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THE ROAD TO RESEARCHER: THE DEVELOPMENT OF RESEARCH SELF-EFFICACY IN HIGHER EDUCATION SCHOLARS

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ABSTRACT

Aim/Purpose	Understanding how students develop a sense of efficacy as researchers can provide faculty members in higher education doctoral programs insight into how to be more effective teachers and mentors, necessitating discipline-specific research on how graduate programs are and can be fostering students' research self-efficacy (RSE). Thus, the purpose of this study was to explore how doctoral programs and early research experiences contribute to the development of RSE in higher education scholars.
Background	Participants identified elements of the formal and "hidden" curriculum that promoted and inhibited RSE development.
Methodology	We employed multiple case study analysis of 17 individual early career scholars in higher education and student affairs.
Contribution	Findings indicate that the development of RSE is complex, but that Bandura's four main sources of efficacy are a useful way to understand the types of experiences that students are and should be having to promote RSE. Our findings also highlight the importance of the research training environment in RSE development.
Findings	We found that the formal curriculum of participants' doctoral programs – their research methods coursework and the process of writing their dissertations – were important facilitators of their RSE development. However, we also found that the "hidden curriculum" – the availability of extracurricular research opportunities, faculty and peer mentoring, and the overall research culture of the doc-

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	toral programs – were influential in participants’ development.
Recommendations for Practitioners	Our findings point to a number of implications for higher education graduate programs seeking to improve students’ RSE. First, with regard to coursework, our findings point to the importance of recognizing the negative experiences students may bring with them to their doctoral programs, particularly related to quantitative methods, and of finding ways to help them see quantitative methods in different ways than they have before. Second, our findings suggest important implications for how faculty members as teachers, advisors, and mentors can think about providing feedback. Finally, our findings suggest the importance of understanding the “hidden curriculum,” and how faculty members can influence students’ experiences outside of coursework and dissertations.
Keywords	graduate student socialization, research self-efficacy, research training

INTRODUCTION

The process of becoming a competent and productive researcher is a major goal of doctoral education broadly and is particularly the aim of the socialization process that occurs during doctoral education (Austin & McDaniels, 2006). Eventually, students must become scholars in their own right and produce scholarship that can stand on its own. This process of developing as an independent researcher is not easy for most graduate students, and in the field of higher education, where students come from a wide variety of backgrounds and have a wide range of career interests (Haley & Jaeger, 2012), this might be even more challenging. Regardless of their future paths, doctoral students all follow a similar trajectory. As Gardner (2008b) found, doctoral programs have three general phases in common: admission, integration, and candidacy. These three stages make up the milestones on the road to becoming a researcher.

What does it take to train a successful, independent researcher at each of these stages? Although there are many factors to consider, a central component of researcher development is the development of research self-efficacy (RSE). Prior research on RSE has identified the importance of RSE in predicting research interest and productivity in the field of counseling psychology (Bieschke, 2006; Gelso, Raphael, Black, Rardin, & Skalkos, 1983; Kahn, 2001), and a great deal of research on self-efficacy, in general, has demonstrated its importance in influencing individuals’ career interests and goals (e.g., Lent, Brown, & Hackett, 1994). Although counseling psychology research has also identified some aspects of the research training environment (hereafter RTE) that may facilitate RSE development (Brown, Lent, Ryan, & McPartland, 1996; Gelso, Mallinckrodt, & Judge, 1996; Phillips & Russell, 1994), little is known about how RSE develops in higher education scholars. Specific aspects of the doctoral RTE that may influence RSE are outlined by Gelso (1993) and include faculty modeling behaviors, early research experiences, connecting research to practice, and others. Both discipline (e.g., O’Meara et al., 2014) and field of study are likely to be highly relevant when studying the experiences of doctoral students, necessitating specific research on how doctoral students in varying fields and disciplines develop RSE. Additionally, the literature on RSE is primarily quantitative, relying on surveys and scales to measure doctoral students’ efficacy and research experiences, limiting the depth of the analysis. Thus, the purpose of this qualitative case study was to explore in depth the development of RSE in higher education scholars.

RESEARCHER DEVELOPMENT AND DOCTORAL STUDENT SOCIALIZATION

Evans (2011) defined researcher development as “the process whereby people’s capacity and willingness to carry out the research components of their work or studies may be considered to be enhanced” (p. 20). Her emphasis on “people” in this definition is intentional, as she argues that re-

researcher development can occur with those who do and those who do not already identify as researchers. Researcher development is both personal and professional, as it involves changes in “attitudes, viewpoints, knowledge, understanding, and skills” (p. 21) that may be equally applied in one’s personal and professional life. Drawing from research and personal experience, Evans proposed a model of researcher development that included behavioral (e.g., skills and competencies), attitudinal (e.g., perceptions, values, and motivation), and intellectual development (e.g., knowledge and understanding).

Early researcher development takes place within the larger context of the doctoral student socialization process. Golde (1998) described graduate school socialization as a process where “a newcomer is made a member of a community—in the case of graduate students, the community of an academic department in a particular discipline” (p. 56). Gardner (2008b) identified three phases of transition to independence. The first phase, Admission, begins when the student is admitted to the graduate program and continues through the beginning of the first year. In this stage, students must navigate the graduate student application process, choose a program, and navigate the transition to a new location and academic environment. The second phase, Integration, occurs when a student is enrolled in coursework. Importantly, however, “this phase includes... integration with peers and faculty, the eventual choice of an advisor and committee, preparation for examinations, and, for many students, the experience of an assistantship” (Gardner, 2008b, p. 336). The relationships students form and the experiences they have during this phase establish the foundation for the third phase, Candidacy. During the Candidacy phase, students work through the dissertation process from proposal through defense and graduation. During this phase students must be more independent in their work than they ever have before, necessitating a delicate balance of independence and reliance on their advisors. Importantly, Gardner (2008a) found that students who did not “‘fit the mold’ of traditional graduate education” (e.g., women, students of color, those attending part-time, older students, or students with children; p. 130) often struggled to integrate into their programs due to “negative interactions with others, structural impediments to success, and general feelings of ‘differentness’” (p. 131).

Weidman, Twale, and Stein (2001) described a number of dimensions that highlight the complexity of the socialization process. Socialization can be collective and/or individual, formal and/or informal, random and/or sequential, fixed pace and/or variable pace, serial and/or disjunctive. Within doctoral programs, the socialization that students experience may reflect different dimensions at different times. For example, in a highly-structured doctoral cohort, students’ early socialization may be collective and sequential, and may progress at fixed paced; as students approach the candidacy phase (Gardner, 2008a), however, socialization may become more individual and random, and may progress at a more variable pace. Throughout a doctoral program, students may be exposed to both formal socialization (e.g., coursework, comprehensive exams, etc.) and informal socialization (e.g., peer cultures).

RESEARCH SELF-EFFICACY

Several studies have pointed to the importance of research self-efficacy (RSE), “the degree to which an individual believes she or he has the ability to complete various research tasks” (Bieschke, Bishop, & Garcia, 1996, p. 60), in the development of independent researchers. In her model of researcher development, for example, Evans (2011) noted the importance of internal perceptions like self-efficacy in the attitudinal development of researchers. Akerlind (2008) similarly noted the importance of developing confidence as one way of understanding researcher development, especially in doctoral students and early career researchers; he found that confidence was a foundation for other, more complex ways of understanding one’s development as a researcher. In Akerlind’s study, confidence involved “not just development of skills, but also a sense of confidence that you are on the right track with your research” (p. 246).

Although important in one’s development of a researcher identity, RSE is also a key predictor of future research productivity. In a review of a number of empirical studies of RSE, Bieschke (2006)

found evidence of a significant, direct effect of RSE on research output. Additionally, Kahn (2001) found that RSE was one of several key predictors of graduate student research productivity, with the others being how far into the program students were and their level of interest in research.

THEORETICAL FRAMEWORK: SELF-EFFICACY

The idea of research self-efficacy is grounded in Bandura's (1977) social cognitive theory of self-efficacy. According to Bandura, self-efficacy is one's personal belief in one's ability to carry out a particular task to achieve a particular goal. Importantly, self-efficacy is domain-specific; while one might be a self-confident person overall, one may have higher or lower levels of self-efficacy in different domains. One's sense of research self-efficacy may be completely separate from one's sense of efficacy in teaching or service activities. Self-efficacy has been well-researched within the field of psychology starting with the work of Bandura and progressing since.

In his general theory of self-efficacy, Bandura (1977) identified four sources of efficacy beliefs. The first is performance accomplishment, encompassing an individual's experiences of success or failure with a specific task. For example, completing one's dissertation may enhance one's RSE, while having a manuscript rejected for publication may diminish one's RSE. Bandura's second source of efficacy is vicarious experience. This reflects one's observation of the success or failures of significant others performing a specific task. Within a doctoral program, this might include a student witnessing a mentor present at an academic conference. If the mentor performs well and makes the task seem within reach, the student's self-efficacy is likely to increase. If the mentor performs poorly, the student may believe that the presentation of her own research will be too challenging.

Bandura (1977) argued that one's own personal performance accomplishments were the strongest source of efficacy, followed by one's observations of others (vicarious experience). Following those first two sources of efficacy, Bandura also identified verbal/social persuasion, or the positive or negative feedback received from others, as an important source of efficacy. Examples might include an advisor praising a student's dissertation proposal or a dissertation committee member critiquing that student's proposed methodology. Finally, Bandura identified emotional arousal as the final source of self-efficacy. Emotional arousal refers to the positive or negative emotions that one has related to performing a specific task. For example, a doctoral student may feel excited about doing research or may feel devastated upon receiving negative feedback on a conference proposal.

RSE DEVELOPMENT: THE RESEARCH TRAINING ENVIRONMENT

There is some research that points to the ways in which doctoral education can produce independent researchers by facilitating students' RSE development. Gelso (1993) outlined the "ingredients" of a positive RTE that may help or hinder one's level of RSE in a doctoral program, specifically in the field of counseling psychology, including faculty modeling, positive reinforcement, early research experience, exposure to a variety of research approaches, emphasis on the flawed nature of all research, connections between research and practice, encouraging students to develop their own research questions and ideas (at developmentally appropriate times), and promoting the view of research as a potentially social endeavor. Gelso argued that faculty must model enthusiasm for research but should also share their experiences of failure with students. He also advocated for quantitative methods instruction that emphasized logic and the research process over the underlying mathematics of statistical analyses.

Research on the relationship between these components of the RTE and the development of RSE has found that this relationship evolves, often for the better, rather than remaining constant. Students generally begin their studies with lower levels of interest in research and this level increases as they are exposed to the training environment throughout their program (Royalty, Gelso, Mallinckrodt, & Garrett, 1986). Phillips and Russell (1994) found a positive correlation between exposure to positive

aspects of the RTE and RSE, providing further support for the connection between the RTE and RSE.

Specifically in the field of higher education, Lambie, Hayes, Griffith, Limberg, and Mullen (2014) explored the topic of RSE among higher education graduate students. They found that students who reported a higher level of interest in research and a strong sense of research knowledge were more likely to present with higher levels of RSE. Further, those doctoral students who had already had a publication accepted scored higher in RSE than did those who did not have a publication. As might have been expected, career aspirations of students (e.g., desire to obtain a faculty position) also had a positive relationship with RSE levels. Similarly, Murakami-Ramalho, Militello, and Piert (2013) found that as educational administration doctoral students progressed through their programs, their ability to identify as researchers progressed as well. First year students did not have high levels of RSE and mostly relied on their coursework to learn about research. Students further along in their programs were more likely to have begun exploring how to conduct research (e.g., through pilot studies, research teams) and for many this was their first step in identifying themselves as researchers.

PURPOSE

Few studies about researcher development exist in the field of higher education (e.g., Lambie et al., 2014; Murakami-Ramalho et al., 2013), and those that do fail to identify the process by which students develop RSE or the environmental contributors to that process. Most of the literature on RSE development and the environment in doctoral programs comes from counseling psychology. There are a number of unique features of higher education programs, however, that may limit the transferability of these findings across disciplines. For example, scholars in the field draw from a variety of disciplines (e.g., psychology, sociology, economics, philosophy, and history), rather than having one cohesive “agreed upon knowledge bases for the field” (Freeman, 2014, p. 6). Students often come to higher education doctoral programs from a variety of disciplinary backgrounds and typically with administrative experience and career aspirations (Haley & Jaeger, 2012). Programs often focus on training “scholar practitioners,” and those students who end up pursuing research-based careers were often socialized first as administrators rather than researchers (Hyle & Goodchild, 2014).

Understanding how students develop a sense of efficacy as researchers can provide faculty members in higher education doctoral programs insight into how to be more effective teachers and mentors, necessitating discipline-specific research on how graduate programs are and can be fostering students’ RSE. Thus, the purpose of this study was to explore how doctoral programs and early research experiences contribute to the development of RSE in higher education scholars.

METHODOLOGY

For this work we employed multiple case study analysis (Merriam, 2001; Stake, 1995, 2006), wherein we examined each participant as an individual case. A case study approach was the best fit for this study because it allowed us to understand the depth of individual experiences, while also looking across experiences to identify patterns and themes that explained the phenomenon of interest. We approached this research—as many case studies do—from a constructivist perspective (Stake, 1995). We believe that knowledge is co-constructed with our participants (and not merely from them) and that a variety of valid perspectives exist which need to be articulated and accounted for to more fully understand the development of RSE.

PARTICIPANT SELECTION

We used maximum variation sampling of information-rich cases (Jones, Torres, & Arminio, 2006) to provide a deep understanding of how RSE is developed. Creswell (2013) asserted that the use of maximum variation provides insight into diverse cases and perspectives. We limited our search to early career scholars (those pre-tenure), as these individuals are close to their graduate school experience,

allowing for more accurate recollection of the details of their research training, but also distant enough to have perspective on their experiences. As it is impossible to observe directly who does or does not have RSE, we used a proxy to identify scholars who were likely to have higher levels of RSE. In light of the empirical link between RSE and research productivity (Bieschke, 2006; Kahn, 2001), we looked for scholars who had frequently published in top journals (as defined by Bray & Major, 2011) and/or had been recognized with early career research awards. While we acknowledge that not all scholarly work is in the form of publication in academic journals, review of one's scholarly publication record in top-tier discipline-specific journals continues to be used as a predominant method of evaluating scholars (Miller & Seldin, 2014).

Once we identified a list of early career scholars that met the criteria, we selected a group of potential participants that reflected an array of identities (with particular attention to race and gender), methodologies, graduate institutions, and current institution types. Of the twenty-five scholars we invited to participate, seventeen agreed. Ten participants identified as women (Ann, Emily, Jackie, Jess, Kathy, Kelly, Laura, Mary, Wendy, and Sylvania) and 7 as men (Dan, David, Eric, Jason, Joe, Lucas, and Robert); 12 identified as White and 5 as faculty of color (to protect confidentiality we have chosen not to provide a further racial breakdown or combine racial and gender identification); and 8 identified primarily as qualitative researchers, 4 primarily as quantitative, and 5 engaged in both qualitative and quantitative research. Participants received their doctoral degrees from 13 different graduate programs (many, but not all coming from research-intensive programs designed to develop faculty members) and worked at 16 different institutions at the time of the study, all in tenure-track assistant professor positions.

DATA COLLECTION

Consistent with case study analysis, we employed multiple forms of data collection (Merriam, 2001; Stake, 1995) to explore experiences of RSE. The primary source of data was a series of three interviews with each participant conducted by the primary investigator, who was also an early career scholar in the field. Interviews lasted between one hour and two and a half hours each and covered participants' approaches to research, early research experiences, graduate research training and mentoring, assessment of the quality of participants' own research, and the research environment in participants' current position. We examined publicly available documents (e.g., faculty websites, CV's, and publications) to triangulate information provided in interviews and add depth to each story. Some participants also provided unsolicited additional sources of data, including relevant e-mail exchanges they had with colleagues.

DATA ANALYSIS

This study involved an embedded analysis "of a specific aspect of the case" (Creswell, 2013, p. 100)—namely, the development of RSE. We combined traditional deductive and inductive coding approaches (Miles, Huberman, & Saldaña, 2014) with narrative writing (Polkinghorne, 1995; Richardson & St. Pierre, 2005) to make sense of the data. We began our data analysis with a thorough within-case analysis of each participant (Merriam, 2001). The researchers reviewed original interview recordings and transcripts, summarized the interviews, identified areas for follow-up in subsequent interviews, and identified emergent themes within each participant. At the completion of all three interviews, team members were assigned particular participants for whom they reviewed all materials, coded the transcripts line-by-line, and developed case reports. Using a tool from narrative inquiry, the case reports were developed by restorying—a process of gathering data and reorganizing the elements into themes or chronological sequence (Creswell, 2013).

After the case reports were fully developed, we engaged in the process of cross-case analysis (Merriam, 2001). At this stage, we strove to balance deductive and inductive coding approaches. We utilized qualitative software (Dedoose) to code these final narratives by looking for the four sources of efficacy identified by Bandura (1977). We also added a code for other sources of efficacy, which we used

for any instance in a narrative that did not fit into the predefined categories. Where necessary, we developed sub-codes to further define each efficacy source (e.g., “performance accomplishment” included the sub-codes of “success” and “failure” to ensure that we were including everything in participants’ experiences that fit Bandura’s sources of efficacy). For consistency, at least two research team members coded each narrative independently, with regular team discussions to review any discrepancies in our understanding of the coding process.

We then examined all coded segments within each category (each source of efficacy and “other” sources of efficacy), paying attention to areas where sources of efficacy overlapped. Narrative summaries of each thematic area were written and in that process, we identified the main experiences within participants’ doctoral program experiences that played a role (for better or worse) in their RSE development. We then took those experiences and wrote up narrative summaries of each, which helped us understand how these experiences fit together in the formal and informal curriculum of participants’ doctoral programs, and how each related to Bandura’s (1977) sources of efficacy and thus RSE development.

TRUSTWORTHINESS

Trustworthiness was sought in several ways, including data triangulation within and across cases, member checking, and peer debriefing (Jones et al., 2006; Miles et al., 2014). We triangulated data within each case by comparing participants’ accounts across all three interviews and by supplementing interview data with documents (e.g., CVs, web sites, etc.). We were further able to triangulate data across cases by comparing and contrasting participants’ experiences to identify convergent and divergent themes. Informal member checks occurred throughout the interview process, asking participants to reflect on emergent themes from previous rounds of interviews. Formal member checks were also conducted by asking participants to read their own case reports and provide feedback; participants also had the opportunity to review this manuscript to provide feedback on the overall findings.

We engaged in reflexive conversations throughout this project, and, as aspiring and early career academics, we acknowledge our presence as “insiders” in the environment under study. Methodologically, this status can be both a help and a hindrance to our work. As Chavez (2008) delineated, being an insider allows us to have direct access to the population under study and the knowledge necessary to ask nuanced questions of participants. Conversely, Chavez suggested that our insider status might have lead our participants to be less forthcoming owing to their need to protect their professional reputation or may have caused us to incorporate our personal bias into data analysis unconsciously. All three researchers participated in continuous peer debriefing by reflecting on their own research training experiences, sense of RSE, and reactions to the interviews.

FINDINGS AND DISCUSSION

As expected, we found that the formal curriculum of participants’ doctoral programs – their research methods coursework and the process of writing their dissertations – were important facilitators of their RSE development. However, we also found that the “hidden curriculum” – the availability of extracurricular research opportunities, faculty and peer mentoring, and the overall research culture of the doctoral programs – were also influential in participants’ development. The following sections provide a discussion of these findings and, to contextualize our findings, we also simultaneously provide a discussion of how our findings relate to Bandura’s (1977) theory of self-efficacy and the prior literature on RSE development (Lambie et al., 2014; Murakami-Ramalho et al., 2013), the RTE (e.g., Gelso, 1993), and doctoral student socialization (Gardner, 2008a, 2008b).

In the next section, we first broadly summarize our findings related to the formal curriculum before situating these findings in relation to the sources of efficacy. While there was evidence of connections between the formal curriculum and all four of Bandura’s sources of efficacy, the three sources

that were most salient in relation to coursework and the dissertation experience will be the focus of this discussion. Following the findings and discussion regarding the formal curriculum, we offer insight to the role of the hidden curricula of participants' doctoral programs by first exploring the role of research experiences, faculty and peer mentors, and program culture in participant experiences followed by a more explicit discussion of how these experiences related to the four sources of efficacy.

THE FORMAL CURRICULUM

Consistent with two of Gardner's (2008b) stages of doctoral student socialization, participants' experiences with formal research training fell into two main categories – research methods courses and dissertation experiences. Each of these components of the formal curriculum was experienced differently by different participants in ways that meaningfully influenced whether or not they felt efficacious in conducting various kinds of research.

Coursework

As part of Gardner's (2008b) second phase, integration, engaging in coursework played an influential role in participants' development of research self-efficacy. Coursework is a primary way graduate students learn the basics of research: methods of research design, data collection, and data analysis, in both qualitative and quantitative research. Many of our participants described their positive experiences with research-related coursework in terms of how the courses increased their knowledge of research, but also their confidence in being able to conduct research. Unsurprisingly, positive course experiences generally increased participants' efficacy while negative course experiences generally decreased their efficacy.

Importantly, positive course experiences were not necessarily easy. David discussed a qualitative research course he took as a master's student. Prior to this class, David considered himself a quantitative person, so the course "was fundamentally challenging every preconceived notion I had about what qualified as evidence, proof, or logic, data, analysis...It was very tough." He remembered his final poster presentation being "standout" and a real boost to his confidence, but he "effectively failed" his final paper because he was over-confident in his abilities. Despite this, the instructor later encouraged him to revise his paper and try to publish it; the paper was eventually published in a top-tier journal. David summed up the effect of this challenging, yet ultimately successful, experience on his RSE:

having been confronted by something that fundamentally challenged how I saw research and data and evidence...having it thrown in my face a couple of different times and still be able to turn that into something that was publishable had given me an awful lot of belief that when it comes time to actually get something done and out I can make it happen.

Joe similarly struggled with quantitative methods and found all of his quantitative methods courses challenging. Yet, he grew to appreciate quantitative methods (and as a researcher now uses almost exclusively quantitative methods) by focusing on "how did they come to this conclusion then can you work your way backwards and recreate those same results." Dan similarly described that despite the fact that he struggled with quantitative methods, his quantitative courses were "pretty good," in large part because "it wasn't just numbers, numbers, numbers. It was always like there was some social issue that [the instructor] was dealing with." Joe and Dan's experiences reflect Gelso's (1993) assertion of the importance of disassociating quantitative research from mathematical equations, and all of these examples point to the importance of success after challenging experiences in fostering "a resilient sense of efficacy" (Bandura, 1997, p. 80).

While some participants benefited from challenging courses that they were able to navigate successfully, other challenging course experiences ended negatively. Eric remembered that his quantitative methods courses covered ANOVA and MANCOVA, and jokingly added "Maria Sherapova," because

he felt lost in the courses and did not really remember any content. He just recalled that it was terrible and involved “a lot of numbers, a lot of instructions, you had to follow the steps.” As a result of these negative experiences, Eric had almost no efficacy in quantitative research. Negative course experiences were not limited to quantitative methods: Laura thought her qualitative course was “horrible.” Laura explained, “I just don’t remember a lot of it. I don’t think I learned a lot from that class. I think I was trying to get it done, I remember it seemed tedious to me.” Because her qualitative coursework was not very good, Laura felt like she had to do a lot of extra work on her own to catch up; as she described, “I still have a long way to go.”

Jason’s quantitative methods experience illustrates the difference between a good and bad methods course. On the one hand, Jason’s ANOVA instructor was kind, but a terrible teacher. Jason felt that his experience hindered his learning and growth as a researcher. Conversely, Jason’s regression instructor was highly effective at motivating students in his courses and “was just out of this world... he was one of the best professors I’ve ever had.” Jason felt “so engaged in soaking up so much” in his regression course and thought that “it was such a good learning experience.” Jason’s course experiences did affect the types of methodologies he used. Although he considered regression to be a more complicated and advanced method, he understood it better than ANOVA-based research. Both courses involved the “same study group, same institution, same classroom even. And I don’t feel nearly as efficacious around [ANOVA] and I think it largely has to do with the instructor.”

Coursework can in some ways be seen primarily as a form of vicarious experience (Bandura, 1977) – an instructor serves as a model, through direct instruction, of how to conduct research. However, we found that participants’ coursework experience more saliently reflected the three other main sources of efficacy.

Performance accomplishment. Coursework provided students an opportunity to perform various research skills, leading to both successes and failures. Success could come from passing a particular methods class or, more indirectly, by providing a springboard to publications. For instance, one of Anne’s qualitative research instructors reached out to her individually to submit her class paper for publication. Anne decided to do so and, as a result, Anne experienced success through her first sole-authored publication. Often smaller course-based research experiences were able to provide participants with some efficacy around conducting research, thus preparing them for larger-scale projects that they would take on in the future. Emily for one found herself going through the IRB for several of the projects that emerged from her coursework to be able to use the data that she collected. Many participants were able to find success in applying what they learned in methods courses to research assistantships or jobs. This synergy was frequently cited as being influential in researcher development. As Jackie pointed out, she “fell in love” with the research process when this happened because she could really see the applications of what she was learning to the real world. Similar to the findings of Murakami-Ramalho et al. (2015), participants’ sense of RSE progressed as they transitioned from simply learning how to conduct research to actually conducting research.

Yet, conducting research was not the only way participants experienced performance accomplishment, sometimes not taking a course provided participants with the feeling of accomplishment that enhanced their future efficacy. For example, Jess decided to skip her introductory quantitative methods course and Emily skipped her introductory qualitative methods course because they each thought they could learn the material on their own and move more quickly into advanced methods. They read books and used other resources to bridge the gap in their formal coursework, and their ability to “figure it out” enhanced their efficacy in learning new methods; they had done it before and they felt confident they could do it again.

Although success in coursework generally enhanced participants’ efficacy, one of the largest detriments to efficacy was a feeling of failure, particularly in quantitative courses. Several participants discussed their perceived failure to learn quantitative methods and how that failure affected their careers. Mary recalled that she did not learn SPSS well enough while she was in classes and would need re-

freshers to be able to conduct quantitative research. She also said that she sometimes felt like she was missing out on research opportunities since she did not have a strong quantitative background. Dan similarly noted that “looking back, [he] might have made a different choice” about taking more quantitative methods courses, because at his institution he could have had access to a large quantitative dataset. With more quantitative methods training, he would have been able to use the data and “get things published really, really quickly.” On the one hand, these examples show that Bandura’s (1977) assertion that self-efficacy is domain specific can be true on a micro level within the realm of research. While lacking an understanding of quantitative methods seemed to negatively affect Mary and Dan’s self-efficacy in quantitative research, it did not necessarily translate to their efficacy in qualitative work. Conversely, not having skills (e.g., in quantitative research) in an area that they found valuable in some way (e.g., the potential to use an interesting dataset) did seem to lower their overall RSE.

Verbal and social persuasion. While Gelso’s (1993) RTE included considerations for faculty modeling research behaviors, it did not underscore the role of instructor feedback. Our findings showed that direct, verbal feedback from instructors was another way that coursework influenced participants’ efficacy. Generally, the examples that participants recalled were negative. Anne and Eric both shared examples of damaging, negative feedback they received from faculty members in their programs. Anne described meeting with one of her instructors to discuss her final project: “he kept telling me ‘No, that’s not a real research question. That’s not a real research problem.’” Anne related that this instructor went on to make offensive, racist comments about her proposed research topic. Things became “so bad and intense that he started actually yelling at me and I started crying and it was just quite traumatic.” Eric similarly described a conversation with his doctoral advisor where his advisor all but called him stupid. As Bandura (1997) noted, independent of actual performance, “disparaging criticism” (p. 104), especially from someone deemed credible and knowledgeable in a particular domain (such as advisors or other faculty members), can have a damaging effect on individuals’ efficacy; this was clearly the case for both Anne and Eric.

Direct feedback affected other participants through a lack of feedback; this could be both positive and negative. David relayed a story about a presentation he was proud of during his master’s program. His instructor “never actually said [that the poster was good]... other than getting a decent grade out of it... [it] was largely my own judgment.” In this case, the lack of feedback did not affect the way that David interpreted this successful research experience. Anne, in contrast, discussed constantly not getting feedback on assignments in her qualitative research methods class. This led to a lot of frustration and feeling like she did not learn much from the class. In fact, due to this and a variety of other issues, she ended up dropping out of the class entirely. Since Anne now primarily engages in qualitative research, this lack of formal qualitative methods training continued to weigh on her sense of efficacy.

Affective states. The final mechanism through which coursework influenced participants’ efficacy was through participants’ affective states, or emotions related to their course experiences. Participants described positive course experiences using terms like “great,” “cool,” “excited,” “love,” “empowered,” and “amazing.” Jess, for example, described how she enjoyed her first quantitative methods course in her master’s program, and that her professor’s excitement over normal curves and other basic concepts also inspired her to be excited about these things. Anne also reflected on a campus ecology class that she loved. Unlike Jess, it was not so much about the way the instructor presented the material as it was about the content. She thought it was exciting to think “about space and organization of physical structure,” and that it made sense. Thinking about math in these terms excited Anne because “then it’s like I have proof.” These positive experiences made Jess, Anne, and others more interested in research and enhanced their sense of efficacy in doing so. In contrast, negative course experiences often led to strong, negative emotional reactions. Robert and Joe both described negative experiences in their qualitative methods class. Robert “felt bad” asking busy students to spend time interviewing with him, and Joe found his project using a critical lens to be “depressing.” Participants generally gravitated towards methods where coursework had inspired positive emotions

and avoided methods when coursework had inspired negative emotions. As Bandura (1997) explained, people generally interpret negative and stressful emotional reactions in particular contexts as “vulnerability to dysfunction”; even without actual failure or lack of ability, these types of negative emotional reactions can dampen individuals’ sense of efficacy related to the source of those negative emotions. Bandura (1997) explains that this process is mutually reinforcing, in that negative emotional reactions can negatively affect efficacy, but at the same time, a lack of efficacy in a particular context can heighten those negative emotional reactions. The role of affective states in participant RSE may seem like an obvious one, but these findings show that even if the ingredients are present in a RTE (Gelso, 1993), the way these elements are presented to students may incite a negative emotional response that can still be damaging to RSE.

Dissertations

In a doctoral program, research training does not stop at coursework; the dissertation process is meant to help students apply their coursework to an independent research project and to establish their independence as researchers (Gardner, 2008b). This should be a key factor in RSE development. Surprisingly, though, for some of our participants, this was not a noteworthy experience when it came to their development as researchers or their RSE. As David explained, “the dissertation process hasn’t really taught me anything I didn’t know or wouldn’t have gotten through other means.” Robert reflected that his dissertation “was just me doing the research that I was going to do anyways.”

For some participants, though, the dissertation process was an important part of their development of RSE. The dissertation provided an opportunity for participants to experience three of the four sources of efficacy: performance accomplishment, vicarious experience, and verbal/social persuasion.

Performance accomplishment. One way that completing a dissertation enhanced participants’ RSE was through showing participants that they could do it; if they could complete one independent research project, a dissertation, they could likely do it again. Bandura (1997) noted that successes “provide the most authentic evidence of whether one can muster whatever it takes to succeed” (p. 80). As Kelly noted, “because [my dissertation] went well, it gave me the additional confidence that I needed... because everything fell into place – and not that it was easy, it was very difficult... but yeah, I certainly felt confident after it.” Emily recalled feeling as though she “knew I could do [research] because I had already done it” via her dissertation.

Participants were not always able to generalize their successful dissertation experiences into a sense of efficacy moving forward. For Kathy, her inability to work as well as she did on her dissertation once she was in a faculty role was a source of stress that lessened her overall RSE. While Kathy was writing her dissertation, she got into a mode where she was “writing a gazillion pages a day and rocking it and getting through transcripts like it was nothing.” Once her environment changed, though, she struggled with her productivity and began to question her research abilities.

Vicarious experience. Often a key part of the dissertation experience was that it was a formative experience—actually developing new skills through the process. Although some participants developed new skills from their own independent initiative, many learned from the experiences of others, often advisors and mentors. This finding aligned with Gelso’s (1993) assertion of faculty modeling as an important part of the RTE. Sylvia experienced frustration with a committee member who did not understand some of the nuances of her dissertation and frequently requested additional information that other members seemed to “get” because of their own experiences as members of minoritized populations. Her dissertation advisor helped her realize, “That’s why you’re doing this research, [so] that you can help other people who don’t get it, get it.” Sylvia noted that the ability to write and research for a diverse audience was critical to her development, and that this was something that she was able to learn in large part based on the experiences of her advisor.

Verbal and social persuasion. Another important part of the dissertation for some was that it was an opportunity for feedback on their work and their abilities. For some this was a positive part of their experience, building their RSE, but for others it was the opposite. On the positive side, Jason won an award for his dissertation, which led to being featured on his university's website and invited to a Board of Trustees meeting. The recognition he received made him feel valued for the work he did, reinforcing his RSE. Both Dan and Laura had direct, positive feedback from advisors and committee members about the value of their chosen dissertation topics.

There were many more examples of negative feedback associated with the dissertation, although it may be that the negative experiences stood out more for participants (although if this is the case, then they are the experiences that likely had the stronger effect on RSE). Perhaps the most significant is that of Wendy, who failed her proposal meeting. Wendy described her proposal as “a low point” and a “crossroads.” When her initial proposal did not suffice, Wendy described herself as “devastated.” She immediately blamed herself and the quality of her work for not achieving this milestone the first time, unlike many of her classmates. She described this setback as “a test of [her] resilience.” After the unsuccessful meeting, Wendy met with different members of her committee and a mentor and got conflicting feedback about the magnitude of what had happened with her proposal. Wendy felt confusion over the conflicting messages she was receiving, which initially “crushed [her] intellectually” and made her think, “maybe I can't do this.” This sense of doubt stayed with her through her job search and into her early career. She described the job search as “terrifying,” and attributed some of those feelings to the experience she had with her proposal.

THE HIDDEN CURRICULUM

All of our participants, and likely all doctoral students, had research methods courses and wrote dissertations. These are the common elements that make up the formal research training in doctoral programs. Yet, for many participants these were not the main experiences that fostered their RSE. Instead, it was the experiences they had outside of the formal curriculum – extracurricular research experiences, faculty and peer mentoring, and the culture of their graduate programs – that shaped how participants developed as researchers. Parallel to Gardner's (2008b) findings, these experiences generally happened during the second phase of doctoral education. We call these experiences the “hidden curriculum” of doctoral programs, because, unlike engaging in coursework and constructing a dissertation, these experiences were highly inconsistent across participant experiences. In fact, many participants did not even know to look for them when choosing a program and often stumbled into them once in their programs. For instance, some participants engaged in formal research experiences through assistantships, others were invited to participate in faculty-led research teams as a matter of happenstance, while others had to rely on their peers for similar experiences. The following sections offer a discussion of how these opportunities played a role in participant development of RSE.

Research experiences

Early research experiences are a key part of a positive RTE (Gelso, 1993). Participants had their first research experiences at varying times, although most described engaging in research for the first time during their undergraduate, masters, or doctoral programs. Many participants got research experience through formal channels. Jess, for example, had an assistantship in institutional research, which allowed her to apply what she was learning in her quantitative methods classes to real-world data. Jess often had to do analyses beyond what she had already covered in class, which pushed her to explore and learn on her own. Jackie had an assistantship working on a large research project, which provided numerous opportunities for developing research questions, conducting analysis, writing up results, and navigating the publication process.

Others engaged in research through teams or independent projects, generally supervised by faculty members. Kathy participated in two different teams with different faculty members, one that was primarily quantitative and the other qualitative. Wendy discussed applying for and receiving a summer

research fellowship after her first year in her doctoral program, which she used to conduct her first independent research study. Although it was a small project, the feedback that she received from her mentor was invaluable in teaching her about research design. Regardless of how they got the research experience, participants discussed how important these experiences were in giving them the opportunity to apply their methods coursework to actual research, understand the ins and outs of conducting research, and learn how to navigate the complexities of conference presentations and peer review.

Faculty and peer mentors

Another component of the hidden curriculum was the faculty and peer mentoring that participants experienced; often, but not always, this happened as part of extracurricular research experiences. Jackie and Kathy had faculty mentors running their research teams, Wendy had a faculty mentor who helped her navigate her independent research project, and when Jess had to learn new data analysis techniques on the job in her assistantship, she had another graduate assistant who helped her.

Other participants discussed their advisors as mentors. Sylvia recalled going to her advisor when she was confused about the definition of “epistemology.” Her advisor acknowledged that the questions she was having were valid and provided Sylvia with a chart that showed many different definitions of epistemology, demonstrating that Sylvia’s confusion was mirrored by experts. Jackie discussed the importance of mentoring in the research process, describing how her advisor “was completely confident in his ability to create quality research, which he should be.” She went on to explain, “There was something about the ability to work with someone like that and to really be guided through that process that really, I think, made the difference... I knew I was learning as I was doing it.”

Not all participants had access to great faculty mentors, and peer mentoring often filled this gap. Anne described how she had very little faculty mentoring in her program, because “our advisors were so [expletive] busy that you had to wait in a line for an hour to sign up for a fifteen-minute appointment.” Anne explained that some students were in particular faculty members’ “inner circle,” but that those outside of that inner circle could learn from those students on the inside. Anne thought that there were positive aspects to this, because they “were engaging with that information in a different way and almost like a safe space where we didn’t have to worry about this authoritarian figure.” Anne’s experience mirrors Gardner’s (2008b) finding regarding the importance of peer mentoring, particularly during the Integration phase of doctoral education, and Gelso’s (1993) assertion that early research experiences should be minimally threatening. Participants who had direct access to mentors in their program did not always have positive mentoring experiences. While Eric described having access to his advisor, he also felt that his advisor was “negative and directive” and “academically abusive.”

Program culture

Research experiences and mentoring all happened within the broader context of program culture. These cultures influenced the research and mentoring opportunities that were available and how participants saw their research in comparison to others in the program and the larger field. Some participants were exposed to program cultures that heavily emphasized research. Lucas recalled this being the case for him and recollected “constantly having to defend what you were saying... It really made me clarify why we were doing what we were doing... you always had to verbalize what you were going to do...even from day one of orientation.” Eric described his program by saying, “if you weren’t publishing, going to [research conferences], there was nothing really to talk about with your advisor.” Lucas also recalled that many of the faculty members in his program were “rock stars,” but were not routinely available for students to interact with because of their status and commitments. Emily, in contrast, described how in her program, “there weren’t a lot of high expectations for us as researchers... Faculty never really talked about their research...there weren’t really opportunities to work with them on research.” Generally, those participants who were in programs that emphasized research were heavily engaged in research activities, but many noted that there were clear dichotomies within

their programs, with some students having access to research opportunities and others not. Often this was related to students' career plans, with those students who had an interest in faculty positions (those who "fit the mold," as Gardner, 2008a, described) receiving more attention and opportunities than those with administrative aspirations.

Sources of efficacy

The elements of the hidden curriculum – extracurricular research experiences, faculty and peer mentoring, and program culture – all contributed to participants' RSE development through the four main sources of efficacy.

Performance accomplishment. Similar to completing a dissertation, having hands-on research experience facilitated participants' sense of accomplishment; having successfully engaged in research in the past, they were more confident that they could do so again in the future. As Lambie et al. (2014) and Murakami-Ramalho et al. (2013) both found, there is a clear connection between early research success and RSE. However, the relationship between research experience and RSE was not always straight-forward. For example, Joe experienced early success, but when he did not experience the same easy success with subsequent publications, his RSE decreased. The first two articles he published went through without any revisions, which made Joe think it would be easy to get his work published in the future. He later found out that one of the journals was "like 100% acceptance rate" the year he submitted. Retrospectively he felt that, "it wasn't like I did good work, but because these journals just needed articles." Overconfident, he then submitted an article to a higher tier journal and "got smoked." This rejection was a reality check. He thought since he defended his dissertation, "of course I can get something published." However, the rejection made him feel like he had "nothing to contribute." This reflects Bandura's (1997) assertion that success that comes too easily can cause individuals to be too easily affected by future failures.

Vicarious experience. One of the other reasons why research experience and mentoring were so critical is that they often gave participants a front-row seat to observe how others, particularly faculty members, engaged in the research process. This provided, as Gelso (1993) described, an opportunity for students to be involved with faculty mentors who they can model themselves after. As Bandura (1997) noted, learning through vicarious experience is particularly effective at increasing self-efficacy when any lack of self-efficacy is due to an actual lack of skills, rather than a "misappraisal of the skills already possessed" (p. 88). This is often applicable to doctoral students, who still have much to learn about conducting and publishing research. Jackie's assistantship shed light on various aspects of the publication process such as how to prepare a manuscript for publication, determining whether an article is ready for submission, and how to address feedback in manuscript revisions. What was really important during this period was not only seeing aspects of the process, but also being guided by "someone who was completely confident in his ability to create quality research"—this made the difference for Jackie. Working with her advisor, Jackie "gained this sense of confidence" with quantitative methodologies and revising and resubmitting manuscripts, which was "transferrable" to her own independent work. Jason described this type of publication process mentoring as having the opportunity to "see behind that veil."

As with performance accomplishment, participants' vicarious experiences did not always have an easy relationship with their RSE. David described how his close relationship with senior scholars gave him insight into "the game" of academic research. This advantage, however, seemed to decrease his RSE because he knew too much. Since David was well-versed in the acceptance rates of journals he had to deal with that knowledge every time he prepared to submit something to a journal. Even when David was confident in the quality of his research, he struggled to be confident in his ability to publish it based on his knowledge of acceptance rates. There seems to be a fine line between knowing too much and knowing just enough to make it easier when it comes to submitting work for publication.

The cultures of participants' programs were also a key source of vicarious experience, influencing participants' perceptions of their research abilities. There are generally no absolute metrics for measuring one's research abilities, and as Bandura (1997) described, a lack of established norms for measuring success makes social comparisons a key way in which interpret the relative success or failure of our efforts. Participants were able to compare themselves to others in their programs, particularly when it came to performance in coursework, opportunities for research, and actual research success. Participants felt that they compared favorably to their peers, which enhanced their efficacy. When compared to her peers, Sylvia thought she was "probably better than average" and attributed some of that to her desire to be a faculty member. She expressed that she felt well prepared for the job market and "had some publications, I had some research experience...I think I was well trained to be able to do my research on my own." For Lucas, comparing himself to others made him step up his game. He said, "when you're around that kind of talent constantly, you better step your game up, and you better step it up quickly because... that's the expectation." Conversely, Kelly valued the fact that she had attended a less competitive doctoral program, explaining, "there were high expectations, but those expectations weren't the same for everybody." This gave her the freedom to develop into the type of researcher she wanted to be, not what she felt she might be pressured to be in other programs.

Verbal and social persuasion. Another way research experience and mentoring fostered participants' efficacy was through the formal and informal feedback they received through these experiences. A number of participants described the benefit of just being invited to participate in research teams or collaborate with faculty projects. Although Jason was not familiar with quantitative research, his advisor invited him to join her quantitative research team as soon as he started in his program. He was also invited to jump in on a manuscript as a third author in his first two weeks in the program. Similarly, Mary was approached by her eventual doctoral advisor to participate in a research project with him before she even decided to apply for a program. Although Mary did not think she was ready to take on her share of responsibilities in the project, her advisor pushed her and gave her the confidence she needed to take it on. Both of these stories point to the importance of these invitations, beyond the actual research experience itself. Simply being invited to take part in a project conveys the inviters' confidence in the invitees' abilities and thus allowed them to feel as though someone who was already "in the scholarly club" had confidence in their abilities.

Interestingly, direct and indirect feedback on participants' skills sometimes bolstered efficacy, even in light of performance failures. Robert, for example, worked with another student on a manuscript during graduate school. When they submitted the paper, they received "some pretty harsh feedback in some of our grad school stuff because we didn't know what we were doing." His lack of publication success during graduate school was difficult because he wasn't having success in publishing and "didn't have other publications to point at and say hey look, you know, I have done good here." However, Robert explained that this did not make him feel like a bad researcher. Reviewer feedback was generally about the literature reviews or writing of the papers he submitted, not about the methods. Robert described that this experience gave him a low sense of efficacy in getting his research published but did not affect his efficacy in doing research. If the reviewers were not critiquing his methods, he must be doing the actual research well.

Affective states. Participants often used emotive language when describing experiences with hands-on research, mentoring, and program culture. Many discussed how they came to start feeling like a researcher and experiencing excitement around research when they began to make connections between their work and the bigger picture. For Laura, the experience of recognizing the power of her research was what led her to pursue a doctoral program, reflecting Gelso's (1993) emphasis on the importance of connecting research and practice. As a master's student, Laura had the opportunity to be involved in a campus climate evaluation study with one of her faculty members. Laura thought this a "powerful" experience because she was able to see how research could be used to inform practice. Laura explained, "we sat down with presidents and vice presidents and they're asking questions

to give us examples of what they can do to either help their campus to heal or shift or transform or some type of change.” During Wendy’s graduate assistantship, she thought that it felt good to be able to contribute to projects and was excited about the work she was able to do. Mary’s work on a project caused her to “realize how much I really enjoyed both the research aspect of it-- gathering data, analyzing them, and also the managing of it.”

IMPLICATIONS

The purpose of this study was to explore in-depth RSE development among higher education scholars. Our findings offer context to, and extend the discussion on, the development of research self-efficacy through an examination of student experiences with aspects of the formal and hidden curriculum. Findings in relation to the formal curriculum included an examination of how the sources of efficacy manifested in student experiences in research methods courses and in constructing a dissertation. Discussion of the hidden curriculum highlighted research experiences, the role of faculty and peer mentors, as well as the program culture. These findings highlight the importance of the RTE (Gelso, 1993) in RSE development and also indicate that the development of RSE is complex, but that Bandura’s (1997) four main sources of efficacy are a useful way to understand the types of experiences that students are and should be having to promote RSE. Importantly, our findings show that it is not necessary for all four sources of efficacy to be present in order for a particular experience to positively or negatively influence the development of RSE. For instance, vicarious experience was not generally evident in relation to participants’ experience with coursework, yet performance accomplishment, verbal and social persuasion, and affective states all played an important role in shaping individual RSE.

Our findings point to a number of implications for higher education graduate programs seeking to improve students’ RSE. First, with regard to coursework, our findings point to important pedagogical implications including the importance of recognizing the negative experiences students may bring with them to their doctoral programs, particularly related to quantitative methods, and of finding ways to help them see quantitative methods in different ways than they have before. Although it is clearly beneficial for students to be exposed to both qualitative and quantitative methods and perfectly acceptable for students to choose to specialize in one over the other, the dynamics of RSE around each type of methodology were quite different. Participants generally did not have the same level of anxiety and negativity around qualitative methods as they did quantitative, pointing to a need to pay attention to RSE development in quantitative methods courses. Also related to coursework, our findings point to the need to connect research methods coursework to hands-on experiences and encouraging students, where appropriate, to pursue presentations and publications related to course assignments. Coursework can also provide an opportunity to encourage students to work and learn together, developing the peer mentoring networks that many participants found helpful.

Second, our findings suggest important implications for how faculty members as teachers, advisors, and mentors can think about providing feedback. Negative feedback can be an important part of the learning process, but receiving only negative feedback or not being able to adequately balance negative feedback with positive can hinder RSE development. Robert’s experience with his initial publication efforts provides a good example of how positive feedback (even if implicit, i.e., his assumption that his research methods were strong since he did not receive criticism from reviewers in that area) can help mitigate the potentially negative effects of criticism (i.e., on his framing and literature reviews). Faculty members should think strategically about how to best present feedback to foster students’ RSE development while still providing the critical feedback needed for them to improve.

Finally, our findings suggest the importance of understanding the “hidden curriculum,” and how faculty members can influence students’ experiences outside of coursework and dissertations. Faculty members can play a role in modeling the research process (including successes and failures) and inviting students in, fostering student connections for peer mentoring, and helping students see the bigger picture of their successes and failures (e.g., understanding the broader process of presenting and

publishing research). Faculty members should also understand the tendency to focus on students who “fit the mold” (Gardner, 2008a) and should seek to involve other students in the research process, too.

The findings of this study also point to several implications for future research. First, given the particular focus of this work on the development of research self-efficacy in higher education scholars, future studies may extend this discussion by focusing on student experiences outside the field of higher education. Given the prominence of field socialization within participants’ experiences, students in other fields may have different experiences. Second, our study intentionally sought out perspectives from individuals after completing their doctoral experience that we deemed as possessing RSE, however exploring students’ experiences during their program could also be telling in terms of allowing participants the opportunity to reflect on ways their experiences are shaped as they go through their program. Similarly, a longitudinal study that tracked students throughout their program would be an effective way to perhaps more effectively trace the progression of RSE development.

CONCLUSION

As the field of higher education continues to develop, one important consideration is how we are training the next generation of researchers and scholars to contribute to the field. Importantly, we need to consider how our graduate programs are fostering the development of researchers who don’t necessarily “fit the mold” (Gardner, 2008a, p. 130) of a traditional scholar. One way we can do this is to consider how students’ experiences in doctoral programs is, and is not, promoting the development of research self-efficacy. By explicitly considering research self-efficacy development, and the factors that contribute to this development (e.g., performance accomplishment, vicarious experience, verbal and social persuasion, and affective states (Bandura, 1997)) across the formal and informal curriculum of higher education graduate programs, faculty members and others working with doctoral students can ensure that all students have the opportunity to develop as researchers.

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