

Researcher development of doctoral students: Supports and barriers across time

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Abstract:

We used content analysis to analyze 42 counseling doctoral students' reports of supports and barriers influencing their researcher development across 3 years. In line with social cognitive career theory, the students named cognitive-person, environmental, and social-context influences. Analyses indicated no differences in frequencies of supports and barriers across time but significant differences by cohort.

Keywords: researcher identity | doctoral researcher identity | research training | supports | barriers

Article:

The development of counseling doctoral students into competent researchers is vital to the profession, because the critical thinking behind scholarship helps advance the field (Walker et al., 2008; Wester et al., 2019) through increased knowledge that informs counseling practice. However, there are concerns about counseling doctoral students' interest in conducting research (e.g., Reisetter et al., 2004) as well as the quality of their preparation for the role (e.g., Barrio Minton et al., 2012; Wester & Borders, 2014).

Given that the researcher role is often new to doctoral students (Lamar & Helm, 2017; Wester & Borders, 2014), several researchers have explored development of the role through the lens of professional identity development. Typically, researcher identity has been studied as part of a larger transition to a counselor educator identity (e.g., Dollarhide et al., 2013; Limberg et al., 2013), with findings that important tasks varied by year in the doctoral program as students moved toward accepting their responsibilities as teachers, supervisors, and researchers based on

increasing internal self-validation. More specifically, Lamar and Helm (2017) focused on researcher identity as a self-concept that included research interest and research self-efficacy. They found that increased skill development was insufficient for researcher identity development, and the development process was not linear and required time for reflection. Lamar and Helm's participants reported that research courses were helpful but needed to be supplemented by early, hands-on research experiences. In Reisetter et al. (2004), five of the six doctoral counseling students interviewed in the same qualitative research class reported that the qualitative paradigm was more congruent with their counseling and research identities than positivist theory. Importantly, all of these qualitative studies involved small samples in either one-time (Reisetter et al., 2004) or cross-sectional (Dollarhide et al., 2013; Lamar & Helm, 2017; Limberg et al., 2013) designs, although longitudinal inferences were sometimes proposed.

In the first of two quantitative studies to date, both cross-sectional, Kuo et al. (2017) found that the faculty advisory relationship moderated the relationship between students' ($N = 190$) motivation sources and their research productivity. In the second study, Lambie and Vaccaro (2011) surveyed 89 counseling doctoral students regarding perceptions of their research training environment, research efficacy, and research interest. Students in the 3rd year of their programs reported higher research self-efficacy than did 1st- and 2nd-year students. Higher research self-efficacy was correlated with higher interest in research activities. Similar to qualitative researchers, Lambie and Vaccaro noted the need for longitudinal studies to track actual changes during and beyond doctoral programs.

Variables tested by Lambie and Vaccaro (2011) and Kuo et al. (2017) can be found in a larger causal model of research productivity based in social cognitive career theory (SCCT; Lent et al., 1994). In brief, Kahn and Scott (1997; see also Kahn, 2001) proposed that scholarly productivity is predicted by factors in Gelso's (1993, 1997) research training environment (e.g., providing early, nonthreatening involvement in research; teaching varied research methodologies) on students' research self-efficacy and research interest, which then contribute to successful involvement in research activities. Across several decades of extensive research, both Gelso's training model (Gelso et al., 2013) and Kahn and Scott's (1997) model—and extensions of the model as suggested by SCCT (e.g., outcome expectations, Bishop & Bieschke, 1998; advisory working alliance, Morrison & Lent, 2014)—have garnered fairly consistent support.

Nevertheless, some relevant SCCT variables have not been explored in investigations of research self-efficacy and productivity. In particular, environmental-contextual influences such as supports and barriers have received almost no attention (Lent et al., 2000), yet “SCCT suggests that students' willingness to translate their interests into goals, and their goals into actions, depends partly on the supports or barriers they encounter in their environment” (Gelso & Lent, 2000, pp. 128–129). In addition, Lent et al. (2000) emphasized the temporal dimension of supports and barriers, thus highlighting the need for longitudinal studies across students' years of doctoral study. Indeed, longitudinal studies of research training are quite rare (Gelso & Lent, 2000), and none were located in the counseling field. Finally, Gelso and Lent (2000) pointed to social-contextual factors, such as one's peer group, as potential influences on research aspirations and productivity.

Thus, we sought to explore the relevance of contextual supports and barriers to doctoral students' longitudinal development as researchers through three research questions:

Research Question 1: What supports and barriers do doctoral students report, across their doctoral program, as influencing their development as researchers?

Research Question 2: Do the frequencies of supports and barriers differ by time point during the program?

Research Question 3: Do they differ by doctoral cohort?

Method

Context and Procedure

The study was conducted within one doctoral program in a midsize university in the southeastern United States. The program was accredited by the Council for Accreditation of Counseling and Related Educational Programs and consists of 3 years of full-time study, including a 3-year developmental sequence of research courses and hands-on experiences (e.g., research apprenticeship with a faculty member during Year 1 that involves working through the sequence of an empirical project toward manuscript submission, sequence of two in-house research methods courses Spring 1 and Fall 2, three-semester sequence of statistical methods starting Fall 1, and optional research team participation throughout).

New doctoral students were invited to participate in an institutional review board–approved longitudinal study of their researcher identity development during their first week in the program and completed the pretest (Time Point 1). Subsequently, they completed the measures, based in Kahn and Scott's (1997) scholarly productivity model and subsequent extensions of that model, at the end of each fall and spring semester across all 3 years (Time Points 2–7). Data on supports and barriers—the focus of this study—included six cohorts who had completed the measures at all seven time points and thus are part of a larger, ongoing research program. Their research self-efficacy means at each time point were not part of the research questions (i.e., not a mixed-methods study); these data were used only as a background descriptor to help explain results for supports and barriers.

Participants

Participants were 42 doctoral students enrolled in the counselor education doctoral program. Thirty-one (73.8%) identified as women and 11 (26.2%) as men. The majority identified as White (83.3%), with four (9.5%) identifying as Black/African American and three identifying as Asian, Hispanic, or international (2.4% each). Their ages ranged from 24 to 48 years ($M = 28.83$, $SD = 4.91$).

Measures

Supports and barriers. In line with approaches used in studies of domain- and context-specific career barriers (Lent et al., 2000), we created two thought-listing-type items to elicit students' perceptions of supports and barriers:

Please list 1–3 *supports* you think could enhance your development as a researcher during your doctoral program.

Please list 1–3 *barriers* you think could get in the way of your development as a researcher during your doctoral program.

Students' responses were examined via content analysis, as described later.

Research self-efficacy. Kahn and Scott (1997) developed a short version of the Self-Efficacy in Research Measure (SERM; Phillips & Russell, 1994). The 12 items represent four domains of research self-efficacy (highest loading three items for each domain): research design skills, practical research skills, quantitative and computer skills, and writing skills. We added two items specific to qualitative research (e.g., using appropriate methods to analyze qualitative data). Participants indicated confidence in their ability to accomplish each task using a scale from 0 (*no confidence*) to 9 (*total confidence*); ratings are summed for a total score. For the original 12-item scale, Kahn and Scott reported good internal consistency ($\alpha = .90$) and positive correlations with measures of scholarly activity and the research training environment. For the current sample, Cronbach's alpha for the 14-item scale was .95. In this study, we included SERM means only to provide a context for understanding the supports and barriers (see below).

Research Team and Trustworthiness

The coding team comprised the first and third authors, and the second author served as auditor. The first author is a White female counselor educator with over 30 years of experience conducting research and mentoring students on research methodologies, writing, and analysis. The second author is a White female counselor educator with over 16 years of experience conducting research, providing research training in quantitative and qualitative methods, and mentoring students on research methodologies. Both authors had extensive experience with content analysis, and both were faculty members in the program where data were collected. The third author is a White female doctoral student who reported her own research identity was evolving; her cohort's data were not a part of the study. This author typed all listings into an Excel sheet for coding to aid students' anonymity. All three authors attempted to bracket assumptions and biases (e.g., endorsement of Gelso's [1993, 1997] research training model, importance of research to the profession, knowledge of the program's emphasis on research) through ongoing discussions throughout the coding process. The auditor reviewed codes and coding discrepancies after the pretest and main analyses and helped the coders clarify definitions, coding decisions, and coding procedures throughout.

Data Analyses

To answer Research Question 1, we analyzed students' listings of supports and barriers following Krippendorff's (2013) steps for conducting content analysis: unitizing, sampling, recording, and

reducing. First, we separated each thought listing into discrete units (e.g., “support of faculty and peers” became two units to represent two sources of support). This process yielded 890 discrete units of supports and 846 units of barriers. Next, we used an inductive coding procedure to categorize the units. In line with Krippendorff’s suggestions, the coders randomly selected (across time points and cohorts) 10% of the support units as a pretest, independently read them for emerging categories, met to discuss the categories and definitions, and then coded them together to enhance consistency. This same process continued until they reached consensus and no additional categories emerged. A codebook (categories and definitions) and coding (rating) sheet for supports units were created, and the coders worked independently, coming together regularly to reach consensus through mutual discussion (each unit categorized into one code). Then they followed the same procedures for the barrier units. The auditor provided feedback throughout, especially for any disagreements. The coders’ initial agreement averaged 91.89%.

To answer Research Questions 2 and 3, we conducted two series of Fisher’s exact tests by time point and then by cohort. For these analyses, the categories were treated as dichotomous variables (i.e., unit of analysis = present/not present; 1 = present, 0 = not present) to indicate whether a student’s list included a barrier or support coded into that category.

Results

Content Analysis

We used descriptive statistics (frequencies and percentages), along with participant quotes, to address Research Question 1. On the basis of the content analysis, participants identified 10 support categories and 11 barrier categories as influencing their development as researchers. Five were parallel, cited as both a support and a barrier (i.e., research experiences, statistics, self-care, faculty, and individual factors). Frequencies and percentages (see Tables 1 and 2) for each category reflect the total number of times, across all time points, students’ responses fell into that category. In the following sections, supports and barriers categories are explained and illustrated by representative participant quotes.

Contextual Supports

Doctoral students’ listings yielded 10 categories of contextual supports that bolstered their development as a researcher. Categories reflected instruction-oriented (i.e., research experiences and courses, collaboration, department environment, writing, and statistics) and interpersonal-oriented experiences (i.e., faculty, peers/cohort, and loved ones), as well as person-oriented categories (i.e., individual factors and self-care). In the following sections, categories are described in descending order of frequencies (see Table 1).

TABLE 1. Contextual Supports Influencing Doctoral Students' Development as Researchers by Cohort

Support Category	Cohort 1 (n = 8)		Cohort 2 (n = 7)		Cohort 3 (n = 7)		Cohort 4 (n = 8)		Cohort 5 (n = 5)		Cohort 6 (n = 7)		Total		Fisher's	p
	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
Faculty	40	71.4	28	58.3	36	75.0	34	59.6	20	62.2	31	66.0	189	65.6	4.91	.428
Research experiences	25	44.6	20	41.7	19	39.6	42	73.7	21	65.6	34	72.3	161	55.9	25.77	.000
Peers/cohort	34	60.7	19	39.6	20	41.7	21	36.8	9	28.1	8	17.0	111	38.5	22.80	.000
Collaboration	17	30.4	18	37.5	17	35.4	20	35.1	12	37.5	7	14.9	91	31.6	8.67	.121
Statistics	7	12.5	13	27.1	1	2.1	10	17.5	7	21.9	0	0.0	64	22.3	18.33	.002
Department environment	7	12.5	14	29.2	14	29.2	8	14.0	5	15.6	9	19.1	57	19.8	8.37	.132
Loved ones	7	12.5	13	27.1	1	2.1	10	17.5	7	21.9	0	0.0	38	13.2	26.25	.000
Individual factors	2	3.6	3	6.3	2	4.2	3	5.3	5	16.1	3	6.4	18	6.3	5.11	.381
Writing	0	0.0	4	8.3	1	2.1	4	7.0	1	3.1	4	8.5	14	4.9	7.27	.146
Self-care	2	3.6	5	10.4	3	6.3	0	0.0	0	0.0	1	2.1	11	3.8	8.46	.060

Note. *f* = frequency supports category listed by cohort members across time points; % = frequency supports category named by cohort members divided by all potential times cohort members could have named the supports category; Fisher's = Fisher's exact test.

TABLE 2. Contextual Barriers Influencing Doctoral Students' Development as Researchers by Cohort

Barrier Category	Cohort 1 (n = 8)		Cohort 2 (n = 7)		Cohort 3 (n = 7)		Cohort 4 (n = 8)		Cohort 5 (n = 5)		Cohort 6 (n = 7)		Total		Fisher's	p
	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
Other demands and responsibilities	44	78.6	32	65.3	38	79.2	43	79.2	23	71.9	36	78.3	216	73.7	4.28	.513
Self-efficacy	15	26.8	21	51.0	27	56.3	27	43.5	12	37.5	23	50.0	129	44.0	11.99	.034
Research competencies, knowledge, and experiences	21	37.5	16	32.7	16	33.3	27	43.5	13	40.6	15	32.6	108	39.6	2.38	.801
Statistics	10	17.9	15	30.6	7	14.6	17	27.4	8	25.0	14	30.4	71	24.2	6.21	.284
Self-care	5	8.9	17	34.7	7	14.6	10	16.1	2	6.3	7	15.2	48	16.4	14.66	.010
Motivation	6	10.7	12	24.5	4	8.3	13	21.0	3	9.4	2	4.3	40	13.7	12.32	.026
Faculty	4	7.1	1	2.0	7	14.6	7	11.3	3	9.4	4	8.7	26	8.9	5.72	.317
Individual factors	4	7.1	5	10.2	3	6.3	10	16.1	4	12.5	2	4.3	28	9.6	5.44	.354
Money/funding	9	16.1	2	4.1	6	12.5	0	0.0	0	0.0	7	15.2	24	8.2	19.49	.000
Family	2	3.6	2	4.1	0	0.0	0	0.0	6	18.8	6	13.0	16	5.5	19.33	.000
International student issues	0	0.0	0	0.0	0	0.0	0	0.0	6	18.8	0	0.0	6	2.0	20.29	.000

Note. *f* = frequency barriers category listed by cohort members across time points; % = frequency barriers category named by cohort members divided by all potential times cohort members could have named the barriers category; Fisher's = Fisher's exact test.

Faculty. Over half the time, doctoral students pointed to mentorship and support of counseling faculty as influential to their development as researchers. They named instruction-oriented factors, such as faculty expertise (e.g., “faculty knowledge/skill level,” “access to faculty highly competent in research design and statistics”) and faculty approachability and availability (e.g., “open access to all faculty,” “I feel I could approach any faculty member with a research idea and they'd help”). Students also named interpersonal experiences with faculty (e.g., “patience

and guidance of faculty members,” “understanding faculty members—those who allow me to ask questions without feeling inadequate,” “faculty expressing confidence in my skills”), including encouragement to identify their own research ideas (e.g., “faculty members' encouragement to follow our passions,” “supportive faculty who listen to what we are interested in”). They sometimes mentioned doctoral committee chairs and committee members specifically (e.g., “encouragement/challenge from committee chair,” “close and productive collaboration with dissertation chair,” “fabulous doctoral chair and committee”).

Research experiences. About half the time, doctoral students cited a range of research experiences and resources. Some were specific to the counseling program (e.g., “research courses that walk us through the process step by step,” “realistic application in the classroom,” “experimenting with creating research designs in class,” “coursework involving research reviews and presentations”), including a number of statements that were specific to the research apprenticeship in the first year of their program (e.g., “research apprenticeship honed my literature review skills,” “opportunities to practice research skills in my research apprenticeship,” “research apprenticeship has already helped build confidence”), whereas some were external to the program (e.g., “cognate faculty,” “grant writing and funding workshops”). Students also highlighted other chances to practice and apply what they were learning (e.g., “opportunities to present/write,” “presenting preliminary findings at conferences,” “helping other doctoral students with data collection”).

Peers/cohort. Perhaps given the full-time study in the program, students pointed to the support of peers in their cohort and others (e.g., “cohort—they are my source of comfort and encouragement,” “cohort cohesiveness,” “other doc[toral] students constantly checking in—support”). They also spoke to opportunities to learn from each other in class (e.g., “cohort—having opportunities to discuss our ideas as a cohort is huge, such as in research class discussing our quant[itative] and qual[itative] ideas,” “stimulating discussions with peers”) and outside of class (e.g., “knowledgeable peers on how to do research,” “cohort—consulting with each other, feedback on writing, etc.”).

Collaboration. In some statements that could have been coded in several other categories (e.g., research experiences), the emphasis on collaboration was so specific to warrant a separate coding. Doctoral students highlighted learning through being on research teams with counseling faculty members (e.g., “research teams are a great way to learn more,” “collaboration with existing projects”) and each other (e.g., “peers encouraging collaborative projects,” “cohort members who want to work together on studies”).

Statistics. Some students cited required and elective statistics courses they took in another department. Some identified the courses (“advanced-level stats courses,” “ability to take research/stats courses that are geared specifically to my interests”), “stats tutors,” and the help desk offered in that department. Others mentioned study groups for working together on statistics homework. One student listed “meeting with a statistician on the research team” as informative.

Department environment. This category included statements about general aspects of the department rather than specific people, courses, or activities. Students spoke generally to a research-oriented environment (e.g., “the culture of curiosity,” “strong encouragement around

research involvement,” “research-friendly atmosphere”) and vicarious modeling (“others around me doing it too,” “witnessing research efforts of others,” “enthusiasm of my cohort and other doc[toral] students re: their research,” “faculty excitement about research”). They also highlighted expectations (e.g., “high expectations,” “professors who seem to want me to succeed”) and support for their own research ideas (e.g., “support for my personal research interests,” “flexibility to follow my own research interest”).

Loved ones. Several students spoke to the support of their families, partners, and friends. They spoke of both general support (e.g., “my wife,” “family and friends for moral support,” “family—while they don't get it, they love me”) and support specific to their work (e.g., “my family values education and is proud [of]/interested in my accomplishments,” “family is supportive of my duties as a researcher”).

Individual factors. A few students named individual traits or actions as supports for their development as a researcher (e.g., “my curiosity,” “high energy/motivation,” “intentional practice on my own time”). A few noted their research topic (e.g., “personal passion for topic,” “my close personal connection to my research topic”) as important. One student mentioned faith as a support (e.g., “my religion, my faith”).

Writing. A few students pointed to specific supports for writing, including writing groups offered through the graduate school, cowriting with faculty members and peers (e.g., “writing/cowriting with member of my cohort”), and participating in publication development.

Self-care. A few students highlighted self-care as important (e.g., “maintaining balance between home/work life,” “more time with family and friends,” “emotional health/wellness/self-care”), including specific decisions to allow time for research (e.g., “my leadership responsibilities are winding down and I'm currently not pursuing new ones”). A few students named times (e.g., summers) when they could focus on their research and writing (“I'm finding more free time as I get closer to 3rd year”).

Contextual Barriers

Doctoral students' descriptions of contextual barriers yielded 11 categories that impeded their development as researchers. These included both internal (e.g., self-efficacy, self-care, motivation) and external (e.g., other demands and responsibilities, lack of experience, statistics, faculty, money/funding, family) barriers. These are described below in descending order of frequencies (see Table 2), with illustrative participant quotes.

Other demands and responsibilities. Doctoral students frequently pointed to academic and personal responsibilities that interfered with their ability to focus on their research and writing (“attention spread too thin—courses, clinical work, life responsibilities”). They named graduate assistantship responsibilities (e.g., “teaching load/supervision load,” “multiple professional roles and responsibilities”), coursework (e.g., “too much time taken up by other academic responsibilities”), family responsibilities (e.g., “taking on extra projects/opportunities could interfere with my family time”), and part-time work outside the program. They frequently spoke

to challenges to find time to focus on research (e.g., “lack of time to dedicate to really learning research methodology,” “time to discuss situations with cohort members and problem solve”).

Self-efficacy. Students often described a lack of research confidence in general (“self-efficacy around my ability to do research”) and around various aspects of the research process. Their statements included the following: “self-confidence in developing ideas,” “imposter syndrome,” “my confidence in creating a dissertation from start to finish,” “lack of confidence in my abilities to design a research project that will contribute to the field,” “I am still quite intimidated (though excited) by the research process,” and “I was once confident and now I am not.”

Research competencies, knowledge, and experiences. Other statements pointed to a lack of research knowledge and experience (“the gap between what I know and what I need to know”). Many students cited limited prior research experience or “lack of previous training” in various aspects of the research process (e.g., “being able to narrow my focus,” “formulating manageable, realistic research questions,” “confused about how the methodologies compare to each other and how to choose”). More individual concerns included “access to a relevant population” and “finding a research team that matches my interest.”

Statistics. Some students specifically named limited knowledge (vs. efficacy) of statistics (e.g., “inadequate knowledge of statistical methods”) or concern about their abilities (e.g., “statistics—difficulty understanding or applying,” “stats STILL confuse and frustrate me”). Some students cited discouraging experiences in their statistics classes (e.g., “lack of application-based focus of statistics courses”).

Self-care. Some students spoke to a need for better balance between academics and social life and leisure time (e.g., “poor work/play/rest balance,” “brain fatigue—bumping into ‘wall’ of too much critical thinking without enough time for rest and integration”). At various points in the program, they said they felt “mental exhaustion,” “overwhelmed,” low energy, and “burnout.” A few students cited choices to prioritize self-care (e.g., “maintaining personal relationships rather than being involved in research projects”).

Motivation. Some students reported low motivation around research. Some pointed to uncertainty around some aspect of the process (e.g., “my own lack of clarity/direction/focus,” “research seems limited in answering the really big questions”). A few students cited a general lack of interest (e.g., “unfulfilling; not much interpersonal motivation towards research,” “rather be focusing on teaching and supervision,” “mixed feelings about academe in general—feeling disillusioned”).

Faculty. A few students reported barriers involving faculty, including “lack of research mentorship (one on one)” and “issues of power” in interactions with faculty members. One student noted that “the ratio of negative to positive feedback is high and I’m discouraged.” A few were concerned about finding a match for their research interests (e.g., “no faculty have my specific research interests,” “faculty may not support interests as I see them,” “faculty members’ acceptance/open-mindedness to unconventional research methods”).

Individual factors. A few students named individual traits as barriers to their development as researchers. These included “perfectionism—I am afraid that I won't do well,” “my procrastination,” “fear of failure,” “myself—overthinking/making it harder,” “difficulty accepting not doing it well right now (patience with self),” and “difficulty asking for help.” Others pointed to aspects of their work style (e.g., “lack of natural draw toward solitary work—writing a dissertation,” “I struggle with being detail oriented,” “my working style—operating on bursts of energy”).

Money/funding. A few students pointed to “financial limitations” (e.g., “lack of funding for the summer”) and “access to resources” to support their work.

Family. A few students named barriers specific to a family situation, such as commuting (e.g., “living in a different city”) and other responsibilities (e.g., “aging parents”). One student pointed to being distracted by larger “social/global issues” relevant to family identity.

International student issues. One international student cited the “language barrier—English is not my first language and it is the most important barrier.”

Overall Percentages

To provide an overview of the most and least frequent supports and barriers, we plotted the top three supports and barriers by time point (see Figure 1). We included mean SERM scores in the figure to indicate students' overall research confidence levels at each time point during the program, thus providing some context for understanding the top supports and barriers. As depicted, top support categories across time points were faculty (all time points), research experiences (all time points), peers/cohort (Time Points 1–5), and collaboration (Time Points 1, 6, and 7). The most frequent barrier categories across time points were other demands and responsibilities (all time points); self-efficacy (all time points); research competencies, knowledge, and experiences (Time Points 1–5); and statistics (Time Points 6–7).

Differences by Time Point and Cohort

A priori power analysis for Fisher's exact test (two-tailed test; $\alpha = .05$, power = .80) suggested a total sample size of 94; our units of analysis exceeded this number for both Research Questions 2 and 3.

Time point. We examined via a series of Fisher's exact tests (two-sided) whether frequency of supports and barriers (dichotomous, category present or not present) differed by time point across the 3 years (Research Question 2). The only significant comparison for supports was department environment (Fisher's = 17.42, $p = .003$). Inspection of frequencies indicated that, in comparison to the overall average frequency listing ($n = 57$, 20.3%), students more often cited environmental support during the first fall semester (pretest/Time Point 1 and end of first semester/Time Point 2, $n = 15$, 36.6%). Frequencies in other semesters varied from 8.1% (Time Point 4/end of first spring semester) to 20.0% (Time Point 5/end of second fall semester).

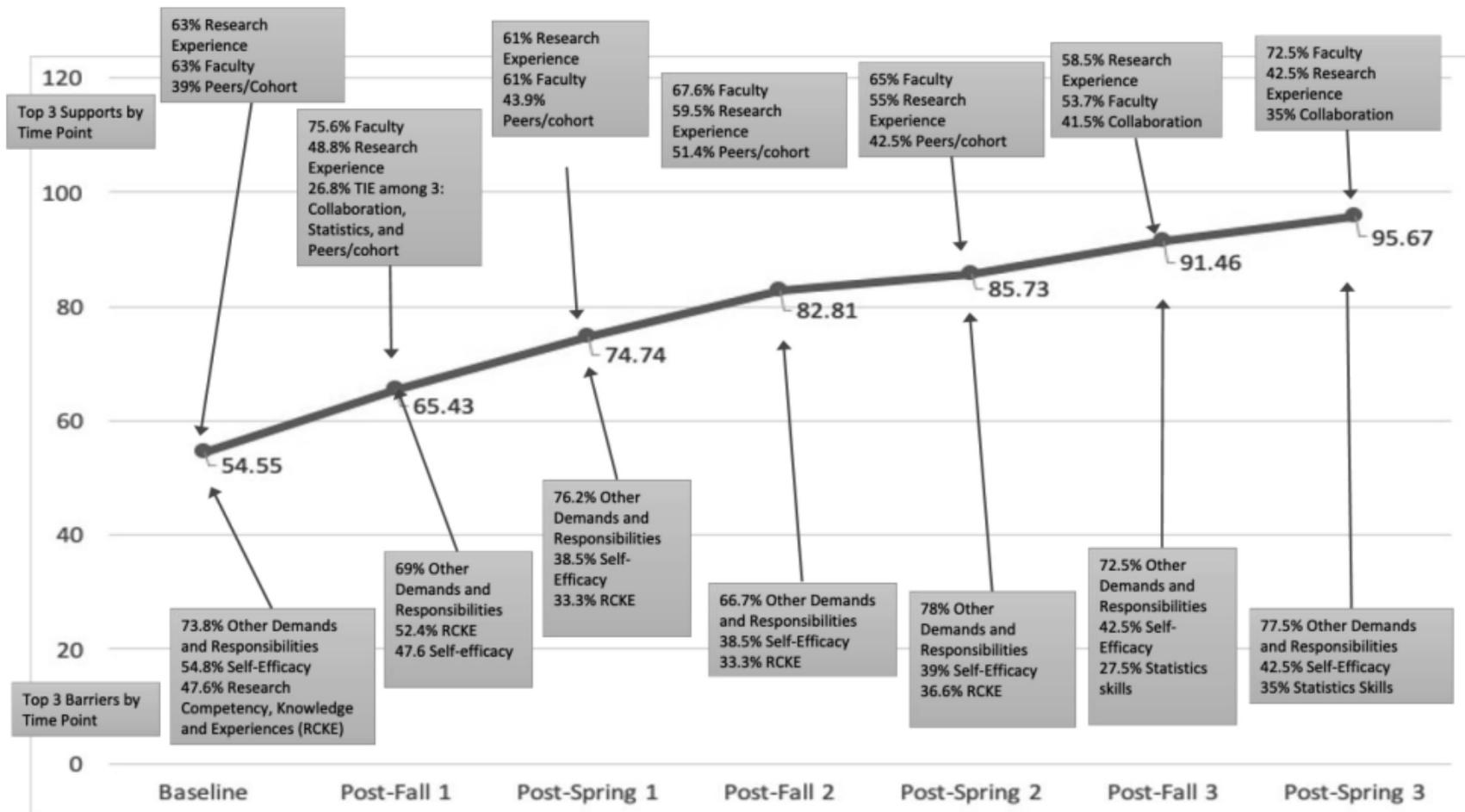


FIGURE 1. Top Three Supports and Barriers by Time Point

Note. Top three supports and barriers (frequencies) by time point are plotted along overall mean scores on the Self-Efficacy in Research Measure (Phillips & Russell, 1994). Baseline (pretest at beginning of Fall 1) = Time Point 1; Post-Fall 1 = Time Point 2; Post-Spring 1 = Time Point 3; Post-Fall 2 = Time Point 4; Post-Spring 2 = Time Point 5; Post-Fall 3 = Time Point 6; Post-Spring 3 = Time Point 7.

Two comparisons were significant by time point for barriers: self-care (Fisher's = 11.37, $p = .040$) and family (Fisher's = 10.18, $p = .032$). For self-care, inspections of frequencies indicated that, in comparison to overall average frequency ($n = 48$, 16.8%), students listed self-care less frequently at the end of the first fall semester (Time Point 2, $n = 1$, 2.4%) and more frequently at the end of the second (Time Point 4, $n = 10$, 25.6%) and third (Time Point 6, $n = 9$, 22.5%) fall semesters, whereas other semesters ranged from 14.3% to 19.0%. For family, in comparison to the overall average frequency ($n = 16$, 0.06%), students did not list family during the first fall semester (pretest/Time Point 1 and end of first semester/Time Point 2); percentages for other semesters ranged from 4.8% ($n = 2$, Time Point 3, end of first spring) to 12.5% ($n = 5$, Time Point 6/end of third fall semester). However, given the low overall frequencies, results for family listings should be considered with caution. No other support or barrier differed significantly by time point, although low power may have been an issue for some categories.

Cohort. Next, we examined via a series of Fisher's exact tests whether frequency of supports and barriers (dichotomous) differed by cohort (Research Question 3; see Tables 1 and 2). Five support categories reached significance: statistics, loved ones, peers/cohort, research experiences, and self-care. In addition, six barrier categories were significantly different: self-efficacy, self-care, money/funding, motivation, family, and international student issues, suggesting different cohort profiles.

Inspection of frequencies of support categories by cohort suggests the following. Cohort 6 named statistics relatively more often than any other cohort. Cohorts 2, 4, and 5 named loved ones/friends relatively more often. Peers/cohort was listed relatively more often by Cohort 1 and relatively less often by Cohort 6. Research experiences were listed relatively more often by Cohorts 4, 5, and 6. Self-care was listed relatively more frequently by Cohort 2.

Similarly, inspection of frequencies of barriers categories suggests the following. Self-efficacy was listed relatively more frequently by Cohorts 2, 3, and 6 and least by Cohort 1. Cohort 2 listed self-care relatively more frequently. Money/funding was listed relatively more frequently by Cohorts 1, 3, and 6. Motivation was named relatively more frequently by Cohorts 2 and 4. Finally, Cohorts 5 and 6 named family barriers relatively more frequently.

To illustrate differing cohort profiles, we inspected support/barrier results and SERM pretest and Time Point 7 mean scores for two cohorts (see Tables 1 and 2 and Figure 1). Cohort 1 began with a SERM mean score of 56.62 ($SD = 10.61$; overall SERM pretest, $M = 54.55$, $SD = 20.23$) and ended with a SERM mean of 107.25 ($SD = 9.88$; overall SERM Time Point 7, $M = 95.67$, $SD = 18.24$). They reported self-efficacy as a relatively low barrier (compared with other cohorts) and cited peers/cohort as a frequent support. In contrast, Cohort 4 began with a SERM mean of 44.75 ($SD = 22.22$) and ended with a mean of 84.00 ($SD = 22.92$); they named research courses as a relatively more influential support and cited motivation as a barrier relatively more often. SERM mean scores increased for both cohorts, whereas their within-group variances did not change.

Discussion

In this initial longitudinal study of doctoral students' development as researchers, students reported influential supports and barriers across time. Findings confirm, and add to, previous studies exploring researcher development among students in doctoral counseling programs (e.g., Lamar & Helm, 2017; Lambie & Vaccaro, 2011). In line with SCCT (Lent et al., 2000), students named cognitive-person variables as well as the conjectured environmental-contextual supports and barriers and social-contextual influences (Gelso & Lent, 2000).

First, the most frequently cited supports across students' 3 years in the program were primarily departmental factors: faculty support, actual hands-on experience with the research process, formal research instruction in the department, and informal learning through research involvement with faculty. These results are in line with factors contributing to doctoral students' development of their research identity in Lamar and Helm's (2017) study. Their participants particularly highlighted hands-on learning opportunities and faculty members' encouragement, reassurance, and assistance. Kuo et al. (2017) highlighted positive relationships with a faculty adviser. The more frequent supports reflect several instructional and interpersonal ingredients in Gelso's (1993, 1997) model of an effective research training environment. Gelso especially emphasized early, hands-on, nonthreatening involvement in research, and doctoral students in this study frequently cited their research apprenticeship with a faculty member during their first year as an important support. As suggested by Gelso (1993, 1997), it may be that these early experiences encouraged many students to continue to be involved in nonrequired research experiences, such as the research teams and peer collaborations they cited. Such collaborations reflect Gelso's (1993, 1997) suggestion that programs promote research as a social (as opposed to isolated) activity. Other Gelso (1993, 1997) ingredients reflected in the environmental supports included teaching varied research methodologies, faculty enthusiasm about research, and faculty modeling research activities. In short, students reported a supportive research culture that encouraged their development as researchers. Importantly, as suggested by Kahn and Scott (1997; see also Kahn, 2001) and research on Gelso's model (Gelso et al., 2013), the environmental supports seemed to be related to students' continual growth in their research self-efficacy (see Figure 1).

Students also cited environmental barriers that were consistent across time. Most predominant were other demands and responsibilities that took up time and mental energy that could have been devoted to research. As full-time students, they had assistantships each academic year (e.g., teaching an undergraduate course, providing clinical supervision for master's students). These supervised activities were also professional learning experiences that required time for preparation and reflection. Such juggling of academic responsibilities may be ubiquitous to doctoral studies in professional fields such as counseling, in which multiple roles and identities are emphasized (e.g., Dollarhide et al., 2013; Protivnak & Foss, 2009). Lamar and Helm's (2017) participants reported searching for balance among their identities as counselor, teacher, supervisor, and researcher in ways that aligned with their priorities and values.

Second, in line with SCCT (Lent et al., 2000), students listed cognitive-person variables. They consistently cited their research self-efficacy and lack of research competencies and experiences as influential barriers. These barriers seemed a "flip side" to the supports designed to address them, such as research experiences mentioned earlier. Yet these barriers did not diminish over the 3 years, which may reflect ongoing new challenges as students moved from assisting with

faculty research to more independent work on their dissertations. Relatedly, statistics became a more predominant barrier during the final, dissertation year. This barrier could reflect students' first experience applying statistics to their own work and/or having research questions that required a statistical method not covered in statistics courses they took.

Finally, students also named social-contextual influences of other students as influential supports. They cited peers' emotional support and encouragement, as well as more research-focused experiences, as one of their top three supports across the first 2 years of the program. They highlighted ongoing research collaborations among peers, stimulating discussions about their research ideas in courses, and opportunities to learn from and assist each other. Some doctoral students in Lamar and Helm's (2017) study also cited doctoral cohort support in figuring out their researcher identity together, whereas others lamented the lack of such support. In the present study, peers/cohort did not emerge as a barrier category. Significant differences in supports and barriers by cohort, however, seem to suggest peers had an important role in students' research socialization in both direct and indirect ways through their different profiles.

Differences by cohort indicated that some groups had more self-efficacy around research and sought additional opportunities to be involved, including with each other, whereas other cohorts had less confidence and motivation around research. These different profiles perhaps reflect whether there was a peer with extensive research or statistics experience within a cohort, different predominant professional goals (e.g., position in teaching-oriented or research-oriented program) between cohorts, as well as beginning research self-efficacy scores. Thus, it seems that cohort peers were not actively discouraging around research (peers not a barrier), but some cohorts perhaps were less encouraging of collaborations or less enthusiastic about discussions of research ideas. In addition, given minimal changes by time point in supports and barriers, it appears support/barrier cohort profiles did not change across the program. These results seem to reflect social-contextual peer group influences, positive and negative, hypothesized by Gelso and Lent (2000). Although research socialization certainly varies at the program level (e.g., Borders et al., 2014), it seems that socialization within a cohort can have a strong influence on peers' researcher development. This result is a unique finding in the literature on doctoral researcher development, as previous researchers have focused primarily on the role of faculty and the research curriculum (Gelso & Lent, 2000).

Limitations and Future Research

Inclusion of cohorts from only one full-time doctoral program is a limitation of the study, although it is also a control for relevant factors such as research culture and instruction. Nevertheless, transferability to other programs is limited and should be considered in light of the program's characteristics (e.g., full-time cohort model, sequence of research courses and experiences); in particular, students may have been attracted to the program because of its research emphasis and opportunities. Similar studies in programs with different profiles (e.g., part-time enrollment) might reveal different supports and barriers. Categorical data (i.e., dichotomous barriers/supports responses) limited formal approaches to managing Type I error rate (i.e., potential false positives from our multiple analyses); thus, we used a more conservative estimate of alpha. Researchers interested in similar work might rephrase our thought-listing prompts; as worded, some of the supports were what the students wished for (e.g., statistics

courses taught within the counseling program) rather than existing supports. Also, some students listed fewer than three supports or barriers; others may have perceived barriers or supports beyond the three lines provided. In general, thought-listing approaches yield only brief descriptions, although this is how domain- and context-specific supports and barriers are typically studied (Gonzalez et al., 2019; Lent et al., 2000). Some students may have self-censored their responses despite efforts to conceal their identity from the faculty researchers. Furthermore, the first two authors' knowledge of SCCT (Lent et al., 1994) and Gelso's (1993, 1997) model may have influenced the findings.

Although the study addressed some underinvestigated areas in the SCCT model (Gelso & Lent, 2000; Lent et al., 2000), further refinements are needed. For example, we did not ask students to rate their supports and barriers by prevalence, magnitude, or impact. We could not determine whether the same barrier or support was perceived differently by individual students (e.g., insurmountable or minor challenge). We also did not give attention to students' responses to barriers (e.g., coping efficacy) nor how they utilized supports, which could be influenced by various dispositional factors (e.g., attachment, Wright et al., 2014). Finally, we did not tie supports and barriers, overall or individually, to SCCT outcomes, such as research interest, goals, and actions (e.g., scholarly productivity), although a connection to their research self-efficacy (a precursor of SCCT outcomes) seemed evident. Thus, future researchers have a number of other avenues for exploring how environmental- and social-contextual supports and barriers influence doctoral students' development as researchers, particularly around cohort research culture.

Implications

Our results provide additional support for Gelso's (1993, 1997; Gelso & Lent, 2000) research training environment model and thus implications for programs seeking to enhance their doctoral students' researcher development. First, given that students frequently cited research involvement as an influential support, students need to be involved in research early in their programs in nonthreatening ways (e.g., research apprenticeship) and have opportunities for ongoing involvement (e.g., research teams) and mentoring relationships. Faculty can model and instill a passion for research, encouraging students to identify and explore their own research ideas and also work together in peer collaborations. Instruction in statistics needs to be tied to application, not only in terms of considering research designs, answering research questions, and interpreting results, but also in terms of real-world application, linking science to practice. Programs can create multiple opportunities for faculty to share their research with students, including their successes and setbacks; the latter could help normalize students' challenges.

Our results suggest, however, that even a strong research culture in line with Gelso's (1994, 1997) model can have differing impacts on a cohort's prevailing culture. It may be that faculty need to tailor research instruction and related experiences based on cohort need, especially for cohorts whose initial research self-efficacy is relatively low, perhaps by identifying their motivations for pursuing doctoral study and highlighting how research is relevant to their goals. Early intervention seems important, given the consistency of supports and barriers across time and within cohorts in this study. Additionally, faculty may need to attend to within-group differences. Of note, although Cohort 4 overall reported relatively low research self-efficacy, the large score variance within the cohort suggested that at least some of its

members were more efficacious and perhaps more interested in research experiences than their peers, who overall expressed lower motivation to be involved in research. Thus, although additional faculty support for more research-oriented “outliers” in a cohort is certainly possible, this would need to be done in consideration of maintaining the broader peer support within a cohort's culture.

Finally, our results suggest local investigations of research supports and barriers can serve as a type of program evaluation to identify what is working well and what needs attention. Program factors were cited as both influential supports (e.g., multiple opportunities to be involved in research) and impeding barriers (e.g., demands of graduate assistantships), suggesting activities to continue (e.g., research apprenticeship) and areas for consideration (e.g., mentoring around balancing competing demands).

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