 18% of the traditional women. Thus, 63% of the nontraditional women fell into the top two grade brackets, compared to only 30% of the traditional women. Percentages of students on the lower end of the scale (with a GPA below 2.49) were 27% and 48% for nontraditional and traditional aged women, respectively (Skinner, 1996).

Dodd and Skinner (1996) concluded that academic success is one of the most promising qualities of returning students. Johnson (1995) investigated the successes of older learners at the United Kingdom Open University and also concluded that while their course choices, motivations, and methods of learning differ from that of younger students, their academic performance compares favorably. O'Conner (1994) found in interviewing a focus group of 12 returning students at Kent State University that grade-consciousness resulted in their having higher grade point averages when compared with

traditional students. Likewise, in an investigation of nontraditional students, Powell-Pitts (1992) reported that returning women had low drop-out rates and achieved high GPAs.

Astin (1976) investigated programs for continuing education in a heterogeneous sample of 15 colleges in the United States via a self-report questionnaire. Participants were 660 women students currently participating in a continuing education program and 540 women alumnae of a continuing education program. While Astin did not compare their performance to traditional students, the returning women reported remarkably good grades. Of those currently in a continuing education program, 73% were receiving overall grades in the "A" to "B" range. Of the remaining 27%, 5% were receiving "Cs," and 22% were receiving no grades (such as in a Pass/Fail grading system) and could not be included in the analysis. Among the alumnae, 82% reported receiving grades while in the continuing education program in the "A" to "B" range, 8% reported "Cs," and 10% received no grades. The alumnae were also asked to report on any programs they were currently attending: 80% were in the "A" to "B" range, 7% were receiving "Cs," and 13% were receiving no grades. None of the 1,200 participants in Astin's (1976) study reported receiving overall grades below "C." While it is recognized that a continuing education program may or may not be as demanding as a typical college program, Astin's findings are presented as additional evidence of nontraditional aged women's performance in school.

Having established that, on average, nontraditional women outperform traditional women, one must now consider *why* they do so well. Most previous research has focused on the differences in social support and multiple role strain

between traditional and nontraditional students and how these might contribute to differences in achievement.

Environment

The majority of previous research on re-entry students has focused on women because they comprise the largest numbers of returning students (Yarbrough & Schaffer, 1990). Women's role in society has changed drastically in the last few decades, while the male role has remained relatively stable in comparison. The consensus is that traditional and nontraditional aged women have matured in quite different environments. Indeed, the former grew up in a more egalitarian society where women were taught that college is attainable and a desirable goal; the latter, on the other hand, matured in a time when women's roles were just beginning to be redefined as such (Lavallee, Gourde, & Rodier, 1990). Returning women have already dealt with the identity confusion of adolescence and therefore are not as distracted by developmental problems that traditional students bear; however, they are suddenly faced with new problems associated with integrating college into their already established lifestyles. Nontraditional women are students second; that is, they have already shown adult responsibility, have sometimes married, and many have held full-time jobs (Apps, 1981). Older women, in particular, may have been raised with the expectation that they need only to marry and have a family, with any other aspirations being secondary or unnecessary. Now, they are finding that a multitude of choices are available; hence, many are returning to school. Since women return to school more than men (Skinner, 1996) and the majority of literature on nontraditional students has focused on women, the current research investigated women only.

While a few studies have found that women with multiple roles are generally happier than women whose roles encompass only home and family (Bauer & Mott, 1990; Kopp & Ruzicka, 1993), most researchers have highlighted the stress and role strain women face when they return to school (Ballmer & Cozby, 1981; Leavitt, 1988; Novak & Thacker, 1991). Many of these women are taking a dramatic step away from their original, expected roles as nurturing mothers and wives. They experience guilt and worry about their "family role" while simultaneously experiencing anxiety and fear about their new "student role" (Lavallee et al., 1990). Indeed, Ballmer and Cozby (1981) found in comparing returning wives and mothers with nonreturning wives and mothers that there was more conflict and less cohesiveness in the returning women's families.

Leavitt (1988) investigated the personal and family adjustments of married women returning to college and, consistent with other research (Justice & Dornan, 1995), concluded that despite the turmoil of transition, nontraditional women fair rather well in the college arena. She notes that, unlike the traditional student whose task is to "find herself," these women have the task of achieving personal growth within the context of their already formed identities as wives and mothers (Leavitt, 1988). Returning women "approach this opportunity for further educational and personal growth as a privilege rather than an entitlement" (Leavitt, 1988, p.312). Among Leavitt's findings were mixed feelings of guilt and role strain with simultaneous increases in self esteem and marital satisfaction. Leavitt (1988) also found increased support received from husbands and children to be related to increased grade point average. As mentioned previously, all but six of her 35 participants were receiving

above-average grades despite occupying multiple roles. Yarbrough and Schaffer (1990) concluded that although these nontraditional women feel stressed about their new roles, their life experiences seem to help them to deal with the stress of school.

Other researchers have identified that children may have an influence upon nontraditional mothers' success in school. Novak and Thacker (1991) found differences between older and younger nontraditional students in self-reports of satisfaction and strain in the student role, with older returning students reporting less strain and more satisfaction in the student role than younger returnees. Novak and Thacker (1991) suggested that these differences were mainly due to the different ages of their children and the social support received from them. Older nontraditional students tended to have older children who are more understanding of their mother's choice to attend college, whereas younger nontraditional women had younger children who saw college as taking away time that their mother could spend with them (Novak & Thacker, 1991).

Social support from family does have an influence on nontraditional women's success at college, but it does not explain the findings of their performance, grade, and anxiety differences when compared to the traditional students. Traditional students have their share of turmoil in trying to find direction in their young lives, but they also normally have access to social support, whether it be from family or close friends (Apps, 1981). Indeed, Wolfgang and Dowling (1981) found one of the differences between younger and older undergraduates to be that traditional students put more emphasis on the social aspect of college. If anything, nontraditional students experience more turmoil, and yet they still typically do better in school than their

younger counterparts (Apps, 1981; Astin, 1976; Johnson, 1995; Leavitt, 1988; Skinner, 1996).

The present study takes the position that perhaps traditional and nontraditional aged women differ in other ways that relate to performance. Social support and life experience were not a focus of the present study; however, previous literature on social support and life experience was used to identify important characteristics that were incorporated into a demographics questionnaire. This questionnaire aided in describing the sample. The current study proposes two areas of differences in the two groups that contribute to performance: motivation and cognition.

Motivation

Though more descriptive than experimental in nature, Apps' book *The Adult Learner on Campus* (1981) provides a good discussion of how older adult learners differ from younger learners, as well as older learners' problems, concerns, and their impact on the classroom. Apps interviewed 18 professors and 12 returning students for his book. According to one professor, it is the motivation that makes the difference: "The highly motivated returning student can outperform the less motivated traditional student, who is sometimes brighter" (Apps, 1981, p. 43). Another professor noted that the returning student isn't satisfied with reading only enough to pass an exam. According to this professor, while the traditional student is happy with getting by and getting a good grade, the returning student "wants to do it all" and really wants to learn (Apps, 1981, p. 48). Bernard (1981) agrees that motivation makes returning students perform more creditably and, he adds, this makes them more intellectually stimulating to teach.

Consistent differences have been found between traditional and nontraditional aged students in their strength of motivation and locus of control (Justice & Dornan, 1995; Klein, 1990; Kopp & Ruzicka, 1993; Miller, Behrens, Greene, & Newman, 1993). Schraw and Dennison (1994) associate perceptions of control over learning or metacognitive awareness with higher academic achievement. In a study of college students of varying academic levels, Talbot (1990) argued that students most likely to succeed were those with adequate motivation for their studies and who also enjoy intellectual activities.

Wolfgang and Dowling (1981) investigated differences in motivation to enroll in higher education between 172 traditional and 153 nontraditional freshmen and sophomores. The study used the Education Participation Scale, a 48-item inventory on which the learner indicates, on a 9-point scale, his or her reasons for participation in higher education. Researchers found that older students scored significantly higher than younger students on the motivational factor of cognitive interest, indicating an internal drive for knowledge. Older students had higher scores on test items such as "To learn just for the sake of learning" and "To seek knowledge for its own sake" (Wolfgang & Dowling, 1981). Conversely, younger students scored significantly higher on items indicating external motivations, such as pursuing college for reasons of forming social relationships or to meet the expectations of another person or authority (Wolfgang & Dowling, 1981). Financial reasons and self-esteem have been found to be among the most reported reasons for nontraditional students to return to college, while a college social life is less important to them (Apps, 1981).

Traditional aged women are often extrinsically motivated to attend college,

while nontraditional women follow intrinsic motivations (Klein, 1990). In Justice and Dornan's (1995) study, 95 traditional and nontraditional aged students completed self-report measures of study skills and motivation. Older females reported higher levels of intrinsic interest (Justice & Dornan, 1995). In Nunn's (1994) comparison of 759 older and younger undergraduates, older students (≥ 25 years) were more internally controlled and younger students more externally controlled on Rotter's Internal-External Locus of Control Scale. Similarly, Kopp and Ruzicka (1993) found that their nontraditional college students scored more internally on this locus of control scale. Klein suggested that the nontraditional student is more likely to "learn for the sake of learning" (1990, p. 283) than the traditional student. In their study of the impact of undergraduates' performance and learning goals on motivation, Miller et al. (1993) noted that individuals are more likely to value the object of learning if they have adopted a goal of learning for its own sake rather than learning merely in order to look good to others.

These findings are logical, considering that young women today receive pressure from family, school, and the economy to further their education just as young men do. It is often expected of them (Apps, 1981). In many cases traditional students have help in supporting themselves through college from parents, financial aid, or scholarships. Even if the traditional student does not rely on parents for financial support, it is unlikely that parents would not be otherwise supportive of their child's decision to go to college. In contrast, returning women are not "expected" to go to college, and they often create family conflict in the transition to college (Apps, 1981). They are more likely to support themselves, or if they are receiving financial aid, are

often more able to appreciate fully the real burden of repaying the loan. All things considered, returning women do not get to college without really wanting to be there (Apps, 1981).

Thus, there is considerable evidence of motivational differences between traditional and nontraditional students. The relation between motivational differences and achievement differences is less clear, however. While most previous work has assumed motivation leads to performance, the connection between the two remains vague. To explore this further, achievement motivation, as well as its relation to performance, was assessed in the current study.

In addition to examining possible motivational differences, the current study examines the possibility that nontraditional aged students may have developed cognitive abilities yet undeveloped in younger students. Cognitive developmental changes, such as those described by Piaget, may not end in adolescence. Recent work by Piagetian researchers (Arlin, 1984; Commons, Richards, & Kuhn, 1982; Lavallee et al., 1990; Perry, 1981; Richards, Armon, & Commons, 1984) suggests that after young adulthood, cognitive changes continue to occur with age. If so, it is possible that nontraditional students begin their college career equipped with different types of cognitive abilities and awareness than younger undergraduates. Two aspects of cognition, cognitive maturation and critical thinking, and how they relate to performance, were also explored in this research.

Cognition

Cognitive Maturation. It has been suggested for more than two decades that Piaget's developmental theory should be extended to adults (Lavallee et al., 1990).

Researchers studying adult cognition generally recognize a common intellectual debt to Piaget's study of cognitive development; however, they simultaneously express dissatisfaction with that work (Richards et al., 1984).

Piaget outlined some common patterns of intellectual development from birth through adulthood in his theory of cognitive development (Crain, 1992). His theory consists of four general periods, which are summarized briefly in Table 1. Piaget believed that, through interaction with the environment, children build new cognitive structures for understanding and experiencing the world. These new cognitive structures are comprehensive and result in the child's cognitive development (Crain, 1992). While children set their own rate of exploration and therefore progress through the periods at different rates, some approximate age ranges for each period are also given in Table 1. Although children progress at different rates, Piaget asserted they must pass through the periods in order (Crain, 1992).

Researchers of adult cognition have focused their criticisms of Piaget's theory on his final period, formal operations. Formal operations is specified to extend from approximately age 11 through adulthood (Crain, 1992). This period involves identification of logical rules applicable to whole classes or types of problems. In other words, it involves the application of abstract and integrative rules to problem-solving (Schaie & Parr, 1981). Unlike children at the period of concrete operations, young people at the period of formal operations have gained the ability to think on a purely hypothetical plane (Crain, 1992). Many feel that Piaget's model of formal operations is too limited to capture the richness of adult thought, and therefore is a truncated conception of development of both adulthood and cognition (Richards et al., 1984).

Table 1

Overview of the Periods of Piaget's Cognitive-Developmental Theory[a]

Period	Description and approximate age range
I. Sensori-Motor Intelligence	This period lasts from birth to approximately two years and consists of six stages. Babies organize action patterns for dealing with the environment. These include sucking, grasping, and hitting.
II. Preoperational Thought	This period lasts from approximately two to seven years. Children begin to learn to think. They use symbols and internal images, but their thinking is illogical and unsystematic and very different from that of adults.
III. Concrete Operations	This period lasts from approximately seven to 11 years. This period is characterized by children's development of the capacity to systematically think about concrete objects and activities. They are unable to think in the abstract.
IV. Formal Operations	This period lasts from approximately age 11 to adulthood. During this period, the capacity to think systematically on a purely abstract and hypothetical plane is developed.

[a] (Crain, 1992)

Considerable research has been devoted to attempting to formulate models of adult cognitive development, known collectively as "post-formal" (Richards et al., 1984). Among post-formal theorists, there is widespread agreement that the ability to perceive and understand abstract relations is central to intelligence and increases with age, either in discrete steps or continuously (Sternberg, 1984). Specific age ranges are not hypothesized for most post-formal theories, but it is generally understood that post-formal thinking begins after adolescence, and any successive higher-order thinking progresses in an invariant sequence. Arlin (1984) notes that "adolescents and adults appear to reason differently along a number of nontrivial dimensions within the cognitive, social, and moral domain" (p. 258). Commons et al. (1982) use the terms "systematic" and "metasystematic" reasoning to describe their two advanced phases, and found that graduate students used more of these two phases of reasoning than undergraduates in solving problems. Arlin (1984) agreed that the combination of two or more systems of reference may be essential for adult thought.

Perry (1970) added an advanced period to Piaget's outline, which he called the "period of responsibility" (p. 205). This scheme of cognitive and ethical development consists of nine positions which are outlined in Table 2. The positions encompass the evolving ways of seeing the world, knowledge and education, values, and oneself. In positions 1-4a, dualism is modified into multiplicity in a series of steps. Dualism involves black and white thinking, the division of meaning into two realms where right answers exist for every problem and authorities know them (Perry, 1981). Multiplicity involves the recognition of diversity of opinion and values, as well as the realization that everyone has a right to their own opinion and that there are some areas where right

Table 2

Overview of the Positions in Perry's Scheme of Cognitive and Ethical Development[a]

Position	General Description
The Modifying of Dualism	
1. Basic Duality	The world is seen in polar terms of black and white. Right answers exist for everything. Authorities dictate what is right.
2. Multiplicity Pre-Legitimate	Diversity of opinion and uncertainty are perceived, but as unreal or alien. Right answers still exist for everything, and authorities still dictate what is right.
3. Multiplicity Subordinate	Diversity of opinion is legitimately perceived, but it is still believed that a right answer for everything does exist but has not been decided upon. Authorities will decide the right answer.
The Realizing of Relativism	
4. (a) Multiplicity Correlate	Diversity of opinion is first recognized as relevant to oneself, and is seen as intriguing, yet confusing. It is recognized that in some instances, even authorities do not know the answers, and in these instances (only these) individuals have the right to form there own opinion. Still, the realm where authority decides

Table 2 Continued

Position	General Description
	right and wrong prevails.
(b) Relativism Subordinate	It is recognized that authorities may tolerate diversity of opinion that is supported with data. However, authorities continue to hold power over one's thinking and beliefs.
5. Relativism	Diversity of opinion, values, and judgment are analyzed and compared in order to formulate one's own beliefs and values, regardless of authority. Knowledge is now viewed as qualitative and dependent on context.
6. Commitment Foreseen	The need to make commitments to new beliefs and values is realized.
<u>The Evolving of Commitments</u>	
7. Initial Commitment	An initial commitment is made in some area.
8. Orientation in Implications of Commitment	The implications of commitment are experienced experienced, and responsibility is explored.
9. Developing Commitments	Identity is affirmed among multiple responsibilities and it is realized that commitment is an ongoing activity.

Note. Age ranges are not specified for positions in Perry's scheme.

[a] (Perry, 1970)

and wrong are not so clearly decided upon (Perry, 1981). In positions 4b-5, relativism is discovered. Relativism is the ability to take diversity of opinion, values, and judgment derived from coherent sources, and analyze and compare to formulate one's own beliefs and values. Knowledge is now viewed as qualitative and dependent on context (Perry, 1981). Finally, in positions 6-9, individuals make commitments to relativism. Commitment involves affirmations, choices, and career and relationship decisions based on the awareness of relativism (Perry, 1981).

Like Piaget's periods, each of Perry's positions both include and transcend the earlier ones and individuals pass through the positions in an invariant sequence. Although Perry's scheme of cognitive development is an outline of intellectual growth and individuals proceed along the outline as they age, Perry does not specify age ranges for his positions. Rather, like Piaget, he asserts that individuals progress at different rates and therefore arrive at positions at different ages. Because college is an environment which stimulates and encourages individuals to actively explore questions about one's world, college is an ideal environment for promoting intellectual growth along Perry's positions. Perry's samples were college students whom he followed across four years, and it may be said that generally a student progresses through the positions as they progress from freshmen to seniors. However, as Perry (1970) describes:

> Not all students are "sophomores," in this sense, in their sophomore year. Some come to college as "juniors" or even "seniors." Some go all the way through college and somehow manage to remain school-boys to the end. In the sense in which we are speaking, indeed, many people achieve the

> consequences of a college education without ever going to college at all. (p. 33)

Perhaps, then, performance differences between older and younger students may be attributable to more nontraditional aged women entering college as "juniors" or "seniors"—cognitively speaking—than is the case among traditional aged women.

While Perry's Scheme and several other theories of adult cognitive development (Arlin, 1984; Common et al., 1982; McDaniel & Lawrence, 1990; Richards et al., 1984; Sternberg, 1984) are quite distinct from one another and most need further clarification, Kramer (1983) has outlined their three shared features. Kramer poses that post-formal thought is characterized by "(1) the realization of the relativistic, non-absolute nature of knowledge; (2) an acceptance of contradiction, and (3) integration of contradiction into an overriding whole" (1983, p. 91). By this, post-formal reasoning represents a new freedom in thought. Commons and his colleagues (1982) explained advances in adult thinking as a combination of native ability, education, and experience, coupled with the ability to draw from all three areas to reach the best method for solving a problem. Post-formal theorists lend convincing evidence to there being a great deal of developmental potential beyond formal operations which needs to be explored. The current study used a scale based on Perry's post-formal theory, the Learning Environment Preferences measure (Moore, 1987), to assess possible cognitive-maturational differences between traditional and nontraditional aged college women.

Critical Thinking. Another factor that may contribute to nontraditional aged women's successes in school is that, as several researchers have argued, many aspects

of intelligence and critical thinking may not be fully developed until after an individual has reached his or her 30s, 40s, and even 50s (Cross, 1981; Friend & Zubek, 1975; Schaie, 1996). For instance, Cross (1981) cited longitudinal studies by Owens in 1953 and 1966 in which participants first tested at age 20 showed significant gains in intelligence 30 years later and nonsignificant losses when tested 11 years after that at age 61. A recently published longitudinal-sequential study, the mammoth "Seattle Longitudinal Study" (Schaie, 1996) on lifespan intelligence, had among its conclusions that verbal meaning, spatial, and reasoning abilities did not peak until age 40 and did not start to decline until age 60, on average. Likewise, peak ages for inductive reasoning and spatial orientation were not occurring until the 50s, with verbal ability and memory peaking in the 60s. Schaie (1996) attributes the findings of numerous other studies that report earlier peaks and declines to a failure to account for the perceptual speed peak in the 20s. Older test-takers may struggle in comparison to younger, faster students on timed tests, but fair well on untimed tests.

Friend and Zubek (1975) studied critical thinking as well as intelligence. To assess critical thinking ability , they administered the Wechsler Intelligence Scale and the Watson-Glaser Critical Thinking Appraisal (WGCTA, Form BM), to 484 participants ranging in age from 12 to 80 years. Participants were grouped according to age, and participants in the various age groups had approximately the same educational background (in terms of mean years of education). Interestingly, they found that in comparison to general intelligence, which peaked in the early 20s, critical thinking ability peaked later, began to decline later, and declined more gradually (Friend & Zubek, 1975). According to their research, critical thinking ability peaked at

about age 25 and held steady through about age 35, when it started to decline slowly and steadily through old age. In addition, certain types of critical thinking peaked even later, including the ability to draw inferences, detect assumptions, and think deductively. These abilities peaked at about age 35, with a more rapid decline afterward. Friend and Zubek (1975) concluded that "critical thinking is an ability that presumably is dependent on a considerable amount of accumulated experience" (p. 74). Friend and Zubek (1975) describe earlier studies by Raven (1948), Bromley (1956), and Lehman (1945) that have reported similar developmental curves in critical thinking ability.

Spaulding and Kleiner (1991) found that GPA increases with improved critical thinking. Therefore, nontraditional women's academic success may point to their having advanced cognitive or critical thinking abilities. Lavallee et al. (1990) found chronological age added substantive predictive value to their regression equation of cognitive and ethical development. Justice and Dornan (1995) found that older females reported higher level study strategies and more cognitive monitoring than younger females. Furthermore, despite their strong view that education results in improved critical thinking, Spaulding and Kleiner (1991) postulated that perhaps maturation could explain their finding that critical thinking improves with increased core credit hours in college students regardless of area of study.

The current study examined two aspects of cognition in traditional and nontraditional students: cognitive maturation and critical thinking. The relationship between differences in cognition and differences in achievement was also examined. Based on the research cited above by Friend and Zubek (1975) and Schaie (1996), who

found critical thinking and cognitive changes at age 25 and again in the early to middle 30s, participants in this study were broken into three groups according to age. Those participants who were age 32 and over were classified as older nontraditional students; those who were age 25 to 31 were classified as younger nontraditionals, and those who were age 18 to 24 were classified as traditional students.

Hypotheses

The present study was an investigation of the possible differences in motivation, critical thinking, and cognitive maturation that may relate to performance differences between traditional aged and younger and older nontraditional aged college women. More specifically, the hypotheses of the study were as follows: (1) there would be developmental differences in GPA among the three age groups; (2) there would be developmental differences in critical thinking among the three age groups; (3) there would be developmental differences in cognitive maturation among the three age groups; (4) there would be developmental differences in motivation between the traditional student group and both nontraditional groups, but not between the younger and older nontraditional groups; (5) critical thinking, cognitive maturation, and motivation would be positively related to achievement in correlational and regression analyses; and finally, (6) motivation to achieve would be the major predictor of achievement; however, cognitive variables would also be significant predictors.

Hypothesis 1 was based on past research on the academic performance of nontraditional aged students (Apps, 1981; Astin, 1976; Dodd & Skinner, 1996; Johnson, 1995; Leavitt, 1988; Skinner, 1996). Grade point average was expected to vary by age group in that the older nontraditional students were expected to have

higher average GPAs than younger nontraditional students, who in turn were expected to have higher average GPAs than traditional students.

Hypothesis 2 follows from research on peaks in critical thinking and intelligence by Friend and Zubek (1975) and Schaie (1996). Quality of critical thinking skills, as measured by the Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1980a), was expected to be poorer for traditional aged women than for younger nontraditional women. Younger nontraditional women, in turn, were expected to have poorer critical thinking skills than older nontraditional aged women. These differences were expected for all subtests of the Critical Thinking Appraisal.

The study's third hypothesis postulated cognitive maturation across the age groups. Cognitive maturation was assessed using the Learning Environment Preferences measure (Moore, 1987), a scale that is based on Perry's (1970) theory of adult cognitive development. Based on the research of post-formal theorists (Arlin, 1984; Commons et al., 1982; Lavallee et al., 1990; Perry, 1970; Richards et al., 1984), it was expected that older nontraditional aged women would score at higher positions of Perry's scheme than younger nontraditional women. Younger nontraditional women were also expected to score at higher positions than the traditional women.

Previous research on motivational differences between traditional and nontraditional women (Justice & Dornan, 1995; Klein, 1990; Kopp & Ruzicka, 1993; Miller et al., 1993; Wolfgang & Dowling, 1981) led to Hypothesis 4. Higher achievement motivation scores on the Mehrabian Achieving Tendency Scale (Mehrabian, 1995) are expected between the traditional group and both nontraditional groups; however, motivational differences are not expected between the two

nontraditional groups.

The study's final two hypotheses deal with predicting GPA. From the author's review of past research about traditional and nontraditional aged women, it was believed that cognitive and motivational variables would relate to one another and to participants' GPAs. It was expected that participants' scores on the critical thinking, cognitive maturation, and motivation scales would surface as predictive variables in regression analyses for the criterion variable GPA. However, motivation was expected to account for more of the variance in GPA than cognitive variables.

CHAPTER II

METHOD

Participants

One hundred and thirty-eight female students were recruited from Old Dominion University's psychology participant pool, from the University's Women's Center, and by posting announcements throughout campus. In order to be included in the study, participants must have been undergraduate females who were taking two or more courses during the fall and spring semesters or at least one course in summer sessions. Traditional aged students who had not attended school for a year or more were not included in the analyses.

A total of 26 participants were excluded from the analyses: 12 traditional students were returning after an absence of a year or more; 8 participants were second degree seeking or graduate students; 6 participants did not complete all tests or completed one or more answer sheets incorrectly. Due to a difficulty in obtaining GPA, an additional five participants were included only in analyses that did not include the variable GPA. After excluding these participants, 112 participants remained for most analyses and 107 remained for analyses including GPA.

The 112 participants were divided into three age groups, consisting of 48 traditional aged participants (18-24 years), 40 younger nontraditional aged participants (25-31 years), and 24 older nontraditional aged participants (above 32 years). The participants' mean ages, by group, were 19.35 (SD = 1.54), 27.05 (SD = 1.83), and 40.17 (SD = 5.55) for the traditional, younger nontraditional, and older nontraditional aged groups, respectively. Students from the psychology department's participant pool

received extra credit in their courses, while others were entered in a raffle to win $100.00 as their compensation for participation. The majority of the sample were freshmen (33%), while 23% were sophomores, 21% were juniors, and 23% were seniors. As shown in Table 3, distribution of class standing differed across age groups, $\chi^2(6, N = 112) = 20.74, p < .01$. Each group's mean number of cumulative credit hours were 47.37 ($SD = 36.36$), 82.80 ($SD = 44.48$), and 71.00 ($SD = 44.24$), respectively. To control for educational effects, therefore, the number of credits completed was used as a covariate in all analyses.

Information from the demographic questionnaire was examined for differences among the three groups. Percentages of each age group belonging to selected demographic categories are presented in Table 3. A chi-square test for independence revealed that group was significantly related to having had experience with marriage, $\chi^2(2, N = 111) = 53.11, p < .001$. Participants having experience with marriage were either currently married or had been at some time in their past. As shown in Table 3, few traditional aged students had experience with marriage. Group was also significantly related to being a parent, $\chi^2(2, N = 112) = 49.25, p < .001$, and of those participants who had children, group was related to the average age of their children, $\chi^2(2, N = 30) = 11.84, p < .01$.

Additional chi-square tests for independence revealed that group was significantly related to number of hours (part-time vs. full-time vs. unemployed) participants were working currently, $\chi^2(4, N = 112) = 17.09, p < .01$, and to whether or not participants had ever held a full-time job before, $\chi^2(2, N = 110) = 36.45, p < .001$. As shown in Table 3, more nontraditional aged women than traditional aged women

Table 3

Percentages of Each Age Group Belonging to Selected Demographic Categories

Demographic Category	Traditional Aged Students	Younger Nontraditional Aged Students	Older Nontraditional Aged Students
Experience with Marriage	4%	70%	79%
Have Children	2%	38%	83%
Children's Ages[a]			
<12 only	--	93%	33%
12-18 only	--	0%	27%
0-18 (both ranges)	--	7%	40%
Currently Employed			
Part-time	54%	28%	21%
Full-time	6%	27%	42%
Unemployed	40%	45%	37%
Have Previously held a Full-time Job	41%	93%	96%
Class Standing			
Freshman	52%	15%	25%
Sophomore	27%	23%	17%
Junior	10%	30%	25%
Senior	10%	32%	33%
Returning Students	0%	93%	100%
Race			
African American	31%	27%	29%
Caucasian	44%	53%	63%
Other	25%	20%	8%

Note. All chi-square analyses except for race were significant at $p < .01$ or better.

[a] The traditional aged women were excluded from the chi-square analysis of children's ages. Only individuals with children were included in the analysis of children's ages.

had held a full-time job before, and large percentages of all three age groups were currently unemployed. As would be expected, group was significantly related to number of years (<1 vs. 1 year or more) out of school as well, $\chi^2(2, N = 112) = 100.81$, $p < .001$. "Returning students" in Table 3 describes students who had taken at least a year off from school. None of the traditional aged women were returning. Neither race, $\chi^2(4, N = 112) = 3.51, p > .05$, nor children residing with the participant, $\chi^2(2, N = 36) = 0.36, p > .05$, were significantly related to group.

Materials

Cumulative grade point average as of the semester tested was obtained from student records as a measure of academic performance. The Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1980a) was administered to assess critical thinking. Cognitive maturation along Perry's scheme of adult cognitive development was assessed using The Learning Environment Preferences Measure (Moore, 1988). Achievement motivation was assessed by the Mehrabian Achieving Tendency Scale (Mehrabian, 1995). A demographic questionnaire was developed to obtain information on variables such as age, race, marital status, number and age of children, number of credits completed, number of current credit hours, working status, resident and financial independence from parents, and length of longest absence from school. This inventory is included in Appendix A.

Watson-Glaser Critical Thinking Appraisal. The Watson-Glaser Critical Thinking Appraisal (WGCTA, Watson & Glaser, 1980a) is the oldest and best established measure of critical thinking (McDaniel & Lawrence, 1990). It has five subtests of critical thinking skills: Inference, Recognition of Assumptions, Deduction,

Interpretation, and Evaluation of Arguments. The subtests consist of arguments, problems, statements, and interpretations of data similar to those encountered through work, the classroom, newspapers, and magazine articles (Watson & Glaser, 1980b).

As previously mentioned, research by Friend and Zubek (1975) found developmental peaks in the middle 30s on the first three WGCTA subtests, but not on the fourth and fifth subtests, nor the on the total score. The publishers of the WGCTA, the Psychological Corporation, were contacted and agreed that eliminating the last two subtests would not affect the validity or reliability of subtest raw score comparisons across groups. Therefore, to shorten the length of the demanding 80-item scale, only the first three subtests (Inference, Recognition of Assumptions, and Deduction) were administered to participants in the current study. The final shortened WGCTA scale administered in this study contained 48 items.

Most items on the WGCTA required the participant to read short passages and then make judgments on a number of statements following each passage. Depending on the subtest, students judged whether statements (1) were valid inferences, (2) were assumptions of the passage, or (3) could be deduced from the passage.

Scores on the WGCTA are based on number correct and may be calculated for each of the three subtests, as well as for the total of the three. The Watson-Glaser has two forms: Form A is intended for college and adult populations, while form B is intended for grades 9-12. Form A, a revision of the Form BM that Friend and Zubek (1975) used, was used in the present study. Split-half reliability coefficients for the WGCTA range from .69 to .85 for all populations tested, and from .80 to .83 for college student populations. Responses in test-retest settings correlated .73 with one

another, and responses from alternate forms of the WGCTA correlated .75 with one another (Watson & Glaser, 1980b). The WGCTA has been shown to have construct and content validity (Burns, 1974; Fogg & Calia, 1967; Sorenson, 1966, as cited in Watson & Glaser, 1980b), and correlates with several measures of academic achievement and general intelligence (Watson & Glaser, 1980b).

The WGCTA has no time limit, though it usually takes approximately 40-50 minutes to complete the whole test or approximately 30 minutes for the three subtests used in this study. The scale can be administered to individuals alone or in a group setting. Due to copyright restrictions, the WGCTA is not provided in appendices.

Learning Environment Preferences. William Moore's (1987) Learning Environment Preferences (LEP) is an objective instrument to assess Perry's (1970) model of intellectual development in college students. Due to copyright restrictions, the LEP is not provided in appendices; however, a letter of permission for use of the scale is provided in Appendix B.

This 65-item scale assesses five domains of the learning environment: (1) course content/view of learning, (2) role of instructor, (3) role of students/peers, (4) classroom atmosphere/activities, and (5) evaluation procedures. Students rated each item (13 for each domain) as to their significance in their ideal learning environment. Ratings are on a 4-point Likert-type scale ranging from not significant (1) to very significant (4). Participants then picked their three most significant items for each of the five domains.

The LEP has two scoring indexes: the Cognitive Complexity Index (CCI) and the Relativism Index. Note that the individual scores are not calculated for each of the

domains. Only the three most significant items for each domain are used for calculating the scores. These are weighted according to first, second, or third choice and then by Perry position number. For the CCI, which is the main scoring index, the weighted numbers are summed and multiplied by 100. For the Relativism index, the percentage of position 5 weighted responses only are multiplied by 100. Higher scores on both indexes indicate more advanced positions on Perry's scheme. Scores on the CCI range from 200-500, which correspond to Perry positions two through five (positions 6-9 deal with level of commitment, not level of cognitive complexity). Preliminary analyses on the current participants' scores indicated that age groups did not vary differently across the two indices; therefore, only participants' CCI scores were reported in the results.

Cronbach's alpha reliability coefficients range from .72 to .84 for the different Perry positions (Moore, 1989). The LEP has been shown to be correlated .36 (Moore, 1989) and .73 (Durham, Hays, & Martinez, 1994) with the most used non-objective measure of the Perry scheme, the Measure of Intellectual Development (MID, as cited in Moore, 1989 & Durham et al., 1994). The original standardization sample for the LEP consisted of 725 undergraduates from several different institutions. The test was found to be a valid assessment of the cognitive portion (Positions 1-5) of Perry's scheme of intellectual development (Moore, 1989).

Mehrabian Achieving Tendency Scale. Albert Mehrabian's (1995) Questionnaire Measure of Individual Differences in Achieving Tendency (Mehrabian's Achieving Tendency Scale, MATS) was used as an achievement motivation measure. It is designed to discriminate those who are motivated to achieve more than they are

motivated to avoid failure (high achievers) from those who are more motivated to avoid failure than they are motivated to achieve (low achievers). The test contains 36 questions and takes about 10-15 minutes to complete. Due to copyright restrictions, the MATS is not included in appendices, however, a letter of permission to use the scale is provided in Appendix C.

The MATS is balanced for response bias in that half of the items are positively worded and half are negatively worded. Participants marked their agreement or disagreement with each item using a 9-point Likert-type scale (ranging from +4 for very strong agreement to -4 for very strong disagreement). The responses to the negatively and positively worded items are summed separately. A total score was determined for each participant by subtracting the negatively worded sum from the positively worded sum. Higher scores indicate increased motivation to achieve. The MATS norms for women are: $M = 44$ and $SD = 35$ (Mehrabian, 1995). The MATS has a high internal consistency/reliability coefficient of .91. Convergent validity coefficients are satisfactory, ranging from .59 to .74 (Mehrabian, 1995).

Procedure

This research was reviewed according to University human subjects guidelines and was approved in February 1997 by the Department of Psychology's Committee for the Protection of Human Subjects. Immediately following, announcements about the study were placed in the psychology department, the University Women's Center, and all around campus. Interested female participants made an appointment by either calling the experimenter or signing up in the psychology department. As compensation for their time, participants were given extra credit in a psychology course or could

choose to entered in a raffle to win $100.00.

Participants were tested individually or in groups as large as 30 in a classroom in the psychology department of Old Dominion University. Before beginning, all participants were given a numbered test packet containing all test booklets, answer sheets, a demographics questionnaire, and an informed consent form. Participants were informed from the outset that all responses would be confidential and only their packet number would be on the actual test materials. The informed consent form (included in Appendix D) contained a section to obtain permission to have an authorized individual obtain their GPA. The experimenter recorded all packet numbers and participants' social security numbers on a separate sheet (for purposes of obtaining GPA).
Oral instructions explaining directions for each questionnaire and answer sheet in detail were given up front so that participants could then complete all questionnaires at their own pace. Participants were told to complete the packet in the following order: (1) informed consent form; (2) demographic questionnaire; (3) WGCTA; (4) LEP; and (5) MATS. Questionnaires and answer sheets were color coordinated to ease matching and had already been sorted into the correct order when they were placed in the packets. Participants were urged to ask questions should they arise, as the experimenter remained in the room for the length of the test session.

Upon completion, participants turned in their packet, separating their informed consent form into a separate stack. Participants were then given a typed debriefing and either an extra credit form or an entry form for the raffle. They were informed that they may only choose one compensation option. Only 12 of the participants chose to enter the raffle; all others chose the extra credit option.

CHAPTER III

RESULTS

The goals of the analyses performed were twofold. The first objective was to assess developmental differences among the traditional and nontraditional aged groups. Our next intention was to examine the degree to which the dependent variables could be used to predict GPA in regression analyses.

In exploring developmental differences among age groups, a General Linear Model (GLM) Multivariate Analysis of Covariance (MANCOVA) was first performed on the three subscales of the WGCTA to test for overall significance of the scale. This was followed by age group GLM Analyses of Covariance (ANCOVAs) for GPA and for each of the WGCTA subscales, the LEP, and the MATS. Number of cumulative credit hours was used as a covariate in all analyses.

In examining predictors of GPA, participants' scores for the three subscales of the WGCTA, the Cognitive Complexity Index (CCI) of the LEP, and the MATS were entered into a stepwise regression analysis. Number of cumulative credit hours was entered first to control for variance due to amount of education. Next, an exploratory multiple regression analysis was performed in which participants' ages were entered into the equation simultaneously with number of cumulative credit hours and all dependent measures (WGCTA, MATS, and LEP scores). The purpose of this second analysis was to determine whether age had predictive value beyond that of the other dependent measures.

Developmental Differences

Achievement. A GLM ANCOVA using number of cumulative credit hours as a

covariate was performed on the data to test for age group differences in cumulative grade point average (GPA). As predicted, a significant difference was found, F (2, 103) = 7.13, $p < .01$. Tukey's Studentized Range Honestly Significant Difference (HSD) post hoc test revealed that both nontraditional aged groups had significantly higher average GPAs than the traditional aged group, but the older groups did not differ from one another. These means and standard deviations are presented in Table 4.

Critical Thinking. It was hypothesized that there would be developmental differences in critical thinking among the three age groups. A GLM MANCOVA was performed for age group on scores for the three subscales of the Watson Glaser Critical Thinking Appraisal (WGCTA). Applying number of cumulative credit hours as a covariate, the WGCTA showed significant group differences using Wilks' Lambda criteria, F (6, 202) = 3.05, $p < .01$. This analysis was followed by three GLM ANCOVAs for the three WGCTA subscales of Inference, Recognition of Assumptions, and Deduction.

Age group means and standard deviations for the three WGCTA subscales are presented in Table 4. Controlling for cumulative credit hours, a significant age group difference was found for ability to recognize assumptions, F (2, 103) = 7.56, $p < .01$. Tukey's HSD post hoc test revealed that both nontraditional age groups were significantly more adept at detecting assumptions than the traditional group; however, the nontraditional groups did not differ significantly from one another.

Contrary to hypotheses, significant age group differences were not found for either the Inferences, $F(2,103) = 0.68$, $p > .05$, or Deductions, $F(2,103) = 2.55$, $p > .05$, subscales. Interestingly, a significant difference was found for the covariate

Table 4

Mean Scores and Standard Deviations by Age Group

Variable	Traditional Aged Students		Younger Nontraditional Aged Students		Older Nontraditional Aged Students	
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
GPA	2.49[a]	(0.78)	2.94[b]	(0.71)	3.25[b]	(0.78)
WGCTA						
Assumptions	10.02[a]	(3.36)	12.43[b]	(2.87)	12.42[b]	(12.42)
Deductions	9.48	(2.50)	10.38	(2.51)	11.04	(2.12)
Inferences	8.40	(2.61)	8.95	(2.04)	8.67	(2.84)
LEP						
CCI	334.44	(51.91)	337.15	(43.68)	336.17	(50.43)
MATS	51.52	(31.88)	62.75	(37.91)	64.83	(23.76)

Note. Means in the same row with different superscripts differ significantly, $p < .01$.

credit hours on the Deductions subscale, F (1, 103) = 5.24, $p < .05$. Thus, credit hours completed had a significant effect on the ability to make deductions.

Cognitive Maturation. Participants' scores on the Cognitive Complexity Index (CCI) of the Learning Environment Preferences were used to measure cognitive maturation, and number of cumulative credit hours was used as a covariate. Contrary to hypotheses, the GLM ANCOVA for age group differences failed to reach significance, F (2, 103) = 0.01, $p > .05$. Group means and standard deviations are presented in Table 4.

Motivation. To test for age group differences in achievement motivation , a GLM ANCOVA was performed on participants' scores on the Mehrabian Achieving Tendency Scale. Number of cumulative credit hours was used as a covariate. Contrary to the author's predictions and to previous research (Apps, 1981; Bernhard, 1981; Wolfgang & Dowling, 1981), no significant group differences were found for the MATS, F (2, 103) = 1.04, $p > .05$. Mean scores and standard deviations for each age group are presented in Table 4.

Predicting Performance

In preparation for multiple regression analyses, bivariate intercorrelations among variables were first examined. The correlation matrix appears in Table 5. It was hypothesized that critical thinking, cognitive maturation, and motivation would be positively related to one another and to achievement. As predicted, age, GPA, and the WGCTA subscales were positively correlated with one another at significant levels. Scores on the MATS correlated positively with GPA, while scores on the LEP correlated positively with the WGCTA subscales of Inference and Assumptions.

Table 5

Correlations among Selected Variables

	1	2	3	4	5	6	7	8
1. Credits	--	.26**	.14	.12	.27**	-.03	.01	.08
2. Age		--	.37***	.25**	.25**	.03	.00	.15
3. GPA			--	.21*	.22*	.33***	.08	.19*
4. Assumptions				--	.27**	.21*	.19*	.09
5. Deductions					--	.37***	.16	-.10
6. Inferences						--	.19*	-.02
7. LEP (CCI)							--	.12
8. MATS								--

Note. For correlations including GPA or credits, $df = 105$; for all others, $df = 110$.

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Hierarchical Stepwise Regression Analysis. It was hypothesized that cognitive variables would be significant predictors of GPA; however, motivation was expected to be the strongest predictor. Participant's scores on the LEP, the MATS, and the three subscales of the WGCTA were entered into a stepwise regression formula with number of cumulative credit hours entered first to control for amount of education. The results of this analysis, including both raw and standardized beta weights (multiple regression coefficients) are presented in Table 6.

Table 6

Summary of Hierarchical Stepwise Regression Analysis for Variables Predicting GPA

Step	Variable	R^2	ΔR^2	B	$SE\ B$	Beta In [a]	Final Beta [b]
1	Credits	.020	.020	.003	.002	.142	.138
2	Inferences	.132***	.112***	.114***	.030	.334***	.338***
3	MATS	.167***	.035*	.005*	.002	.188*	.188*

Note. $N = 107$. Number of cumulative credit hours was entered first to control for amount of education.

[a] The beta in column presents standardized multiple regression coefficients for a given variable at the step the variable was entered into the model. [b] Final beta weights are standardized multiple regression coefficients for the variable in the final model when GPA was regressed on all three predictors.

*$p < .05$; ***$p < .001$

Hypotheses were partially supported in that both motivational and cognitive variables were significant predictors, but motivation was not the strongest predictor. Table 6 shows that credit hours accounted for 2% of the variance at Step 1, $R^2 = .02$. Participants scores on the Inferences subscale of the WGCTA accounted for an additional 11% of the variance at Step 2, $R^2 = .13$. Finally, MATS scores accounted for another 4% of the variance in GPA at Step 3, for a final R^2 of .17. The final model, then, including only credit hours, Inferences, and MATS scores as predictor variables, accounted for 17% of the variance in participants' GPAs, $F(3, 103) = 6.87$, $p < .001$, adjusted $R^2 = .14$.

Adding Age as a Predictor: Simultaneous Multiple Regression Analysis. Using simultaneous multiple regression, grade point averages were next regressed on the linear combination of credits, the three WGCTA subscales, CCI score, MATS score, and age. In order to include all of these variables in the equation, simultaneous multiple regression analysis was used rather than stepwise regression. All variables were included so that the variance unique to age, above and beyond all other predictors, could be determined. The equation containing these seven variables accounted for 27% of the variance in GPA, $F(7, 99) = 5.19$, $p < .001$, adjusted $R^2 = 0.22$.

Beta weights (standardized multiple regression coefficients) and uniqueness indices were reviewed to assess the relative importance of the seven variables in the prediction of GPA. The uniqueness index for a predictor is the percentage of variance in the GPA accounted for by that predictor, beyond the variance accounted for by the other predictor variables. Both raw and standardized beta weights, as well as

Table 7

Beta Weights and Uniqueness Indices Obtained in Simultaneous Multiple Regression Analyses Predicting GPA

	B Weights[a]		Beta Weights[b]		Uniqueness Indices[c]	
Predictor	*B*	*SE B*	Beta	*t*[d]	Index	*F*[e]
Credits	.0010	.5890	.0516	0.56	.0023	0.32
Assumptions	.0102	.0328	.0413	0.44	.0015	0.20
Deductions	.0020	.0318	.0062	0.06	.0000	0.01
Inferences	.1048	.0017	.3117	3.30***	.0805	10.90***
LEP (CCI)	.0002	.0232	.0117	0.13	.0002	0.02
MATS	.0037	.0015	.1509	1.70	.0213	2.89
Age	.0317	.0022	.3175	3.35***	.0827	11.19***

Note. $N = 107$; $R^2 = .27$.

[a] B weights are unstandardized multiple regression coefficients obtained when GPA was regressed on all seven predictors. [b] Beta weights are standardized multiple regression coefficients obtained when GPA was regressed on all seven predictors. [c]Uniqueness indices indicate the percentage of variance in GPA accounted for by a given predictor variable beyond the variance accounted for by the other six predictors. [d] For *t* tests that tested the significance of the beta weights $df = 99$. [e] For *F* tests that tested the significance of the uniqueness indices $df = 1, 99$.

***$p < .001$

uniqueness indices, are presented in Table 7.

Table 7 shows that only the Inference subscale of the WGCTA and age had significant beta weights, .31 and .32, respectively. Likewise, uniqueness indices were only significant for Inference scores and age. Scores on the Inference subscale of the WGCTA accounted for approximately 8% of the variance in GPA, beyond the variance accounted for by the other six predictors, $F(1, 99) = 10.90, p < .001$. Similarly, age accounted for 8% of the unique variance in GPA, $F(1, 99) = 11.19, p < .001$. Because variance unique to age remained after all variance from the dependent variables was accounted for, it can be said that other unknown factors not examined in this study relate to GPA.

CHAPTER IV

DISCUSSION: FINDINGS AND INTERPRETATIONS

The present study investigated the factors contributing to nontraditional students' successes in returning to college, despite their absence from the school arena for quite some time and their expressed anxiety and role strain. Past literature has stressed that these students are qualitatively different from the young traditional student just out of high school. They also outperform the typical traditional student academically. Results of this study lend further evidence of nontraditional aged women's successes at school, and also offer new evidence of nontraditional women's advanced abilities in recognizing assumptions.

Developmental Conclusions

Consistent with past research (Astin, 1976; Dodd & Skinner, 1996; Johnson, 1995; Leavitt, 1988; O'Conner, 1994; Skinner, 1996), the present study found developmental differences in performance among our groups. Nontraditional women as a whole had significantly higher GPAs than the traditional women. The mean GPA for traditional aged students in this sample was in the "C+" range on the university grading scale ($M = 2.49$, university range for a "C+" is 2.30-2.69). The mean GPA for younger nontraditional students was in the "B-" range ($M = 2.94$, university range for a "B-" is 2.70-2.99), and older nontraditional students' mean GPA was in the "B" range ($M = 3.25$, university range for a "B" is 3.0-3.29). The university grading scale denotes a "C+" as "satisfactory," while both a "B-" and "B" are "good." As hypothesized, the current sample of nontraditional aged women were performing well in school. Unfortunately, *why* their GPAs are elevated might still be a mystery, for, as

will be discussed in detail below, measures which varied developmentally did not prove to predict GPA in regression analyses.

As hypothesized, additional developmental differences were found among the groups on the Watson Glaser Critical Thinking Appraisal. On the Recognition of Assumptions subscale, nontraditional aged women as a whole scored significantly higher than traditional women. Nontraditional aged students were more able to recognize that a statement following a passage was something presupposed or taken for granted. Younger and older nontraditional aged students did not differ significantly in this ability. These findings are consistent with Friend and Zubek's (1975) findings that recognizing assumptions continues to improve up to about age 35. In addition, these findings provide new evidence that nontraditional aged students do, indeed, *think differently* than traditional students.

Friend and Zubek (1975) noted peaks in critical thinking abilities at different points during adulthood. This research did not find developmental differences among our age groups in the ability to deduce or infer information from a passage. Perhaps developmental differences were not revealed because the sample was fundamentally different from Friend and Zubek's. Friend and Zubek's sample was mixed gender and consisted of five occupational groups: (1) professional; (2) semi-professional; (3) skilled labor; (4) unskilled labor; and (5) students. Only 15% of their sample were students, while 100% of the present sample were students. Student populations may differ from other adult populations in important ways.

Although developmental differences were not found on the Deductions subscale, the present research did find that the ability to deduce information from a

passage varied significantly by credit hours completed. Friend and Zubek reported that participants in their age groups had similar mean years of education, but they did not control for amount of education, as the present study did. This finding was not expected and lends evidence to the importance of education in one's ability to deduce information. Moreover, this finding lends evidence that schools are, indeed, teaching individuals to think critically. Some past researchers have argued that American schools are no longer teaching critical thinking (Denitto & Strickland, 1987; Norris, 1985).

Although one would certainly expect cognitive maturation to increase with age, as would be the whole premise of post-formal operations, this sample did not differ developmentally on the LEP measure. In his original reports of the LEP measure, Moore's sample of women had a mean position (CCI) score of 339, and ranged from 325 for freshmen to 347 for seniors (Moore, 1989). CCI scores in his sample increased significantly across class standing. The current sample's overall mean was similar, with a CCI score of 336. The current sample's scores, then, are typical of college students' LEP scores when credit hours are controlled for as they were here.

Unlike the current study, however, the samples Moore (1987, 1989) used in validating his instrument were almost exclusively traditional students, aged 18-24. Group standard deviations in the current sample were high, indicating a great deal of variability within each age group. It is possible that the LEP measures cognitive complexity as taught in college, not as may happen with age. Even Perry agreed that college is an ideal environment for intellectual growth along the positions, but he also stated that college is not necessary for such growth (Perry, 1970). The LEP has been

shown to correlate .36 (Moore, 1989) and .73 (Durham et al., 1994) with the Measure of Intellectual Development (MID), the most used non-objective measure of the Perry Scheme. Future research should take this into account and explore developmental differences between traditional and nontraditional students with the MID. The present findings were certainly unexpected and warrant further investigation of the LEP as an accurate instrument for nontraditional aged women.

Perhaps the most surprising finding of this research is that we did *not*, as so many past researchers (Apps, 1981; Bernard, 1981; Wolfgang & Dowling, 1981) have suggested, find developmental differences in motivation. While we did not find a motivational difference, we do expect that there is some other type of motivational difference among the groups not explored in this research. For instance, Justice and Yelich (1998) found differences in motivation to enroll using the Education Participation Scale (EPS). On this scale, traditional aged students scored significantly higher on the subscales of Social Relations, External Expectations, and Professional Advancement than nontraditional aged students (Justice & Yelich, 1998). The MATS distinguishes between those who are more motivated to achieve and those who are more motivated to avoid failure. In choosing this scale, it was hoped that these types of motivation might explain some of the most apparent differences in learning between traditional and nontraditional women. In other words, it was thought that perhaps the nontraditional women's trademark characteristic of learning for the sake of learning (Apps, 1981; Klein, 1990; Wolfgang & Dowling, 1981) was really due to their being more motivated to achieve (learn) than to avoid failure.

It is also possible that motivational differences were not found on the MATS

due to the current study being less convenient and more demanding than other research projects posted in the department. That is, most other studies were take-home surveys and many surveyed opinions and habits. The current study not only required the participants to sign-up for an appointment (to control for a quiet environment conducive to concentration), but it also required them to think critically. Consequently, the current study may have drawn largely from certain subsets of participants: those who really needed extra credit in their classes after all other projects had been closed to participants; and those who were genuinely interested in the current study's posted objective. Scores on the MATS were in the hypothesized direction; however, group standard deviations were large, indicating a great deal of variance within each age group. Justice and Yelich (1998) also administered the MATS in their take-home survey study. Unlike the current study, they found significant differences between their traditional aged and nontraditional aged students (means for their traditional and nontraditional students were 47.72 and 70.17, respectively). Further research exploring motivational differences between nontraditional and traditional aged student groups is warranted.

Regression Conclusions

Results of stepwise regression analyses revealed that, as predicted, inference and motivation were significant predictors of GPA, explaining 15% of the variance. This is not surprising, since both the ability to infer and motivation to achieve are intuitively necessary to do well in school. Inference alone explained 11% of the variance in participants' GPAs. To make an inference is to draw a conclusion from evidence or statements; therefore, the ability to infer is certainly important in obtaining

good grades. That is, to study for a test, an individual must review the evidence (e.g., text and notes) and then draw conclusions from it (i.e., learn). A critical thinking predictor would be expected, as it is consistent with McCutcheon, Apperson, Hanson, and Wynn's (1992) finding that high academic achievers made significantly fewer errors on the WGCTA, and Spaulding and Kleiner's (1991) finding that GPA and age were among their predictors of scores on the Cornell Critical Thinking Test. Likewise, authors of the WGCTA have reported that their test correlates with grade point average in their freshmen samples (Watson & Glaser, 1980b).

Stepwise regression analyses found that the best predictors of GPA were the ability to infer coupled with achievement motivation. Motivation alone explained 3% of the variance in stepwise regression analyses. Numerous previous researchers have also indicated the importance of adequate motivation in doing well in school (Apps, 1981; Miller et al., 1993; Talbot, 1990; Wolfgang & Dowling, 1981).

It is indeed surprising that the one measure that varied developmentally—recognition of assumptions—was not a significant predictor of GPA in our analysis. While such a finding might have helped explain nontraditional aged women's superior grades, it is possible that recognizing assumptions is simply not that important for academic achievement as measured in this study. Recognizing assumptions is a skill which involves recognizing that although something is not stated directly, it is assumed in the statement. For example, in the statement, "I'll graduate in June," it is assumed that you will be alive in June and that the school will judge you eligible for graduation (Watson & Glaser, 1980a). Educators, for the most part, are not likely to test individuals on what they themselves consider as evident or taken for granted in the

material they teach. Rather, they are more likely to test the actual material that they teach. Logically, if an educator views something as taken for granted, then they would expect a ceiling effect on any test items associated with it. Consequently, such an item that does not discriminate would not be considered a "good" question. Recognizing assumptions may give nontraditional aged students some advantage, such as following along with the lecture; however, this advantage does not explain their higher academic achievement.

In a second simultaneous regression analysis in which all dependent variables were entered, age accounted for 8% of the variance above and beyond the variance accounted for by the other measures. This finding suggests that other factors may contribute to nontraditional students' successes, such as other cognitive variables like memory capacity, or even variables unrelated to cognition, that were not assessed in the current study.

It is possible that life experience itself may contribute to nontraditional women's success. Throughout history, older people have been revered for their wisdom and judgment, for, as they age, they accumulate knowledge and develop perspective and experience in the use and application of it (Cross, 1981). It is common for researchers to talk about older people's compensation for a loss of quickness in learning with their experience and wisdom (Cross, 1981). Baltes (1987) argues that older adults seem to have available to them a well-developed system of knowledge about situations involving life planning. This wisdom, Baltes (1987) says, is practical intelligence and knowledge about the pragmatics of life. In school, older adults are able to use knowledge from experience in various situations and apply it to their learning. Not

surprisingly, many traditional aged students have experienced relatively little of life in comparison, and may be more naive in this area. A more developed assessment of experience is necessary and future research is needed to understand more about how such practical intelligence and knowledge about the pragmatics of life may influence nontraditional women's successes in school.

Variables assessed by the demographic questionnaire may provide a starting point for future research. Having children, being independent from one's parents, taking time off from school, having experience with full-time work, and being or having been married all correlated positively with GPA. Perhaps some of these variables contribute to the development of post-formal reasoning or practical intelligence. In Peterson's (1981) "Sources of Education and Learning in the United States" (p. 307) for adult learners, he includes not only the traditional forms of learning, but also travel, print media, electronic media, and finally, even unintentional learning in the home, from friends, and at work.

All of the demographic variables that correlated with GPA also correlated positively with age, so little can be drawn from the current findings. In the natural confounds of the current study, it is not possible to study the effects of certain demographic variables on GPA due to their correlation with age. The current research was cross-sectional, where the ideal project would be cross-sequential to observe both cohort and age effects. Wisdom from experience cannot be fully assessed separately from possible developmental cognitive changes. A cross-sectional design was necessary due to time constraints, and therefore the findings should be taken with caution. Future research investigating demographic and developmental effects

separately in a cross-sequential design is warranted.

While it is difficult to separate the life experience, motivation, and cognitive developmental aspects of nontraditional aged students' advantages over traditional aged students, the question of why they succeed in college remains a matter of debate and is in need of further research. The current research has shown that older women are more able to recognize assumptions, but this does not explain their superior grades. There is something to be said for the wisdom of maturation, but is it actually age or experience that brings about the wisdom? Is it merely the internalization of goals and motivations that occurs only through years of exploration and experience in this world, or some other aspect of cognition yet unexplored?

Summary

This research reviewed areas of differences between traditional aged and nontraditional aged college women and proposed that differences in three main areas contribute to nontraditional aged women's superior academic performance: motivation, cognitive maturation, and critical thinking. Developmental differences were found in that nontraditional aged groups had higher GPAs and scored higher on the Assumptions subscale of the WGCTA than the traditional group. Regression analyses revealed that the WGCTA Inference subscale and the MATS were significant predictors of GPA. The variable that varied developmentally—recognition of assumptions—did not predict GPA. Further research is needed to investigate additional factors contributing to nontraditional aged women's success in college.

REFERENCES

Apps, J. W. (1981). *The adult learner on campus: A guide for instructors and administrators.* Chicago: Follett.

Arlin, P. K. (1984). Adolescent and adult thought: A structural interpretation. In M. L Commons, F. A. Richards, & C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. 258-271). New York: Praeger.

Astin, H. S. (1976). *Some action of her own: The adult woman and higher education.* Lexington: D.C. Health and Co.

Ballmer, H. B., & Cozby, P. C. (1981). Family environments of women who return to college. *Sex Roles, 7,* 1019-1026.

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. *Developmental Psychology, 23,* 611-626.

Bauer, D., & Mott, D. (1990). Life themes and motivations of re-entry students. *Journal of Counseling and Development, 68,* 555-560.

Bernard, J. (1981). Women's educational needs. In A. W. Chickering (Ed.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 256-278). San Francisco: Jossey-Bass.

Chartrand, J. M. (1990). A causal analysis to predict the personal and academic adjustment of nontraditional students. *Journal of Counseling Psychology, 37,* 65-73.

Commons, M. L., Richards, F. A., & Kuhn, D. (1982). Systematic and metasystematic

reasoning: A case for levels of reasoning beyond Piaget's stage of formal operations. *Child Development, 53,* 1058-1069.

Crain, W. (1992). *Theories of development: Concepts and applications.* Englewood Cliffs, New Jersey: Prentice Hall.

Cross, K. P. (1981). *Adults as learners: Increasing participation and facilitating learning.* San Francisco: Jossey-Bass.

Denitto, J., & Strickland, J. (1987). Critical thinking: A skill for all seasons. *College Student Journal, 21,* 201-204.

Dodd, J. L. & Skinner, J. (1996). *Adult women students at Old Dominion University: Spring 1996* (Summary Report). Norfolk, Virginia: Old Dominion University, Women's Center.

Durham, R. L., Hays, J., & Martinez, R. (1994). Socio-cognitive development among Chicano and Anglo American college students. *Journal of College Student Development, 35,* 178-182.

Friend, C. M., & Zubek, J. P. (1975). The effects of age on critical thinking ability. In D. B. Lumsden & R. H. Sherron (Eds.), *Experimental studies in adult learning and memory* (pp. 37-50). Washington, D. C.: Hemisphere.

Johnson, M. L. (1995). Lessons from the Open University: Third-age learning. *Educational Gerontology, 21,* 415-427.

Justice, E. M., & Dornan, T. M. (1995, April). *Metacognitive and motivational variables related to course performance for traditional and non-traditional age students.* Poster session presented at the biennial meeting of the Society for Research in Child Development, Indianapolis, IN.

Justice, E. M., & Yelich, T. G. (1998, May). *Motivational and achievement differences between traditional and non-traditional age college students.* Poster session presented at the 10th Annual Convention of the American Psychological Society, Washington, D. C.

Klein, J. D. (1990). An analysis of the motivational characteristics of college reentry students. *College Student Journal, 24,* 281-286.

Kopp, R. G., & Ruzicka, M. F. (1993). Women's multiple roles and psychological well-being. *Psychological Reports, 72,* 1351-1354.

Kramer, D. A. (1983). Post-formal operations? A need for further conceptualization. *Human Development, 26,* 91-105.

Lavallee, M., Gourde, A., & Rodier, C. (1990). The impact of lived experience on cognitivoethical development of today's women. *International Journal of Behavioral Development, 13,* 407-430.

Leavitt, R. S. (1988). Married women returning to college: A study of their personal and family adjustments. *Smith College Studies in Social Work, 59,* 301-313.

McCutcheon, L. E., Apperson, J. M., Hanson, E., & Wynn, V. (1992). Relationships among critical thinking skills, academic achievement, and misconceptions about psychology. *Psychological Reports, 71,* 635-639.

McDaniel, E., & Lawrence, C. (1990). *Levels of cognitive complexity: An approach to the measurement of thinking.* New York: Springer-Verlag.

Mehrabian, A. (1995). Individual differences in achieving tendency: Review of evidence bearing on a questionnaire measure. *Current Psychology, 13,* 351-364.

Miller, R. B., Behrens, J. T., Greene, B. A., & Newman, D. (1993). Goals and perceived ability: Impact on student valuing, self-regulation, and persistence. *Contemporary Educational Psychology, 18,* 2-14.

Moore, W. S. (1987). *The learning environment preferences: Establishing preliminary reliability and validity for an objective measure of the Perry scheme of intellectual development.* Unpublished doctoral dissertation, University of Maryland.

Moore, W. S. (1989). The learning environment preferences: Exploring the construct validity of an objective measure of the Perry scheme of intellectual development. *Journal of College Student Development, 30,* 504-514.

Norris, S. P. (1985). Synthesis of research on critical thinking. *Educational Leadership, 42,* 40-46.

Novak, M., & Thacker, C. (1991). Satisfaction and strain among middle-aged women who return to school: Replication and extension of findings in a Canadian context. *Educational Gerontology, 17,* 323-342.

Nunn, G. D. (1994). Adult learners' locus of control, self-evaluation and learning temperament as a function of age and gender. *Journal of Instructional Psychology, 21 (3),* 260-264.

O'Connor, P. (1994). The needs of adult university students: A case study. *College and University: A Journal of the American Association of Collegiate Registrars, 69,* 84-86.

Perry, W. J., Jr. (1970). *Forms of intellectual and ethical development in the college years.* New York: Holt, Rinehart, and Winston.

Perry, W. J., Jr. (1981). Cognitive and ethical growth: The making of meaning. In A. W. Chickering (Ed.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 76-116). San Francisco: Jossey-Bass.

Peterson, R. E. (1981). Opportunities for adult learners. In A. W. Chickering (Ed.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 306-327). San Francisco: Jossey-Bass.

Powell-Pitts, S. (1992). Reentry women in higher education: The quiet revolution. *College Student Affairs Journal, 12,* 69-75.

Richards, F. A., Armon, C., & Commons, M. L. (1984). Perspectives on the development of thought in late adolescence and adulthood: An introduction. In M. L. Commons, F. A. Richards, & C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. xiii-xxviii). New York: Praeger.

Schaie, K. W. (1996). *Intellectual development in adulthood: The Seattle longitudinal study.* New York: Cambridge University Press.

Schaie, K. W., & Parr, J. (1981). Intelligence. In A. W. Chickering (Ed.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 117-138). San Francisco: Jossey-Bass Inc.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology, 19,* 460-475.

Skinner, J. (1996). *Summary report on returning women students at Old Dominion University, 1995-1996* (Unofficial Report). Norfolk, Virginia: Old Dominion

University, Women's Center.

Spaulding, S. C., & Kleiner, K. A. (1991). The relationship of college and critical thinking: Are critical thinkers attracted or created by college disciplines? *College Student Journal, 26,* 162-166.

Sternberg, R. J. (1984). Higher-order reasoning in postformal operational thought. In M. L. Commons, F. A. Richards, & C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. 74-91). New York: Praeger.

Talbot, G. L. (1990). Personality correlates and personal investment of college students who persist and achieve. *Journal of Research and Development in Education, 24,* 53-57.

Watson, G., & Glaser, E. M. (1980a). *Watson-Glaser critical thinking appraisal.* San Antonio, TX: Psychological Corp.

Watson, G., & Glaser, E. M. (1980b). *Watson-Glaser critical thinking appraisal manual.* San Antonio, TX: Psychological Corp.

Wolfgang, M. E., & Dowling, W. D. (1981). Differences in motivation of adult and younger undergraduates. *Journal of Higher Education, 52,* 640-648.

Yarbrough, D. W., & Schaffer, J. L. (1990). A comparison of school-related anxiety experienced by nontraditional versus traditional students. *College Student Journal, 24,* 81-90.

APPENDIX A

DEMOGRAPHICS QUESTIONNAIRE

1. What is your age?_____ (Date of Birth:_____)

2. Current relationship status: ___Married ___Widowed ___Divorced
___Separated ___Single/Never Married ___Not Married/Living with partner

3. Number of children (including any stepchildren) you have (0 if none): _____

4. List your children's ages: _____

5. Ages of any children who live with you now: _____

6. Total number of years you have been living out of your parents' home:
___0 ___<1 ___1-3 ___4-10 ___>10

7. Number of years you have been living without major financial support from your parents (i.e., parents covering 50% or more of your living expenses):
___0 ___<1 ___1-3 ___4-10 ___>10

8. Do you currently work? ___Part-time ___Full-time ___No

9. Number of years working at current or most recent job:
___<1 ___1-3 ___4-10 ___>10

10. Total number of different full-time jobs you've held: _____

11. Total number of different part-time jobs you've held: _____

12. You are: ____Freshman ____Sophomore ____Junior ___Senior

13. How many credits have you completed? _____

14. How many credits are you currently taking? _____

15. Longest period of time out of school since graduating from high school: _____

16. Period of time out of school before enrolling in this university: _____

17. Race: ____African-American ____Asian-American ____Caucasian
____Hispanic ____Native-American ____Other

APPENDIX B

LETTER OF PERMISSION FOR USE OF THE LEP

Center for the Study of Intellectual Development
William S. Moore, Coordinator
1505 Farwell Ct. NW
Olympia, WA 98502
360-786-5094 (voice) wsmoore@earthlink.net (email)

ORDER FORM/CONTRACT

The Measure of Intellectual Development (MID) (Knefelkamp & Widick. 1974) and the Learning Environment Preferences (LEP) (Moore. 1987) can only be reproduced with written permission from the Center for the Study of Intellectual Development or one of the authors. A signed copy of this form constitutes such permission from the Center. Please complete this form and send it to the Center coordinator for review and signing: a copy will be returned to you for your files.

I agree to the following items as conditions for my use of the Measure of Intellectual Development and/or the Learning Environment Preferences:

1) I understand that this permission only applies to the research project described herein; I will not release the instruments to others or use the instruments in any subsequent studies without permission from the Center;

2) MID essays will be scored by CSID raters or raters approved by the Center in order to insure high levels of accuracy and consistency. If approved, outside raters are used, I understand that a percentage of the sample (from 10-25% depending on individual circumstances) must also be rated by CSID for reliability purposes. LEP answer sheets will also be sent to CSID for scoring;

3) For scoring purposes, I will send the originals or high-quality copies of the MID essays (and a cover sheet with student demographic information) or the LEP answer sheets, and I understand that these will be retained by CSID for its data bank;

4) Upon request, I will provide CSID with a copy of any research report or publication produced based on this data, and will charge the Center for any photocopying costs incurred.

In return, the Center for the Study of Intellectual Development agrees to:

1) Rate the MID instruments for a fee of $5.00 per essay ($2.50 per rater per essay);

2) Score the LEP answer sheets for a fee of $1.00 per instrument (50¢ per instrument if collected in conjunction with the MID);

3) For the MID, provide a summary sheet of both individual and reconciled ratings--for the LEP, a summary sheet including all demographic information, position subscores, and the overall CCI (Cognitive Complexity Index) score, plus basic summary statistics as requested by the researcher;

4) Provide any additional followup necessary for the interpretation of the instrument scores or summary sheets.

5) SPECIAL NOTES/REVISIONS OF TERMS:

OVER

Instrument/s Requested:

MID ____ ----------> [Essay Form:A ___ AP ___ Q____ Other*? ____]

LEP X

*Essays A, AP, and Q are the primary essays used for measuring general epistemological issues related to the Perry scheme. Alternative essays are available for research on other specific domains, e.g., careers, decision-making, specific academic disciplines (math, humanities, science). For more information about these essays, or potential work on other variant essays, contact the Center Coordinator.

****

Kelli J. England — Kelli A. England
Name of Principal Researcher — Signature

Old Dominion University — 2/3/97
Institution — Date

3756 Historyland Drive — (757) 486-3688
Address — Phone (w/ AC)

Virginia Beach, Virginia 23452-3308 — kje100z@oduvm.cc.odu.edu
City/State/Zip Code — Email address

****

William S. Moore — 2/8/97
William S. Moore, Coordinator, CSID — Date

****

APPENDIX C

LETTER OF PERMISSION FOR USE OF THE MATS

Dear Colleague,

The following list of fees applies to your request. For each of the measures requested, you will receive the scale items, scoring key and directions, and norms.

Mehrabian (1969) measure of Achieving Tendency including 1994 revision, manual, and review of validity studies	Fee=$28 U.S.
Emotional Empathic Tendency: 1994 manual and review of validity studies	Fee=$28
Trait Arousability (the converse of Stimulus Screening): manual for the 1994 revision and review of validity studies	Fee=$28
Affiliative Tendency and Sensitivity to Rejection: manuals and review of validity studies	Fee=$28
Dominance-submissiveness: manual for the 1994 revision of the scale.	Fee=$28
Arousal Seeking Tendency (Mehrabian, 1978)	Fee=$28
Trait pleasure, arousability, and dominance scales, including computational formulas to predict personality scale scores on numerous traits. Includes manual and general background on Mehrabian's PAD Temperament Model.	Fee=$58
State pleasure, state arousal, and state dominance measures (Mehrabian, 1978). A comprehensive system of measures for assessing affect.	Fee=$28
Individual differences in fidgeting (1986)	Fee=$18
Depression and Trait Anxiety scales: includes basic theoretical rationale and manual.	Fee=$28
Child Stimulus Screening	Fee=$28
Three orthogonal measures of parental attitude: pleasure-, arousal-, and dominance-inducing qualities of parental attitudes (the emotional climate created for children by parents)	Fee=$28

In ordering the measure circled above, I agree that payment of the fee corresponding to the scale provides me with permission to use that instrument in my experimental studies, but not for reproduction of items and/or the scale in any medium for distribution to others (e.g., dissertation, journal article, book, another manual). Others in my department who wish to use the same scale must write you specifically for permission for its use.

Your name and home address: Elaine M. Justice
3516 Hewitt Dr
Norfolk, VA 23518

Your signature: Elaine M Justice Date: 11/21/96

BE SURE TO INCLUDE $3 FOR POSTAGE WITH YOUR REQUEST.
Please circle the desired scales above and return with your check payable to :

Albert Mehrabian
1130 Alta Mesa Road
Monterey, CA 93940 Tel. 408/649-5710

APPENDIX D

INFORMED CONSENT FORM

Subject #: _____

OLD DOMINION UNIVERSITY
Department of Psychology
INFORMED CONSENT

Project Name: SCHOOLDAZE
Investigators: Dr. Elaine Justice and Ms. Kelli England

This is to certify that I _____, agree to participate as a volunteer in a research project as part of the educational and research program at Old Dominion University under the supervision of Dr. Elaine Justice.

I understand that this project is designed to investigate the cognitive and motivational variables that may predict academic performance in traditional and non-traditional age college females.

I understand that in order to complete this study I will be asked to complete four questionnaires.

I also understand that participation in the study requires that the experimenters obtain my overall Grade Point Average. I hereby give my consent to have authorized personnel obtain my GPA from Student Records for the investigators stated above. Only overall GPA will be obtained.

I understand that all data obtained, including my GPA, will be confidential and will be available only to the experimenters. Data from the project will be reported only in group form.

I understand that I am free to withhold any answer to specific items or questions on the questionnaires. I have been given an opportunity to ask questions, and all such questions have been answered to my satisfaction.

I acknowledge that I was informed about any possible risks to my health and well-being that may be associated with my participation in this research.

I further understand that I am free to withdraw my consent and terminate my participation at any time, without penalty.

I have been informed that I have the right to contact the Psychology Department Committee for the Protection of Human Subjects and/or the University Committee should I wish to express any opinions regarding the conduct of this study.

_____ _____
Signature Date

_____ _____
Print Name Birth Date (month/day/year)

VITA

Kelli Jean England
Department of Psychology · Old Dominion University · Norfolk, Virginia 23529-0267

EDUCATION

August 1998 M.S. - General Psychology. Old Dominion University, Norfolk, VA.
May 1995 B.S. - Psychology, Magna Cum Laude. Old Dominion University.

PUBLICATION

Janda, L. H., England, K. J., Lovejoy, D., & Drury, K. (1998). Attitudes toward psychology relative to other disciplines. *Professional Psychology: Research and Practice, 29,* 140-143.

A SAMPLING OF PREVIOUS AND CONCURRENT RESEARCH:

- Project Director: Old Dominion University. 10/97 to present. Studied risky behaviors (sex, violence, etc.) in prime time television. Supervisor: Bryan Porter, Ph.D.
- Senior Research Associate: Old Dominion University. 1/97 to present. Assisted in the development, implementation, and evaluation of two extensive community traffic safety programs targeting the reduction of red light running and other risky intersection behaviors. Supported by two Federal 402 grants. Supervisor: Bryan Porter, Ph.D.
- Graduate Research: Old Dominion University. 8/95 to 5/96. Completed a first year Master's research project investigating 4- and 6-year-old children's understanding of the causal link between strategy use and recall performance, and the relationship between this understanding and the child's actual performance. Supervisor: Elaine Justice, Ph.D.
- Undergraduate Honors Thesis: Old Dominion University. 8/94 to 5/95. Investigated professors' views of various scientific fields, focusing on the public image of psychology. Supervisor: Louis Janda, Ph.D.

CLINICAL AND RELEVANT WORK EXPERIENCE:

- Practicum: Eastern Virginia Medical School, Norfolk, Virginia. 8/96 to 10/97. Organization, implementation, and testing in a longitudinal study of nasal dysfunction and quality of life in children with cystic fibrosis. Supervisor: David Darrow, M.D.
- Psychometrician: Fairfield Psychological Associates, Virginia Beach, Virginia. 8/96 to 10/97. Administration and scoring of WAIS-R, WISC-III, and WMS-R. Supervisor: Robin Lewis, Ph.D.
- Teaching Assistant: Psychology Department Learning Communities, Old Dominion University. 8/96 to 12/96. Coordination and maintenance of undergraduate program for psychology students. Supervisor: Robin Lewis, Ph.D.
- Research Assistant: Psychology Department, Old Dominion University. 1/96 to 8/96. Assisted in data collection, entry, analysis, and interpretation in various research projects. Supervisors: Elaine Justice, Ph.D., Robin Lewis, Ph.D.