

## LEARNING THEORY & APPROACHES

Asera, R. & Fong, C.J. (2010). *Psychosocial theories to inform a new generation of student support structures for learning mathematics*. Stanford, CA: The Carnegie Foundation for the Advancement of Teaching.

*This paper explores psychological research and theories from the 1970s to contemporary (2009) in order to inform a new generation of student support structures committed to increasing student motivation and academic success. This paper synthesizes social and psychological theories that build upon Bandura's theory of self-efficacy. The authors used these theories to develop a theoretical framework in order to enhance student support structures with research-based approaches. The framework highlights theories about the sources of information from which students assess their sense of competence, the mediating and self-regulating processes that appraise and attribute these sources, and the potential outcomes, specifically, a strong sense of self-efficacy, high levels of motivation and a gritty resilience. The authors present the Academic Youth Development (AYD) program as an example of an initiative that links theory to practice. AYD was designed to support the successful transition of middle school students into Algebra I by shaping students' commitment to success in rigorous academic programs. It melds best practices in supporting algebra-readiness skills with recent advances in developmental and social psychology. Interviews and surveys of students who participated in AYD revealed how integrating motivational theories and creating a community of learners can be implemented into strategies for students to productively persist in a rigorous and challenging academic courses.*

Breen, R., & Lindsay, R (2002). "Different disciplines require different motivations for student success." *Research in Higher Education*, 43(6), 693-725.

*The present study builds upon the work of Meyer and Eley (1999), which explored the types of learning goals (outcome incentives) and sources of enjoyment (process incentives) that characterize students in different disciplines. The purpose of the study is to test the hypothesis that student learning goals and enjoyment sources as motivational concepts can be used to predict who will succeed and who will fail in different disciplines. The theoretical framework underpinning the study was derived from the results of an interview investigation of student motivation and conceptions of disciplinary knowledge (Breen, 2002; Breen et al., 2000). The researchers explored qualitative differences between the motivations of students studying different disciplines and to consider how these might interact with the students' conceptions of disciplinary knowledge. The theoretical framework was used to develop statements for a questionnaire designed to measure the relative importance of particular goals (outcome incentives) and associated sources of enjoyment for students studying in specific disciplines. The questionnaire was made available to all students from all years of study (N = 1,569), via e-mail*

*and researchers stationed at the entrance to the main university building in the final term of the academic year 1999 – 2000. The overall response rate for the completion of the questionnaires was 29% (n = 380), but across the eight disciplines, the response rate ranged from 14% to 50% (31 in geology, 43 in biology, 47 in education, 48 in anthropology, 49 in history, 50 in food science and nutrition, 52 in computing, and 60 in planning). Discipline-specific regression models of motivation and discriminant analyses suggest that that student learning goals and enjoyment sources as motivational concepts can be used to predict who will succeed and who will fail. Results indicate that earning goals and sources of enjoyment consistently explain more variation in student performance than general motivations. The findings support the claim that discipline-specific knowledge conceptions and expectations are important intervening variables in the execution of learning tasks.*

Feldman, K.A., Smart, J.C., & Ethington, C.A. (2004). What do college students have to lose? Exploring the outcomes of differences in person-environment fits. *Journal of Higher Education*, 75(5), 528-555.

*This article analyzes John Holland's "theory of careers" (1966, 1973, 1985, 1997) to examine the patterns of student stability and change inherent in the college experience—as part of an effort to understand the satisfaction, learning, and retention of college students (see Smart, Feldman & Ethington, 2000; Feldman, Smart & Ethington, 1999; and Feldman, Ethington & Smart, 2001). There are two primary purposes of this study. The first is to examine gains and losses of students who are congruent and incongruent with their chosen academic environment. The second purpose of this study is to explore the possibility that students who enter academic environments not congruent with their dominant personality type incur various "costs" in relation to their peers who enter congruent academic environments. Data for the present study come from the 1986 and 1990 surveys of the Cooperative Institutional Research Program (CIRP). The overall CIRP sample consisted of 4,408 students attending 360 different institutions. The researchers formed five multi-item indicators from items in the 1990 CIRP survey to assess students' levels of involvement in and satisfaction with academic and social activities in their environments, as well as any personal costs and discontents that might have accrued as a result of their interactions in these environments. Findings suggest that students majoring in a field matching their dominant personalities made sizable gains on their dominant interests and abilities while decreasing in their scores on these interests and abilities or making only very small gains if they majored in any of the three fields incongruent with their dominant personality. A test of the discriminant function was non-significant indicating that students with personalities incongruent with their academic major were engaged in similar levels of activities as the congruent students and had similar levels of satisfactions and discontents. These findings*

*suggest that student gains in newfound abilities and interests promoted by their chosen academic environment do not come at the expense of the quality of their educational experience or their satisfaction with those experiences, and does not cause them to sacrifice their social activities or induce greater personal costs and discontents.*

Hativa, N., & Birenbaum, M. (2000). Who prefers what? Disciplinary differences in students' preferred approaches to teaching and learning styles. *Research in Higher Education*, 41(2), 209-236.

*This study inquires into students' preferences for instructors' approaches to teaching. For this study the researchers developed an instrument to measure students' preferences and used students' approaches to learning and different academic environment for its validation. The sample consisted of 175 undergraduates enrolled in the engineering and education schools at a major university in Israel. The Motivated Learning Strategies Questionnaire (MLSQ) (Pintrich et al., 1991) was used to assess college students' self-reported motivation orientations and their learning strategies for a particular course. A factor analysis using the principal axis extraction method was performed on the 13 subscales of the IPQ in order to identify the underlying structure of students' instructional preferences. Four factors emerge, explaining 71% of the variance. Four multiple regression analyses were employed to estimate the weights of school and students' learning approaches (MLSQ scales) in predicting preference for each of the four teaching approaches. This study developed a tool for identifying students' preferred teaching approaches, which was proved to have high internal consistency for the scales involved. The study indicates that students with different approaches to learning are likely to define good teaching in ways that reflect those approaches.*

King, P.M. (2009). Principles of development and developmental change underlying theories of cognitive and moral development. *Journal of College Student Development*, 50(6), 597-620.

*This article is a literature review of college student cognitive and moral development. Using development principles as a lens to review several theories of cognitive and moral development, it mainly draws on developmental psychology and educational psychology. It discusses cognitive and moral development as aims of higher education. It uses the following three principles to illustrate the nature of cognitive and moral development. 1) Individuals actively construct and organize their interpretations of experiences. 2) There are discernable age-related patterns in the ways individuals organize their thinking. 3) Development occurs in context, in interaction with one's environment. The article presents models that provide alternative conceptions of how development unfolds. It suggests ideas for future research that include theory building and assessment.*

Lattuca, L.R. (2002). Learning interdisciplinarity: Sociocultural perspectives on academic work. *Journal of Higher Education*, 73(6), 711-739.

*This exploratory study uses sociocultural theory to examine how some faculty members create spaces for interdisciplinary thinking, research, and teaching. To examine how faculty learn to do interdisciplinary work, the researchers re-analyzed data gathered for a previous study. The previous study was based on interviews with college and university faculty involved in a variety of interdisciplinary scholarly activities. It focused on the processes, contexts, and outcomes of interdisciplinarity. Participants for the study were selected from four sites: a research I university, a doctoral I university, and two selective liberal arts colleges. A two-stage, purposeful sampling strategy was used to identify faculty on each campus. The process of analytic induction was used to identify categories and sub categories in the data. Findings from the study showed how the learning that enabled interdisciplinarity was relational, mediated, transformative, and situated.*

Lattuca, L.R., Voigt, L.J., & Fath, K.Q. (2004). Does interdisciplinarity promote learning? Theoretical support and researchable questions. *Review of Higher Education*, 28(1), 23-48.

*This article use theories of learning and cognition to explore how and why interdisciplinary courses might promote specific learning outcomes. The article examines two illustrative cases of interdisciplinary in practice to see why it might encourage student learning. The work of Greeno and his colleagues (1997) suggest that educational thought and practice as been shaped by the associationist/behaviorist perspective, the domain-structural/cognitive perspective, and the situative perspective. The article uses these three general perspectives to guide the analysis of the cases. Five themes emerged from this analysis. These themes were Engaging Students' Prior Knowledge and Experience; Encouraging Effective Thinking; Developing Multiple Perspectives; Motivating Students to Learn; and Constructing Meaning in the classroom. Insights gained from this analysis are used to develop a research agenda in order to encourage systematic study of the effects of interdisciplinarity on student learning.*

Lietz, P., & Matthews, B. (2010). The effects of college students' personal values on changes in learning approaches. *Research in Higher Education*, 51(1), 65-87.

*The purpose of the analyses was to examine the extent to which learning approaches and their constituent subscales of motive and strategy changed over the 3 years of undergraduate study and to investigate the way in which student background factors, in particular personal values, operated to influence learning approaches and changes in them over time. This study is embedded in the students' approaches to learning (SAL) perspective, the communalities with the self-regulated learning (SRL) perspective, in particular as far as the motivational and strategic components of student learning are concerned, will ensure the relevance of results to both*

*perspectives. The sample for this study consisted of a cohort of international students who started their 3-year Bachelor of Arts or Bachelor of Science degree at an international university in Germany, where English was the language of instruction, in September 2004. Of the cohort, 137 students participated in 2004, 155 in 2005, and 116 in 2006 with 88 students taking part on all three occasions and 153 students participating on two of the three occasions. Learning approaches were measured using the Study Process Questionnaire and the Portrait Value Questionnaire. The SPQ aimed at measuring the achieving, the deep and the surface approaches to learning. The Portrait Value Questionnaire was composed of 40 items that were designed to measure self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism. Hierarchical linear modeling was used to allow for the estimation of the effect of any predictor on the outcome variable while all other predictors were taken into account. The model explained only 20 per cent of the differences in the achieving approach at the beginning and during the 3 years of students' undergraduate degrees. In answer to the main research question as to how personal values influence learning approaches and changes therein over time, results reveal three significant effects. (1) Students who value achievement more highly than other students, upon arriving at university, display characteristics of the achieving approach to a greater extent than students who value achievement less. (2) Students who value security more highly than other students are higher on the achieving approach to learning. (3) Students who value having a good time and fun more highly follow the achieving approach to learning to a lesser extent than their peers.*

Lyke, J.A., & Young, A.J.K. (2006). Cognition in context: Students' perceptions of classroom goal structures and reported cognitive strategy use in the college classroom. *Research in Higher Education*, 47(4), 477-490.

*This study sought to assess the impact of goal orientation and perception of classroom goal structure on cognitive strategy use. Participants were 322 undergraduate students enrolled in four sections of a Human Development course at a large, comprehensive regional university in the Midwest. The Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 1996) was administered both at the beginning (pretest) and end of the semester (posttest). The scales used for analyses included pretest measures of intrinsic goal orientation, extrinsic goal orientation, rehearsal strategy use, and deep strategy use. After all data was collected, students' pretest scores on intrinsic and extrinsic goal orientations were trichotomized into the lowest third, middle third, and highest third in order to examine possible non-linear effects of goal orientation on strategy use. A two-way ANOVA was performed using the three levels of intrinsic and extrinsic goal orientations to examine A two-way ANOVA was performed using the three levels of intrinsic and extrinsic goal orientations to examine. Results indicated a significant main*

effects for the relationship between participants' pretest intrinsic goal orientation and their posttest use of deep cognitive strategies ( $F(2, 201)=21.51, p<.001$ ). A two-way ANOVA was also performed using the three levels of pretest intrinsic and extrinsic goal orientations to examine mean scores of students' posttest reports of their use of rehearsal strategies. Results indicated a significant main effect for the relationship between students' pretest extrinsic goal orientation and their posttest use of rehearsal ( $F(2, 201)=8.61, p<.001$ ). Students' ratings of the task structure and performance structure of their classrooms were significantly negatively correlated ( $r(255)=-.38, p<.001$ ), and students' pretest intrinsic goal orientation was significantly positively correlated with perception of the classroom as task structured ( $r(210)=.33, p < .001$ ). Students' perceptions of their classroom's task structure were significantly positively correlated with their reported posttest use of both deep cognitive strategies ( $r(255)=.30, p<.001$ ) and rehearsal ( $r(255)=.14, p<.05$ ). The results of this investigation indicate that student goal orientation, perceived class structure, and cognitive strategy use are indeed interrelated for undergraduates.

Paulsen, M.B., & Feldman, K.A (2007). The conditional and interaction effects of epistemological beliefs on the self-regulated learning of college students: Cognitive and behavioral strategies. *Research in Higher Education*, 48(3), 353-401.

*This study focuses on the estimation of the conditional and interaction effects of epistemological beliefs on cognitive and behavioral learning strategies in a product-term model. The study complements this previous research on the effects of students' epistemological beliefs on the use of effective motivational learning strategies by studying the effects of students' epistemological beliefs on the use of educationally productive cognitive and behavioral learning strategies. The subjects for this study were 502 students at a large urban public university. The researchers examined the relations between four measures of epistemological beliefs (independent variables) and various measures of cognitive and behavioral learning strategies (dependent variables) college students use in their courses. Multiple regression was used to capitalize on all the cross-student variation in variables available with the continuous measures employed. Additionally, all independent and dependent variables were standardized—before any interaction terms were created—so that the estimates of regression coefficients would measure effect sizes in standard deviation units. The researchers compared each of the four cognitive learning strategies (the dependent variables) on the four dimensions of epistemological beliefs and on all possible two-way interactions between the four dimensions of epistemological beliefs (the independent variables) in order to estimate the conditional and interaction effects of epistemological beliefs on students' use of cognitive learning strategies. The findings of this study indicate that compared to students with more sophisticated beliefs that one's ability to*

*learn can be improved and enhanced through effort and experience over time, students with more naive beliefs that the ability to learn is fixed are less likely to use cognitive strategies of rehearsal, organization, elaboration, and metacognition. The study found that a belief in certain knowledge has a statistically significant conditional effect on only one of the self-regulated cognitive strategies, organization.*

Paulsen, M.B., & Feldman, K.A (2005). The conditional and interaction effects of epistemological beliefs on the self-regulated learning of college students: Motivational strategies. *Research in Higher Education*, 46(7), 731-768.

*This study examines the relations between four measures of epistemological beliefs and six measures of motivational learning strategies college students use in their courses. The researchers assessed students' epistemological beliefs using the Epistemological Questionnaire (EQ) developed by Schommer (1990). Students' use of self-regulated learning strategies was assessed using the Motivated Strategies for Learning Questionnaire (MSLQ). This study uses multiple regression analysis to estimate the conditional and interaction effects of a set of four measures of epistemological beliefs on six measures of students' use of motivational learning strategies in their college coursework. Findings indicate that college teachers could promote their students' use of effective motivational self-regulated learning strategies by designing learning environments and activities that instruct and challenge their students to advance toward greater maturity and sophistication in their epistemological beliefs.*

Perry, R.P., Hladkyj, S., Pekrun, R.H., Clifton, R.A., & Chipperfield, J.G. (2005). Perceived academic control and failure in college students: A three-year study of scholastic attainment. *Research in Higher Education*, 46(5), 535-569.

*This study is a follow up to Perry et al.'s (2001) analysis of the paradox of failure. The study examined perceived academic control and failure preoccupation over a 3-year period with more comprehensive measures of scholastic attainment than Perry et al. The researchers employed the same classification groupings, but instead of using grades in a single course as was done in Perry et al., we obtained year-end cumulative GPA, voluntary withdrawals from courses (VW), and complete departures for each student from institutional records for 3-years, beginning with the year in which Perry et al.'s 1-year study took place. The GPA, VW, and student departure measures were analyzed using an Academic Control (low, high) by Preoccupation with Failure (low, high) by Year in Program (1, 2, 3) repeated measures 2x2x3 ANCOVA. Self-reported HSG was included as a covariate to control for possible preexisting differences in student aptitude and/or past performance. This design extends Perry et al.'s (2001) basic 2x2 factorial design by adding the Year in Program (1, 2, 3) variable as a repeated measure. The study showed that academic control and failure-preoccupation influenced*

*students' scholastic attainment throughout their undergraduate training in terms of cumulative GPA, voluntary course withdrawal (VW) rates, and student departures. The study improved the ecological validity of Perry et al.'s research by including three performance-based institutional measures that are commonly employed in gauging college students' academic attainment.*

Pierson, C.T., Wolniak, G.C., & Flowers, L.A. (2003). Impacts of two-year and four-year college attendance on learning orientations. *Review of Higher Education*, 26(3), 299-321.

*The study estimated the net total and net direct influences of attending a two- or four-year college on the same four learning orientations as the Pascarella, Bohr, Nora, Ranganathan, Desler, & Bulakowski (1994) investigation (i.e., openness to diversity/challenge, learning for self-understanding, internal locus of attribution for academic success, and preference for higher-order cognitive activities). The study also sought to determine if the effects of two-year college attendance on learning orientations were the same for all students or if they differed for students with different background characteristics. The institutional sample consisted of 18 four-year and 5 two-year colleges and universities located in 16 states throughout the country. The institutions were chosen from the National Center on Education Statistics Integrated Postsecondary Education Data System (IPEDS) data to represent differences in colleges and universities nationwide on a variety of characteristics. The individuals in the sample were students participating in the first two follow-ups of the National Study of Student Learning (NSSL). The study estimated direct effects by regressing each dependent variable on the dummy variable representing two- or four-year college attendance and all other variables in the analytic model. Results counter the prevalent notion that the very nature of two-year community colleges leads perforce to a less developmentally influential undergraduate experience than that typically available at four-year colleges and universities. The significantly greater gains made in learning orientations by two-year college students could not be totally accounted for by differences between two- and four-year college students in the academic and nonacademic experience of college.*

Pierson, C.T., Wolniak, G.C., & Flowers, L.A. (2003). Impacts of two-year and four-year college attendance on learning orientations. *Review of Higher Education*, 26(3), 299-321.

*This study uses quantitative measures to explore the relationship between epistemologic development and academic performance as well as epistemologic development and academic behaviors and beliefs of high-risk students. Results indicated that a positive correlation existed between epistemologic development and academic achievement. The study investigates two key questions. (1) Is there a relationship between epistemologic development and academic performance? (2) How is epistemologic development related to achievement processes, which*



could influence academic outcomes? Participants ( $N=628$ ) were recruited from a large, selective, predominantly White, Northeastern, public research university. All participants completed an assessment packet that included the following measures: Demographic questionnaire, the attribution scale (Connell, 1985), the COPE Inventory (Carver et al., 1989), and the Self-Authorship Survey (Pizzolato, 2007). To investigate whether there is a relation between epistemologic development and academic achievement, a bivariate correlation was run on students' total scores on the Self-Authorship Survey and college GPA. This correlation ( $r=.26$ ;  $P<.001$ ) showed that there is a small, positive relationship between epistemologic development and academic achievement. A series of bivariate correlations were run to investigate the relation between epistemologic development, attributions for success and failure, and coping strategies. Attributing success or failure to both unclear factors ( $r=-.34$ ;  $p<.01$ ), or external factors ( $r=-.40$ ;  $p<.01$ ) were both negatively correlated to epistemologic development. Conversely, attributing success and failure to internal factors was positively related to epistemological development ( $r=.12$ ;  $p<.01$ ). The data file was then split in order to determine if the epistemologic development-academic achievement relation held true for high-risk students. Risk factors include the following characteristic; (a) first-generation status, (b) high minority concentration in the participant's high school ( $>75$ ), (c) high concentration of students on free lunch in the participant's high school ( $>75\%$ ), (d) low academic quality of participant's high school (e) individual student SAT scores more than 2 standard deviations below the mean for the university, (f) high school GPA below a 2.0, and (g) membership in a racial or ethnic group that historically has faced discrimination and has underperformed relative to other groups. A bivariate correlation suggested that there was a moderate, positive relationship ( $r=.28$ ;  $p<.01$ ). While the correlation is similar to that of the full sample, there was a significant difference between the full sample and the high-risk group in terms of mean score on the Self-Authorship Survey ( $d=.60$ ). The findings of this study clarify the relationship between epistemological development and learning, in terms of both outcomes and processes, the findings also speak to the difference in relation between epistemologic development and academic achievement by risk group.

Salter, D.W., Evans, N.J., Forney, D.S. (2006). A longitudinal study of learning style preferences on the Myers-Briggs Type Indicator and Learning Style Inventory. *Journal of College Student Development*, 47(2), 173-184.

*This study addressed the stability of learning styles as measured by two popular assessment tools, the Myers-Briggs Type Indicator (MBTI) and the Learning Style Inventory (LSI). The 292 participants in this study were graduate students in a master's degree program in student affairs administration at a state university in the Midwest. The sample included 83 men*

and 139 women; 185 students were white and 37 students were people of color; and 142 students were categorized as traditional and 79 as non traditional. Gender, ethnicity, and status were screened for anomalous relationships to the MBTI and LSI results with likelihood-ratio and chi-squares. CFA was used to analyze the stability of LSI and MBTI scores. Two statistically significant relationships were noted between demographic characteristics and the MBTI and LSI scores. A significant relationship was found between gender and the thinking-feeling score ( $L^2 = 17.61, p < .001$ ). Gender also seemed related to LSI profiles ( $L^2 = 9.67, p = .004$ ). The CFA of MBTI scores indicated that five of the eight preferences: sensing, thinking, feeling, judging, and perception failed to reach significance there was preference stability. The results of the studies of the LSI profiles revealed stable patterns for accommodators, assimilators, and diverse. These results support the supposition that trait-based learning style preferences are relatively trustworthy across time.

Shivpuri, S., Schmitt, N., Oswald, F.L., & Kim, B.H. (2006). Individual differences in academic growth: Do they exist, and can we predict them? *Journal of College Student Development*, 47(1), 69-86.

*The main purpose of this study was to examine college students' academic growth overtime and determine what factors, other than traditional standardized test scores, predicted growth. This study is unique because it uses latent growth modeling to analyze and describe academic growth over time. Data were collected from a sample of 644 freshmen undergraduate students from a large Midwestern university. A biodata measure was administered during the spring semester of the participants' first year in college. Standardized scores on the SAT and ACT served as an index of cognitive ability. A 49-item biodata measure developed by Oswald et al. (204) was used to measure the five dimensions of college success (knowledge and general skills, continuous learning, perseverance, adaptability, and interpersonal skills). Latent growth modeling (LGM) was used to represent change in GPA across time and to determine the presence of inter-individual differences in both the slope and intercept of GPA. Information from these models were used to test alternative models. Hypothesis 1 stated that the dimensions of knowledge of general principles would predict initial status on success above and beyond average cognitive ability as indexed by SAT and ACT scores. Results demonstrated that students who had higher SAT/ACT scores coming into college tended to be more successful than those with lower scores. The second hypothesis stated that the dimensions of continuous learning, adaptability, interpersonal skills, and performance would predict rate of change in academic success over time. This hypothesis was not fully supported. Of these dimensions only continuous learning and adaptability significantly predicted rate of change.*

Valle, A., Cabanach, R.G., Núñez, J.C., González-Pienda, J., Rodríguez, S., & Pineiro, I. (2003). Cognitive, motivational, and volitional dimensions of learning: An empirical test of a hypothetical model. *Research in Higher Education, 44*(5), 557-580.

*In this study creates an integrated research model that combines motivational and cognitive (learning strategies) with affective variables. The research model is structured along three dimensions that account for achievement: (a) motivational-affective, (b) cognitive, and (c) volitional. Participants were 614 university students (26% males and 74% females), aged between 18 and 23 years. The Learning and Study Strategies Inventory (LASSI; Weinstein, Schulte, and Palmer, 1987) was used to evaluate the construct deep learning strategies. Structural equation analysis was employed to analyze the viability of a general cognitive-motivational model to explain the principal cognitive, motivational, and volitional variables involved in academic learning and academic achievement. The series of causal relationships specified in the model only accounted for approximately 52% of the total variance. Analysis of the effects between the variables of the model revealed the following relevant aspects: students' predisposition to feel responsible for the results of their academic behavior is related to positive academic self-concept, both being important conditions for development of learning goals. All of this involves selection and use of learning strategies for deep learning strategies, which leads students a positive and significant effect on academic achievement.*

Whitt, E.J., Pascarella, E.T., Nesheim, B.E., & Marth, B.P. (2003). Differences between women and men in objectively measured outcomes, and the factors that influence those outcomes, in the first three years of college. *Journal of College Student Development, 44*(5), 587-610.

*The purpose of this study was to identify and describe differences between male and female students' cognitive outcomes in the first three years of college. The sample was composed of students who participated in the National Study of Student Learning (NSSL). Initial sample included 3,331 students from 18 four-year institutions. The data collection included as NSSL precollege survey that gathered information on student backgrounds, as well as aspirations, expectations of college, and orientations toward learning. Different regression models were employed to determine the net effects of being a female on the dependent variables. The analyses of cognitive outcomes revealed more differences between men and women than similarities.*