

Achievement Goals as Predictors of Research Self-Efficacy

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ABSTRACT - Prior research has examined the relations of personality, contextual, and social cognitive factors as predictors of several important research training outcomes. The present study aimed to examine the relations of three types of achievement goals—mastery approach, mastery avoidance, and performance avoidance—to research self-efficacy. Survey data were obtained on a sample of 228 counseling psychology doctoral students and subjected to hierarchical regression analyses. Results indicated that mastery approach goals were significant positive predictors of research self-efficacy over and above year in training and career-related goals, while the interaction of age with both mastery avoidance and performance avoidance goals proved to be detrimental to research self-efficacy. Implications for research training and potential research directions are discussed.

Research self-efficacy (RSE) has become an important focal point in the research training literature over the years. This is not surprising given that RSE has been shown to relate positively to increased research productivity (Hollingsworth & Fassinger, 2002; Kahn, 2001) and interest in research (Bishop & Bieschke, 1998). According to Bandura's (1986, 1997) social cognitive theory, self-efficacy derives from four sources: (a) physiological states (e.g., fatigue and arousal); (b) vicarious experience; (c) verbal persuasions; and (d) mastery experiences. Recent research suggests that mastery experiences account for more of the variance in self-efficacy than each of the other three sources (Usher & Pajares, 2006). It would thus appear that the motivational mechanisms underlying the pursuit of mastery experiences would have important implications for RSE.

A test of achievement goal theory (AGT) would enhance our understanding of such mechanisms. AGT posits that the underlying purpose of achievement striving is to either develop or demonstrate competence, or avoid underdevelopment and the demonstration of incompetence, relative to self or others (Dweck & Leggett, 1988; Nicholls, 1984). Achievement goal theorists (Elliot, 1997; Elliot & McGregor, 2001) have identified four types of achievement goals: (a) mastery approach goals which reflect desires to attain absolute or incremental task mastery; (b) mastery avoidance goals which reflect desires to avoid being unable to achieve task mastery; (c) performance approach goals which reflect desires to outperform others; and (d) performance avoidance goals which reflect desires to avoid performing poorly relative to others. This framework has been subjected to extensive empirical

scrutiny, particularly with respect to perceptions of competence. Elliot and Harackiewicz (1994) have speculated that achievement goals are ideally suited as antecedents of competence perceptions because they serve as regulators of the psychological processes that engender successful academic performance. A number of studies have supported this proposition as mastery approach goals have evidenced positive relations with academic self-efficacy (e.g., Bandalos, Finney, & Geske, 2003; Elliot & Church, 1997; Shim & Ryan, 2005).

In contrast, Elliot and his colleagues have linked avoidance goals to perceived threat (Elliot & Reis, 2003), neuroticism (e.g., Elliot & Thrash, 2002), and low perceptions of competence (Elliot & Sheldon, 1997). Performance avoidance goals in particular have been shown to relate negatively with academic performance (Senko & Harackiewicz, 2005; Zusho, Pintrich, & Cortina, 2005) and intrinsic motivation (Elliot & Church, 1997). Similarly, mastery avoidance goals have demonstrated negative and positive relationships with academic performance (Finney, Pieper, & Barron, 2004) and disorganized study strategies (Elliot & McGregor, 2001), respectively. Achievement goals as a collection, however, have received almost no empirical attention relative to research training issues. Only one study has shown that RSE is positively correlated with mastery approach goals but negatively correlated with both mastery and performance avoidance goals (Deemer, Martens, & Podchaski, 2007). However, because research self-efficacy was not an outcome variable in the Deemer et al. study, it is unclear whether the construct can be directly predicted by achievement goals while controlling for demographic and developmental factors. The present study seeks to determine whether achievement goals are predictive of RSE over and above correspondingly-valenced factors. Since mastery experiences represent one source of self-efficacy, the pursuit of mastery approach goals should be associated with greater self-efficacy among students. It is also likely that students' perceptions of research competence increase as a function of their doctoral training experiences, thus, year in training was included in the mastery approach goal model as a positive covariate. Conversely, students should report lower research self-efficacy to the extent that they are more concerned about avoiding personal and normative failure as researchers. Age and gender were included as negative covariates in the avoidance models. Age was modeled on the basis that older students are typically more temporally removed from formal methodological instruction than younger students, and are therefore less likely to feel efficacious in their research skills. The inclusion of gender was based on previous findings indicating differences between males and females in RSE (Brown, Lent, Ryan, & McPartland, 1996). No hypotheses were advanced with regard to performance approach goals as previous research suggests they are unrelated to RSE (Deemer et al., 2007).

Method

Participants

The sample consisted of 228 doctoral students in counseling psychology from 71 APA-accredited training programs across the U.S. and Canada. Of these programs, 68 offered the Ph.D. degree while 3 offered the Psy.D. degree.

Participants ranged in age from 22 to 50 ($M = 28.19$, $SD = 4.80$) with the majority of the sample (81.3%) being female. Year in program ranged from 1 to 8 with a mean of 3.02 ($SD = 1.69$). Participants reported a primary career preference for clinical practice (64.5%), followed by teaching (17.6%), research (11.0%), and consulting (5.3%), with the remainder of the sample (1.6%) ranking two or more of the activities equally.

Measures

Achievement Goals. Because tools for assessing achievement goals for research do not currently exist, a 12-item measure was developed for the purpose of this study. The present measure, which was adapted from Elliot and McGregor's (2001) Achievement Goal Questionnaire, consists of 4 subscales corresponding to each of the achievement goals noted previously. Participants responded to items on a Likert scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). Subscales, items, and reliability coefficients are as follows: Mastery Approach: (1) "One of my goals in graduate school is to learn as much as possible about how to conduct research", (2) "A goal of mine in graduate school is to understand how to do research as thoroughly as possible", and (3) "A goal of mine in graduate school is to completely master the skills necessary to do research" ($\alpha = .91$); Mastery Avoidance: (1) "I am often concerned that I may not learn all that there is to learn about how to do research", (2) "I worry that I may not learn all that I possibly could about how to conduct research", and (3) "Sometimes I'm afraid that I may not understand how to do research as thoroughly as I would like" ($\alpha = .88$); Performance Approach: (1) "It is important to me that I do well in research compared to other students", (2) "It is important for me to do better than other students in research", and (3) "My goal as a researcher is to perform better than other students" ($\alpha = .83$); Performance Avoidance: (1) "I just want to avoid doing poorly in research compared to other students", (2) "My fear of performing poorly in research relative to other students is often what motivates me", and (3) "My goal as a researcher is to avoid performing poorly compared to other students" ($\alpha = .82$).

Research Self-Efficacy. RSE was assessed using Kahn and Scott's (1997) abbreviated version of the Self-Efficacy in Research Measure (SERM; Phillips & Russell, 1994). The brief SERM consists of 12 items that tap participants' confidence in their ability to carry out four types of research tasks: research design, practical tasks, quantitative and computer tasks, and writing. Participants respond to items on a Likert scale ranging from 0 (*no confidence*) to 9 (*total confidence*). Construct validity has been demonstrated through positive correlations of the 12-item SERM with both the research training environment and research productivity (Hollingsworth & Fassinger, 2002; Kahn & Scott, 1997). The SERM demonstrated good internal consistency ($\alpha = .90$) in the present study.

Research Goal. For the purpose of this study, research goals were operationally defined as a participant's preference for a career in research relative to practice. Participants were asked to rank order their preference for each of the two options; scores were dummy-coded such that those individuals who primarily preferred a

career in research were assigned a score of 1 and those who primarily endorsed a clinical career goal were assigned a score of 0.

Procedure

Data for this study were collected using an online survey method. Training directors from 71 APA-accredited doctoral programs in counseling psychology were contacted individually via email and asked to forward an attached description of the study to their students. Participants were asked to enter a portal directing them to the survey if they chose to proceed with the study; entering this portal represented their understanding of the study and their informed consent to participate. Participants were asked to consider their thoughts and feelings about research in responding to the items; their responses were subsequently submitted to a password-protected data file accessible only to the investigator. To reduce the probability of duplicate responses, internet protocol addresses of those who participated were obtained and inspected; no duplicate submissions were detected.

Results

Descriptive statistics and bivariate correlations are reported in Table 1. Hierarchical regression analyses were next conducted to assess the relations of the achievement goals to RSE (see Table 2).

Table 1
Descriptive Statistics and Intercorrelations Among Study Variables

Variable	1	2	3	4	5	6	7
1. Age	--						
2. Year	.39***	--					
3. MAP	-.02	-.14*	--				
4. MAV	-.05	-.01	.40***	--			
5. PAP	-.10	-.17*	.23***	.29***	--		
6. PAV	-.09	-.13*	-.09	.26***	.66***	--	
7. RSE	-.05	.14*	.30***	-.19**	-.06	-.32***	--
8. <i>M</i>	28.19	3.02	4.84	3.93	3.11	2.91	5.75
9. <i>SD</i>	4.80	1.69	1.53	1.64	1.33	1.43	1.54

Note: $N = 223$ MAP = Mastery Approach Goal MAV = Mastery Avoidance Goal PAP = Performance Approach Goal PAV = Performance Avoidance Goal RSE = Research Self-Efficacy * $p < .05$ ** $p < .01$ *** $p < .001$

All possible two-way interactions were examined in the analyses. Entry of year in training on step 1 revealed a significant main effect, $F(1, 222) = 4.34$, $p < .05$ ($\beta = .14$), while the research goal variable on step 2 explained an additional 7.5% of the variance in research self-efficacy, $\Delta F(1, 221) = 18.23$, $p < .001$ ($\beta = .27$). Adding mastery approach goals to the equation on step 3 increased the proportion of variance accounted for in RSE by 6%, $\Delta F(1, 220) = 14.14$, $p < .001$ ($\beta = .26$). The relationship between mastery avoidance goals and RSE was next evaluated. Results revealed that neither gender (coded male = 0, female = 1) on step 1, $F(1, 221) =$

2.77, $p = .10$ ($\beta = -.11$), nor age on step 2, $\Delta F(1, 220) = 1.15$, $p = .28$ ($\beta = -.07$), were significant univariate predictors of RSE. Adding mastery avoidance goals on step 3 resulted in a significant increase of 4% of the explained variance, $\Delta F(1, 219) = 9.20$, $p < .01$ ($\beta = -.20$), thus indicating that concerns about being unable to develop research competence are predictive of decreased RSE. It is noteworthy that a main effect for gender ($\beta = -.13$, $p < .05$) was also revealed on step 3, which suggests that females possess significantly lower RSE than their male counterparts when age and mastery avoidance goals are partialled out.

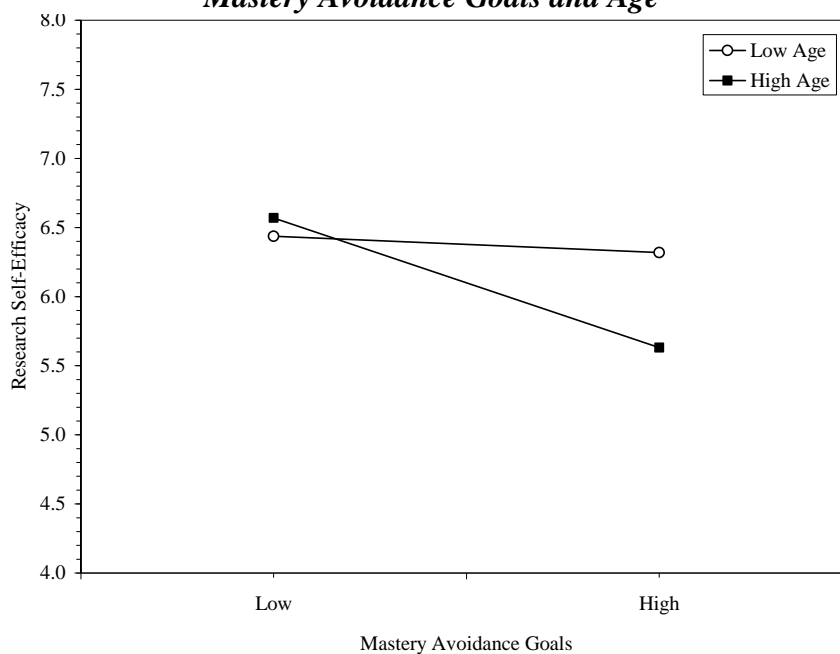
Table 2
Results of Hierarchical Regression Analyses
Predicting Research Self-Efficacy

Variable	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
Mastery Approach Goals ^a					
Step 1				.02*	.02*
Year	.13	.06	.14*		
Step 2				.09***	.075***
Year	.15	.06	.16*		
RG	1.26	.30	.27***		
Step 3				.15***	.06***
Year	.17	.06	.19**		
RG	.83	.31	.18**		
MAP	.26	.07	.26***		
Mastery Avoidance Goals ^b					
Step 1				.01	.01
Gender	-.44	.26	-.11		
Step 2				.02	.01
Gender	-.48	.27	-.12		
Age	-.02	.02	-.07		
Step 3				.06**	.04**
Gender	-.52	.16	-.13*		
Age	-.03	.02	-.08		
MAV	-.19	.06	-.20**		
Step 4				.08**	.02*
Age x MAV	-.03	.01	-.87*		
Performance Avoidance Goals ^c					
Step 1				.01	.01
Gender	-.41	.26	-.11		
Step 2				.01	.003
Gender	-.44	.26	-.12		
Age	-.02	.02	-.05		
Step 3				.11***	.10***
Gender	-.40	.25	-.10		
Age	-.03	.02	-.08		
PAV	-.33	.07	-.32***		
Step 4				.14***	.03**
Age x PAV	-.04	.01	-1.03**		

Note: MAP = Mastery Approach Goal MAV = Mastery Avoidance Goal PAV = Performance Avoidance Goal RSE = Research Self-Efficacy ^a $n = 224$ ^b $n = 223$ ^c $n = 221$ * $p < .05$ ** $p < .01$ *** $p < .001$

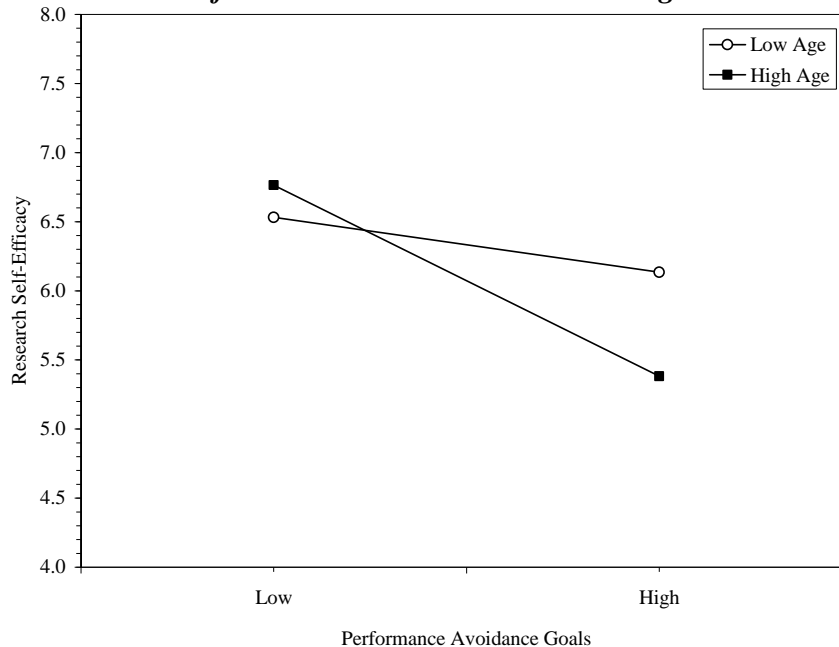
The age-mastery avoidance goal interaction term was significant in the last step of the analysis as it explained 2% of the variance over and above the covariates, $\Delta F(1, 218) = 5.16, p < .05 (\beta = -.87)$. A graphical depiction of the 2-way interaction is presented in Figure 1. Predicted values for RSE were plotted at one standard deviation above and below the means of age and mastery avoidance goals. Post hoc probing of the simple slopes revealed a significant negative relationship between mastery avoidance goals and RSE for older students, $t(218) = -3.26, p < .01 (b = -.29)$, but not younger students, $t(218) = -.39, p = .70 (b = -.04)$.

Figure 1
Research Self-Efficacy as a Function of the Interaction of Mastery Avoidance Goals and Age



In the last set of hierarchical analyses RSE was regressed on the demographic covariates, performance avoidance goals, and all possible 2-way interactions. Once again, neither the inclusion of gender on step 1, $F(1, 219) = 2.53, p = .11 (\beta = .11)$, nor age on step 2, $\Delta F(1, 218) = .63, p = .43 (\beta = -.05)$, resulted in significant increments in R^2 . A significant main effect for performance avoidance goals emerged on step 3 as they uniquely accounted for 10% of the variance, $\Delta F(1, 217) = 24.31, p < .001 (\beta = -.32)$. Entry of the age-performance avoidance goal interaction term on step 4 resulted in an additional 3% of the variance explained over and above the covariates, $\Delta F(1, 216) = 6.85, p < .01 (\beta = -1.03)$. Predicted values for RSE were once again plotted at one standard deviation above and below the means (see Figure 2). Post hoc probing of the interaction indicated that pursuit of performance avoidance goals was negatively predictive of RSE among older students, $t(216) = -5.29, p < .001 (b = -.48)$, but not younger students, $t(218) = -1.40, p = .16 (b = -.14)$.

Figure 2
Research Self-Efficacy as a Function of the Interaction of Performance Avoidance Goals and Age



Discussion

All hypotheses were supported as the data provided clear evidence for significant patterns of relations between achievement goals and RSE. Mastery approach goals were shown to account for significant variation in RSE over and above the cumulative effects of training and research-related career goals. This is consistent with the theoretical predictions of Bandura (1986, 1997) insofar as individuals who strive for mastery experiences, and receive positive feedback regarding their progress in such endeavors, should possess greater confidence in their abilities. Although a significant interaction between year in training and mastery approach goals was not detected, further research (e.g., longitudinal) is needed to explore the potentially synergistic relationship between achievement goal pursuits and research training processes. Studies utilizing a cross-lag panel design would be well positioned to illuminate the interrelations among the research training environment, RSE, and achievement goals over time.

Results also indicated that age moderated the relationship between both mastery and performance avoidance goals and RSE. High mastery avoidance goals appeared to have negative implications for RSE among older students, whereas RSE was not influenced by mastery avoidance goal pursuit for younger students. Perhaps older students who have returned to graduate school after having been away from research for some time may be prone to fears that they will be unable to grasp and implement statistical and methodological concepts. Conversely, it is possible that younger students possess more stable efficacy beliefs because they typically

experience shorter periods of research inactivity in the intervening time between undergraduate and graduate training. Gender was also found to be a significant univariate predictor of RSE over and above the contributions of age and mastery avoidance goals. The finding that females reported less confidence in their research abilities than their male counterparts is one which accords with previous research (Kahn & Scott, 1997). Given that research self-efficacy beliefs appear to be stimulated by the research training environment to a greater extent for females than males (Brown et al., 1996), it seems particularly important for faculty to foster mastery experiences among female students. This may be done by ensuring that female students pursue moderately challenging research tasks—that is, tasks which are neither too easy nor too difficult—such that they are apt to infer competence from their efforts and engage in more adaptive attributional processes (Nicholls, 1989).

A similar interaction emerged as age was discovered to moderate the relationship between performance avoidance goals and RSE. Specifically, high levels of performance avoidance goals were shown to be associated with significantly decreased RSE for older students while younger students' competence beliefs appeared to be unaffected by the adoption of such goals. The magnitude of difference between the simple slopes for each of the age groups suggested that performance avoidance goals are even more deleterious to RSE for older students than are mastery avoidance goals. Thus, older students seem to be concerned about giving the appearance of being incompetent researchers to their peers, and these concerns clearly have negative consequences for their competence beliefs. It seems, then, that research trainers would do well to structure their programs such that older students, and indeed, all students, are less concerned about failing as researchers.

Recent theorizing suggests that a clearer distinction should be made between aims and reasons in conceptualizing avoidance goals (Elliot & Murayama, 2008). Thus, for example, individuals may have a goal of avoiding incompetence but the affective impetus behind such a goal would likely be a negative affective concern (e.g., embarrassment). Future research would do well to take this distinction into account, particularly with regard to devising research-specific measures of achievement goals. Regarding limitations in the present research, inferences of causality are cautioned against due to the cross-sectional and correlational nature of the study. Also, because the data were collected via the internet, it is difficult to determine how many students from each program chose to complete the survey. Given that there are approximately 33 students per counseling psychology doctoral program (Council of Counseling Psychology Training Programs, 2005), it is possible that approximately 2,343 participants were given the opportunity to participate in the present study (assuming all training directors forwarded the survey to their students). This would indicate a response rate of approximately 10% was obtained, which raises the question of whether selection bias skewed the data. Despite these limitations, the present research is believed to have important implications for the facilitation of favorable research attitudes and behaviors among counseling psychology doctoral students.

Author Note

This research was based, in part, on the author's doctoral dissertation.

References

- Bandalos, D. L., Finney, S. J., & Geske, J. A. (2003). A model of statistics performance based on achievement goal theory. *Journal of Educational Psychology, 95*, 604-616.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, N.J.: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bishop, R. M., & Bieschke, K. J. (1998). Applying social cognitive theory to interest in research among counseling psychology doctoral students: A path analysis. *Journal of Counseling Psychology, 45*, 182-187.
- Brown, S. D., Lent, R. W., Ryan, N. E., & McPartland, E. B. (1996). Self-efficacy as an intervening mechanism between research training environments and scholarly productivity: A theoretical and methodological extension. *The Counseling Psychologist, 24*, 535-544.
- Council of Counseling Psychology Training Programs. (2008). *CCPTP survey data 2005*. Retrieved November 5, 2008 from, <http://www.cciptp.org/resources/surveydata.html>.
- Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology, 90*, 666-679.
- Deemer, E. D., Martens, M. P., & Podchaski, E. J. (2007). Counseling psychology students' interest in research: Examining the contribution of achievement goals. *Training and Education in Professional Psychology, 1*, 193-203.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.
- Elliot, A. J. (1997). Integrating the "classic" and "contemporary" approaches to achievement motivation: A hierarchical model of approach and avoidance achievement motivation. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 143-179). Greenwich, CT: JAI Press.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218-232.
- Elliot, A. J., & Harackiewicz, J. M. (1994). Goal setting, achievement orientation, and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 66*, 966-980.
- Elliot, A. J., & McGregor, H. A. (2001). A 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501-519.
- Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology, 100*, 613-628.

- Elliot, A. J., & Reis, H. T. (2003). Attachment and exploration in adulthood. *Journal of Personality and Social Psychology*, 85, 317-331.
- Elliot, A. J., & Sheldon, K. M. (1997). Avoidance achievement motivation: A personal goals analysis. *Journal of Personality and Social Psychology*, 73, 171-185.
- Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology*, 82, 804-818.
- Hollingsworth, M. A., & Fassinger, R. E. (2002). The role of faculty mentors in the research training of counseling psychology doctoral students. *Journal of Counseling Psychology*, 49, 324-330.
- Kahn, J. H. (2001). Predicting the scholarly activity of counseling psychology students: A refinement and extension. *Journal of Counseling Psychology*, 48, 344-354.
- Kahn, J. H., & Scott, N. A. (1997). Predictors of research productivity and science-related career goals among counseling psychology doctoral students. *The Counseling Psychologist*, 25, 38-67.
- Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, 91, 328-346.
- Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Phillips, J.C., & Russell, R.K. (1994). Research self-efficacy, the research training environment, and research productivity among graduate students in counseling psychology. *The Counseling Psychologist*, 22, 628-641.
- Senko, C., & Harackiewicz, J. M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology*, 97, 320-336.
- Shim, S., & Ryan, A. (2005). Changes in self-efficacy, challenge avoidance, and intrinsic value in response to grades: The role of achievement goals. *Journal of Experimental Education*, 73, 333-349.
- Usher, E. L., & Pajares, F. (2006). Sources of academic and self-regulatory efficacy beliefs of entering middle school students. *Contemporary Educational Psychology*, 31, 125-141.
- Zusho, A., Pintrich, P. R., & Cortina, K. S. (2005). Motives, goals, and adaptive patterns of performance in Asian American and Anglo American students. *Learning and Individual Differences*, 15, 141-158.