EXAMINING THE INFLUENCE OF RESEARCH MENTORING AND TRAINING MODEL ON CLINICAL AND COUNSELING GRADUATE STUDENTS' SCHOLARLY ACTIVITY.

By

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To my family and friends, who supported me throughout this process

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This study focused on graduate student research training through exploration of research mentoring experiences and training model as predictors of clinical and counseling psychology graduate students' scholarly activity. Findings revealed research mentoring and training model served as significant predictors of students' scholarly activity. Training model served to differentiate students' based on their training experiences and scholarly activity. While, students from practitioner-scholar programs reported greater satisfaction with the clinical emphasis of their training, they reported less positive perceptions of their research training environment, and reported lower scholarly activity than students from science-practitioner or clinical-scientist programs. This study adds to the developing literature concerning graduate student research mentoring and training model within professional psychology.

CHAPTER 1
INTRODUCTION

Research training of professional psychology doctoral students has received a fair amount of attention in the last 2 decades (Hollingsworth & Fassinger, 2002). This attention developed, in part, from recognition that despite counseling and clinical psychology's commitment to the development of competent practitioners and productive scientists (Szymanski, Jovanovic Ozegovic, Phillips, & Briggs-Phillips, 2007), most applied psychologists pursue practice-oriented careers (Fitzgerald & Osipow, 1988). For example, 71% of counseling psychology graduates report initial employment in human service settings (APA, 1996). With such clinically oriented placements, it is not surprising that few clinical or counseling psychologists conduct research after completing their degrees (Brems, Johnson, & Gallucci, 1996). Reports among counseling psychologists suggest research constitutes less than 10% of their time and does not generally lead to publication (Fitzgerald & Osipow, 1988; Watkins et al. 1986). Arguably, these findings reflect lower scientific output than is expected by endorsement of a scientist-practitioner model of training, espousing equal emphasis on research and practice (Kahn & Scott, 1997) and raises the question of what needs to be done to change this trend.

Despite the current nature of the field, increasing student and graduate involvement in scholarly activity is a desirable goal (Kahn, 2001) for several reasons. Research represents a primary tool in informing practice (Belar, 2000) and serves to advance professional psychology (Belar, 2000; Gelso, 1979, 1993; Gelso & Lent, 2000). Because of the importance of quality research to the applied fields of psychology, increased attention to factors of graduate training that contribute to students' scholarly activity is needed (Gelso, & Lent 2000). Thus, the present study was designed to augment recent efforts in the research training literature by 1) examining the influence of research mentoring and training model on scholarly activity, and 2) broadening

the examination of research training environments to include scholarly activity among clinical and counseling psychology graduate students. The subsequent section will review existing literature in these areas to establish an empirical warrant and hypothesize relationships among the variables of interest in this investigation. First, findings from the research training environment literature will be reviewed. We will then examine the available research on the role of mentoring relationships in contributing to scholarly activity. Finally, we will conclude the review with recent findings examining training models and their contributions to scholarly activity.

CHAPTER 2
LITERATURE REVIEW

The factors that influence student involvement in scholarly activity have been gaining increasing attention. Generally, research has found the interaction of individual factors such as personality and interests and contextual factors such as the Research Training Environment (RTE) exert a significant influence on attitudes toward research and subsequent scholarly activity (Bishop & Bieschke, 1998; Gelso, 1997; Kahn, 2001; Kahn & Scott, 1997; Krebs, Smither & Hurley, 1991; Mallinckrodt, Gelso, & Royalty, 1990; 2002). However, several authors have suggested broadening the examination of factors influencing scholarly activity within the literature to include other relevant factors such as faculty mentoring (Betz, 1997; Gelso, 1997; Hill, 1997; Hollingsworth & Fassinger, 2002) and training model science-practice emphasis (Szymanksi et al. 2007).

Research Training Environment

Gelso (1979, 1993,1997) proposed examining the influence of Research Training Environments (RTE) in contributing to graduate student training outcomes. Gelso (1993, 1997) proposed RTE theory to explain how contextual factors impact students' research interest and scholarly activity. This perspective suggests that academic training environments often lack critical research training necessary to facilitate positive student attitudes toward research (i.e., interests) and scholarly activity (Kahn & Scott, 1997). Gelso (1997) describes effective RTEs as represented by both instructional and interpersonal components critical to scholarly activity (e.g., publication & professional presentations). While *instructional* elements encourage idea generation and research implementation, *interpersonal* elements encourage involvement in minimally threatening research early in training, provide support and encouragement of students' efforts, focus on the collaborative nature of research, and utilize faculty role-modeling of

appropriate scientific behaviors (Gelso, 1993, 1997). According to RTE theory, these interpersonal and instructional components work together to increase scholarly productivity both directly and indirectly through enhancing research self-efficacy and research interest. More specifically, Gelso (1993) proposed that effective RTEs influence scholarly activity in two primary ways: they enhance student interest in research by demonstrating the exciting elements of research and increase students' research self-efficacy. Thus, research interest and self-efficacy mediate the relationship between RTE and scholarly activity (Gelso, 1993). This conception has been consistently supported by research findings suggesting students' perceptions of their RTE predict interest in a variety of research activities (Bishop & Bieschke, 1998; Kahn & Miller, 2000; Kahn & Scott, 1997; Mallinckrodt, Gelso & Royalty, 1990; Royalty, Gelso, Mallinckrodt, & Garrett, 1986). Surveys of graduate students also provide support for RTE enhancing students' research self-efficacy (Bishop & Bieschke, 1998; Gelso, Mallinckrodt, & Judge, 1996; Kahn & Miller, 2000; Kahn & Scott, 1997; Phillips & Russell, 1994). Thus, effective RTEs facilitate research interest and self-efficacy among students, which encourages greater involvement in research (Kahn & Scott, 1997; Kahn, 2001). Research interest and self-efficacy have also been shown to predict scholarly activity for current students (Kahn, 1997; Krebs et al. 1991; Phillips & Russell, 1994) and graduates (Royalty & Magoon, 1985; Royalty & Reising, 1986).

While the influence of research interest and research self-efficacy on scholarly activity has become increasingly well documented, authors have also begun to consider the role of research outcome expectations (Bishop & Bieschke, 1998; Kahn, 2001) and prior levels of research interest (Gelso, 1997; Hollingsworth & Fassinger, 2002) in predicting scholarly activity. For example, Kahn and Scott (1997) proposed that individual differences (e.g., personality components) and contextual factors (e.g., environmental supports and barriers) interact to

influence research self-efficacy (e.g., confidence in being able to effectively complete research task) and research outcome expectations (e.g., expected consequences of doing research: getting published). Thus, the more confident a student feels regarding doing research, the more they will perceive positive outcomes regarding research involvements (Kahn, 2001). Kahn and Scott (1997) suggested research self-efficacy and research outcomes expectations lead to research interests, with research efficacy and interest ultimately predicting scholarly activity. Numerous studies have provided support for these predictions (Bieschke, Bishop, & Herbert, 1995; Bieschke, Herbet, & Bard, 1998; Kahn & Miller, 2000; Phillips & Russell, 1994). Although it has gone largely unaccounted for in recent research training literature, Gelso (1997) and Hollingsworth and Fassinger (2002) have suggested individual differences in prior levels of research interest may also influence students' later research productivity. The role of prior research interest in predicting scholarly activity is yet unknown. Lastly, Taylor and Neimeyer (in press) have highlighted the importance of mentoring in graduate student training outcomes such as scholarly activity and training program satisfaction. The authors noted several findings relevant to the current investigation. They found that the amount of time spent with one's mentor was positively associated with greater scholarly activity (e.g. publications and presentations) and students' overall level of satisfaction was positively associated with particular types of mentoring (e.g. socioemotional and instructional). The later finding lead the authors to suggest that the nature of one's mentoring experience may promote overall satisfaction with their graduate training program. While noteworthy and informative, these findings have limited generalizability to students from programs with a strong research emphasis. A broader examination of students from professional psychology graduate programs with varying levels of commitment to practice and science might serve to inform the literature regarding how these differences affect scholarly

activity. Despite this limitation, these findings offer encouraging support for mentoring as a contributor to scholarly activity.

Research Mentoring

While the relationship of RTEs to research training outcomes has received substantial attention in the literature, several authors (e.g., Betz, 1997; Gelso & Lent 2000; Hill, 1997; Hollingsworth & Fassinger, 2002; Kahn, 2001; Taylor & Neimeyer, in press) have suggested broadening the examination to consider the influence of faculty mentoring on scholarly activity. Hollingsworth and Fassinger (2002) have suggested faculty mentoring "emerges as a consistently important undercurrent in the research training environment" (p. 324). This is consistent with reports regarding the influence of mentoring on graduate training more generally. Graduate students suggest having a mentor is a crucial component of graduate training (Atkinson, Neville, & Casa, 1991; Lark & Croteu, 1998; Luna & Cullen, 1998). Authors have also noted the profound effect mentoring can have on a variety of key student outcomes including: the mentee's professional identity and skills development (Elman, Illfelde-Kaye, & Robiner, 2005; Vespia, 2006), doctoral training satisfaction (Clark et al., 2000), and salary and career satisfaction (Hume & Johnson, 2003). With regards to research mentoring, Royalty and Reisling (1986) reported advisor-advisee interaction regarding research activities was one of the strongest positive influences on students' research interest. Others have noted student reports highlighting their relationship with faculty members as a critical element in their research training (Gelso, 1997; O'Brien, 1995). Among minority students surveyed, reports suggest the mentors' encouragement of student in research involvement is crucial (Atkinson et al. 1991). Faculty research mentoring has also been shown to influence greater research involvement and scholarly activity among current psychology students and recent graduates (Cronan-Hillix, Gensheimer, Cronan-Hillix, & Davidson, 1986; Galassi, Brooks, Stoltz & Trexler, 1986; Krebs

et al. 1991). Cronan-Hillix et al. (1986) found mentoring was significantly related to several measures of research productivity. Kahn and Scott (1997) proposed that faculty mentoring may serve as a mechanism to enhance research interest and research self-efficacy. Hill (1997) has compared the research mentoring relationship to the counselor-client working alliance, leading her to suggest the mentoring relationship may be a crucial element in the research training environment, deserving a more explicit focus in RTE literature research. Gelso (1993), acknowledging the impact of faculty research mentoring, identified a series of interpersonal and instructional faculty behaviors to help establish a positive research mentoring relationship. Gelso (1997) and Hollingsworth (2000) have noted the influence of the mentoring relationship on student's self-efficacy and research attitudes.

Despite authors suggesting the positive benefits of mentoring on student research training, only two studies examining mentoring as a predictor of scholarly activity have been conducted. In one study, Kahn (2001) extended the work of Kahn and Scott (1997) by measuring the mentoring relationship as part of the research training environment. To assess the mentoring relationship, Kahn (2001) utilized the Mentoring Functions Scale (Noe, 1988), which measures students' perceptions of the adequacy of their relationship with their mentor. Results in this study did not support student perceptions of the mentoring relationship as a significant predictor of scholarly involvement. However, these findings should be considered with caution, given several important considerations. Surveys of graduate students suggest many students do not have an identifiable mentoring relationship (Cronan-Hillix et al.1986; Smith & Davidson, 1992). This may be due to lack of agreement in the mentoring literature regarding what constitutes a mentor (Schlosser & Gelso, 2001), which further attenuates the strength of this relationship with no clear definition of the role of mentoring in research. Consistent with this concern, Kahn's (2001) study

lacked specificity regarding this role. He notes possible confusion on the part of students on who to choose as a mentor, "students were free to identify any faculty member as a mentor, and it is possible that many identified a person who has been a strong mentor in their growth as a practitioner, but has not stimulated interest or efficacy as a practitioner with respect to research activities" (p. 353). Consistent with this point, Kahn (2001) did not report the nature of science-practice emphasis of the sample. It is possible that for many students, even if they had an established mentoring relationship, their programs do not emphasize research training or scholarly activity. A likely outcome, given 40% of the participants in Kahn and Scott 's (1997) study reported not having to write a thesis during their doctoral training. Without measurement of the program's science-practice emphasis, it becomes difficult to accurately assess their comparative level of commitment to scholarly activity. Further complicating assessment, even within the same program, advisors may differ in their science-practice commitments (Mallinckrodt, 1997). In other considerations, a gender effect may have impacted the study's results. Kahn (2001)'s sample was predominantly female and previous research has suggested females perceive research training environments less favorably and experience less research self-efficacy than men (Kahn & Scott, 1997; Landino & Owen, 1988). These perceptions may interact with faculty reactions to further impact the mentoring relationship through faculty members' willingness to invest energy in research training (Schlosser & Gelso, 2005). Lastly, Kahn's (2001) predictive model had an insufficiently large sample given the large number of parameters estimated. Failing to meet the minimum number of observations (e.g., 5-10 per estimated parameters, Bentler & Chou, 1987), thus reducing the ability to adequately measure these relationships. Given these findings and the inherent limitations regarding Kahn's (2001) study, further work is needed to examine the mentoring relationship.

In the only other study of research mentoring among counseling psychology doctoral students, Hollingsworth and Fassinger (2002) attempted to provide a conceptual bridge between research training environment and mentoring relationships, examining research mentoring experiences as predictors' of upper division counseling psychology doctoral students. A link believed to be critically important to understanding the research training process (Betz, 1997; Gelso, 1997; Hill, 1997; Hollingsworth & Fassinger, 2002). The authors also included prior research interest and training model as additional variables believed to influence scholarly activity. The inclusion of these variables has been supported by findings suggesting higher levels of research interest differentiate between more and less productive counseling psychologists (Royalty & Magoon, 1985) and training model has been found to lead to differential scholarly productivity for clinical and counseling students (Cherry et al. 2000; Neimeyer, Saferstein, & Rice, 2005; Szymanski et al. 2007). Hollingsworth and Fassinger (2002) developed the Research Mentoring Experiences Scale (RMES) that broadly measured students mentoring experiences, and more specifically measured two aspects of the mentoring relationship: psychosocial (e.g., affective aspects and interpersonal elements of the faculty-student research training relationship) and career mentoring (e.g.,. mentor's efforts to facilitate acquisition of necessary skills to complete research tasks successfully). These relationally based concepts were analogous to Gelso's broader, programmatically based instrumental and interpersonal elements of effective RTEs. Hollingsworth and Fassinger (2002) proposed that the research mentoring relationship would mediate the relationship between research training environment and scholarly activity, while controlling for students' prior interests might attenuate the relationship between RTEs and self-efficacy and research productivity. Finally, they investigated the potential moderating effect of gender and training program science-practice emphasis on scholarly productivity. Consistent

with previous research, findings supported research training environment, research self-efficacy, and past research attitudes as direct predictors of scholarly productivity. While gender and training model were not significant predictors of productivity in their study, mentoring experiences were found to be a significant predictor of scholarly activity. The mediating relationship of students' mentoring experiences between RTE and productivity was also supported. These findings support proposals regarding the importance of research mentoring as a critical element within research training environments (e.g., Betz, 1997; Gelso, 1997; Gelso & Lent, 2000; Hill, 1997) and provide tentative empirical evidence regarding the facilitative nature of research mentoring in students' research training (Hollingsworth & Fassinger, 2002). The authors note two additional considerations regarding implications of their findings: 1. Consistent with previous proposals (e.g., Gelso, 1997; Mallinckrodt, 1997), the strong correlation between research training environments and research mentoring may suggest that strong research training programs can facilitate strong research mentoring relationships. 2. However, the meditational nature of research mentoring suggests it serves as a vehicle through which RTE exerts the greatest influence on students' scholarly productivity. Thus, while a training program's science-practice commitments may serve to define the training program "culture" present during training, the relative influence may be enhanced or hindered by the nature of the faculty-student relationship. These interpersonal elements (e.g., role modeling, support, and guidance) can exert a powerful influence, above and beyond RTE, on student attitudes toward research and subsequently, their scholarly activity (Mallinckrodt, 1997).

While more conclusive than Kahn (2001) regarding the importance of mentoring as a critical ingredient of research training in contributing to scholarly productivity, Hollingsworth and Fassinger's (2002) findings suggest the need for further investigation. Several limitations of

this study warrant acknowledgement. Most notably, Hollingsworth and Fassinger (2002) reported scale modifications that may qualify their findings. The authors reported concerns regarding multicollinearity between the RTES-R and RME and utilized a modified 16-item RTES. The authors also reported use of shortened version of the scholarly activity scale (SAS). Thus, the association reported by Hollingsworth and Fassinger (2002) may represent different constructs than previous research. Other limitations include failure to include research outcomes expectations, which have been supported as mediating the relationship between RTE and scholarly productivity (Bishop & Bieschke, 1998; Kahn, 2001).Similarly, additional examination of training model is needed to determine its role in research productivity. Lastly, our confidence in the generalizability of these findings may be enhanced by broadening the investigation to include both clinical and counseling graduate students. But first, we will briefly review research supporting the importance of academic training models in scholarly productivity for these students.

Academic Training Model

While RTEs have been of interest to researchers attempting to understand the nature of scholarly activity and other research training outcomes, investigations of training models and their associated science-practice emphasis within psychology graduate programs (Belar & Perry, 1992; Hoshmand & Polking-Horner, 1992; Murdock, Alcorn, Heesacker, & Stotlenberg, 1998; Stoltenberg, et al. 2000) may offer additional insight into graduate student scholarly activity. For example, Galassi, Brooks, Stoltz, & Trexler (1986) surveyed training directors from APA accredited programs and found more productive programs (based on actual research published or presented) tended to involve students in research earlier in training, were more likely to require research participation, and placed greater emphasis on philosophy of science. These findings

suggest the importance of a program's chosen training model, but before reviewing more recent work, a brief review of the conceptual foundations of these models will be discussed.

Generally, training models offer a conceptual framework that serves to guide a particular program's professional training focus, expectations, and outcomes (Neimeyer, Saferstein, & Rice, 2005; Neimeyer, Rice, & Keilin, 2007). Training models are primarily distinguished by the nature and degree of their commitment to scientific and professional endeavors (Neimeyer et al. 2005). Notably, there is considerable variability in programs' identification with a particular training model within the clinical and counseling psychology specialties. On one hand, there are programs primarily or exclusively dedicated to a professional training model. These training programs, based on the practitioner-scholar model; focus on developing professional skills, and serving as "consumers" of scientific knowledge in the service of professional practice. Thus, the primary emphasis in practitioner-scholar programs is providing clinically oriented services that are effective and responsive to the varied needs of those served (e.g., individual, community, society) (McHolland, 1992). On the other hand, the clinical-science training model represents a primary or exclusive emphasis on scientific training (Neimyer et al. 2005). These programs are characterized by a "commitment to empirical approaches to evaluating the validity and utility of testable hypotheses and to advancing knowledge by this method" (Academy of Psychological Clinical Science, 2004). Despite these apparent differences, nearly 98% of professional psychology doctoral programs endorse to a scientist-practitioner training model based on the Boulder Model (O'Sullivan & Quevillon, 1992). The science-practitioner model encourages the integration of science and clinical practice knowledge to effectively inform the work of professional psychologists (Jones & Mehr, 2007). It also attempts to foster a career-long process of psychological investigation, assessment, and intervention (Belar & Perry, 1992). Notably,

even within science-practitioner programs, the degree of commitment to implementing tenets of the science-practitioner model varies widely, with programs emphasizing one or the other of their tandem commitments.

Given these differences, several investigators have begun examining the relation between training model and scholarly activity for clinical and counseling psychology training programs (Cherry et al., 2000; Gaddy, Charlot-Swilley, Nelson, & Reich, 1995; Neimeyer et al., 2005; Neimeyer et al., 2007). For example, Cherry et al. (2000) examined training outcomes for clinical psychology programs. The authors found that clinical-science and science-practice programs reported higher levels of scientific productivity (e.g., greater publications and presentations) among faculty and students. In contrast, practitioner-scholar programs demonstrated greater levels of professional service delivery. Findings also revealed employment setting and activities were in line with program emphasis. These findings represent outcomes generally consistent with program orientation (Cherry et al. 2000). Similarly, Neimeyer et al. (2005) found faculty and students in practice-oriented programs were less likely to publish in professional or scientific journals or present at professional meetings, although programs did not differ in relation to faculty and students involvement in professional service delivery.

In considering results of these studies together, Neimeyer et al. (2005) suggested noteworthy differences in regards to outcome between the two specialties within professional psychology. For example, counseling psychology programs differences were generally with regards to scientific outcomes, while differences extended to professional outcomes in clinical psychology. Cherry et al. (2000) found practice oriented clinical programs reported significantly higher levels of service delivery than science-practice or clinical-science. Given these findings, Neimeyer et al. (2005) highlighted the need for further examination of the influence of training

model in scholarly outcomes with professional psychology. The training model literature collectively offers important implications for clinical and counseling scholarly productivity, however they are limited by primary focus on either clinical or counseling. Notably, only one study has examined the nature of training model and research outcome simultaneously for clinical and counseling psychology, although no study has yet to examine these outcomes for graduate students.

In the only study to date to examine the influence of research training environment and training model on scholarly productivity, Szymanski et al. (2007) investigated the impact of RTEs on scholarly activity of early career professionals. Szymanski et al. (2007) found the training model matters in the scholarly productivity during academic and internship training. Participants from programs emphasizing a science-practitioner training model reported significantly higher scholarly productivity than those from practitioner-scholar programs. Interestingly, perceptions of academic research training environment were not influenced by the nature of their program's training model. In interpreting these findings, the authors suggested that while it seems reasonable to assume differences would exist across academic RTEs, a possible explanation may be that participants perceptions of their RTE matched with their expectations. Consistent with previous work, the relationships among research training variables proposed in RTE theory was generally supported in Szymanski et al.'s (2007) study. RTE, research self-efficacy, research outcome expectations, and research interest were all significantly related to scholarly productivity. Although, results of the path analysis specifying these relationships suggested that only research self-efficacy and research interest predicted scholarly activity. Consistent with meditational proposals from previous work, RTE did significantly account for variance in self-efficacy and RTE and self-efficacy significantly predicted outcome

expectations. Szymanksi et al. (2007) did not include training model in predicting scholarly activity. In concluding their work, Szymanski et al. (2007) recommended the inclusion of additional variables such as research mentoring in future models to explore their influence on scholarly activity.

The current investigation attempts to advance the literature on research training by exploring the role that research mentoring relationships and training model emphasis play in predicting scholarly productivity for clinical and counseling psychology students. The current investigation will also examine key differences in graduate student experiences and scholarly activity as a function of training model. Consistent with the above-mentioned literature, the following hypotheses guide this work:

1. Research training environment, research mentoring relationships, research self-efficacy, level of research interest, level of practice interest, and research outcome expectations will predict clinical and counseling students' scholarly productivity.
2. Training model will be positively related to scholarly activity and will serve as an additional significant predictor of scholarly activity for clinical and counseling students.
3. Students' report of research, clinical, and overall programmatic satisfaction will differ as a function of training model.
4. Students from more practice-oriented programs (e.g., practitioner-scholar) will report similar overall perceptions of their RTEs and lower levels of scholarly productivity than more research oriented programs (e.g., clinical-scientist) for both clinical and counseling students.
5. The research mentoring relationship will mediate the relationship between research training environment and scholarly productivity for clinical and counseling students.

CHAPTER 3
METHODS

Participants

Letters requesting participation in a survey were e-mailed to APA- accredited clinical and counseling programs. The solicitation letter stated that the survey was available to all graduate students with the purpose of exploring the nature of scholarly activity among professional psychology graduate students. Training directors were asked to disseminate the survey to graduate students. Participation was voluntary and all participants were required to read and confirm their agreement to an informed consent form prior to participating in this study. All inventories were completed online and submitted to an online database. It took participants approximately 15 minutes to complete the instruments, and the study was conducted in accordance with APA ethical guidelines.

Measures

Perceptions of Research Training Environment: were measured by the 18-item Research Training Environment Scale–Revised (RTES–R–S; Kahn & Miller, 2000). This measure is a short form of the 54-item RTES–R (Gelso et al., 1996), which includes items representative of the nine ingredients of the research training environment described by Gelso (1993, 1997). Each ingredient is measured by two items, rated on a scale ranging from 1 (disagree) to 5 (agree). Sample items include "I have felt encouraged during my training to find and follow my own scholarly interests" and "Our faculty seems interested in understanding and teaching how research can be related to counseling practice." Total scores for RTES–R–S range from 18 to 90. Higher scores represented more positive perceptions of the research training environment. Internal consistency values of the RTES–R–S reported range from .85-.88 (Kahn & Miller, 2000; Kahn, 2001). The RTES–R–S correlates .96 with the 54-item RTES–R (Kahn &

Miller, 2000). Convergent validity is supported by positive correlations between RTES–R–S scores and measures of research self-efficacy and interest in scientist activities (Kahn & Miller, 2000).

Research Self-efficacy: was measured by the 12-item version of the Self-Efficacy in Research Measure (SERM; Phillips & Russell, 1994) developed by Kahn and Scott (1997). The 12-item SERM is characterized by items measuring four domains of research self-efficacy. Each domain is measured by 3 items: research design skills (e.g., "formulating hypotheses"), practical research skills (e.g., "keeping records during a research project"), quantitative and computer skills (e.g., "understanding computer printouts"), and writing skills (e.g., "writing the introduction and literature review for a dissertation"). Students completing the SERM indicated their confidence, from 0 (no confidence) to 9 (total confidence), in successfully performing each task or their belief that they possess the skill to complete each task. Scores range from 0 to 108, with higher scores suggesting greater research self-efficacy. The 12-item SERM has good internal consistency ranges .89-.90 (Kahn & Scott, 1997; Kahn, 2001). Kahn and Scott (1997) reported positive correlations between the 12-item SERM and measures of scholarly activity and perceptions of the research training environment.

Research Outcome Expectations: was measured using The Research Outcome Expectations Questionnaire (ROEQ; Bishop & Bieschke, 1998). On the ROEQ, students rate 17 potential outcomes associated with doing research on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Sample items include "Involvement in research will enhance my job/career opportunities," "Involvement in research will allow me to contribute to practitioners' knowledge base," and "Involvement in research will take time away from leisure activities" Scores range from 17-85, with higher scores suggesting more positive research

outcome expectations. Internal consistency ranges from .88-.90 (Kahn, 2001) (Bishop & Bieschke, 1998) (Bieschke et al., 1995). Bishop and Biseschke (1998) report that ROEQ correlates positively with interest in research, perceptions of the research training environment, research self-efficacy, and investigative interests.

Science versus Practice interest: was measured with the Science-Practice Inventory. SPI–20 is a 20-item scale that measures interest in 10 scientific and 10 practitioner activities in psychology using a 5-point scale ranging from 1 (*very low interest*) to 5 (*very high interest*). In previous work, the internal consistency for the SPI–20 scores was .92 (scientist) and .69-.85 (practitioner). Validity evidence has been demonstrated previously through a positive correlation with a measure of career interest in a sample of psychology graduate students (Leong & Zachar, 1993).

Research Mentoring: was measured with the Research Mentoring Experiences Scale (RMES), a measure created by Hollingsworth and Fassinger (2002) based on comparable instruments developed for business settings (e.g., Noe, 1988b; Ragins & McFarlin, 1990). Hollingsworth and Fassinger (2002) report that the RME includes two subscales. The first subscale, Psychosocial Mentoring, measures the affective aspects of research training, and focuses on the interpersonal elements of the faculty-student relationship. Participants rate 13 items investigating the extent to which their faculty mentor provides emotional support, respect and personal regard, and models positive research attitudes. The second subscale, Career Mentoring, examines the mentors's efforts to help students acquire necessary skills to complete research tasks successfully. This subscale includes 16 items representing faculty members' teaching of research skills, advice giving, and the provision of research opportunities. Instructions in the current study will ask students to rate their relationship with the faculty

member whom they considered most important in their current doctoral research training. Possible responses ranged from 1 (faculty member pays very little attention to …) to 5 (faculty member pays a great deal of attention to …). Student responses are summed and divided by the number of items to generate a total score. Possible scores range from 1 to 5. Hollingsworth and Fassinger (2002) reported a Cronbach's alpha of .74.

Past Attitudes Toward Research: was measured by four items constructed by Royalty et al. (1986). Royalty et al. (1986) measured counseling psychology students' recalled interest in conducting research prior to their enrollment in the doctoral program. The items included the following: 1. "I would have preferred to have the option of completing my doctoral training without being required to complete research projects" (Preference), 2. "I had a strong interest in doing research" (Interest), 3. "I placed a high value on the place of research in my future career" (Value), and 4. "Participating in research activities after graduation was not a major priority for me" (Priority). Students rate their agreement on a 5-point Likert scale, which ranged from 1 (strongly disagree) to 5 (strongly agree), the first and last items were reverse-scored. Responses are summed and divided by the number of items to produce a final score, having a potential range from 1 to 5. Research supports the internal consistency, with alpha coefficients ranging from .87 to .90 (Gelso et al., 1996; Hollingsworth & Fassinger, 2002; Kahn & Scott, 1997; Royalty et al., 1986). Test-retest has been reported at .93 (Royalty et al., 1986).

Dependent variables. The dependent variable *scholarly activity* was measured utilizing Kahn and Scott's (1997) 9-item measure, the Scholarly Activity Scale (SAS). According to Kahn (2001) these items measure both past accomplishments (e.g., number of manuscripts published) and the current research activities (e.g. whether student is currently collecting data). Thus, this measure provides a broad examination of student involvement in research-related activities

including data collection and analysis, manuscript development, presentations, research convention attendance (Kahn & Scott, 1997). Students respond to each item by reporting a number of activities they are engaging for each area of research involvement. Responses to all items summed to obtain a total scholarly activity index with higher scores reflecting greater scholarly activity. Internal consistency coefficients (K-R-20) for this scale for Kahn and Scott (1997) was .68, Kahn (2001) .70; Hollingsworth & Fassinger (2002) .75; Szymanski et al. (2007) was .79. Kahn and Scott (1997) report this measure positively correlates with interest in research and science relatedness of students' career goals.

The dependent variable *Program Satisfaction* was measured through a series of 3 likert-type questions developed for the current investigation due to a lack of suitable existing measures. These items measured clinical and counseling psychology students' satisfaction with their training program's clinical, research emphasis, as well as, their overall satisfaction with their training program experience. The items were represented by the following example: "Please rate your SATISFACTION with your program's emphasis on RESEARCH on a 5-point Likert scale, ranging from 1 (completely unsatisfied) to 5 (completely satisfied)."

Demographic information

The sample consisted of 215 graduate students from clinical and counseling psychology graduate programs (170 female, 45 male) with a mean age of 28.61 (SD = 6.59). Of the 32 programs represented, the mean number of students per program for counseling was 6.72 (SD = 3.10), and 7.93 (SD = 4.92). The overall mean number of students was 7.25 (SD = 3.25). The sample was primarily Caucasian, 79.1% (N = 170), followed by Asian American, 7.0% (N = 15), Hispanic, 5.6% (N = 12), African American, 4.2% (N = 9), Multiracial, 1.9% (N = 4), Other, 1.9% (N = 4), and Native American, 0.5% (N = 1).

There was a fairly even split of Clinical 47% ($N = 101$) versus Counseling 53%($N = 114$) graduate students, with primarily PhD programs, 83.7% ($N = 180$) and some PsyD programs 16.3% ($N = 35$). Graduate student's reported their year in their doctoral program, with first year students representing 20.9% ($N = 45$) of the sample, second year 19.5% ($N = 42$), third year 12.6% ($N = 27$), fourth year 20% ($N = 43$), fifth year 15.3% ($N = 33$), and sixth year students representing 11.6% ($N = 25$) of the sample. Results of the Pearson's Chi Square examining year in program and training model revealed year in program did not vary as a function of training model designation, X^2 (10, $N = 215$) = 17.72, $p = .06$.

Students were asked to "pick one of the following that BEST DESCRIBES the degree of science-practice emphasis of your training program." The majority of students rated the degree of science-practice emphasis in their graduate programs to be science-practitioner, 71.6% ($N = 154$), followed by practitioner-scholar, 20.5% ($N = 44$), and clinical scientist, 7.9% ($N = 17$). Examination of actual science-practice emphasis of participants' graduate programs based of training director ratings from *The Insiders Guide to Clinical and Counseling Psychology* (Norcross, Sayette, & Mayne, 2008) revealed a slightly different picture of graduate programs' science-practice emphasis: science-practitioner, 42.3% ($N = 91$), followed by practitioner-scholar, 29.8% ($N = 64$), and clinical scientist, 27.9% ($N = 60$). Students were additionally asked to rate their own personal research versus clinical emphasis on a 7-point Likert type scale ranging from 1 (clinically oriented) to 7 (research oriented). Students reported a mean score of 3.35 (*SD* 1.46). For purposes of the study, participants were classified by science-practice emphasis based on training directors' ratings in an attempt to address individual differences in participants' views of their programs.

Procedure

In an attempt to recruit a participant sample that was representative of the participants of interest, training programs were sent the online survey containing an informed consent, a brief demographics sheet, and the aforementioned measures. A total of 50 professional psychology programs within clinical and counseling were initially identified for inclusion in the study. Programs were selected on the basis of the following criteria: identification as a clinical or counseling psychology doctoral program, espousing either a scholar-practitioner, science-practitioner, or clinical-scientist, training model, having basic recognition with its respective specialty area, and geographical location (e.g. Northeast, Midwest, Southeast etc). The latter criteria attempted to provide geographical diversity so as attempt avoid regional bias. Of the programs solicited, the specialties were roughly equally represented with 27 clinical and 23 counseling programs. Attempts were also made to obtain a stratified sample consisting of equivalent number of programs (e.g. 8 scholar-practitioner, 8 science-practitioner, and 8 clinical-scientist training programs) within each specialty. Participants from 32 programs of the 50 programs solicited completed the survey. Of these 32 programs, 14 identified as clinical and 18 identified as counseling. Programmatic training model was derived from training director ratings included in *The Insiders Guide to Clinical and Counseling Psychology* (Norcross et al. 2008) and stratification followed procedures utilized by Neimeyer et al. (2005) and Neimeyer et al. (2007). Training directors were asked to review the study to assess its usefulness and appropriateness for their program. Upon their review, they were asked to forward our study to their students. Thus, participants were graduate students recruited via email solicitation according to program membership. Participants were asked to read and electronically sign the informed consent form. Once the participant agreed to participate, they were asked to click on link to the survey. Once

participants completed the surveys and submitted their responses, they were thanked for their participation.

CHAPTER 4
RESULTS

Results from the current study are described below. First, I will discuss measurement issues, followed by sample descriptives, general correlations, regression analyses, MANOVA analyses, and finally results of the mediation analysis.

Descriptive and Preliminary Analyses

Power analyses were conducted on the hypotheses in the current study to ensure inclusion of sufficient number of participants to estimate parameters. For a multiple regression analysis with six predictors, a medium effect size (0.15), and Alpha level of 0.05, and strong power (0.95), a total sample size of 143 participants was needed. This was the most participants that were needed for each of the 5 hypotheses.

Multivariate analyses of variance were conducted on the 5 measures used in the current study (RTES, SERM, ROEQ, SPI, RMES, PATR, SAS) and suggested that there were no differences in the mean scores of the variables of interest among the questionnaire forms (all *ps* > .004). Thus for all analyses, the data from different forms were combined.

Measurement Reliability

Measurement reliabilities for the RTES, SERM, ROEQ, SPI, RMES, PATR, and SAS scores appear in Table 4-1. Notably, Chronbach's coefficient alpha for the RTES of .88, was much higher than the .74 reported by Hollingsworth and Fassinger (2002).

The reliability finding for the SERM was an alpha of .91. This is comparable to previous reports ranging from .89-.90 (Kahn and Scott, 1997; Kahn, 2001).

Reliability findings for the ROEQ revealed a Chronbach's coefficient alpha of .93, which is also comparable to the internal consistency ranges found from .88-.90 (Kahn, 2001; Bishop & Bieschke, 1998; Bieschke et al., 1995).

The measurement reliability findings for the SPI were an alpha of .87 for the scientist subscale and an alpha of .83 for the practice subscale. This is similar to findings in previous work, where the internal consistency for the SPI–20 scores was .92 (scientist) and .69-.85 (practitioner) (Leong & Zachar, 1993).

Measurement reliability for the RMES revealed a Chronbach's coefficient alpha of .95, which was much higher than the .74 reported by Hollingsworth and Fassinger (2002).

Reliability findings for the PATR revealed a Chronbach's coefficient alpha of .91 for the overall score. Research supports the internal consistency, with alpha coefficients ranging from .87 to .90 (Gelso et al., 1996; Hollingsworth & Fassinger, 2002; Kahn & Scott, 1997; Royalty et al., 1986).

Finally, reliability for the SAS revealed a Chronbach's coefficient alpha of .69. This was comparable to previous research indicated internal consistency coefficients (K-R-20) for this scale for Kahn and Scott (1997) .68, Kahn (2001) .70; Hollingsworth & Fassinger (2002) .75; and Szymanski et al. (2007) .79. Kahn and Scott (1997) report this measure positively correlates with interest in research and science relatedness of students' career goals.

Regression

Hypothesis 1 and 2

For the first two hypotheses a multiple regression analysis was conducted. First, Person Product Moment correlations, using a criterion level of .05 (1-tailed), were computed between the criterion variable (SAS) and each of the predictor variables in an attempt to confirm that the relationships were in the predicted directions. Pearson Product Moment correlations were conducted between the SAS and the RMES, $r = .34$, $p < .001$, the SERM, $r = .35$, $p < .001$, the PATR, $r = .32$, $p < .001$, the ROEQ, $r = .15$, $p < .016$, science practice orientation $r = .35$, $p < .001$, and SPI science, $r = 0.25$, $p < .001$, revealing positive significant correlations in the

predicted directions. In contrast, a negative significant correlation occurred between SAS and SPI practice $r = -0.31$, $p < .001$. The correlation between SAS and the RTES was conducted to verify that participants with more positive perceptions of their research training environments reported greater scholarly activity. Results were not in the predicted directions, revealing an insignificant correlation between the SAS and the RTES, $r = 0.10$, $p = ns$. Thus, RTES was not included as a predictor in the regression analysis for hypothesis 1.

Review of the correlation matrix also revealed multicollinearity concerns due to significant correlations between PATR and ROEQ, $r = .75$, $p < .001$, and PATR and SPI science $r = .80$, $p < .001$ suggesting these variables shared 56% and 64% of their variance respectively, with PATR. Therefore, PATR was removed from the analysis as it did not serve as primary hypothesis within the study (See Table 4-1).

In order to assess the capacity of the data to be in line with the normality assumptions of multiple regression, the data was subjected to tests of skewness and kurtosis. Results of these analyses indicated that the assumptions for multivariate normalcy were met. All skewness and kurtosis estimates for the variables fell between 2 and –2 except for the Scholarly Activity Scale, which had a kurtosis value of 2.551. Examination of the data revealed 8 outliers. As noted in the literature, outliers can have deleterious effects on statistical analyses including: increasing error variance, reducing power, altering the odds of Type I and Type II errors, and influencing estimates of interest (Osbourne & Overbay, 2004). Thus, for the dependent variable (SAS) 4 outliers were removed based on the generally accepted convention of 3 standard deviations from the mean (Osbourne & Overbay, 2004). As a further safe guard, alpha levels were also protected by conducting Bonferroni corrections (dividing the conventional alpha of .05 by the number of criterion variables), resulting in a more conservative test of the hypotheses.

Hypothesis 1 examined RTE, research mentoring relationships, research-self-efficacy, research interest, practice interest, and research outcome expectations as predictors of clinical and counseling students' scholarly productivity. Hypothesis 2 included training model orientation as an additional predictor of scholarly activity. Thus, for the first two hypotheses, a simultaneous multiple linear regression analysis was conducted to determine if these variables were significant predictors of the criterion variable (scholarly activity). The predictor variables accounted for significant variation in scholarly productivity scores, $F(6, 205) = 11.62$, $p < .001$ ($R^2 = .254$). The standardized beta coefficients for the RMES ($\beta = .137$), $t(205) = 1.96$, $p = .05$, the SERM ($\beta = .190$), $t(205) = 2.65$, $p = .009$, and training model ($\beta = .210$), $t(205) = 3.14$ $p = .002$, were significant and in the positive direction. The direction of these effects indicated that the more the students endorsed research self-efficacy, quality mentoring relationships, and the more scientifically oriented their program, the greater their report of scholarly activity. In contrast, the standardized beta coefficient for the SPI practice ($\beta = -0.393$) was significant and in the negative direction for the SAS, $t(207) = -2.82$, $p = .005$. The direction of the effect for SPI practice was in expected direction, and was conceptually consistent, indicating that the more the students endorsed practice-oriented interests, the lower their report of scholarly activity. The standardized beta coefficients SPI science and ROEQ did not reach significance (See Table 4-2).

MANOVA

For hypothesis 3, (Students' report of research, clinical, and overall programmatic satisfaction will differ as a function of training model) a MANOVA was conducted with the independent variable being training model as measured by the *Insider's Guide to Clinical and Counseling Psychology (2008)*. Following Neimeyer et al. (2005) and Neimeyer et al. (2007), Programs with a practice orientation (values 1-3) were placed in the practice-oriented group, those with an equal emphasis (value of 4) were placed in the science-practice oriented group and

participants with a higher science orientation (values 5-7) were placed in the science-oriented group. The dependent variables were participants' ratings of their satisfaction with their program's emphasis on research, practice, and their overall satisfaction with their graduate program. Results of the MANOVA were significant $F(3, 210) = 6.74$, $p < .001$. Follow-up ANOVAs revealed significant differences in program science-practice orientation for satisfaction with program's emphasis on clinical practice $F(3, 209) = 13.58$, $p < .001$. Bonferroni Post-Hoc analyses revealed that participants with a practice orientation reported significantly more satisfaction with their program's emphasis on clinical practice ($M = 4.39$) as compared to those with science-practice ($M = 3.99$) and science orientation ($M = 3.47$) (See Table 4-3). Participants from science-practice programs also reported significantly more satisfaction with their program's emphasis on clinical practice than those with a science orientation. Significant differences were not found for participants' ratings of their satisfaction with program's research emphasis and overall satisfaction with training program.

For hypothesis 4, (Students from more practice-oriented programs will report similar overall perceptions of their Research Training Environments (RTEs) and lower levels of scholarly productivity (SAS) than more research-oriented programs for both clinical and counseling students), the independent variable in the MANOVA was program training model (e.g. Practice, Science-Practice, or Science Orientation), with the dependent variables being participants' perceptions of their Research Training Environments and Scholarly Activity. Results of the MANOVA were significant $F(2, 209) = 10.41$, $p < .001$. Follow-up ANOVAs revealed significant differences for training model along both dependent variables, Research Training Environment, $F(2, 209) = 7.01$, $p < .001$ and Scholarly Activity $F(2, 209) = 15.92$, $p < .001$. Participants with a practice orientation had significantly more negative perceptions ($M =$

60.87) of research training environments as compared to those with science (M = 66.40) and science-practice orientations (M = 68.14), Bonferroni Post-Hoc analyses. There was not a significant difference found between science and science-practice program orientations. For scholarly activity similar findings occurred, with participants in programs with a greater practice orientation having significantly lower reported levels of scholarly activity (M = 10.45), compared to science-practice (M = 18.83) and science (M = 22.60) oriented programs, Bonferroni Post Hoc analyses. No significant differences were found between science and science-practice program orientations. These results were in the predicted directions. To ensure that there was not a confound between clinical and counseling psychology student in these analyses, a MANOVA was conducted to assess for significant differences between clinical and counseling psychology students scores on the dependent variables. Results revealed that the MANOVA, $F(1, 210)$ = 1.11 and ANOVAs for type of program (clinical vs. counseling psychology) along research training environment, $F(1, 210) = 0.20$ and scholarly activity, $F(1, 210) = 1.89$, were insignificant $p = ns$ (See Table 4-4).

Lastly, hypothesis 5 assessed whether the research mentoring relationship mediates the relationship between research training environment and scholarly productivity for clinical and counseling students. Per Baron and Kenny (1986), the following criteria were necessary for mediation: (I) the predictor (research training environment) is significantly associated with the outcome (scholarly activity); (II) the predictor is significantly associated with the mediator (research mentoring relationship); (III) the mediator is associated with the outcome variable (with the predictor accounted for); and (IV) the addition of the mediator to the full model reduces the relation between the predictor and criterion variable. These guidelines for mediation were not met to test the influence of research training environment on scholarly activity via research

mentoring relationship due to the lack of a significant relationship between research training environment and scholarly activity (r = .103, *ns*).

Table 4-1. Intercorrelations, Means, and Standard Deviations of Variables

Variable	1	2	3	4	5	6	7	8	
ROEQ									
RMES	0.37**								
RTES	0.48**	0.45**							
SERM	0.33**	0.34**	0.48**						
PATR	0.75**	0.32**	0.35**	0.41**					
SAS	0.15*	0.26	0.10	0.35**	0.32**				
SPI Science	0.68**	0.32**	0.42**	0.47**	0.80**	0.25**			
SPI Practice	-0.26**	-0.05	-0.06	-0.21**	-0.38**	-0.30**	-0.24**		
Training model	0.23**	0.35**	0.18**	0.31**	0.27**	0.35**	0.25	-.019	
M	72.04	3.15	65.37	75.35	3.31	17.44	27.99	38.87	4.09
SD	13.29	1.12	12.33	17.60	1.21	13.12	7.67	6.21	1.38

Note. $N = 213$ $p < .05$.* $p < .01$.**

Table 4-2. Summary of Multiple Regression Analyses for Variables Predicting Scholarly Activity (N =205)

	Scholarly Activity		
Variable	*B*	*SE B*	*β*
RMES	1.61	.82	.14*
SERM	.14	.05	.19**
Training model	1.74	.55	.21**
ROEQ	-.15	.21	.16
SPI Science	.19	.15	.11
SPI Practice	-.50	.14	-.23*
R	.50		
R^2	.25		
F	11.62		

*$p < .05$. **$p < .01$.

Table 4-3. Differences in Satisfaction between Training Models

	Practitioner-Scholar (n =64)		Science-Practitioner (n =91)		Clinical-Scientist (n = 60)				
Satisfaction	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Effect Size (η^2)	Observed power
Clinical	4.39	.88	3.99	1.05	3.47	1.00	13.58*	.114	.998
Research	3.59	1.06	3.82	1.05	3.73	1.09	.998	.008	.200
Overall	4.09	.87	3.91	.80	3.79	.79	2.74	.025	.537

$F(3, 209) = 13.58$, $p < .001$.*

Table 4-4. Differences in Perceptions of RTE and Scholarly Activity between Training Model

	Practitioner-Scholar (n =62)		Science-Practitioner (n =90)		Clinical-Scientist (n = 60)				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Effect Size (η^2)	Observed power
RTE	60.87	12.27	68.14	11.86	66.40	11.82	7.01*	.063	.925
Scholarly Activity	10.45	7.40	18.83	12.84	22.60	15.13	15.92**	.133	.999

$F(2, 209) = 7.01$, $p < .001$.* ; $F(2, 209) = 15.92$, $p < .001$.**

CHAPTER 5
DISCUSSION

The current investigation attempted to advance the research training literature through exploration of research mentoring experiences and training model as potentially important factors in training outcomes among professional psychology graduate students. Previous work has supported research training environments, research self-efficacy, research interest, and research outcome expectations as predictors of scholarly activity among counseling psychology students. The current investigation included these previously supported variables, and broadened the investigation through examination of the influence of these variables on clinical and counseling students' scholarly activity. In addition, the current study also examined key differences in graduate student experiences and scholarly activity as a function of programmatic training model.

Results of the current investigation were generally consistent with previous research, although several important departures were noted. Consistent with previous work, research mentoring, research self-efficacy, research outcome expectations, and research interests were all positively related to reports of scholarly activity. These data suggested greater endorsement of these variables was associated with greater reports of scholarly activity for both clinical and counseling students. Interestingly, in the current study, the relationship between RTE and scholarly activity failed to reach significance. This may be explained, in part, by differences in RTE measurement, a decision in the current study guided by equivalent reliability and a decision to balance amount of data collected with potential risk of participant fatigue influencing findings. That being said, the 54 item RTES-R utilized in earlier research (Kahn & Scott, 1997) may provide a more sensitive measure of the association between RTE and scholarly activity, particularly given the reported association has generally been a small one. Future research may

benefit from measurement of RTE through use of this more extensive measure. Notably, of the variables measured, training model had the strongest association to scholarly activity. This was particularly interesting to the current investigation, given it has not been previously examined as a predictor of scholarly activity within the literature. Also relevant, participants' endorsement of practice interests was negatively associated with scholarly activity, suggesting greater endorsement of interest in practice activities was associated with lower levels of scholarly activity. These findings appear generally consistent with assertions that "the model matters" (Neimeyer et al. 2005, 2007; Szymanski et al. 2007).

When examining the predictive nature of the above-mentioned variables, departures from previous findings were observed. The data suggested only research self-efficacy, training model, practice interests, and research mentoring experiences, served as significant predictors of scholarly activity, the later finding supporting recent assertions regarding the influence of research mentoring in training outcomes (Gelso, 1993, 1997; Hill, 1997; Hollingsworth, 2000; Hollingsworth & Fassinger, 2002). Students' level of research interest, and research outcome expectations did not reach significance as predictors of scholarly activity. It may be feasible to suggest that inclusion of research mentoring and training model as additional predictors served to account for variance in scholarly activity previously attributed to other variables of interest. The lack of support for these previously supported variables may be also be explained by some of the following considerations. As noted by Gelso (1993,1997) and Kahn and Scott (1997) academic training programs often do not emphasize training experiences that facilitate positive attitudes toward research and scholarly activity. A possible consequence of this is that students feel less confident in their research abilities and they are less likely to perceive positive outcomes of research involvement (Kahn, 2001). Another potential explanation comes from Neimeyer et al's.

(2005, 2007) suggestion that training models offer a conceptual framework, which serves to guide programmatic training focus, expectations, and outcomes. The inclusion of training model emphasis, with its overarching framework, may account for the instructional and interpersonal elements associated with RTEs. The moderately strong association between training model and elements of RTE (e.g., interpersonal) found in the current study lends possible support for this conclusion. Alternatively, Hollingsworth and Fassinger (2002) have proposed that while the training model commitments define the "culture" of a program, its implementation can be enhanced or hindered by interpersonal elements, such as the nature of mentoring relationship. Thus, the inclusion of training model and research mentoring may have accounted for the variance in scholarly activity previously attributed to the above-mentioned variables. Further work is clearly needed to clarify the nature of these relationships.

In addition to attempts to enhance understanding of the potential influence of key variables on scholarly activity, the current investigation also attempted to clarify whether differences in scholarly activity found in previous examinations of training model literature extend to differences in satisfaction with key aspects of students' training experiences, and perceptions of their RTE. Consistent with the current study's predictions, participants from practice-oriented clinical and counseling programs reported significantly less scholarly activity than their science-practice and science-oriented peers. In the current investigation, they reported 45% and 54% less scholarly activity, on average, than participants from science-practice or science-oriented programs. Although clinically oriented commitments were not assessed in the current investigation, it may be informative to examine whether less scholarly activity, translates into increases in delivery of clinical services. Given increases in interest in clinical activities was associated with decreases in scholarly activity, further attention to these variables as they

influence scholarly activity is warranted. Similarly, from a training standpoint, the examination of one's relative preference for service delivery compared to scientific investigation may serve to inform prospective students about their potential level of satisfaction, given their chosen program's training model commitments.

Potentially supportive of the proposition above, participants from practice-oriented programs were generally more satisfied with their programs' emphasis on clinical practice than those from science-practice or science-oriented programs. Differences in satisfaction did not extend to ratings of research emphasis or overall satisfaction. These findings appear to imply that students from more science-oriented programs are unsatisfied with their programs relative commitment to professional service delivery, although further review revealed, that on average, participants from these groups were moderately satisfied. Future research may benefit from greater specificity regarding students' ratings of satisfaction through allowing for free response or multiple question assessment formats.

With regards to participants' perceptions of their RTEs the current study differed from previous research in important ways. Szymanski et al. (2007) found early career psychologists perceived of their academic RTE similarly regardless of their program's training model, while the current data suggested participants from practice oriented perceived their RTE's less positively. Again, it is important to note that participants from all three groups generally perceived their programs RTE positively. Thus, the practical implications of these findings are not entirely clear. Szymanski et al.'s (2007) conclusion that participants' perceptions of their RTEs are generally inline with their expectations may provide a partial explanation as to the lack of differences noted previously. Building upon this conclusion, the current study's failure to find differences in satisfaction with programmatic research emphasis, may suggest students are less

satisfied with specific programmatic elements. For example, students may appreciate the "consumer" of research philosophy held by their program, hence they are generally satisfied, yet may be frustrated with a research methods requirement or a mentor's greater than average level of research interest, hence less positive perceptions of their RTE. The discrepancy between Szymanski et al.'s (2007) finding and the current study's results may also be due, in part, to differences in sample demographics (e.g., early career psychologists vs. current students; retrospective evaluation vs. current experience). Additional research is needed to support these propositions and clarify the complex nature of these questions.

The current investigation was unable to provide support for the potential mediating role of research mentoring. While the association between RTE and scholarly activity has been demonstrated in prior work, the failure to find such an association, an assumption required for mediation, precluded the current investigations' meditational analyses. Potential measurement issues (discussed in further detail below) may have played a role in the lack of association found. Interestingly, participants in the current study, had moderately positive perceptions of their RTE, yet these perceptions did not appear to influence scholarly activity in a perceivable way. Given the current sample examined participants from practice and science-oriented programs, the lack of association may suggest that for programs that do not emphasis research and scholarly activity, perceptions of RTE may be irrelevant. Future research may benefit from sampling from programs with a clear science commitment.

The current study was also unable to evaluate recent proposals regarding the role of students' prior research interest serves as predictor of their later scholarly activity (Gelso, 1997; Hollingsworth & Fassinger, 2002). Examination of the association between past attitudes toward research (PATR) and measures of current research interests revealed high associations

suggestive of risk of multicollinearity. Subsequently, past and current research interests were deemed too conceptually similar to include as separate predictors in the current investigation. Thus, the influence of previous research interest on scholarly activity remains untested at the time of this study.

In addition to discussing notable findings from the current investigation, considering the strengths and limitations of the current study in the context of the previous literature and conclusions drawn from this work is also warranted. The current study served to advance research training literature through inclusion of additional variables such as research outcome expectations, training model emphasis, research mentoring, and broadened examination to include both clinical and counseling psychology for potentially greater generalizability. Generalizability may have been further enhanced by the current investigations' sampling procedure, which included multiple programs within each specialization within professional psychology. Although not hypothesized, an additional benefit of the current investigation was attention to possible differences in respondents as a function of disciple. Data suggested that participants did not differ in their responses as a function of their choice of clinical or counseling graduate training, thus this finding implies training model appears to influence clinical and counseling students in similar ways. The current investigation also attempted to address previous confounds (e.g., unclear definitions of research mentor, inadequate sample sizes, reporting science-practice emphasis of participants) to clarify the nature of the relationships under investigation. Lastly, the current investigation attempted to maximize its comparative potential with previous or future work through use of generally strong, and frequently utilized, measures to allow for greater comparison of findings across studies.

The current's study strengths appear to outweigh its limitations, yet several limitations serve to qualify the current study's findings and their acknowledgement will likely serve to improve future research. Notably, a primary hypothesis remains untested and thus, the current study was unable to further our understanding of the potential meditational properties of research mentoring. As mentioned above, this may due to differences between the previous and current studies including: variations in the measurement of RTES, and lower reliability of dependent measure in the current study. Relatedly, it is possible the current study lacked measurement sensitivity (e.g., RTE-R) needed to support one of the primary assumptions of mediation (i.e. association). It also seems feasible to suggest there may have been variations in sample characteristics between the two studies.

As alluded to in the previous limitation, many of the conclusions drawn from the current study were based on a dependent variable with less than ideal reliability. While it is true that the current investigation revealed reliability estimates well within those cited within previous literature, the overall low Chronbach's alpha reported for the SAS across the literature implies a need to revisit its psychometic properties and reassess of whether the SAS is adequately measuring the construct of interest. An examination of item reliabilities suggested the two items requesting students to endorse involvement in gathering data or conducting statistical analyses appeared to be driving the low reliability of the SAS. A possible revision to improve SAS reliability and the informative nature of these items, might include a report format assessing the number of data gathering or data analysis projects rather than endorsement of involvement. Given the already brief length of the SAS, it would appear that the item modification would serve as a better alternative than item removal, although Hollingsworth and Fassinger (2002) reported SAS reliability at .74 with a shorter version of the SAS. Alternatively, the varied nature

of scholarly activity suggests that future research may benefit from examining the tenability of viewing scholarly activity as defined by multiple domains, to be assessed along separate dimensions.

The current study attempted to enhance understanding of the influence of a variety of factors on the scholarly activity of professional psychology graduate students and differences in these factors as a function of the conceptual framework underlying the program, yet several questions require further investigation. First, the predictors in the current study only accounted for 25% of the variance in scholarly activity. The question remains as to what accounts for the other 75 %? In support of the current investigation, it is noteworthy to mention that the variables studied accounted for nearly 10% more variance in scholarly activity than previous work (e.g., Kahn, 2001), yet the fact remains, additional constructs of interest wait to be investigated to gain a broader understanding of factors influencing scholarly activity. Variables for possible inclusion in future work include: year in program, career goals (Kahn & Scott, 1997), and research competence (Kahn, 2001). Although at present, measurement issues (e.g., lack of adequate measures for particular variables) and feasibility (e.g., longitudinal analysis) have precluded such work (Kahn, 2001).

While not previously hypothesized as a predictor, in the current study, data was collected on students' graduate standing (i.e. year in graduate program). An exploratory ANOVA revealed a significant difference in scholarly activity by year in graduate program. The data suggested that sixth year students reported significantly greater levels of scholarly activity compared to all other years, except fifth year students. Forth and Fifth year graduate students also reported greater scholarly activity than first and second year students. This finding provides support for graduate standing as a potentially relevant variable for consideration in the RTE literature. This variable

may warrant further investigation as a potential predictor of the scholarly activity of clinical and counseling graduate students. Additionally, greater understanding of the factors influencing the research productivity of faculty advisors and mentors, charged with dissemination of research training is also warranted (Kahn & Scott, 1997). This particularly true in light of increasing support for the role of research mentoring in students' scholarly activity, and the strong interpersonal nature of these relationships (Schlosser & Gelso, 2001, 2005).

Lastly, it seems relevant to acknowledge that while the current investigation primarily focused on the influence of training models on scholarly activity, training models and their associated science-practice commitments serve to contribute more to graduate training than is implied by this singular focus on research productivity. Future research may benefit from a broader examination of these influences such as how training model impacts other ways of being a scientist or a clinician. For example, training model emphasis might be reflected in the nature of an individual's view of the world as conceptualized by their report of their scientific thinking or scientific skepticism broadly. Or more specifically, in their understanding of empirical research, application of research to practice, or critical evaluation of interventions and outcomes as it affects their clients, and their choices. Similarly, while scholarly activity was conceptualized as influenced by the above mentioned variables, it may be the product of many things such as having a productive mentor, being attached to a federal research grant, etc. Thus, it may be important to qualitatively, as well as, quantitatively assess students and relevant others' perceptions of these factors in future research. Also, within any training environment, whether it be clinically or scientifically oriented, the better the student-program match and student-mentor relationship fit, the greater likelihood of positively perceived outcomes. Future research may

benefit from an examination of the role of "fit or match" as it relates to relevant training outcomes (e.g., satisfaction, productivity, retention).

In conclusion, research targeted at increasing attention to factors of graduate training contributing to students' scholarly activity is continually needed (Gelso, & Lent 2000). Applying research findings in the form of subsequent interventions focused on cultivating greater scholarly activity among programs and students with interest in these pursuits may help to support the goal of advancement professional psychology (Belar, 2000; Gelso, 1979, 1993; Gelso & Lent, 2000). The current investigation attempted to provide a small contribution to understanding these factors and relevant differences among professional psychology students.

APPENDIX A
RESEARCH TRAINING ENVIRONMENT SCALE-REVISED SHORT FORM (RTES-R)

Below is a series of statements concerning research training.

Please note that we define research broadly. "Research" when used in this survey includes the following types of activities: designing and executing research projects, preparing manuscripts of a theoretical nature or a critical review of literature, conducting program evaluations or needs assessments, making presentations at professional conferences, participating as a member of a research team engaged in any of the above activities, and advising the research projects of others.

Please respond to the following statements in terms of the doctoral program in which you are currently receiving your training. (Note: If you are currently on internship, please rate the graduate program in which you were previously trained.) It is important to answer each item, even if some of the items are difficult to answer. Consider each statement using the following scale:

1	2	3	4	5
disagree	somewhat disagree	neutral	somewhat agree	agree

1. Many of our faculty do not seem to be very interested in doing research.

2. The faculty does what it can to make research requirements such as the thesis and dissertation as rewarding as possible.

3. My advisor understands and accepts that any piece of research will have its methodological problems.

4. I have felt encouraged during my training to find and follow my own scholarly interests.

5. Statistics courses here are taught in a way that is insensitive to students' level of development as researchers.

6. The statistics courses we take do a good job, in general, of showing students how statistics are actually used in psychological research.

7. There is a sense around here that being on a research team can be fun, as well as intellectually stimulating.

8. Faculty members in my program use an extremely narrow range of research methodologies.

9. Generally, students in my training program do not seem to have intellectually stimulating and interpersonally rewarding relationships with their research advisors.

10. It is unusual for first-year students in this program to collaborate with advanced students or faculty on research projects.

11. I have the feeling, based on my training, that my thesis (or dissertation) needs to be completely original and revolutionary for it to be acceptable to the faculty.

12. Our faculty seems interested in understanding and teaching how research can be related to counseling practice.

13. Most faculty do not seem to really care if students are genuinely interested in research.

14. During our coursework, graduate students are taught a wide range of research methodologies, e.g., field, laboratory, survey approaches.

15. Students in our program feel that their personal research ideas are squashed during the process of collaborating with faculty members, so that the finished project no longer resembles the student's original idea.

16. Students here seem to get involved in thinking about research from the moment they enter the program.

17. Students in this program are rarely taught to use research findings to inform their work with clients.

18. The faculty members of my graduate program show excitement about research and scholarly activities.

Reprinted with permission from Kahn, J. H., & Miller, S. A. (2000). Measuring global perceptions of the research training environment using a short form of the RTES-R. *Measurement and Evaluation in Counseling and Development,* 33, 103–119.

APPENDIX B
SELF-EFFICACY IN RESEARCH MEASURE (SERM)

Instructions: The following items are tasks related to research. Please indicate your degree of confidence in your ability to successfully accomplish each of the following tasks on a scale of 0 - 9 with 0 representing no confidence and 9 representing total confidence.

0 1 2 3 4 5 6 7 8 9

no confidence total confidence

1. Keeping records during a research project.

2. Designing an experiment using traditional methods (e.g., experimental, quasi-experimental designs)

3. Writing the introduction and literature review for a dissertation

4. Writing the introduction and discussion sections for a research paper for publication

5. Formulating hypotheses

6. Writing the method and results sections of a thesis

7. Utilizing resources for needed help

8. Understanding computer printouts

9. Defending a thesis or dissertation

10. Using multivariate statistics (e.g., multiple regression, factor analysis, etc.)

11. Using statistical packages (e.g., SPSS-X, SAS, etc.)

12. Operationalizing variables of interest

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APPENDIX C
THE RESEARCH OUTCOME EXPECTATIONS QUESTIONNAIRE (ROEQ)

Directions: Using the 5-point scale provided, please indicate the degree to which you agree with each statement.

1	2	3	4	5
Strongly Disagree		Agree		Strongly Agree

1. Involvement in research will enhance my job/career opportunities.
2. People I respect will approve of my involvement in research.
3. Involvement in research will allow me to contribute to practitioners knowledge base.
4. Doing research will increase my sense of self-worth.
5. Becoming involved in a research project will lead to the kind of career I most want.
6. Research involvement is valued by significant people in my life.
7. My peers will think highly of me if I become involved in research.
8. Pursuing research involvement will enable me to associate with the kind of people I value most.
9. Involvement on a research team can lead to close personal connections.
10. Research involvement will lead to a sense of satisfaction.
11. Being involved in research will contribute to my development as a professional.
12. I believe research skills will be fruitful for my career.
13. My involvement in research will lead to meaningful contributions to the field.
14. If I get involved in research it will take time away from my significant relationships.*
15. Involvement in research will take time from leisure activities.*
16. Involvement in research will help me to understand the current issues in my profession.
17. My analytical skills will become more developed if I am involved in research activities.
18. I believe that research involvement will lead to becoming well-known and respected in the field.
19. Research involvement will lead to increased financial opportunities.
20. Involvement in research will positively influence my applied skills.

Reprinted with permission from 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,* 182–188.

APPENDIX D
SCIENCTIST-PRACTITIONER INVENTORY

The following questions ask about interest in activities often performed by psychologists. Indicate how interested you are in each of the following activities. Please provide your answers on the blank line to the right of each item. The response categories are as follows.

very low interest 1	low interest 2	medium interest 3	high interest 4	very high interest 5

		Your response
1.	Designing a new treatment method for a mental health agency.	_____
2.	Writing a scientific book for psychologists.	_____
3.	Conducting couples and family therapy	_____
4.	Collecting data on a research project you designed	_____
5.	Reviewing journal articles	_____
6.	Presenting a report during a case conference.	_____
7.	Applying for research grants	_____
8.	Interpreting a test battery for a client	_____
9.	Serving as an editor for a scientific journal	_____
10.	Learning new strategies to deal with psychological problems	_____
11.	Reading a book on innovative research designs	_____
12.	Receiving therapy to make yourself a better person	_____
13.	Learning about new statistical procedures	_____
14.	Reviewing an agency's intake form for a new client	_____
15.	Developing new explanations of well accepted empirical studies	_____
16.	Reading a book written by a famous psychotherapist	_____
17.	Serving on a thesis or dissertation committee	_____
18.	Planning a behavior modification program for a client	_____

Reprinted with permission from Leong, F.T.L. & Zachar, P. (1993). Presenting two brief versions of the Scientist Practitioner Inventory. *Journal of Career Assessment, 1*, 162-170.

APPENDIX E
RESEARCH MENTORING EXPERIENCES SCALE (RMES)

Faculty often play an important role in students' research training and research experiences. Some students receive their most significant research experiences with their formally assigned advisor, while others receive their most important research mentoring through more informal faculty relationships. If you do not have anyone that you consider as a faculty mentor, please consider the faculty relationship that has been most important in your research training while in your current doctoral program, and use the following items to describe your current perceptions of this relationship. It is important that you consider your relationship with only one faculty member in completing this survey. Not all of these behaviors are important to all students or faculty, so please indicate "N/A" for those behaviors that are not present in your relationship.

You will need to provide a response to the stem in each column, circling the appropriate number in each column.

Research Task Functions	IN YOUR RESEARCH RELATIONSHIP WITH A SPECIFIC FACULTY MEMBER, TO WHAT EXTENT DOES HE OR SHE PAY ATTENTION TO THE FOLLOWING:					
	A Great Deal		Some		Very Little	Not Applicable
1. discussing your research-related goals?	5	4	3	2	1	N/A
2. helping you develop research ideas?	5	4	3	2	1	N/A
3. involving you in one or more specific research projects?	5	4	3	2	1	N/A
4. exposing you to different research methods?	5	4	3	2	1	N/A
5. reminding you that flaws in research projects are inevitable?	5	4	3	2	1	N/A
6. suggesting additional resources, such as people or literature, you can consult to improve your research?	5	4	3	2	1	N/A
7. helping you organize a review of the literature?	5	4	3	2	1	N/A
8. helping you to identify weaknesses in a research project?	5	4	3	2	1	N/A
9. helping you develop a realistic timetable for research projects?	5	4	3	2	1	N/A
10. encouraging you to apply for research-related grants?	5	4	3	2	1	N/A

Research Task Functions	IN YOUR RESEARCH RELATIONSHIP WITH A SPECIFIC FACULTY MEMBER, TO WHAT EXTENT DOES HE OR SHE PAY ATTENTION TO THE FOLLOWING:					
	A Great Deal		Some		Very Little	Not Applicable
11. encouraging you to attend important professional conferences?	5	4	3	2	1	N/A
12. introducing you to her/his professional colleagues who have similar research interests?	5	4	3	2	1	N/A
13. encouraging you with presentations of research at professional conferences?	5	4	3	2	1	N/A
14. collaborating with you on joint research projects?	5	4	3	2	1	N/A
15. encouraging you to express your ideas in research meetings?	5	4	3	2	1	N/A
16. using his/her power to motivate you to complete research tasks?	5	4	3	2	1	N/A
17. offering positive feedback about your research work?	5	4	3	2	1	N/A
18. constructively criticizing your research work?	5	4	3	2	1	N/A
19. encouraging you to talk openly about anxieties or fears that interfere with research?	5	4	3	2	1	N/A
20. providing advice about how to manage feelings of frustration with research?	5	4	3	2	1	N/A
21. communicating interest in your ideas when you talk about research?	5	4	3	2	1	N/A
22. communicating respect regarding cultural differences in your relationship?	5	4	3	2	1	N/A
23. expressing appreciation for your contributions to research?	5	4	3	2	1	N/A
24. modeling competence in research-related skills?	5	4	3	2	1	N/A
25. observing connections between research and practice?	5	4	3	2	1	N/A

Research Task Functions	IN YOUR RESEARCH RELATIONSHIP WITH A SPECIFIC FACULTY MEMBER, TO WHAT EXTENT DOES HE OR SHE PAY ATTENTION TO THE FOLLOWING:					
	A Great Deal		Some		Very Little	Not Applicable
26. describing research as rewarding?	5	4	3	2	1	N/A
27. discussing his/her research dilemmas with you?	5	4	3	2	1	N/A
28. expressing enthusiasm for research?	5	4	3	2	1	N/A

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APPENDIX F
PAST ATTITUDES TOWARDS RESEARCH

Please rate your agreement with each of the following statements on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

1. I would have preferred to have the option of completing my doctoral training without being required to complete research projects.

1 2 3 4 5

2. I had a strong interest in doing research.

1 2 3 4 5

3. I placed a high value on the place of research in my future career.

1 2 3 4 5

4. Participating in research activities after graduation was not a major priority for me.

1 2 3 4 5

Reprinted with permission from Royalty, G. M., Gelso, C. J., Mallingckrodt, B., & Garrett, K. D. (1986). The environment and the student in counseling psychology: Does the research training environment influence graduate students' attitudes toward research? *The Counseling Psychologist, 14,* 9–30.

APPENDIX G
SCHOLARLY ACTIVITY SCALE (SAS)

Instructions: The following items assess research accomplishments and current involvement in research activities. Please answer the following questions based on your past and current research involvement.

_____ 1. How many published manuscripts (either empirical or otherwise) have you authored or coauthored in a refereed journal? (include manuscripts in press)

_____ 2. How many unpublished empirical manuscripts have you authored or coauthored (not including your thesis or dissertation)?

_____ 3. How many articles have you submitted to refereed journals?

_____ 4. How many manuscripts are you currently in the process of preparing to submit for publication (i.e., writing the manuscript)?

_____ 5. How many presentations have you made at local, regional, or national conventions?

_____ 6. How many presentations are you currently in the process of preparing to submit for presentation (i.e., writing an abstract)?

_____ 7. How many local, regional, or national research conventions have you attended?

Y N 8. Are you currently involved in gathering data (do not include your thesis or dissertation)?

Y N 9. Are you currently conducting statistical analyses on data (do not include your thesis or dissertation)?

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BIOGRAPHICAL SKETCH

Geoffrey A. Lee was born in San Antonio, Texas, in 1981. In 1994 his family moved to Key West, Florida, where he resided until he was eighteen years old.

He attended the University of Florida in 1999 majoring in psychology as an undergraduate. In 2003, he graduated earning highest honors with a Bachelor of Science in psychology.

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