Comparing the Impacts of Social and Personal Support Amongst First Year Doctoral Students

by

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ABSTRACT

The quality of support provided to students in higher education can have a powerful impact on the student's experience, their perceptions of challenges, and their overall academic success, particularly retaining in and completing their degree. Though many universities create robust services to support undergraduate students, existing literature and efforts by universities may be lacking when it comes to doctoral student support. The purpose of this action research, mixed methods study was to evaluate academic support to first year doctoral students in the School of Life Sciences (SOLS) at Arizona State University, specifically addressing the following concepts related to their doctoral study: development of self-efficacy, awareness of requirements and policies, and sense of belonging. With Communities of Practice and self-efficacy theory providing a framework for this study, first year doctoral students in SOLS were invited to participate in a twelve-week, two-condition study during their first semester. The two-condition study involved a Personal Support and a Social Support condition, wherein Personal Support participants (n=8) received 1:1 academic advising and biweekly newsletters, while Social Support participants (n=14) engaged in biweekly advising sessions within groups of 3-6 students and an academic advisor. Results suggest Social Support significantly impacted SOLS doctoral student self-efficacy scores (z = -1.96, p = .05), it created an avenue for students to cultivate community with doctoral student peers thus benefiting sense of belonging, and collaborating with peers influenced awareness to the point of Social Support participants becoming a resource for other students not participating in the study. In contrast, Personal Support appeared to have less of an impact on self-efficacy, sense of belonging, and awareness. For students with vulnerable

needs to disclose, Personal Support has the potential to reinforce self-efficacy, sense of belonging, and awareness, but the impacts are nominal otherwise. Furthermore, by the end of their first academic year Social Support participants had retained their self-efficacy and sense of belonging scores. Ultimately, the findings suggest the need for reevaluating how doctoral students are supported in and outside SOLS, with a specific discussion about incorporating Social Support as a permanent model for academic support.

DEDICATION

To my grandma, Lynn Anderson, for always sending me off with a new book to read, affirming that I can do anything I put my mind to, helping to instill in me a passion for education, and for whom I have no doubt could have been the first doctor in the family had she been afforded the same opportunities I have had.

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CHAPTER 1

INTRODUCTION AND PURPOSE OF THE ACTION

The decision to embark on a higher education journey to complete a degree at any level is a valiant one. According to the United States Census Bureau, as of 2021, about 22% of people in the United States aged 18 and over have completed a bachelor's degree (U.S. Census Bureau, 2022). In addition, about 10% have completed a master's degree and about 2% have completed a doctoral degree (U.S. Census Bureau, 2022). With a more advanced degree comes fewer role models and a smaller community of peers completing degrees at the same level. Though this makes the accomplishment of completing a bachelor's, master's, or doctoral degree significant, it also contributes to the challenge that it is to commit to a degree and complete it.

In light of this reality, how can students be supported during their higher education journey? Vincent Tinto (2016), a known expert on student retention, emphasizes the importance of self-efficacy, sense of belonging, and perceived value of curriculum as key indicators of student motivation to persist. Self-efficacy and sense of belonging will be discussed in greater detail in the chapters to follow. Meanwhile, Tinto (2016) also suggests the importance of universities listening to their students and being sensitive to how their perceived experiences within the institution may present unique needs. One place where student needs may vary is in the degree they are seeking, particularly the differences between undergraduate students and graduate students, doctoral students in particular. Have you ever browsed your local higher education institution's website, specifically the student services they offer? Many institutions offer robust programs and events tailored toward the wellness and retention of undergraduate

students; however, locating doctoral student resources can be more challenging or lacking altogether.

While a first-time undergraduate freshman student is incredibly different from a first-year doctoral student, both types of student require support in some form, as the interactions between a student and their institution impact student experiences and intent to persist (Tinto, 2016). A first-time undergraduate freshman is navigating a myriad of new changes: new courses, a new infrastructure for learning, perhaps a new location, new roommates, and more. Doctoral students likely navigate similar new changes, but first-time undergraduate freshman may be experiencing this level of change for the very first time. Many universities address this with extensive first-year resources for the transition to undergraduate studies. Meanwhile, doctoral students are not new to the collegiate infrastructure for learning and may be accustomed to some of the other potential changes they may experience when starting a new doctoral degree. They may, however, face new challenges, and it is important for universities to seek out doctoral student voices, investigate their areas of need, and implement robust services for them as well.

Uniquely, the role of a doctoral student may balance the functions of multiple university roles. They may hold some combination of roles making them part student, part faculty, and part staff depending on the graduate assistantships they hold during their degree; they typically take coursework and engage in research as a student, sometimes assist with teaching like a professor, and sometimes assist with research like a research technician. While doctoral students operate on each of these planes, they simultaneously deal with the overlap of policies, requirements, and university services. For some, this may be a challenging new role to exist in and navigate. In fact, this could be exacerbated

if institutions fail to make expectations clear or emphasize support in one of the roles more than the other. Though some of the extensive university efforts to support undergraduate students may not be appropriate for a doctoral student, it is imperative to remember doctoral students are, in fact, students. Their role may be unique, but universities ought to consider how doctoral students interact with the university and how, as a result, they can be encouraged to persist and complete their degrees. The research and chapters to follow seek to highlight the importance of supporting doctoral students and understanding the type of support they need to be successful.

Larger Context

The Department of Education's (ED) Federal TRIO Programs were generally established to help first-generation and economically disadvantaged students be successful in postsecondary education. In 2010, the ED released a report detailing the findings of an analysis of their program called Student Support Services (SSS), which is one of eight federally funded grant programs launched as a component of the Federal TRIO Programs and is tailored to undergraduate students. Specifically, SSS focuses on assisting students while they are enrolled in postsecondary school, helping universities offer students opportunities for academic development during their studies and encouraging students to successfully complete their postsecondary degrees; this is done in an effort to increase college retention and graduation rates (Chaney, 2010). The program includes 947 projects (as of 2008) involving activities like academic tutoring, postsecondary course selection, help with applying for admission, obtaining financial assistance, and peer tutoring and mentoring (U.S. Department of Education, 2020).

With this report longitudinally evaluating the effectiveness of the SSS program activities by analyzing GPAs, retention rates, and degree completions, the most consistent finding was that additional support services were associated with enhanced academic outcomes among students (Chaney, 2010). Students who received support had higher GPAs, were more likely to retain, and more likely to complete their degrees (Chaney, 2010). Though focused on undergraduate students, the suggested importance of support services for academic performance translates to doctoral students because they have a need for support as well. Introduced earlier, doctoral students typically experience new challenges as they transition to doctoral programs where they may navigate the overlap of student, faculty, and staff roles. Other factors make the transition to doctoral study challenging, such as but not limited to the following: navigating funding, the level of and type of work involved in independently researching and writing a dissertation, changes to or progress hindrances with the research, the faculty mentor and student relationship, and the awareness that doctoral study is a significant and lengthy commitment.

The Survey of Earned Doctorates reveals the median time to doctoral degree completion in science and engineering fields range from 6 to 8.8 years depending on the specific field of focus (NCSES, 2022). This, combined with the roughly 50% attrition rate commonly seen in doctoral programs, demonstrates the need for sufficient institutional support to extend to the doctoral student population (Council of Graduate Schools, 2008; Di Pierro, 2012). Rather than providing a breadth of support for undergraduate students and allowing the support to dwindle for those enrolled in more advanced degrees, it is imperative institutions consider the way support services impact academic outcomes as described in the SSS report and explore more ways to address the

needs of doctoral students, such that their GPAs, retention rates, and degree attainment can be encouraged as well. In fact, the SSS report found that the most influential effect on student academic performance occurred during a student's first year of postsecondary education, when the most SSS were delivered (Chaney, 2010).

The research in student support largely focuses on undergraduate students, neglecting to consider how support services affect graduate students. The SSS report findings about the impact and importance of support in undergraduate students' first years could apply to doctoral study, but without focused research on that demographic the information implies possible applicability only. Therefore, the ED's SSS program and subsequent evaluations provide implications for the importance of support altogether, particularly pointing out their impact in the first year of undergraduate study. There is an open question about whether first year doctoral students might similarly benefit from increased support services. Perhaps implementing effective first year support could help ease doctoral students' transition challenges and set them up for long-term success.

In fact, many researchers have found that research on graduate student support, both at the master's and doctoral level, is lacking, impacting understanding of graduate student needs and their priority within the institution (Bloom et al., 2007; Hardré & Hackett, 2014; Zhang et al., 2019). Some work, like that of Vincent Tinto, began to consider graduate student needs. Expanded on in Chapter 2, Tinto (1993) found that doctoral student attrition was similar to undergraduate student attrition in that it was dependent on the student's relationship with the institution itself. Tinto (1993) claims that the specific needs differ (i.e., doctoral students are also employees of the university in many cases impacting their needs), yet the relational importance remains. He developed a

longitudinal model of doctoral persistence emphasizing major milestones like advancing to candidacy wherein the student's level of integration with social and academic systems may lead to retention or departure (Tinto, 1993). Some of the factors that he highlighted in these systems as important to retention include classroom relations, faculty relations, graduate positions, financial support, research opportunities, and peer relations (Tinto, 1993). Further research is necessary to bring understanding to the needs of doctoral students.

In higher education, there are two leading associations focused on student affairs, the American College Personnel Association (ACPA) and the National Association of Student Personnel Administrators (NASPA). Specifically, ACPA - College Student Educators International and NASPA - Student Affairs Administrators in Higher Education created a joint set of standards related to competency areas for individuals working in student affairs (ACPA & NASPA, 2015). The goal of the ACPA and NASPA collaboration was to establish competencies for those working in student affairs to deal with issues like the demand for access, increased diversity, and technological innovations (ACPA & NASPA, 2015). One of the ten competencies was advising and supporting students. This competency framework allows student affairs educators to assess their proficiencies in particular competencies, thus setting a standard for and justifying the need for advising and supporting students.

The advising and supporting competency ranges in outcome through engaging the individual student (foundational) to addressing student support issues within groups (intermediate) and across departments (advanced) (ACPA & NASPA, 2015). These standards suggest it is critical to engage the individual student in tasks like goal-setting.

This lays a foundation of personal support that any professional providing academic advising and administrative support to students ought to execute. An advanced understanding of ACPA's and NASPA's (2015) standards is likely to yield a systematic approach to dealing with advising efforts and students' issues. While these standards suggest that it is foundational for academic advisors to support the individual student, they also suggest that "progression from foundational to advanced level proficiency involves the development of higher order capacities for listening, addressing group dynamics, managing conflict and crisis situations, and partnering with other professionals, departments, and agencies" (ACPA & NASPA, 2015, p. 15). As an academic advisor, this competency framework supports my action research as I aim to professionally move toward more advanced proficiency of advising and supporting students. I have listened to student feedback provided during cycles of research to try to improve student support, and this study used group advising, allowing me to address group dynamics. In conducting action research, I hope to have conversations with other departments and professionals about the importance of supporting doctoral students.

Kuh et al. (2006) working with the National Postsecondary Education Cooperative provided a report analyzing factors that contributed to student success based on the existing literature. The authors analyzed theoretical perspectives, discussed a variety of contributing student background characteristics and behaviors, detailed institutional factors, and offered outcomes and recommendations. Specifically, Kuh et al. (2006) emphasized student engagement, pointing out that institutions cannot control students' backgrounds and behaviors, nor can every aspect of the institution itself be controlled or changed. In contrast, institutions do have some control over the level of

their student engagement, and high student engagement is correlated with student satisfaction, persistence, and educational accomplishment (Kuh et al., 2006). They specifically explored learning communities, explaining that participation in a learning community was related to student retention, academic performance (GPA in particular), number of credit hours completed, and overall student satisfaction (Kuh et al., 2006). Tinto (1993) further discusses the importance of a student incorporating, or engaging, with their new university community by adopting the norms of that institution; Tinto suggests that a lack of incorporating could contribute to leaving the institution altogether. This work suggests institutions need to deliver student services, like academic advising, in an easily accessible way to increase student engagement, such that the student engagement encourages greater student success (Kuh et al., 2006; Tinto, 1993).

These outcomes were related to the points raised in the ACPA and NASPA competencies on advising and supporting students, as they pinpointed the importance of exploring beyond individual student relationships to focus on engaging groups and community as a means to encourage greater student success, a concept influencing the intervention introduced later in this chapter. At the same time, this work considers the individuality of students and how that individuality suggests a range of individual student needs. Groups and community may be critical, but so is the individual student.

Among the important recommendations this report suggests, it mentions that students benefit from early interventions and receiving continuous support throughout transitions in higher education. In the report, Kuh et al. (2006) discuss new student adjustment and advocate for ongoing orientation programs, new student advising, study group experiences, and more to assist new students as they adapt to a new institution.

Furthermore, the report suggests that institutions that focus on student success and creating a student-centered culture better equip students to accomplish educational goals. Kuh et al. (2006) specifically discuss the following efforts institutions can prioritize to create a student-centered culture helping students accomplish goals: opportunities for more faculty and staff to interact with students, increased access to peer interactions, experiences with diversity (i.e., talking with others of a different background), and more cocurricular activities.

Overall, policies and organizations related to student support point to its importance. Providing student support services increases student success on a tangible, academic level. Additionally, the work provided points to the following key points: more research is needed with doctoral student populations, early or first-year support is critical as students face the challenges of transition and may be explored further with doctoral students, individual support of students is foundational but implementing and analyzing group support could reveal the importance of social connection for student success and retention, and institutions need to make student services accessible to encourage and analyze student engagement (Chaney, 2010; ACPA & NASPA, 2015; Kuh et al., 2006; Tinto, 1993).

Local Context

As one of the largest undergraduate populated institutions in the nation, ASU has been growing quickly, innovating consistently, and targeting ways to enhance its research-based programs to equip students to contribute to society. Although its size and growth positively affect large numbers of students, staff, and faculty, specific challenges have been associated with these outcomes, as well. As a Program Manager in ASU's

School of Life Sciences (SOLS), I have observed this firsthand. SOLS is ASU's largest natural sciences academic department. In 2018, SOLS launched its first undergraduate online program, and the enrollment numbers quickly grew. During the spring of 2020, 1,857 students were enrolled in the online undergraduate programs. One year later with the programs still only a few years old, 2,630 students were enrolled during spring 2021. On campus, face-to-face undergraduate programs have also encountered year over year growth, which ultimately helps to feed our graduate program enrollment. Though we matriculate new students each year from locations all over the world, about 37% of our current master and doctoral student population are ASU alumni, having graduated with an undergraduate or graduate degree previously at ASU.

With 14 master and doctoral degrees, SOLS supported roughly 450 graduate students during the 2022-2023 academic year. Considering the thesis- and dissertation-based nature to our programs, except one non-thesis master's option, admission is largely dependent on faculty advisors being willing to support a research project. Therefore, 450 graduate students enrolled is significant. In order to admit and support these students, SOLS has a large number of faculty admitting students into their labs. Combined with the importance of the faculty mentor-student relationship, there can be a disparity in the type of support students receive in the research setting from their faculty mentor. Better faculty mentoring training would be beneficial, but perhaps consistent and reliable support from staff academic advisors can help ensure students' needs are met as well. This growth has continued to be unwavering. In the midst of the COVID-19 pandemic, the largest-ever pool of 505 applications was received for the fall 2021 semester for SOLS graduate programs, further growing to 548 applicants for fall 2022.

Although SOLS has experienced positive trends in the form of student enrollment growth and the launching of new programs, consequential problems have resulted. In particular, the graduate programs team on which I work is small, consisting of four staff members and a faculty director, and has seen substantial turnover over the last couple of years. The program size and inconsistencies in team staffing while serving a large and growing population has resulted in problems, particularly in an inability to provide quality service to students. For example, we used to send out a regular newsletter to students and offered the option to live chat with our team, but both services have stopped due to team size and staffing challenges. With university-wide programs more pointedly addressing undergraduate student needs, the challenging responsibility to support this growing graduate student body with an understaffed team is exacerbated. The byproduct of this imbalance has been a poor office reputation where students have felt unsupported by those individuals on whom they were supposed to be able to rely.

Several times a year, the program has held a graduate student 'town hall meeting,' where students have had an open forum to ask questions and communicate concerns. I have witnessed considerable frustration among students in these settings, which has been exhibited through feelings expressed about lack of support and the development of lack of trust in the leadership and services provided by SOLS. In addition to current students generally feeling unsupported, there is concern that the problem will be exacerbated when we launch our first nontraditional degrees. By nontraditional I refer to programs offered in an online modality that do not require the more traditional research and thesis typical of life science graduate programs.

In our traditional programs, students have one faculty mentor they research under. Albeit inconsistent across our graduate student population, the faculty guidance provides a layer of support and connection for students. The nontraditional online students that will join SOLS with these new programs will have no faculty research mentor. As a result, our team will be the sole point of contact for guiding these students, suggesting an increased demand of our team's limited resources. Specifically, SOLS is in the process of launching three new online master's degrees, the first of which has been tentatively set to begin spring 2023. These new programs introduce more growth and a new student population into an already precarious support environment. Together, the current support issues combined with limited resources and rapid growth create a problem that needs to be addressed. Actions must be taken to improve student support, otherwise student success and retention could be at risk.

Although the problems described generally affect attitudes and our office's ability to appropriately support students, I hear about it more than others because I serve as the sole academic advisor for current graduate students. Notably, our staff members serve students in a number of critical ways. We are responsible for: (a) handling teaching and research assistant hiring and funding; (b) managing fellowships and other financial award processes; (c) hosting events for students, including orientations and recruitment; (d) managing the application review process and communicating decisions, (e) providing academic advising to students, and (f) carrying out processes to make curricular updates and launch new programs.

With respect to many student concerns and questions, I serve as the first point of contact and the person responsible for ensuring our academic advising processes are

effectively helping students. As a result, I feel responsible for the limited support they might receive. Although I have worked for improvements in this area, I still find myself working to balance advising, which consumes about 25% of my time, with the other non-advising responsibilities I hold. With the launching of new online programs, my efforts will shift toward supporting the starting of these new programs, which will likely impact my time devoted to academic advising.

In addition to hearing students' concerns and feeling responsible for their support, the lack of quality, structured student support creates administrative problems I spend excessive time fixing. For example, I have worked with students who came to the end of their doctoral programs, only to find they have not actually met all of the degree course requirements or perhaps missed critical deadlines. Students may have been guided incorrectly when they originally started the program five years previously, they may have slipped through the cracks as a result of a lack of effective advising, or perhaps they were never taught to establish a sense of self-efficacy and "own" the necessary logistics in their programs. Ultimately, my time spent reacting to issues would be better spent proactively preventing problems, which requires thinking about advising and department support best practices. A substantial concern is that as we grow, the support issues will magnify. The effects could be detrimental, affecting student connectedness, success, and retention. It could also affect the success of our programs altogether. For these reasons, graduate student support issues in SOLS must be addressed.

Moreover, students expect our office to handle a number of logistical procedures that we expect the students to do independently. The misaligned expectations from students and staff affect how students perceive university and staff support, an important

component of student success discussed further in Chapter 2. Despite making logistical information available, students have continued to rely on our office for processes we have expected of them. This has been particularly common among doctoral students in SOLS. For example, it has become routine for many advanced doctoral students to forget to enroll in coursework or enroll in the wrong number of credits. What seems like it should be a simple task for an experienced student has actually led to common mistakes. The consequences of these mistakes have the potential to be quite substantial. Perhaps our office has set a precedent of reactively solving student problems instead of teaching them to confidently address their own (ideally before it would turn into a real administrative issue).

Another example is when students fail to update their doctoral faculty committee, which gets inputted in the student's Interactive Plan of Study (iPOS) before they schedule their dissertation defense. In addition to students confirming and entering this information into the iPOS themselves, I also send a confirmation to the student prior to defense, and we send an additional announcement out to SOLS personnel and students more broadly to advertise. Despite multiple opportunities to catch a mistake, I have had students reach out to me after defending their dissertation, realizing that the iPOS information was incorrect; however, it was too late to make an update at that point. This meant that one of the faculty members on the student's committee was not able to be recognized for their contribution, because the dissertation document had to match what was in the system. Recurring problems like these have revealed flawed expectations and a potential lack of student self-efficacy or process awareness.

Action Research and Cycle 0 Findings

To address these issues, this study applies an action research approach. Different from traditional forms of research, action research is described as a cyclical systematic inquiry conducted by a practitioner within their own professional context with a goal to better understand the context (i.e., operations, curriculum, teaching, etc.) and challenge the status quo to ever-improve it (Mertler, 2017). Unlike traditional forms of research where researchers analyze a context they are not connected to, I conducted research in SOLS, my place of work. As the cyclical nature suggests, I performed cycles of research to explore different questions about student support in SOLS.

The expressed need for improved support in SOLS suggests that efforts should be made to evaluate and positively influence student support and student self-efficacy in SOLS. Student support services demand improvement. The existing literature, combined with what I discovered during Cycle 0 of my own action research, suggests that this improvement might be tied to advising efforts designed to consider individual, diverse student needs while also considering the impact of group goals and peer interaction. Meanwhile, academic advising methods should encourage greater self-efficacy amongst students. This dissertation and current action research cycle aims to address these factors in SOLS graduate programs. Therefore, findings from Cycle 0 in particular, are shared in this section, as the findings informed the questions framing this dissertation study.

While the larger number of undergraduate students in universities compared to doctoral students might demand more programs to support them, a misconception remains that doctoral students do not require or desire support, advising, and opportunities from their administration, discussed further in Chapter 2 **(**Bloom et al., 2007; Hardré & Hackett, 2014; Zhang et al., 2019; Stagg & Kimmins, 2014). The

responsibility to provide this support is inadvertently placed on the small teams of administrative personnel offering support to graduate students in their academic departments. As a result, there is no centralized structure or set standard for doctoral student academic advising and support, and departments must ensure they provide sufficient support to graduate students.

With the literature suggesting doctoral students need support, a goal of my Cycle 0 research was to explore whether SOLS graduate students truly felt they needed support, and if so, to explore what type of support they felt they needed. The research questions below framed my Cycle 0 inquiry:

RQ 1: What kinds of support do graduate students in SOLS need?

RQ 2: How effective has support been for graduate students in SOLS?

RQ 3: What kinds of training and/or resources would be helpful to support SOLS' graduate students?

In this exploratory cycle, the first cycle of action research I conducted, I gathered information and perceptions from three students and two staff members about support issues and needs in SOLS at ASU through semi-structured interviews held and recorded via Zoom. Each interview consisted of six questions and lasted about thirty minutes. There was a set of questions for staff and a set for the student participants. The student interviews included the following questions, among others: "Do you feel supported by the SOLS graduate programs staff? Please explain" and "What kinds of support services from staff do you need to be successful in your program?". Both staff members held coordinator roles in our office, and the students included two graduating doctoral students and one accelerated master's student.

One key theme that emerged was the expectation students described in the interviews for being able to come to our team with any need and receive the appropriate help to continue to progress in their programs. One student remarked, “I would be pulling my hair out because... [of] just how confusing it can be… so having you know you guys out there to help us is pivotal I think… like making sure I’m on track.” Another student said, “your office is a lifeline to actually… hitting all of the bars that are set for us to achieve so that we can be mindfully aware of how we’re progressing through our studies.” These perspectives highlight the necessity of staff support for graduate students in SOLS. They also show that students want to come to our office with any need and have that be addressed, which may differ from the expectations we have for students, like being able to independently answer some questions on their own. In a couple of my student interviews, we talked about how faculty mentor advising varies so significantly across students with some being more hands on and involved while others prefer not to get involved at all. To combat this, students expect consistency from our office.

In addition to this theme, two other vital themes emerged: (1) graduate students expressed a desire for increased opportunities to meet other graduate students, particularly others at the same point in their degrees, and (2) they suggested avenues to provide more tailored support or resources for students in specific programs or at particular points in their degrees. The increased opportunity for peer interactions was made evident through statements like the following: “it’s always appreciated whenever we’re allowed to socialize as a group” and “if we can think of ways to help build that community even stronger that’d be really cool, at least for the mission of making sure graduate students... don’t feel isolated.” The tailored support theme was also made

evident through statements including these: it might be beneficial to create a, "workshop designed for incoming graduate students, a workshop designed for mid-career graduate students, and then late career graduate students [asking something like] okay, you are in your first year, what are some things you can be doing now to make sure you're successful after you graduate?" and "you might consider intermittent forums to… give a pat on the back of 'hey, you made it this far.'" With this feedback in mind and reinforced by current literature, I considered the interplay of these themes. Could our office teach graduate students, doctoral students in particular as the focus of this study, what they need to know in an effort to increase their agency for dealing with the challenges they might encounter in graduate study, thus making them less dependent on our office? Could we better provide opportunities for peer interaction or more tailored support, as needed?

With Community of Practice (CoP) and self-efficacy theories used as guiding frameworks, briefly defined below, these questions will be further discussed to determine how doctoral students can feel equally as supported as undergraduate students.

- Community of Practice – "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner & Wenger-Trayner, 2015).
- Self-efficacy theory – "People's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 71).

Intervention—A Brief Introduction

In order to consider possible improvement of support to SOLS doctoral students, an intervention was utilized with self-efficacy and Communities of Practice guiding the

study. The intervention included two conditions, with a sample of SOLS doctoral students being assigned to one of the two. Although less typical for action research, the two-condition intervention was used because of the slightly contrasting suggestions brought up through the literature and Cycle 0 – group learning or support and tailored services to meet individual student needs. Therefore, one condition included Zoom group advising sessions, called "Social Support;" the second condition, called "Personal Support" included a mix of one on one advising sessions and a weekly newsletter with specific follow up or calls to action based on individual student needs. Impacts on self-efficacy, awareness, and sense of belonging are analyzed and discussed in the chapters to follow.

Purpose Statement and Research Questions

The study was conducted with the goal to better support doctoral students in their studies in SOLS including their need for developing self-efficacy related to doctoral study, awareness of requirements and policies related to doctoral study, and address their expressed need for peer interaction with fellow doctoral students to look at sense of belonging. In addition to this goal, the research sought to determine if the "Social Support" condition influences these factors any differently than "Personal Support." Thus, the purpose of this project was to address inefficiencies or gaps in the support of doctoral students by considering their self-efficacy, awareness, and sense of belonging. Given this purpose, several research questions guiding the project are provided below.

RQ 1: What are the impacts of "Social Support" on self-efficacy, awareness, and sense of belonging?

RQ2: What are the impacts of “Personal Support” on self-efficacy, awareness, and sense of belonging?

RQ3: What differences exist between the impacts “Social Support” and “Personal Support” have on self-efficacy, awareness, and sense of belonging?

CHAPTER 2

THEORETICAL PERSPECTIVES AND RESEARCH GUIDING THE PROJECT

In Chapter 1, it was introduced that graduate students, specifically doctoral students, require higher education support, much like undergraduate students. However, many institutions have a breadth of resources that speak to undergraduate student needs, with fewer efforts addressing doctoral student needs. In addition to introducing this issue, the context of the study was described, which included an overview of the current graduate student support issues experienced in the School of Life Sciences (SOLS). To address the issues, the two-condition, social and personal support, innovation was introduced alongside the purpose of the study and research questions. This chapter expands on the research that provided context and support for this study. In particular, research topics include the following: graduate student advising, student perceptions and expectations of support, early or first year support, personal support, social support and communities of practice, and self-efficacy.

Graduate Student Advising

Importance of Advising

As introduced in Chapter 1, limited research exists addressing student support and advising efforts of graduate students in higher education. Bloom et al. (2007) point out that the lack of equal attention to both undergraduate and graduate advising in higher education has created deficiencies in the visibility of graduate student needs. Hardré and Hackett (2014) similarly remark that, despite many research universities enrolling more graduate than undergraduate students, "little systematic research is conducted that informs more than a very small subset of those who teach, manage, and make policy to

support graduate students" (p. 224). With many institutions focused on creating new programs, renovating campuses, and obtaining external funds, student advising, in general, is often not top priority for their agendas (Zhang et al., 2019). Stagg and Kimmins (2014) further assert that there is little difference in the assistance undergraduate students and graduate students need, yet the graduate student support focus remains disproportionately low. Given that about 50% of doctoral students typically never complete their degrees, it is essential that graduate student advising needs are seen and met (Di Pierro, 2012).

Vincent Tinto, a known name in research on higher education retention, attrition, and learning communities, was one of the first to claim that an education institution has characteristics that impact student achievement, rather than the student's characteristics alone playing a role (Young-Jones et al., 2013). Though much of Tinto's work focuses on undergraduate students, Tinto (1993) does posit that doctoral student attrition, like undergraduate student attrition, is dependent on the student relationship with the institution. Tinto (1975, 2007) created a model that marked five qualities required to create a supportive college atmosphere; these include expectation, advice, support, involvement, and learning. Tinto's model is reinforced by the National Academic Advising Association's (NACADA) core values, which involve holistic advising and an understanding of both the institution and the student (NACADA, 2017). Unlike undergraduate students that may require more effort in social integration, doctoral students require academic integration, as their academic department is also their professional context (Tinto, 1993). Given the importance of academic integration and the institution-student relationship for doctoral student support, it is beneficial to consider

what advising characteristics are essential from the student's perspective.

Graduate Student Advising Needs

In SOLS at ASU and in other institutions, students receive research mentoring from a faculty member expert in the content or topic of their research. Departments administer this relationship differently. Some may have students rotate in different labs before selecting a faculty mentor, some may assign a mentor in year two, or others like SOLS might assign the mentor from the very beginning, before the student starts the program. Students in SOLS are encouraged to reach out to their faculty mentor, develop a relationship, and students inevitably rely on the faculty for an array of guidance both in and outside of the research setting. While this relationship is indeed critical, some faculty mentors are more aware of the policies than others; similarly, some are more willing than others to hold discussions about class options, career, stress, and more. Not held to any particular standard or kept up to date on the relevant ASU policies students need to know, this results in inequitable guidance from faculty mentors.

Recently, a student met with me to discuss final steps needed to graduate. She had been told by her faculty mentor that she still had plenty of time to defend her thesis and graduate in that term, so she had not scheduled her defense or applied to graduate yet. At the time of our meeting, both deadlines had already passed, and I had to tell her she would need to enroll at least one more semester and defend then to properly finish her degree. In another recent meeting with a different student, he expressed to me that he felt lost. He had no idea what goals he should be aiming for with his research, what he was working toward, what his comprehensive exams entailed, and more. This particular student expressed his frustration, telling me he has tried to schedule regular meetings

with his faculty mentor, but that particular individual would not do so with the student. These are just a couple examples of many interactions I have with students as they indicate a lack of guidance from their faculty mentor.

While the examples above certainly do not negate the importance of the exceptional research guidance faculty provide, they also highlight the need for administrative student support from the academic department. Just because graduate students, unlike undergraduate students, have faculty mentors, we cannot assume they do not require academic advising. Missing deadlines, being uninformed about the policies, and not understanding the procedures or their timing themselves are scenarios I see frequently. Instead of placing the burden to effectively deliver this information to students on individual faculty mentors, graduate students require academic advising to ensure equal and accurate guidance on these topics.

Given this need, what characteristics or types of support help graduate students? Hughey (2011) emphasizes the importance of interpersonal skills, like the following: reflecting, asking probing questions, challenging and confronting, and initiating and maintaining change. Effective academic advisors listen and have the ability to challenge students in an empathetic way, creating a safe space for growth. Furthermore, Bloom et al. (2007) found that the following advising characteristics are critical, as described by graduate students themselves: visible care for students and their success, accessibility, personally tailored guidance, being a role model, and integration with the profession.

Interestingly, despite the need for effective graduate student support from both the institutions' and students' perspectives, a gap remains. This gap specifically suggests that graduate students need academic advising, but due to the relationships graduate students

have with faculty and some of the assumed guidance they would receive in those relationships, fewer resources are allocated to offer robust academic advising services. Efforts exist in SOLS, but I have observed dissatisfaction and frustration from our graduate students.

While research about academic advising at the graduate level may be lacking and while institutions may limit resources for graduate students, there are staff like myself working to support them. Increasing resources for these efforts might be ideal but making a particular academic department's limited time and personnel more efficient may also serve the purpose of bridging this gap. As an example, perhaps academic advisors utilizing online tools or delivering information more innovatively could positively influence efficiency, making greater use out of the limited department resources. In addition to increased efficiency, it is important for higher education institutions to recognize graduate students' unique needs and to create processes and resources that specifically speak to them. This gap and what I have observed in SOLS is grounded in student perception and expectation, one of Tinto's (1993) qualities for a supportive college environment. Perception is critical to understand in order to explore potential means for improving graduate student support.

Student Perceptions and Expectations of Support

Notably, research marks the importance of student perceptions as they relate to support; in particular, perception of support appears to correlate with improved student performance (Ivankova & Stick, 2007; Mah & Ifenthaler, 2018; Young-Jones et al., 2013). Mah and Ifenthaler (2018) specifically used a quantitative exploratory study to discover how first year students expected academic staff to properly support their student

development, but students also self-reported low confidence across their own academic competencies, research skills in particular. This difference in what students expected from staff versus the learning they felt they actually obtained is significant to note because it supports the gap mentioned earlier in this chapter; students have a need, or in this case an expectation from staff, that is not being met.

Similar to student expectations of staff, research has also shown that most first-year students begin their higher education journeys unprepared, lacking basic academic competencies (Mah & Ifenthaler, 2018). Mah and Infenthaler (2018) specifically highlight generic or soft skills within these academic competencies, as they emphasize that they exist among the following factors influencing student retention: socio-demographic characteristics, choice of studies, cognitive capacity, motivation, personal situation, and academic and social integration (Tinto, 1993). After they reviewed the literature, they focused their study on these specific academic competencies: time management, learning skills, self-monitoring, technology proficiency, and research skills (Mah & Ifenthaler, 2018). Thus, students self-reported their expectations for staff to help teach them these competencies. Perhaps creating an academic advising framework that helps to teach students generic skills like these will help to reduce the gap that exists between advising efforts and student success. Overall, perceptions play an important role in student support. Perceiving department or university support positively could lead to greater student success, whereas negative perceptions or misaligned expectations might reveal a university's pitfalls in supporting students (Mah & Ifenthaler, 2018).

Students' perceptions and expectations of staff might differ from academic advisors' or department staff members' expectations of students. Understanding these

differences and the students' perspectives could benefit student support efforts. For instance, findings suggest many institutional staff members have an expectation, whether explicit or implicit, that students begin their higher education careers already established as independent learners (Mah & Ifenthaler, 2018; Peck et al., 2010). Though independence appears to be the expectation of many staff members on students in higher education institutions, study results repeatedly reveal students expect staff support to aid in the journey from dependence to independence; additionally, student support from staff members consistently leads to greater student engagement, competency, and persistence (Mah & Ifenthaler, 2018; Mu & Fosnacht, 2019; Peck et al., 2010; Xerri et al., 2018).

Tochstone (2014) conducted a study, which specifically analyzed graduate student perceptions of academic advising in the University of Idaho's College of Agricultural and Life Sciences. Using a web-based survey, Tochstone found students had average perceptions of advising, as opposed to more positive results. Although not negative, Tochstone explained potential areas of improvement. According to Tochstone, the less than positive feedback was likely due to the fact that faculty served as academic advisors for graduate students, and the faculty were stretched thin with numerous responsibilities. Ultimately, Tochstone recommended that having staff members whose sole purpose was to provide academic advising to students could lead to increased satisfaction on the part of students, substantiating the importance of staff providing support to graduate students. This helps to support the need for staff academic advisors to graduate students, as opposed to expecting this guidance from faculty mentors who have duties to teach, research, mentor other students, and more.

If students continue to expect or perceive support from their institution in a

manner that is not met by the department, the research provided in this section indicates that students will be dissatisfied and, as a result, less successful (Mah & Ifenthaler, 2018; Peck et al., 2010; Tochstone, 2014). The research presented has made a case for the importance of academic advising and department support for improving student perceptions (Mah & Ifenthaler, 2018; Peck et al., 2010; Tochstone, 2014). How then, can these improvements occur? Prior research expands on perception findings to indicate specific suggestions for improving student perception and ultimately their success (Peck et al., 2010; Hardré & Hackett, 2015). Before introducing these specifics in the section to follow, the implications of student perception research will be discussed.

Implications from the Research on Student Perceptions and Expectations of Support

Studies by Mah and Ifenthaler (2018) and Peck et al. (2010) demonstrate students need support and lack independence. These matters are evidenced in ASU's SOLS graduate programs as well. Frequently, students come to me with basic questions, like how to set up their interactive plans of study (iPOS) or how to enroll in classes. Although I assist students who reach out with these questions, it is the general expectation from our office that students should be able to utilize the resources we provide to perform these tasks on their own. With the example of the iPOS, I have created tutorial videos walking students through the process of setting up their iPOS. Additionally, I created a frequently asked questions sheet for the iPOS, and students are encouraged to schedule advising meetings with our office when they need assistance. We expect students to remember where these resources are housed and to utilize them to successfully submit the iPOS, but many students do not use them.

Though these are simple examples, it is clear there are discrepancies between

students' and department staff members' expectations, and this needs to be addressed as part of analyzing and improving student support. Finally, in the Peck et al. (2010) study, accessibility and availability of services is a recurring conversation throughout the focus groups as students note their own lack of awareness and their perceptions of lack of support. This has implications for how students in SOLS, a fast-growing population with an understaffed graduate office, might perceive long response times or infrequent reminders as an inability to support students.

There are several implications for my work that emerge from Tochstone's (2014) study. Specifically, Tochstone suggests faculty members who are advising should receive more training or that there be dedicated advising staff to better support the needs of graduate students as they engage in their studies. As the Program Manager, I handle some academic advising, but I support our programs through a myriad of other avenues. I am unable to focus solely on student advising, and faculty members who advise in research-focused capacities tend to lack the knowledge needed to provide more academic, administrative, or policy focused support. Thus, as Tochstone suggests there are different ways to deal with the problem of graduate advising and students' perceptions of support within my own context.

As is evident in Hardré and Hackett's (2015) research, evaluating student perceptions of support can reveal a variety of different issues and opinions about support services in higher education. Perception affects the extent to which students feel support, the success they believe they can achieve, and whether they feel equipped to tackle projects and opportunities without staff or department prompting. Notably, student perceptions might reveal flaws in the system. They might differ from departmental staff

members' or advisors' expectations, thus revealing potential reasons that students feel unsupported.

Recognizing that students have their own perceptions of their university and support staff is important. However, it is also essential for administrators to consider how we can collect that feedback from students to inform our processes. Student feedback has the potential to reveal to administrators the successes and pitfalls of services offered in their organization. Obtaining this feedback from our SOLS graduate students might unveil room for improvement within SOLS. Part of analyzing department support in order to improve how graduate students are academically advised involves understanding students' unique perspectives. Thus, creating an innovation and gathering data that considers how students will perceive support is crucial.

Bridging the Gap: Early or First Year Support

To address student perception and in turn improve student achievement, research suggests the importance of early or first year support. Peck et al. (2010) utilized a focus group to gain insights into students' perceptions of support, specifically learning about support services. Results indicated students' efforts to interact with learning support services staff members was contingent on their perceived need to acquire the skills related to those services. In the focus group discussions, students suggested ideas about learning support services. These ideas included better advertisement about the support services offered, increased guidance from dependence to independence as part of student transition, and more subject-focused student networking opportunities (Peck et al.). Clearly, these ideas were related to what students perceived to be important *and* lacking.

Notably, results of this research suggested three important outcomes. First,

students may simply have been unaware of resources that were available to them. Second, they expected better guidance toward independence, which contradicted department and university staff members' expectations of the students to enter their programs with basic soft skills or academic competencies already established. Third, students generally felt there were not enough opportunities to interact with peers. As a result, Peck et al. (2010) suggested utilization of a formal induction program to introduce new students to the services and resources offered by a department. The intent was that the induction program would equip students with the knowledge needed to be successful during their first year.

In this example, the expressed need or areas of improvement are addressed with an early or new student program that informs and provides opportunities across each area. The two-condition innovation I have created for SOLS students, discussed in detail in Chapter 3, serves that same purpose. New students would have the opportunity to participate in a robust supportive process throughout their first two semesters, with the goal of impacting perceptions and student success.

Stagg and Kimmins (2014) similarly discuss the idea that the first year in higher education (FYHE) is a common focus of support efforts for undergraduate students, but the concept is often not applied to graduate students despite, according to them, the need for it to be applied. FYHE research emphasizes the need for undergraduate students to understand the institution's expectations of them, but graduate students similarly need to understand institutional expectations (James, 2002; Stagg & Kimmins, 2014). Symons (2001) posits that the need for graduate students to understand a new institution's expectations of them is even higher than the need for undergraduate students. Stagg and

Kimmins (2014) hypothesized that both undergraduate and graduate students "will report a general lack of confidence in their ability to locate and evaluate academic information" as well as "report a lack of confidence in their ability to organize the information located during their initial research efforts for assignment work" (p. 148). Self-reported feedback from undergraduate and graduate students were not statistically different, further supporting the need for similar first-year support amongst the graduate population as well.

In their study assessing graduate students' perceptions of their programs, Hardré and Hackett (2015) developed surveys to uncover interesting perspectives related to students' perceptions. They specifically aimed to examine how those perceptions changed across time during students' enrollment in a degree program (Hardré & Hackett, 2015). The survey included questions related to reasons for pursuing a graduate degree; satisfaction with the experience; self-efficacy with respect to participating in the program and their profession; satisfaction with advising and with the program; and perceived value of the degree. Differences of means were compared for program entry, program mid-point evaluation, and program exit. Across the different survey topic areas, results generally revealed perceived satisfaction scores started high, dropped midway through the program, and then rose again at exit (Hardré & Hackett, 2015). The authors suggested these outcomes could have been indicative of graduate students generally experiencing self-doubt, challenges, and drops in perceived support, which affected how they evaluated the program and department differently during the middle of the program. As a consequence, Hardré and Hackett suggested that advisors and support personnel create a lasting structure for checking on and supporting students well.

Though Hardré and Hackett found that students expressed problems with support midway through their programs, their suggestion is key. They indicate that a proper structure for student guidance is needed so those mid-point issues are not experienced or minimized. Instead of introducing new material at that point in their program, it is essential to start a new student with substantial support that lasts through the changes. This might come in different forms, but if students are effectively taught about resources, given guidance, and experience increased self-efficacy for handling graduate study, perhaps students will be better equipped to cope through the challenges that may reveal themselves later on.

With the work of Stagg and Kimmins (2014) and Hardré and Hackett (2015) in mind, I have aimed to create an innovation for SOLS graduate students that properly teaches them about ASU and SOLS, such that they adapt to the new expectations from the university in their first semester. In addition, by targeting self-efficacy and utilizing mastery experiences, which are opportunities for mastering a task to encourage confidence discussed in more detail later in this chapter, I have aimed for the innovation to have a lasting impact on the students. In combination with coaching them and providing support during their first semester at ASU, the support is intended to give them the network and tools to recall information when potentially needed during the middle of the program. Students may not think they need as much guidance at the start, but the innovation has been created to teach SOLS graduate students about the information they will need to be aware of later when they are in the middle of their degree programs. Instead of reaching the mid-point of a degree program having never learned whom to contact or where to look for guidance, SOLS graduate students will have learned that

information and made the necessary connections to recall themselves or inquire with confidence.

Personal Support

With the importance of academic advising and support to graduate students established, it is also essential to consider the channels through which students can be academically advised. Those familiar with academic advising are likely aware of the more common structure of one-on-one appointments, but universities might also host workshops, post videos, utilize a website, send newsletters, host group advising appointments, and more. Different department resources and unique student needs might influence the decisions departments make in terms of delivering academic advising services. In reviewing the literature and supported by my Cycle 0 findings discussed in Chapter 1, students desire individualized guidance tailored to their specific needs, but they also need social connection and networking opportunities. That said, the following sections detail academic advising through means of personal support and social support, which outline and substantiate my two-condition innovation in which SOLS graduate students were academically advised through one of the two modes of delivery.

Relevant research related to support details the importance of personalizing and individualizing support to specific needs. One of the core values in advising is empowerment, according to NACADA (2017), which involves respecting the individual student while motivating their success. Studies suggest advisors ought to be responsible for a student's success with a personalized approach to support (Kardash, 2020; Smith & Allen, 2006). There are conversations in the literature surrounding which types of support are best and whether it is most ideal to cater support toward those most in need or attempt

to generalize support to a diverse group (Peck et al., 2010). What does not seem to be contested is that needs and environments change in higher education, so tailoring support is necessary for the purpose of success and is desired by students (Peck et al., 2010; Mu & Fosnacht, 2019). Therefore, personalizing support is critical as a core value in advising, and it is a way in which support staff can work to ensure effective support in light of a consistently changing higher education environment.

Tailoring support to individual student needs is important, but so is the academic advisor-student relationship. Abdelhamid and Alotaibi (2021) suggest that when students do not meet with academic advisors, their academic progress and graduation have significant potential to be impacted. They go on to say that academic advisors need to have a full knowledge of their students in order to effectively advise, which requires personal meetings and strengthening of the relationship to understand students' unique needs (Abdelhamid & Alotaibi, 2021).

Furthermore, Allen and Smith (2008) conducted a study surveying faculty and staff on the aspects of academic advising that mattered most to each group. Interestingly, they found that faculty placed low importance on individuation in academic advising, while students rated this factor higher (Allen & Smith, 2008). They propose that it is imperative for students to have their individuality recognized by their academic advisor, as this influences the student's belief that they are appreciated and noticed (Allen & Smith, 2008). Feeling noticed and appreciated may encourage student sense of belonging as well, a concept that encourages student success, discussed later in this chapter. Therefore, the academic advisor-student relationship has the potentially powerful impact of creating a source of connection for students.

In addition to change being constant in higher education, there are also differences across institutions that should be accounted for. At a university like ASU, there are differences amongst our many academic departments and even individual faculty research labs. A generalized approach to advising may not adequately serve graduate students. Graduate students are typically immersed in their research; in SOLS, this is certainly the case, but some of our students conduct research in labs off campus at affiliate institutions. This means that there are unique needs that may not be handled appropriately with a generic email or orientation sessions. Further, as technology advances, the best forms of support need to be continually reevaluated to determine the appropriate way to individually serve the student (Mu & Fosnacht, 2019).

Overall, personal support may benefit students through: meeting their expectations, providing unique guidance that encourages student success, and administering a critical relationship with an academic advisor that helps the student feel they are valuable and belong. The importance of student expectations has been discussed in this chapter (e.g., Ivankova & Stick, 2007; Mah & Ifenthaler, 2018; Young-Jones et al., 2013); with the literature about personal support suggesting students desire tailored support (e.g., Mu & Fosnacht, 2019; Peck et al., 2010), ensuring its delivery may importantly meet student expectations, influencing positive perceptions from students and encouraging student success. Moreover, uniquely addressing each student's needs may better address their questions and solve their problems, furthering their ability to succeed. In addition, the personal meetings help students develop a relationship with their academic advisor, which offers a valuable connection to their department and program.

Social Support

Students interact with one another, as well as with staff and faculty members; thus, it is imperative to consider how graduate students are socialized. Socialization has been defined as the process through which persons might develop social skills, certain beliefs or values, and the behaviors needed to efficiently participate in a specific group (Weidman & Stein, 2003). There are formal aspects of socialization, which are detailed explicitly, like course requirements, a grading system, comprehensive examinations, and requirements for granting a degree (Weidman & Stein, 2003). Nevertheless, socialization also includes informal interactions between faculty members and students and between students and students (Weidman & Stein, 2003). These diverse interactions may encourage or inhibit students' successes. In the following section below, I discuss research on socialization, social support, and communities of practice.

Xerri et al. (2018) utilized a social support theory to analyze the socialization of higher education students. Social support involves student 'connectedness' in the form of student relationships with staff and faculty members and other students. In this study, the authors aimed to assess how social support affected students' sense of purpose, their perceptions of workload, and their willingness to participate in academic activities. Social support theorists have asserted that providing psychological or non-psychological support in combination with the presentation of an action could improve individuals' abilities and desires to express a behavior. This support might present itself in a number of ways. It might include emotional support, or it might involve instrumental or material support.

In their study, Xerri et al. (2018) found teacher-student relationships significantly affected student perceptions of workload. Specifically, positive teacher-student relationships encouraged students to perceive their workload as more manageable.

Results also indicated stronger teacher-student and student-student relationships also positively affected student engagement in academic activities. Overall, this study suggests the importance of social interactions and relationships positively influencing how students perceive and participate in certain components in their education.

Wilcox et al. (2005) conducted a study that utilized qualitative interviews to evaluate social support in first-year students and how that determined reasons for student withdrawal, while also exploring how to improve students' experiences. This study specifically examined social support to determine how social integration affected students' choices to remain at a university or withdraw from it (Wilcox et al., 2005). Although this research focused on first-year undergraduate students and the social relationships they developed, results showed that a number of the students who withdrew reported experiencing problems with their tutors (Wilcox et al., 2005). The authors also discussed the complexity and stress of social integration while highlighting the importance of social relationships in generally aiding adaptation to higher education. Thus, social support appears to extend beyond an academic department. In particular, student friendships appear to play an important role in socialization.

Weidman and Stein (2003) used a questionnaire to evaluate doctoral student socialization to academic norms with respect to research and scholarship. This particular questionnaire included questions created to analyze departmental features that were pinpointed as essential components in graduate student socialization. Specifically, this included variables such as scholarly activity participation, interactions between student and faculty and among peers, environment of supportive faculty, department collegiality, and scholarly encouragement among students. Several relations were observed including

that doctoral students' perceptions of being in a department characterized by student scholarly encouragement and membership in the educational foundations department were significantly associated with students' participation in scholarly activities. Perceptions of being in a supportive faculty environment and departmental collegiality were significantly associated with student scholarly encouragement. Perceptions of being in a supportive faculty environment were significantly associated with collegiality among the departmental faculty and student-faculty interactions (Weidman & Stein, 2003, p. 651). These findings about relations among the variables are important because they suggest the climate in a department has substantial potential to socialize students by relaying scholarly norms through social interactions (Weidman & Stein, 2003). This is another example of the crucialness of socialization as a potential for establishing norms and setting standards within an academic unit.

Communities of Practice and Socialization of Graduate Students

These studies emphasizing socialization and social support strongly suggest the impact of students' social interactions on success. Communities of practice (CoP), introduced briefly in Chapter 1, is an essential theoretical framework providing context and guidance for the innovation I implemented with SOLS graduate students, specifically the social support condition, which is discussed in detail in Chapter 3. CoP is viewed as a social learning theory, and it was formed through the interconnection of meaning, practice, community, and identity (Wenger, 1998). As a reminder, the framework is defined as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner & Wenger-Trayner, 2015). Moreover, CoP are characterized by qualities like collaboration, mutual history,

and shared learning (Wenger, 1998).

Individuals might be involved in numerous CoP. For instance, students who are in a particular class for a semester might develop a community of practice because students in the class learn and engage with one another, sharing knowledge and making connections. Such a community might change each semester, but at the same time, students could be in a CoP with a group of peers in the same program who regularly get together to collaborate and share learning with one another. Participating in a CoP provides opportunities for connection, development of mutual relationships, and establishing group characteristics and individual identities in the group (Wenger, 1998). Notably, CoP go well beyond basic group involvement because CoP are not organized around a 'one-and-done task;' rather, they are established as long-term entities that are mutually beneficial to participants who share common interests and needs. Thus, there is greater intention and involvement with a CoP, compared to a group.

Work by Hardré and Hackett (2015), previously mentioned in this chapter, found that graduate students reported significantly low scores for participation in academic communities, when surveyed about perceptions of support. The authors considered this to be problematic because academic community participation can encourage self-perceptions of membership in students' desired professions. This thought aligns with the ideas about integration, mentioned earlier in this chapter. Beyond that, however, the reported lack of community participation amongst graduate students decreases opportunities for CoP. Opportunities for shared learning are lessened as graduate students isolate themselves from their academic communities. Interestingly, this might not be a matter of graduate students choosing not to pursue these opportunities, but there could be

an issue with their existence in the first place, particularly in advising and student support.

Furthermore, Lahenius (2012) conducted a study in which he sought to analyze the effects of CoP on doctoral student study. Doctoral students were placed into groups with the intent of engaging in meaningful action and promoting a sense of group belonging as they discussed research literature and research plans with one another. Following this CoP interaction, semi-structured interviews were conducted to evaluate student experiences. Generally, results revealed CoP have a positive effect on doctoral student experiences, supporting their studies.

Notably, Lahenius (2012) was able to conduct a more fine-grained examination because two groups were created and analyzed as part of this study. One group united in action, engaged more fully, which fostered greater learning that benefited the group collectively, but the other group did not unite and no meaningful group learning occurred. Lahenius concluded this second group never became a CoP and thus its members did not benefit. Interestingly, a senior researcher was leading the first group, whereas the second group lacked that kind of leadership. Results suggest peer interaction and CoP development are improved when coordinated by a staff member who helps facilitate this socialization process.

Implications from the Research on Socialization of Graduate Students and Communities of Practice

Implications include careful consideration of how students are being socialized as well as the best methods for providing a structure where students are best supported. Specifically, improving graduate student support or addressing student support in any

capacity should consider those beyond the individual. As evidenced here, socialization of students can produce positive results or prevent students from learning or growing. Moreover, socialization might reveal how students interact with aspects of their programs, providing insights for how to socially support students. Communities of practice provide especially important implications and are the basis of the Social Support condition in my innovation. Specific implications are provided in the next portion of this section.

First, Xerri et al. (2018) found stronger student-to-faculty member and student-to-student relationships affected perceptions of workload and engagement. Thus, the implication is that the innovation should take into account working with students on how to build these relationships to support them as they participate in graduate studies. The implications of fostering an environment where support occurs outside of the classroom or office is also supported by the work of Wilcox et al. (2005). Thus, helping students build student friendships is one way to support student socialization. Mentioned earlier, SOLS graduate students are immersed in research across a variety of labs, both on and off campus. As a result, many are disconnected from ASU, SOLS, and certainly from one another. Considering an innovation that combats this reality could reveal a manner in which students feel better supported.

Second, based on the research of Weidman and Stein (2003), it is clear student perceptions of belonging and support in a department are related to socialization. Importantly, this outcome is also connected to perceptions and expectations discussed in earlier work. Thus, flawed perceptions or poor socialization can inhibit student perceptions of support and their performance.

Third, results from the use of a CoP also provide important implications and underly other socialization and social support research. As graduate students express a lack of community participation, it is important to provide increased opportunities for it. This offers opportunity for peer relationships, establishing belonging, and increasing perceptions of support in students. Additionally, CoP involvement creates opportunity for shared learning. When led well, CoP can be successful contributors to a student's positive experience and increased learning. In particular, three characteristics of the CoP appear to be beneficial to SOLS students, thus influencing the design of the innovation, including: engaging in meaningful interaction by sharing information and concerns, experiencing a sense of belonging to a group with individuals who were in the same situation(s), and together devising ways to deal with research and other matters associated with the program.

Brief Comparison of Personal Support and Social Support

The sections above display how both personal support and social support may positively influence students. Both value relationships, but personal support emphasizes one relationship between academic advisor and student, while social support places a greater emphasize on the community and environment. Personal support aligns more closely with advising norms across institutions, so students may expect and desire this form of support (Mu & Fosnacht, 2019; Peck et al., 2010), Meeting these expectations may have a positive impact. Furthermore, personal support allows academic advisors to consider a student's unique needs and address them, in combination with establishing a deeper relationship with them (Abdelhamid & Alotaibi, 2021; Peck et al., 2010). Unlike social support where the emphasis is more broadly placed on integration with the

community, the individual value students feel with personal support may better equip students to be successful.

Social support provides relationships and important points of connection for students as well, but students may not feel as deeply known or understood by their academic advisor. Relationships with peers help students socialize and integrate with a department in a university, which positively impacts students' perceptions of the support they receive (Weidman & Stein, 2003; Wilcox et al., 2005). Like personal support with its academic advisor-student relationship, the integration with community and relationships with peers may positively influence a student's sense of belonging, which encourages student success. Moreover, students with established connections with peers may rely more on one another as they go through graduate study together, discouraging opportunity for isolation.

Social support may not offer the deep level of knowledge academic advisors have with students with personal support, but social support has the potential to be more scalable. Personal support places responsibility on one academic advisor, but that responsibility is more evenly dispersed within a community via social support. Students may feel comfortable communicating with their peers to address certain challenges, or if an academic advisor administers group advising they can support multiple students at the same time. Students with different personalities, like an introvert versus an extrovert, may thrive under one condition compared to the other. Ultimately, both personal support and social support have benefits and challenges; comparing the two types of support may reveal valuable understanding for improving graduate student support.

Constructs to be Measured

Summarized in the sections above, current literature suggests the importance of both personal and social support to graduate students. It is possible, however, that the two forms of support impact students differently. This inquiry is depicted through the research questions framing this study. In comparing the two modes of support, it is important to consider how personal support and social support might affect students. Therefore, the sections below detail the literature supporting and professional experiences informing self-efficacy and sense of belonging, constructs to be measured in this study in order to compare condition impact.

Self-efficacy

Like student perceptions and socialization discussed in the sections above, graduate students' self-efficacy provides an important framework for this study and is crucial to understanding the goals of supporting students while encouraging the development of autonomy. In addition to providing a framework for the student, self-efficacy is also a construct being measured. Self-efficacy was originally identified and discussed by Albert Bandura (1994, 1997). Bandura (1994) stated self-efficacy involves, "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 71). Rather than being concerned with the types of or quantity of skills one might have, self-efficacy is focused on what individuals believe they can accomplish with what they do have under a variety of circumstances (Bandura, 1997). Those with high self-efficacy have greater belief in their abilities to accomplish a given goal, so they exert greater effort to overcome challenges. By comparison, individuals with low self-efficacy demonstrate little belief in their abilities to accomplish a given goal, so they would be more prone to giving up or not

applying the needed effort. Graduate study is incredibly challenging. As a result, self-efficacy is used as a guiding framework for addressing student support issues in SOLS.

Bandura (1997) identified four sources of self-efficacy, including mastery experiences, vicarious experiences, social or verbal persuasion, and physiological and affective states. Each of these sources are described below.

Mastery experiences: increased self-efficacy occurs when an individual is faced with a challenge that they successfully handle.

Vicarious experiences: increased self-efficacy occurs when an individual observes a similar individual face a challenge that they successfully handle.

Social or verbal persuasion: increased self-efficacy occurs when an individual receives positive verbal feedback encouraging their persistence and success in the midst of a challenge.

Physiological and affective states: a person's self-efficacy can be influenced, positively or negatively, depending on a person's physical, emotional, or psychological well-being.

Mastery experiences played a pivotal role in the design of this study's innovation, discussed in Chapter 3. Bandura (1997) stated that, "Mastery experiences are the most influential source of efficacy information because they provide the most authentic evidence of whether one can muster whatever it takes to succeed. Success builds a robust belief in one's personal efficacy. Failures undermine it, especially if failures occur before a sense of efficacy is firmly established" (p. 80). As part of supporting graduate students, we want them to feel supported through positive perceptions of the support they are receiving; however, we additionally want to help them establish confidence to navigate

their way through the challenges of graduate study. As such, opportunities for success are essential to new students as they begin their doctoral journeys.

To view this further, Muñoz (2021) conducted a concept analysis of self-efficacy, examining 23 studies in which she reviewed antecedents, attributes, and consequences of self-efficacy. Through this analysis, the author found self-efficacy among graduate students involved antecedents such as perceived, positive experiences. Its attributes included being personal, malleable, goal-driven, a resource, and built on knowledge and trust. Finally, the consequences of graduate student self-efficacy encompassed productive thoughts, feelings, and actions leading to achievable outcomes. The relationship between perception, self-efficacy, and success is important. Each source of self-efficacy mentioned above provides opportunity for perceived, positive experiences. Therefore, equipping students to successfully accomplish goals and establish positive experiences might improve both perceptions and self-efficacy.

Moreover, Lev et al. (2010) conducted a study of self-efficacy in which they explored graduate students' research self-efficacy. The authors of this study sought to compare student perceptions of their own research self-efficacy with the students' mentors' perceptions. A cross-sectional design was used, and they employed the Clinical Research Appraisal Inventory to measure research self-efficacy. Results revealed statistically significant differences between students' and mentors' perceptions of research self-efficacy. Notably, the mentors provided higher ratings of self-efficacy than students perceived in themselves. This difference reveals the manner in which faculty or staff might assume a student's ability to address challenges. The challenges may be wrestled with in a nonvisible manner. Therefore, it is crucial not to assume a student has

high self-efficacy, but to instead provide opportunities for them to experience the sources of self-efficacy.

Implications from the Research on Self-efficacy

Students' beliefs in their abilities to accomplish a task or goal is imperative. Self-efficacy is a powerful concept, which can distinguish a successful student from a less successful one. Self-efficacy could be the determining factor in whether a student stays and completes a degree program versus another who withdraws from the degree program. Understanding what influences self-efficacy, how it is characterized, and the results of it could lead to improved support efforts.

Notably, the self-efficacy research relates back to the expectations and perceptions I describe early in this chapter, where unmatched expectations are discussed. It can be detrimental for an academic unit's faculty and staff members to assume students have the self-efficacy required to excel in their graduate studies, particularly when students exhibit doubts about their own self-efficacy on the same matter(s). Based on Muñoz's (2021) work, understanding what fosters, characterizes, and results from graduate student self-efficacy could provide important information to better support SOLS' graduate students. Additionally, guiding them toward tangible mastery experiences may give opportunities to excel that reinforce their confidence for continuing to cope with the challenges of graduate study. These concepts are further discussed as they are incorporated into the method design of this study.

Sense of Belonging

Sense of belonging is another construct being measured in conjunction with the implementation of a personal support and social support innovation, discussed in detail in

Chapter 3. It is described as a feeling of connectedness and a belief that one matters to their community (Holloway-Friesen, 2021; O'Meara et al., 2017). Applied to higher education, sense of belonging has been shown to relate to several important academic concepts including self-efficacy, motivation, academic success, and persistence (Curtin et al., 2013; Holloway-Friesen, 2021; O'Meara et al., 2017). Graduate students are more likely to seek or feel connection to a specific program or department and their disciplines, as opposed to undergraduate students' belonging to residential environments and student organizations (O'Meara et al., 2017). This suggests it is important for individual departments and programs to promote opportunities for connection amongst graduate students.

Sense of belonging is of particular importance to measure because it has been found to influence graduate student retention and success (O'Meara et al., 2017; Strayhorn, 2012). In their study, O'Meara et al. (2017) surveyed students from four institutions in an effort to better understand any relationships that may exist between graduate student sense of belonging, professional relationships, and microaggressions and microaffirmations. Microaggressions are small exchanges that send negative messages, while microaffirmations are small exchanges or acts that send positive messages attempting to help others' success (O'Meara et al., 2017).

Importantly, they found that graduate students self-reported professional relationships as the most important factor contributing to sense of belonging (O'Meara et al., 2017). These professional relationships influencing sense of belonging emphasizes the critical role of faculty mentors. However, the current literature's focus on the faculty mentor (e.g., Curtin et al., 2013; Holloway-Friesen, 2021; O'Meara et al., 2017) leaves

room for exploring students' relationships with their academic department. Additionally, O'Meara et al. (2017) confirmed with their findings that microaggressions and microaffirmations did also contribute to graduate students' reported sense of belonging. Microaffirmations are like mastery concepts in their attempt to encourage the student's confidence and ability to succeed.

Implications from the Research on Sense of Belonging

Sense of belonging is an important concept for students in higher education, particularly graduate students. The transition into and through graduate study is challenging. Feeling deeply connected to a department, program, or mentor increases the student's ability to retain (e.g., Curtin et al., 2013; Holloway-Friesen, 2021; O'Meara et al., 2017). Since graduate students are more likely to seek connection with their program or department, the research implies the importance for academic departments to create ways for graduate students to connect with one another as well as staff and faculty in their department (O'Meara et al., 2017).

For SOLS graduate students who are researching in different labs, easy connection to the department is limited. As indicated in Cycle 0 findings discussed in Chapter 1, SOLS graduate students desire connection to combat feelings of isolation. Unlike undergraduate students who may join a club or live alongside their peers, graduate students tend to seek out their own living arrangements off campus, and they are immersed in their research – reducing their time spent in classes or on campus altogether meeting others in their department. Graduate students naturally have fewer connections, impacting their retention when the challenges of graduate study (i.e., slow research progress, comprehensive exams, etc.) inevitably occur. The personal support condition of

this study gave students a chance for close connection with an academic advisor, ideally connecting them with the department; meanwhile, the social support condition gave students the chance to interact closely with their peers, in addition to some interaction with an academic advisor. It is possible the different forms of connection had different influences on students' sense of belonging. Understanding how SOLS graduate students report their sense of belonging before and after participating in social or personal support may provide interesting insight into avenues SOLS can pursue to encourage student success and retention.

In closing, the research provided in this chapter supports the aim of this dissertation action research study. Current literature supports the need for graduate student advising. Despite graduate student differences when compared to undergraduate students, they still require support and expect their department to help them succeed. While students expect support and guidance, many personnel supporting graduate students simultaneously expect that they will address their own questions or processes independently. When graduate student support staff set clear expectations for students and help students in the way they expect, particularly in the first year, students are more likely to have positive perceptions that increase their ability to succeed. Students can receive support in different ways. The literature suggests the effectiveness of personalized, tailored support, in addition to social support. Social support of graduate students is framed by communities of practice and the socialization of graduate students. Given the importance of both personal and social support, evaluating their impact on graduate student self-efficacy and sense of belonging may reveal insights into graduate student success.

CHAPTER 3

METHODOLOGY

Due to the challenges of doctoral study and the difficult decisions involved in retaining in a doctoral degree, it is important universities consider how to sufficiently support doctoral students during their programs. The extent of this support has the potential to influence student experiences and, ultimately, help equip doctoral students to graduate and pursue their post-degree goals. Though many universities have resources that focus attention on undergraduate students, graduate students need the support of their administration to be successful as well. This action research project is in response to my perception as an academic advisor that PhD students in the School of Life Sciences (SOLS) lack awareness regarding degree requirements and basic processes expected of students. It is also in response to the perceived need for doctoral students to receive adequate support to help them want to continue in their programs.

There is a pattern of SOLS PhD students not enrolling in the right number of credit hours, impacting the receipt of their teaching or research assistantship funds, in addition to missing enrollment deadlines, not completing required coursework, and more. Missing a simple deadline or misunderstanding a policy like these examples can have serious ramifications on a student's ability to graduate on time and avoid financial issues. It may have other impacts as well, like negatively influencing a student's confidence in their ability to successfully navigate their program. Therefore, in this study, I explored two types of advising support, social and personal, and their compared impacts on a new cohort of SOLS PhD students. The social support condition was characterized by student involvement in Communities of Practice (CoP), while the personal support condition was

characterized by individual advising sessions and receiving important information via newsletters. I analyzed how each type of support impacted gains in self-efficacy for dealing with graduate study, awareness of requirements and resources, and sense of belonging. These gains were then compared between conditions to determine if one type of support better or differently addressed these issues compared to the other.

Setting

This study was conducted within the School of Life Sciences at Arizona State University (ASU). ASU is a large research university, with campus immersion enrollment reaching 80,065 students in Fall 2022; with online enrollment included, ASU had 142,616 students enrolled in Fall 2022 altogether (*Facts and figures*, 2022). Priding itself on whom it includes, not excludes, ASU continues to grow each year, preparing more and more students to advance research and innovatively contribute both to academia and the community (*Charter*, 2021). SOLS echoes the mission and growth of the university. As ASU's largest natural sciences unit, SOLS has seen enrollment growth as well, particularly in combination with the launching of new programs. As mentioned in Chapter 1, the SOLS undergraduate population is growing and feeding into the graduate programs. Beginning Fall 2022, there were 425 graduate students in our 15 graduate programs. There were 305 PhD students specifically, and at the beginning of the Fall 2022 semester, we welcomed 59 incoming PhD students. Starting in the summer term is atypical for SOLS PhD students. However, when the student and their faculty mentor decide the student should start research early, there may be cases of summer admission. A few Fall 2022 admitted students had their admit terms moved up to

Summer 2022.. The size and growth in this setting are important because these factors are part of the demand for efficient and well-structured support services.

Each student admitted to a program in SOLS with a thesis or dissertation culminating event is assigned to work with a particular faculty advisor or two faculty co-advisors, except for more unique cases where the student may be offered the opportunity to rotate in different labs. SOLS faculty, thus, play an important mentoring role for our graduate students as they conduct research in their labs, field settings, or affiliated institutions. PhD students, the focus of this action research project, have faculty in diverse settings mentoring them. See Table 1 below for a brief summary of the lab breakdown for the 59 incoming SOLS PhD students.

Table 1

Incoming SOLS PhD Students Lab Breakdown

Total Students/Lab Assignments	Total Number of Different Labs	SOLS Labs	Non-SOLS Labs	Labs External to ASU
59	52	38	10	11

Each of the 59 incoming SOLS PhD students were assigned to research in a specific lab. While each new PhD student had a lab assignment, there were 52 different labs within the 59 assignments, meaning that only 7 students were assigned to labs with other new SOLS PhD students. Thus, most of the incoming cohort was researching in labs where no one else from the incoming cohort was researching. Of the 59 lab assignments for each of the 59 students, 38 were assigned to SOLS labs. For these, the students worked with a SOLS faculty member whose lab would have been somewhere on

ASU's Tempe campus, where SOLS itself is located. For the 21 remaining, 10 students were assigned to work with ASU faculty in other departments at ASU, non-SOLS. These students may still have been active on ASU's campus, but their faculty mentors would have been less familiar with SOLS processes, in addition to the student likely having less interaction with SOLS. Finally, 11 students were assigned to labs external to ASU. They had faculty mentors that were not ASU faculty, so they conducted their research in labs at partner institutions like Barrow Neurological Institute, the Mayo Clinic, and Caris Life Sciences.

Because doctoral students spend a majority of their time conducting research, the various settings importantly reveal how spread out our SOLS doctoral students were. The 38 students mentored by SOLS faculty may receive more consistent guidance, but the other 21 students lack the added layer of SOLS guidance from faculty. With isolation an issue discussed in Cycle 0 findings and sense of belonging a factor that contributes to student success, the incoming cohort of SOLS PhD students require departmental effort to have sources of connection inside SOLS. Our office works to be a point of connection for our PhD students, ensuring they are aware of various ASU policies and SOLS requirements that they may not otherwise learn while providing opportunities for social connection as well. However, our limited staff, discussed in Chapter 1, face challenges as they work to support all SOLS graduate students in a myriad of ways.

Research Design

This research aimed to address the following research questions:

RQ 1: What are the impacts of "Social Support" on self-efficacy, program requirement awareness, and sense of belonging?

RQ2: What are the impacts of "Personal Support" on self-efficacy, program requirement awareness, and sense of belonging?

RQ3: What differences, if any, exist between the "Social Support" and "Personal Support" conditions regarding self-efficacy, program requirement awareness, and sense of belonging?

This action research mixed-methods design included the following key aspects: self-efficacy and sense of belonging pre-survey, a 12 week two-condition innovation, a program requirement awareness assessment at week 4, a self-efficacy and sense of belonging post-survey, post-innovation focus groups, and an end of the year self-efficacy and sense of belonging survey. Mixed-methods involve a combination of both quantitative and qualitative data; the surveys and assessment provided quantitative data and some qualitative data through open-ended questions, while the focus groups solely provided qualitative data. The pre-survey allowed me to establish a baseline understanding of students' perceived self-efficacies and senses of belonging and were later compared with post-survey scores. Those were compared again with the end of the year survey scores.

With the literature and Cycle 0 findings, discussed in Chapters 1 and 2, supporting the potential importance of both individual advising (personal support) and group advising (social support), the two-condition study was designed in response to allow for a comparison between the two forms of support. Defined in Chapter 1, the nature of action research involves a practitioner conducting research in their own professional context (Mertler, 2017). As a result, I worked closely with students in each condition. My role in our office involved advising students in addition to evaluating and

improving our advising efforts. Action research allowed me to naturally focus my efforts in pursuit of improving support on the specifics of this study. Thus, as a close player in the research, I provided the individual advising for participants in the personal support condition, led the CoP for those in the social support condition, and led the focus groups.

Innovation

I created two conditions to examine graduate student support in SOLS, a social support condition and a personal support condition. The two conditions were characterized by different actions brought about by the literature and Cycle 0 feedback. The social support condition focused on CoP engagement in group advising sessions, while the personal support condition emphasized one-on-one advising and delivering resources through newsletters. However, both conditions were designed with self-efficacy theory in mind. Discussed in Chapter 2, an important component of self-efficacy includes mastery experiences. Mastery experiences are defined as personal experiences of success (Bandura, 1997). Each condition focused on the same concepts and asked participants to complete the same mastery experiences based on those concepts. The concepts included the following: understanding degree requirements, basic SOLS resources, and broader ASU resources; graduation timeline, SOLS requirements related to program timeline including when to finalize committee and complete comprehensive exams, and committee requirements; specific course planning and creating a plan of study. As each concept was introduced, students were given the opportunity to show mastery of that concept, as explained later in this chapter.

Personal Support Condition

The personal support condition was designed to be an elevated version of current practice in SOLS. Though not required, graduate students in SOLS have access to one-on-one advising whenever they need support. Additionally, our office communicates important reminders and resources primarily via email. Many students do not take advantage of advising, nor do we know the extent to which they read the information we send out. By requiring at least one appointment and utilizing a more intentional strategy for content delivered via email, this condition offers basic improvements, framed by best practices in advising.

The National Academic Advising Association, NACADA, points out that one of the core values in advising is empowerment, which involves recognizing and motivating students to reach their potential while respecting their individuality (NACADA, 2017). NACADA further explains that the advisor ought to approach advising in the following ways, amongst other ideas: assume responsibility for students meeting their program requirements, create rapport and establish trust with students, promote student understanding of their requirements and curriculum, and have a personalized approach with accurate and timely information delivery (Kardash, 2020; Smith & Allen, 2006). These ideas and other findings presented in Chapter 2 have informed the personal support condition wherein participants received one-on-one advising sessions in combination with informative newsletters.

Structure and Content in the Personal Support Condition. Participants assigned to this condition were expected to have at least one 30-minute advising meeting with me during the first 4 weeks of the study via Zoom or in person, depending on the student's preference. They were asked to book the meeting using my booking

appointment calendar within the first four weeks of the study. If they wanted to have additional meetings, they were free to book additional meetings with me. Of the 8 students assigned to the personal support condition, 5 of them scheduled and had 1:1 appointments with me. The remaining 3 never scheduled their meetings. One of the 5 students that booked appointments did schedule one more follow up meeting, while the other 4 did not schedule beyond the one expected appointment. Finally, 4 of the 5 that booked meetings did indeed schedule it within the first 4 weeks of the study, while the remaining 1 booked it during week 6. Each initial 30-minute session followed a similar agenda: I provided an overview of each participant's specific degree requirements, what a typical course load looks like, a quick introduction to the iPOS, and best practices for course and timeline planning. Participants were encouraged to bring up questions and concerns of their own as well.

In addition to the advising meeting, participants in the personal support condition were sent an email newsletter nearly every other week in alignment with the topics outlined in Table 2. Emails were sent via Mailchimp, a platform that allows monitoring of email engagement. I spent about 30 minutes drafting each comprehensive emailed newsletter, outlining what students needed to be aware of for the given topic. As an example, Newsletter 1 gave students a breakdown of degree requirements in SOLS with links to resources (i.e., handbook and academic catalog) to further explore their individual degree's specific requirements on their own. Newsletter 2 described and linked various SOLS and ASU resources they needed to be aware of (i.e., TA/RA Policies and Procedures manual, Graduate College policy manual, EOSS Resources Hub). This continued for each newsletter, equating to about an additional 2.5 hours of work to draft

and send the newsletters for the semester. The table below summarizes the newsletter topics and timeline for sending.

Table 2

Newsletter Topics and Timing

	Newsletter 1	Newsletter 2	Newsletter 3	Newsletter 4	Newsletter 5
Date sent	16-Sep-22	30-Sep-22	17-Oct-22	7-Nov-22	21-Nov-22
Topic focus	Degree requirements	SOLS and ASU resources	Research timeline and SOLS requirements related to that	Identifying a committee	Course planning and understanding the iPOS

Social Support Condition

Detailed in Chapter 2, CoP stimulate learning through authentic communication, mentorship and coaching, collaboration, and self-reflection (Wenger, 1998). This theory guided and supported the social support condition of the innovation. Wenger (1988) discusses ideas like the following: learning is both experiential and social, it is a matter of engagement, and it is shaped by growing types of membership and ownership of meaning. Thus, CoP were utilized and designed to be a space for participant engagement such that they would experience the content of the innovation together in a social manner to encourage understanding of the concepts introduced.

Structure and Content in the Social Support Condition. With an emphasis on shared learning and mutual engagement, advising in the social support condition occurred via Zoom group meetings. Each CoP met with me once for one hour about every other

week during the 12-week innovation (5 meetings total, 1 hour per meeting, 3 groups, 15 total hours of advising). There was a Monday group, a Wednesday group, and a Friday group. For the most part, CoPs met on the even numbered weeks within the innovation, week two, four, six, and so on. However, some meetings were adjusted slightly in lieu of holidays, like fall break, preventing availability to meet. Each meeting had a primary focus, displayed in the table below. Note, the focus for each CoP discussion aligned with the newsletter topics delivered to students received personalized support.

Table 3

Concept Focus Per CoP Discussion

Meeting 1	**Meeting 2**	**Meeting 3**	**Meeting 4**	**Meeting 5**
Group 1: Sept. 12, 2022 Group 2: Sept. 14, 2022 Group 3: Sept. 16, 2022	Group 1: Sept. 26, 2022 Group 2: Sept. 28, 2022 Group 3: Sept. 30, 2022	Group 1: Oct. 17, 2022 Group 2: Oct. 12, 2022 Group 3: Oct. 14, 2022	Group 1: Oct. 31, 2022 Group 2: Oct. 26, 2022 Group 3: Oct. 28, 2022	Group 1: Nov. 14, 2022 Group 2: Nov. 9, 2022 Group 3: Nov. 18, 2022
Degree requirements	SOLS and ASU resources	Research timeline and SOLS requirements related to that	Identifying a committee	Course planning and understanding the iPOS

While there were basic conversation topic focuses during these meetings, they were left unstructured enough to allow for open dialogue as well. I wanted participants to feel like members with opportunities to ask questions or provide their own comments throughout the discussions, while I ensured the information they needed to know was provided to them. Each session opened with 5-10 minutes for social engagement and catching up, then I presented the information allowing conversation along the way for

about 15-30 minutes, and the remaining amount of time was dedicated to questions and further discussion amongst participants.

Advising Concepts and Mastery Experiences

The concepts focused on during the 12-week innovation were chosen based on the type of content typically discussed or introduced in a SOLS PhD student's first semester. In addition, they were chosen based on my own experience with common questions or confusion students have as they adapt to new programs and, often, a new university as well. There are multiple handbooks and locations where policies or requirements are housed at ASU, and it can be challenging to navigate that as a new student, perhaps in a new state or country on top of other forms of 'new.' Instead of asking a student to read the handbook or linking them to various sites, these advising concepts considered a more creative way to synthesize and provide easily accessible and understandable content.

Students in both the personal and social support conditions were given opportunities to demonstrate mastery of their new knowledge and skills throughout the innovation. The 12-week innovation was broken into the 3 four-week concept focuses: (1) understanding degree requirements and resources, (2) program timeline, and (3) specific course planning. At the end of each four-week session, all participants were asked to complete a task to display mastery of those concepts. This was designed with Bandura's (1997) notion in mind, that the opportunity to face an attainable challenge and be successful drives self-efficacy. As participants were learning new content, regardless of condition, they were asked to complete these tasks with the intent of building their self-efficacies along the way.

Focus 1: Understanding Degree Requirements, Basic SOLS Resources, and

Broader ASU Resources. During the first four weeks of the innovation, participants were introduced to their program's degree requirements. Students were given a breakdown of their degree requirements, outlining required courses and credit hours. In addition, SOLS resources included an overview of how funding works, since almost all PhD students are hired on and funded as teaching or research assistants. Finally, participants in both conditions were given contacts and resources, so they were aware of who or what they needed to refer to within or outside of SOLS depending on their circumstances.

Focus 1 Delivery for Each Condition. In the personal support condition, some students received degree requirement information in their 1:1 advising sessions. Since students in this condition were expected to have one advising appointment within the first four weeks of the study, this advising session covered an overview of each specific student's degree requirements and the resources they needed to be aware of. Only 4 of the 8 personal support participants booked their appointments with me within this intended period of time. For these participants, the 1:1 format allowed us to discuss specific classes and how to make selections that aligned with students' individual research areas. Students were free to ask any questions they had during this time as well. In addition to the advising meeting, personal support condition participants received two newsletters addressing this content focus. For those that did not schedule a 1:1 meeting, they still received detailed information through these newsletters. Alternatively, students in the social support condition had two CoP group discussions, one focused on understanding degree requirements and the other on ASU and SOLS resources. While I introduced these

topics, students were also able to share thoughts and questions with one another in the CoP setting.

Focus 1 Mastery Experience. At the close of week four with Focus 1 content wrapping up, students were assessed on their awareness and understanding of their degree requirements, SOLS resources, and ASU resources (see Appendix D). The assessment was delivered electronically via Qualtrics. Upon completion of the assessment, if students received a 100%, they received a congratulatory message with their score. Alternatively, if students received any score less than 100%, they were shown their score in a message asking them to complete the quiz again until obtaining a 100%. In addition, students were encouraged to contact me if they had any questions. The number of attempts and score-related data is discussed in Chapter 4.

Focus 2: Timeline, SOLS Requirements Related to Program Timeline, and Committee Requirements. The second four weeks of the innovation focused on student timelines and committee requirements. Each SOLS PhD program has content in the handbook (e.g., suggested first year courses, when students need to confirm their committees, when they should submit their proposals, when they should defend their proposals). However, through the questions I have received from students while advising them in previous years, the handbook appears to be an insufficient way to deliver information. Additionally, in my experience, I have witnessed student confusion over material described in the handbook. The goal of this content focus was to help students understand the requirements from the start of their program, as well as provide information regarding where to find this information in the future.

Focus 2 Delivery for Each Condition. In the personal support condition, this focus's information was relayed through two newsletters. Four of the 8 students in this condition had already completed their required advising appointment, but they had the continued option to schedule additional appointments if desired. One student had their required 1:1 advising session with me during this time. In the social support condition, one meeting focused on the research timeline and SOLS related requirements, while the second was focused on identifying a committee.

Focus 2 Mastery Experience. The mastery experience to coincide with Focus 2 included students initiating and holding a conversation with their faculty advisor to discuss their timelines and to submit a mentoring compact, an agreement between faculty advisor and student. Our office strongly encourages students complete the mentoring compact by the end of their first year of study, so including it as a mastery experience placed more structure and accountability around this requirement. If students are completing research rotations, it may not be possible to complete the mentoring compact as early as others. Not completing it may also be indicative of the faculty mentor-student relationship. Historically, we have struggled with students and faculty mentors actually completing this document, which can be problematic considering the importance of this relationship.

Focus 3: Specific Course Planning and Creating a Plan of Study. The final four weeks of the innovation focused on course planning. ASU has a tool graduate students must utilize called an Interactive Plan of Study (iPOS). Essentially, students fill out a tentative plan with current and future coursework through degree completion during their first semester. Students must also add their committees to their iPOS, and the tool

tracks other academic information that can be helpful for students to understand and navigate, such as petitions, a progress audit, and professional development activities. During this portion of the innovation, participants were briefed on the tool, how to access it and what it is used for. Students were asked to consider what classes they wanted to take to fill their elective spaces, provided with common examples, and encouraged to consider their pace in relation to the iPOS. Considering their pace means the students start by selecting their anticipated graduation term and determining how many credit hours they need and plan to complete each semester so that they fulfill degree requirements by their intended term of completion. In order for our hired students to receive their tuition coverage, they must enroll in six credits and can enroll in up to 18 per fall and spring semesters; therefore, this content included best practices for enrollment that aligned with funding.

Focus 3 Delivery for Each Condition. Like the second focus, students in the personal support condition received the information in Focus 3 through the final newsletter with the option to schedule additional advising appointments. Alternatively, students in the social support condition participated in one more CoP meeting, focused on course planning and understanding the iPOS. It was originally intended for this focus to include 2 newsletters and 2 CoP meetings. However, ASU observed holidays impacted the intended flow of CoP meetings and newsletter sending, such that timing within the semester only allowed for 1 final newsletter and 1 final CoP meeting. This worked out well because students were anxious to understand and work on their iPOS, and combining discussions about course planning and the iPOS allowed students to plan their coursework and navigate the tool together.

Focus 3 Mastery Experience. Finally, Focus 3's mastery experience involved submitting an initial iPOS for review and approval. Since students are required to have an approved iPOS by the close of their first semester, this task was a logical conclusion to evaluate understanding of the tool, degree requirements, and individual course options. As is often true for action research, in each of these mastery experiences, the intent was to elevate what was already required by providing additional support, structure, accountability, and measurability to these tasks.

Participants

With the intent to analyze an incoming cohort of students who were new to graduate study and, perhaps, new to ASU, the group of Fall 2022 SOLS PhD incoming students were assigned to either be advised under the personal support condition or the social support condition. While all students were assigned to one advising condition, participation in the research was optional. On August 5th, 2022, the incoming cohort was briefed on the study via email and given the opportunity to respond with their interest to be included in the study. This email included the informed consent form for them to sign and send back to me if they were indeed interested in participating. Reminder emails were sent on August 15th and 17th, continuing to invite participants. Then, on August 23rd and September 6th, I sent individual emails to the remaining population inviting them to participate.

In total, 22 first year SOLS PhD students agreed to participate in the research study. Fourteen of them were assigned to the social support condition and 8 were assigned to the personal support condition. Tables 4 and 5 below provide the participants'

gender and demographic data. Table 4 below provides a gender summary of the 22 total participants that were recruited to participate in this study, divided by condition.

Table 4

Gender Summary

Answer	Personal Support	Social Support	Total
Male	4	6	10
Female	3	8	11
Non-binary / third gender	1		1
Prefer not to say			0
Total	8	14	22

Furthermore, Table 5 below describes the reported ethnicities of the 22 participants, divided by condition.

Table 5

Ethnicity Summary

Answer	Personal Support	Social Support	Total
American Indian or Alaska Native			0
Asian	4	1	5
Black or African American		1	1
Latino or Hispanic	1	4	5
Native Hawaiian or Pacific Islander			0
White	3	8	11
Other			0

Prefer not to say			0
Total	8	14	22

In addition to gender and ethnicity, students were also asked to report their Arizona state residency, highlighting which students likely moved out of state or out of their country to begin their doctoral program. Eleven of the 22 students were Arizona residents, while 6 were non-residents (from out of state), and 5 were international students. Moreover, 7 of the 22 students reported they completed a previous degree at ASU, while the remaining 15 were totally new to ASU. Sixteen students were first-generation doctoral students, 5 were not and 1 student preferred not to share. Meanwhile, 8 students were first-generation undergraduate students, 13 were not, and 1 participant preferred not to share. Finally, 5 students considered themselves introverts, 6 extroverts, and 11 students considered themselves ambiverts, a mix of both.

Following the intervention carried out during the Fall 2022 semester, the same group of first year SOLS PhD students (n=59) were invited to complete an end of the year self-efficacy and sense of belonging survey. Students were sent an email on May 1, 2023 inviting them to complete the survey, which included an informed consent page at the beginning of the survey. In total, 23 responses were received: 10 from social support participants, 3 from personal support participants, and 10 who did not participate in the intervention during the fall.

The sampling was done both purposefully and conveniently. It was purposeful in that the incoming cohort was asked to participate based on their statuses as new SOLS

PhD students. However, the sample was also convenient in that it was dependent on the number of incoming PhD students willing to participate (Ivankova, 2015).

Condition Assignment

On August 29th, the participants that had signed their informed consent forms were asked to fill out an availability survey for group advising. Though I would have liked to have had more participants and to randomly assign to each condition, the priority was to ensure there was sufficient attendance for the social support condition, as this was the novel way to advise in SOLS. As I continued to recruit after social support group assignment was determined, any remaining students that decided to participate were assigned to the personal support condition.

Condition assignment and group assignment occurred based on student availability. Using their availability, I grouped students together in groups of 4-6 for the social support condition; students whose schedules did not align with any of the social support condition meeting times were assigned to the personal support condition. In addition to student availability, I aimed to keep students in the same programs together, if possible, since they would relate to each other's research topics and the types of classes they may select. While this was possible to an extent, condition assignment was primarily at the mercy of student availability. Ultimately, this resulted in 3 social support groups consisting of 16 students altogether originally: a group of 6, a group of 5, and a group of 5.

Each group had a specific time slot where availability overlapped. The remaining 7 students were given those meeting time slots in the event they were available and the groups could be maneuvered to all have 6 students; if they were indeed unavailable, their

assignment to the personal support condition was solidified. Since none of the remaining 7 students were able to attend the group advising time slots, this left 7 students officially assigned to receive personal support. One student in a social support group of 5 dropped out of the study before the first meeting but after condition assignment was completed, and another student in that same group had a change in availability before the first meeting that resulted in them not being able to participate in group advising. Instead, this particular student moved to the personal support condition, increasing those participants to 8 total students. This particular social support group proceeded with 3 members as a result, though it was originally a group of 5, thus resulting in 14 social support participants: one group of 3, one group of 5, and one group of 6.

Upon the completion of condition assignment, I sent recurring calendar invites to the social support participants on September 8th, so they were aware of all upcoming meetings throughout the semester. Finally, I sent a brief email on September 9th (one to the personal support participants and one to the social support participants) letting students know what they could expect over the next 12 weeks, including a link to complete the pre-survey. Participants in each condition were kept separate throughout the 12-week innovation and focus groups that followed. However, it is likely that students interacted with others in a different condition through their own relationship-building.

Creating Communities of Practice Amongst Social Support Condition Participants. Participants in the social support condition were assigned to an advising group with intended characteristics of a community of practice. Wenger-Trayner and Wenger-Trayner (2011) emphasize the idea that no specific number of CoP participants is best; rather, it is important to consider whether the size offers enough mutual engagement

to create learning value. Too small, and a CoP could become stale as members have heard everyone's opinions, but too large, and smaller more specialized subgroups could form to allow for thorough interactions that might not be taking place in the CoP (Wenger-Trayner & Wenger-Trayner, 2011). For the purpose of this study, it was decided that CoPs would be 4-6 members in size. However, student availability and unanticipated schedule changes made this 3-6 instead. Though the different group sizes were unplanned, they allowed me to observe CoP characteristics amongst different sized groups, confirming Wenger-Treyner and Wenger-Trayner's expertise that the specific number of participants is not indicative of a CoP.

Rather than assigning students to CoPs randomly, CoP assignment was done such that, to the extent it was possible, students in the same program were in the same CoP. After being assigned to the social support condition based on overlapping availability, the number of students enrolled in the same SOLS doctoral programs were observed. Where possible, social support participants were grouped with their peers in the same programs or more similar programs, even if it meant they had 1 other peer in the same program. While programs may be different, certain ones like the Neuroscience, PhD and the Molecular and Cellular Biology, PhD, have overlapping characteristics and possible research topics. Moreover, the Biology and Society, PhD has the potential for shared research interests with any other program. Student availability made this manipulation a challenge, but the intent was to create increased opportunity for students to share more experiences with peers in their same program. While the division did not perfectly give each student a peer, some program overlap or similar program overlap was possible within each group. Table 6 below details the doctoral programs for social support groups.

Table 6

Social Support Group Program Enrolled

CoP Group 1	CoP Group 2	CoP Group 3
Evolutionary Biology, PhD	Environmental Life Sciences, PhD	Evolutionary Biology, PhD
Molecular and Cellular Biology, PhD	Biology and Society, PhD	Biology and Society, PhD
Molecular and Cellular Biology, PhD	Microbiology, PhD	Biology and Society, PhD
Neuroscience, PhD	Microbiology, PhD	
Neuroscience, PhD	Neuroscience, PhD	
Environmental Life Sciences, PhD		

Instruments and Data Sources

Mentioned throughout this chapter, this study utilized several instruments and sources of data to address the research questions. Participants in both conditions were given nearly the same instruments and means for data collection. The pre-surveys measuring self-efficacy and sense of belonging were the same for each condition (see Appendix A); however, the post-surveys for these constructs included distinct open-ended questions asking participants for feedback about the condition they were part of (see Appendix B and C). The end of the year survey was slightly modified and closely resembled the pre-survey (see Appendix E). In addition to the self-efficacy and sense of belonging surveys delivered via Qualtrics, an awareness of requirements assessment, focus groups, and my research journal were used to collect data. See Table 7 below for a

breakdown of the instruments and their use aligned with the research questions framing this study.

Table 7

Research Questions with Aligned Instruments

Research question	Instrument to collect data
What are the impacts of "Social Support" on self-efficacy, awareness, and sense of belonging?	Self-efficacy and sense of belonging pre- and post-survey
	Awareness of resources assessment
	Research journal
	Mastery experience outcomes
	Focus groups
What are the impacts of "Personal Support" on self-efficacy, awareness, and sense of belonging?	Self-efficacy and sense of belonging pre- and post-survey
	Awareness of resources assessment
	Research journal
	Mastery experience outcomes
	Focus groups
What differences exist between the impacts "Social Support" and "Personal Support" have on self-efficacy, awareness, and sense of belonging	Compare scores self-efficacy and sense of belonging pre- and post-survey
	Compare scores awareness of resources assessment
	Research journal
	Mastery experience outcomes
	Focus groups

Self-Efficacy and Sense of Belonging Survey

A self-efficacy and sense of belonging survey was created and used as both a pre-survey and post-survey to obtain baseline responses across these two constructs in addition to post-innovation responses. The third version of the survey was sent at the end of the Spring 2023 semester to determine whether these scores changed after an additional semester with status quo support provided (i.e., no intentional personal or social support as implemented during Fall 2022). Though measuring two constructs, the survey administered them together. The self-efficacy component of the survey was loosely based on Bandura's (2006) Children's Self-Efficacy Scale, with design following some of the guidelines described in his guide for creating self-efficacy scales. Bandura's (2006) guide includes self-efficacy scales for regulating exercise, eating habits, self-efficacy for driving, problem-solving, parenting, and more. Though the name Children's Self-Efficacy Scale sounds like it may be tailored for children, the scale is actually designed to help survey administrators understand what is difficult for students (Bandura, 2006). In this guide, Bandura (2006) says that questions should be phrased in 'can do' statements rather than 'will do;' labels should not be used or should be nondescript; and a 0 to 100 degree of confidence scale is optimal for measurement. Questions were adapted to more specifically ask about aspects of graduate study. Thus, the survey asked participants to rate their confidence on a scale from 0 (cannot do at all) to 100 (highly certain can do), then listed a series of statements for students to respond to. The following are a couple of examples: "Get a friend to help me when I have personal or social problems," and "Pass my comprehensive exams and dissertation prospectus."

Furthermore, the sense of belonging questions were adapted from another survey used to assess sense of belonging amongst graduate students (O'Meara et al., 2017). Their

survey had items broken down into categories, and the sense of belonging, professional networks, and mentoring category questions were utilized or adapted to be used for SOLS PhD students (O'Meara et al., 2017). Questions were presented with five-point Likert scale responses ranging from strongly agree to strongly disagree. A few examples include the following: “I find SOLS to be welcoming,” and “I feel valued as a person in SOLS.” The survey included several open reflection items for students to provide additional detail regarding their self-efficacy and sense of belonging. For instance, the post-survey for social support participants asked them to describe how the peer support they received influenced their confidence and their sense of belonging, while the post-survey for personal support participants asked students to describe how personal support influenced their confidence and sense of belonging. The post-survey for the personal support condition also asked students to describe how often they read the newsletters they received and if they felt important information had been missing. This provided qualitative data in addition to the quantitative data provided via scaled responses.

Awareness of Resources Assessment

The assessment addressing awareness of resources (see Appendix D) delivered at the end of week four in the innovation was designed to be a quiz. Unlike the self-efficacy and sense of belonging survey, the awareness assessment included multiple choice and true or false questions with one correct answer out of a set of options for each question. I designed the questions in an attempt to directly assess comprehension based on the content discussed with students during Focus 1 of the innovation. Rather than a challenging multiple choice quiz, this survey was designed to assess the content with simple questions, such that participants were prompted to recall the information without

feeling overwhelmed during the process. Participants were additionally encouraged to make use of the resources provided to them during Focus 1, since all answers were housed in the provided materials. The sense of awareness assessment provided quantitative data via scores of the number of correct responses out of the total number of questions.

Focus Groups

All participants were also invited to participate in one of three focus groups offered at the end of fall 2022. Focus groups were offered on different days and times in an attempt to accommodate varying schedules, and students were invited to join the focus group that fit their schedule best. Most social support participants participated in the focus groups (n= 11 out of 14), but no personal support participants joined, perhaps due to focus groups occurring just before finals. It is also possible that personal support participants had more scheduling conflicts during their weekdays, as this was part of what led them to be assigned to the personal support condition in the first place.

The three one hour-long focus groups were held via Zoom after the 12-week innovation and were loosely structured. Questions were asked related to the following: content provided, the structure of the advising support they received, their self-efficacy gained if any, their awareness gained if any, their general sense of belonging, and their comments or criticisms on their experience as a whole. I obtained consent to record the conversations and played the role of mediator as needed. However, the intent was to provide ample space for student feedback, gathering qualitative data to be coded. The qualitative data offered during the focus groups was designed to provide support, explanation, and clarification of the quantitative findings.

Data Analysis

Though data was monitored as it was collected during the study, data analysis was conducted after the study ended. I began with qualitative data, consisting of transcripts from the focus groups, my research journal, and all open-ended post-survey questions. Since the focus groups had the largest amount of text to analyze, I began my analysis there by listening to the recordings while reading the transcription Zoom populated, fixing errors in the Zoom transcription along the way. After focus group transcriptions were cleaned up, I read through all qualitative material gathered to ensure it was ready for analysis. Following this, I decided to use qualitative content analysis to analyze said data because the method is straightforward, can be applied to a variety of data, and utilizes quantitative-type approaches to qualitative analysis through word and phrase frequency (Flick, 2014). It essentially reduces the amount of qualitative material as the researcher focuses on important components of meaning, specifically those that relate to or address the research questions (Flick, 2014). Given that I had multiple qualitative data sources and was interested in the frequency of words said (as opposed to how or why those words were said), this approach allowed me to accomplish these goals with the data.

After deciding on a research question and selecting material, qualitative content analysis requires building a coding frame, which involves structuring and generating categories, defining categories, and revising and expanding the frame (Flick, 2014). Working from my research questions, I decided on my initial categories, which were concept-driven for what I wanted to know more about. They included self-efficacy, sense of belonging, and awareness to align with my research questions. Qualitative content analysis requires at least 1 main category and within each main category at least 2

subcategories (Flick, 2014). After defining these three main categories, I did an initial sweep of the data, coding all qualitative text into these categories and further marking it as positive, negative, or neutral. All qualitative data was saved on Google docs, so this involved highlighting text into different colors to align with the main category and whether positive, negative, or neutral.

Since I wanted the subcategories to be data-driven, based on the frequencies of words or phrases, I used a process called subsumption to identify subcategories. Subsumption involves the following steps (Flick, 2014):

1. Reading the material until a relevant concept is encountered.
2. Checking whether a subcategory that covers this concept has already been created.
3. If so, mentally 'subsuming' this under the respective subcategory.
4. If not, creating a new subcategory that covers this concept.
5. Continuing to read until the next relevant concept is encountered.

Through repeating this process with the qualitative data, the main categories and subcategories were finalized. Once they were finalized, each subcategory was defined to help ensure all subcategories were mutually exclusive and would lead to consistent coding.

Table 8

Coding Categories

Self-efficacy	**Awareness**	**Sense of belonging**	**Advising experiences**
Confidence gains: increased ability to cope, accomplish tasks, self-efficacy improvements	Increased awareness: a gained understanding of resources needed to alleviate	Collaboration: shared learning or working together with peers to learn or create something	Timing of support: when support is most needed or impactful for PhD students

	concerns and potentially drive confidence		
Accessible support: support that is not intimidating, made easy and accomplishable	Ability to teach or advise peers: ability to provide peer support (i.e., answer questions) for those not participating in the study	Community: a sense of feeling not alone, not isolated, like "we are all in this together"	Efficiency: advising modality influencing efficiency of supporting students from a staff perspective
Mastery experience: student experiencing success firsthand to increase belief in self	Lack of awareness: gaps in knowledge or areas of improvement	Connection and increasing network of support: the opportunity to meet and get to know more people in such a way that it may add to community or opportunity for collaboration	Individual student needs: acknowledging unique needs, ability or inability to address the individual's specific needs
Trusted advisor/student relationship: social or verbal persuasion, a trusted source gives feedback and encouragement to increase student belief in self			Continuation of social support: positive impact of social support, expressed desire for it to continue
Hindrance to confidence: any task, activity, or experience that hinders a student's ability to be confident or			

grow in confidence			

With the coding categories and subcategories finalized and defined, I then segmented the data by dividing all material into units, such that each unit aligned with a subcategory. Then, I created a coding sheet to prepare for trial and actual coding, and I carried out the coding process, placing each segment within its specific subcategory. Frequencies for each subcategory were calculated and are discussed amongst the results in Chapter 4.

After the qualitative data were analyzed, I moved onto the quantitative data, which consisted of the pre- and post-surveys assessing self-efficacy and sense of belonging, as well as the quiz at week 4 assessing awareness based on topics discussed during the first 4 weeks of the study. All surveys were administered via Qualtrics, so I began the process by downloading summaries of all survey data. From there, I paired the results from the pre- and post-surveys. Students were asked to put the last 4 digits of their phone number, or some other 4 digit code, to be used for pairing with other survey responses. Once the pre- and post-survey data were paired, I began analysis. There were some responses to the pre- and post-surveys that could not be paired because students only filled out one or the other, or they did not fill out the surveys altogether. This essentially resulted in a smaller sample size for the pre- and post-survey quantitative data, consisting of results from 3 personal support participants and 8 social support participants.

Given the small sample size, the fact that students were not randomly sampled, and the non-normal distribution, nonparametric tests were utilized to evaluate the data. I went through the data and summed all participants self-efficacy and sense of belonging

scores, such that each student had a self-efficacy score on a scale from 0-2700 (27 questions with 0-100 scales assessing confidence for various tasks related to doctoral study) and a sense of belonging score on a range from 22-110 (22 Likert scale questions where 1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree). For the self-efficacy scores, the closer the score is to 2700, the higher the self-efficacy. For sense of belonging, the closer the score is to 22, the stronger the sense of belonging. Three questions were reverse coded to ensure all 22 questions were scored in the same direction.

Once the pre- and post-survey self-efficacy and sense of belonging scores were summed for each participant, I utilized the Wilcoxon signed rank test to determine whether there were significant differences between the pre- and post-scores for social support participants, then for personal support participants. This was done separately for self-efficacy scores and then again for sense of belonging scores. This test was used since it is essentially the nonparametric version of the paired samples t-test, and its assumptions are that the dependent variable is continuous or ordinal and the independent variable is categorical (2 related groups). These results were used to address research questions 1 and 2 and are discussed further in Chapter 4. In addition to this, I then calculated the differences, or gains, between pre- and post-survey scores for all participants by subtracting the pre-score from the post-score. Through this, I was able to see to what extent students' scores increased or decreased from the start to the end of the study. These differences were then compared to each other using the Mann-Whitney U test, the nonparametric equivalent to an independent samples t-test. This was carried out

separately for self-efficacy scores and for sense of belonging scores. These results are also discussed in Chapter 4, and they provided insight to research question 3.

Next, I analyzed the data from the awareness quiz participants took at week 4 of the study. This simple 5-question quiz doubled as a mastery experience, so students were prompted to keep retaking the quiz until they scored a 100%. As such, the submitted results for all complete quizzes are perfect scores. However, I compiled the number of attempts for all quiz submissions, including incomplete quiz attempts, and used the 4 digit codes to pair them with the other survey responses. The awareness quiz provided 5 personal support participant responses and 11 social support participant responses. Number of quiz attempts were compiled for each condition, and the incomplete quiz attempts gave some insight into questions that may have challenged students. No statistical analyses were conducted given the nature of these results, which are discussed further in Chapter 4.

Analyses for the end of the year self-efficacy and sense of belonging survey followed a similar procedure to the pre- and post-survey analyses described above. Since this survey included consented participants that had not participated in the Fall 2022 intervention, the approach to its analysis had some differences from the pre- and post-surveys. Like the others, I summed the self-efficacy and sense of belonging scores for the 23 participants that filled out the end of the year survey. Moreover, I utilized the 4 digit codes provided to determine whether they were part of the earlier intervention and if so, which condition. Then, I utilized a Kruskal-Wallis test, another nonparametric test essentially equivalent to a one-way ANOVA, to test for significant differences in self-efficacy and sense of belonging scores for personal support participants, social support,

and students who had not participated in the intervention. After this analysis, I paired scores as applicable with existing pre- and post-survey self-efficacy and sense of belonging scores for social (n=8) and personal support (n=1) participants and used a Friedman's two-way analysis of variance by ranks test to test for differences between social support participants' pre-scores, post-scores, and their end of the year scores. I was unable to carry out this process for personal support participants with only 1 student's paired pre-, post-, and end of the year survey scores.

Role of the Researcher

As the action researcher in this study, my role was a combination of both participant and observer. My time was spent holding one-on-one advising meetings for those in the individual support condition, a form of participant interaction. The CoP meetings for the social support group were similar, as I facilitated conversation and observed responses and discussions amongst participants that resulted. Throughout the study, I kept a log of my time spent doing work for each condition (e.g., 1:1 advising sessions and preparing newsletters for the personalized support and facilitating CoP meetings for the social support), things I observed, issues that came up, and more. Additionally, I included in my log the time allocated toward both conditions, like gathering resources to be shared for students in both conditions. Because I organized the entire study, sending emails, notifications, and calendar invites as needed, I was regularly interacting with students in both conditions. If students emailed me with follow up questions or had questions outside of the content discussed in the innovation, I answered those as my advising role gives me this responsibility. Similarly, during focus groups, I was still highly involved in the conversations, asking questions, facilitating conversation,

and providing information as needed. The duality of my role emphasizes the uniqueness of an action research study.

CHAPTER 4

RESULTS

Research Question Review

The purpose of this research study was to evaluate the impact different types of advising support have on doctoral students in the School of Life Sciences (SOLS) at Arizona State University (ASU). Given the attrition that occurs in doctoral programs, this study was conducted with previous research supporting the contributing importance of factors including self-efficacy, awareness, and sense of belonging on students' persistence to remain in and complete their degrees. First-year PhD students in SOLS were invited to participate and assigned to either receive social support or personal support in their first semester. Students in the social support condition were divided into three groups (average group size = 4.7, SD=1.5) with consideration for the qualities of communities of practice, and they received peer support through biweekly group meetings. Meanwhile, students in the personal support condition were required to meet once with me for a 30-minute one-on-one advising session during their first semester, and they received biweekly newsletters. Personal support mirrors current practice for supporting graduate students in SOLS. The following research questions framed the study:

RQ 1: What are the impacts of "Social Support" on self-efficacy, awareness, and sense of belonging?

RQ2: What are the impacts of "Personal Support" on self-efficacy, awareness, and sense of belonging?

RQ3: What differences exist between the impacts "Social Support" and "Personal

Support" have on self-efficacy, awareness, and sense of belonging?

Sources of Data Review

This study yielded several data sources that contributed to the ability to address these research questions. These included my research journal, recorded and transcribed focus groups, and open-ended survey questions gathered through post-surveys to provide qualitative data. In addition, quantitative data included a pre-, post-, and end of the year survey addressing sense of belonging and self-efficacy, and a short quiz administered approximately 4 weeks into the study that addressed awareness degree requirements, resources available to students, and other topics discussed during the first 4 weeks of the study.

The Impacts of Social Support

Discussed in Chapters 2 and 3, the social support condition design was guided by the community of practice (CoP) framework. Characterized by qualities like collaboration, mutual history, and shared learning, providing SOLS PhD students with CoP to receive academic support presented an opportunity for students to learn how to better navigate doctoral study together (Wenger, 1998). I purposefully left the structure of each advising session loose enough to allow time for socializing, for students to ask questions of their peers and myself, and I aimed to ensure I was not the only one jumping in to answer each student's questions. As a result, 2 of the 3 groups effortlessly took on the qualities of a CoP, while 1 group struggled to adopt those qualities. An aspect that could have impacted CoP characteristics was social support group attendance, which is summarized in the table below.

Table 9

Social Support Group Advising Attendance Summary

	Advising Group 1 (n=6)	Advising Group 2 (n=5)	Advising Group 3 (n=3)
Meeting 1	6	4	2
Meeting 2	4	4	3
Meeting 3	5	5	3
Meeting 4	6	5	2
Meeting 5	5	5	3

Meeting attendance was adequate overall, with students missing here and there for reasonable conflicts, many of whom would email me in advance and ask to be informed about what they would miss. With decent attendance, students in each group were able to get to know one another, and I observed students grow more comfortable with each other throughout the semester. This was especially true of groups 1 and 2 who strongly exemplified characteristics of a CoP. Group 1 may have shared the most non-academic social interaction. For instance, during one meeting they talked about parking permit cost and location concerns, and they united over their shared disappointment with the options they have as graduate students. One of them wanted to lead a charge to try to talk to decision-makers at ASU about their feelings, and other students in the group wanted to join the initiating student to raise their concerns together. The result of several conversations like this in group 1 was an ease in students raising and answering each other's honest questions and concerns during the advising sessions.

Group 3 evolved as a CoP through shared interests. In my research journal, I wrote that, "Because of related topic interests, they were able to discuss specific classes,

professors, etc., that the others may want to check out" (research journal) and, "This interestingly felt the most like a CoP due to more shared information by students" (research journal). During the semester, group 3 expressed and discussed the most shared research interests, and they offered suggestions and ideas for one another that I would have never been able to come up with due to my lack of knowledge about their specific research interests in the life sciences. Meanwhile, group 2 struggled to adopt CoP qualities, particularly because they were quiet and more subdued than the other groups. Typically, the group 2 meetings would not deviate from the planned content I had prepared to discuss, students often did not pipe in with questions, and there was little to no casual social chatter. While the students were attentive, the mutual engagement and shared learning present for the other two groups was lacking with group 2, suggesting groups 1 and 3 successfully operated as CoP and group 2 may not have. This could have impacted the qualitative and quantitative data described in the following sections.

Self-Efficacy: Qualitative Data

Across focus groups, open-ended survey questions, and my research journal, 20% of the qualitative data (25 out of the 122 total social support segments) related to the construct of self-efficacy. Within this category, 60% of the segments specifically addressed the confidence students felt or gained through participating in social support, 20% addressed the accessibility of social support, 12% included comments about factors that hinder confidence, 4% referred to the trusted relationship between a student and their advisor, and the final 4% pointed to mastery experiences. Each of these categories will be examined in the sections that follow.

Gains in Confidence. Making up a majority of the self-efficacy codes, social

support participants made statements that suggested the confidence gains in their first semester. This was revealed through simple statements like the following: “These interactions influenced my confidence positively” (post-survey), “...Feel confident and prepared for everything” (post-survey), “I feel prepared for a second semester” (focus group), “...I feel like everything’s really obtainable…” (focus group), and “I’m excited for next semester to be a walk in the park” (focus group).

Some student responses were expanded beyond that. One participant shared the following feedback during a focus group while discussing preparedness for entering their second semester of PhD study: “...I feel good about it. Um, I feel like from where I’m at now and expected to be… I feel like I’m on track. Obviously I’m still nervous about the future, that you know, five more years we have, but I do feel a lot better” (focus group). Another focus group participant shared the following:

> “Uncertainty…makes people nervous, you know, if you don’t know what exactly we need to do… what kind of requirement we have to meet at certain timeframes that… makes us more concerned. But if we know what you need to do, I think at this point the only thing that we need to [be] concerned about is that… doing research, there is no certainty right? You don’t know if your [research]… is going to work... So, I think the cool thing is that that’s the only thing we need to worry about, rather than how to… handle the system itself” (focus group).

Interestingly, this comment points to a possible relationship between self-efficacy and awareness; namely that increasing awareness about degree requirements, committee requirements, and comprehensive exam and dissertation proposal process, and more leads to an increased belief that participants will be successful in the PhD program. Advising

through the means of social support brought about a delivery of information and an ease of access that consequently allowed this student to feel like they could focus solely on their research. It is further possible this confidence for navigating their degree may be related to the network of peer support developed through the social support they received. Students in PhD programs ought to receive the support they need from their academic advisors and support staff to confidently focus on their research and not allow something as minute as navigating degree requirements or administrative processes to inhibit their intention to retain in their degree. Further confidence-coded commentary echoes these ideas: 1) social support participants feel prepared to continue in their degrees, and 2) the knowledge and support gained contributes to expressed feelings of confidence.

Accessibility of Social Support. While 60% of the self-efficacy codes were specifically subcategorized as pertaining to confidence, 20% of the self-efficacy segments addressed the accessibility of social support, pointing to another important theme. Students specifically shared feedback like the following: social support was less intimidating than scheduling a one-on-one meeting, the recurring meeting meant they knew they could get questions addressed without having to go through the hassle of getting something else added to their calendars, and information was delivered to them instead of needing to seek it out. One student expressed these concepts like this:

> "...It also kind of brings across, like the informality aspect of it. Where we're just, you know, all chatting as a group. I can throw my questions around instead of going online and scheduling a one-on-one meeting and blocking out times in their schedule and coming up with an agenda for the meeting, so that you're not wasting your time, and it's… just a lot more intimidating to make like a one-on-

one meeting, and you feel like you have to have a valid reason. Usually like you're not gonna go to the doctor, for you know, like a little runny nose. But, you know I will if I have a whole agenda of things going on, you know... So I think the group setting really, really helps, and it kind of keeps everyone on the same track, and, you know, gives people an environment to kind of ask those… silly questions and stuff" (focus group).

Because PhD students bring undergraduate (and sometimes master's level) degree experience into their PhD programs, there may be a chance they only seek out guidance if they "have a whole agenda of things going"; however, a recurring meeting with an advisor and group of peers provides an easy modality for PhD students to ask questions. When multiple students are asking what they may deem "silly questions" in the group setting, there is a greater sense of camaraderie as they realize they share similar questions, reinforcing an environment where those questions can be easily expressed and addressed.

Another student shared:

"I think it's definitely helped, you know, me feel more… in place with everything and settled and everything like that, because as an undergrad, I never had, you know, this group mentoring session, and whenever I had a question I had to go out of my way on my own terms to, you know, get my questions answered, whereas with this I feel like they kind of just come to me. The information is just provided, and I don't have to really go searching for it and asking for it and scheduling for it. It's just if I have a question, it's here. If there's information I need, it's provided. So it's really helped me to... just have it in one place, and I

don't have to like reach for it, you know" (focus group).

By making information and academic advising more accessible to students, the repeated pattern of having a question and successfully getting that addressed in an easy way reinforced confidence, or self-efficacy, as described here. Feeling too intimidated, or having a low sense of self-efficacy, may cause students to not seek out support when they need it. Instead, the social support provided during the Fall 2022 semester allowed these PhD students to have their concerns addressed easily, providing opportunities for small mastery experiences (personal accomplishments). Doing so amongst a group of peers provided opportunities for small vicarious experiences (watching others accomplish tasks) as well. These sources of self-efficacy and the resulting potential for student confidence to increase were made available through the way in which social support offered accessible, easy delivery of information to students.

Hindrances to Self-Efficacy. While the PhD students overall shared they felt confident moving into their second semester, 12% of the self-efficacy feedback were expressions of what they still felt unsure about when considering the rest of their PhD studies. This revealed three aspects of PhD study that some PhD students may find challenging to overcome: a new teaching assistant (TA) or research assistant (RA) position, feeling behind due to doing rotations compared to students that did not do rotations and started with their lab right away, and the comprehensive exam and dissertation prospectus process.

Only one student shared about their nervousness related to a new teaching assistant position they were going to be starting in their second semester. This particular student did not TA in their first semester, so they expressed they felt "...Anxious about

starting to TA… for the first time in the spring" (focus group). Without further exploration, it is difficult to know whether this is an outlier, perhaps a very student-specific thought, or it could point to a challenge that impacts PhD student self-efficacy and their attrition as a result. We fund our PhD students in the School of Life Sciences (SOLS) through TA and RA positions, and these positions change each semester. Due to the possible changing of their faculty advisor's funding and the changing undergraduate courses in SOLS that require TAs, many of our PhD students essentially have a new job every semester. Some students do end up holding a TA position for the same undergraduate course multiple semesters or years in a row, and some are funded fully with an RA position with their faculty advisor; students in these scenarios have some added stability. However, the majority see changes in their positions from semester to semester, which may hinder their confidence and introduce more challenges to overcome, which could ultimately play a part in some PhD students not completing their degrees.

Similarly, a different student shared they felt they would be in a better spot in terms of their overall confidence when their rotations were done, since they still were not settled in a lab yet. Very few SOLS PhD students start their programs with lab rotations. Instead, a large majority start in the specific lab they will be in for the 5-6 years it will take to complete their PhD. Therefore, this feedback is an outlier, but it does suggest that we ought to ensure SOLS has structure in place to support students doing lab rotations. Various deadlines and assumptions for PhD students in their first semester are simply not applicable to students doing rotations. For instance, they cannot complete and submit a mentoring compact because they do not have a faculty advisor finalized yet. Instead of having standards in place that may create confusion or encourage a student doing

rotations to compare themselves to a student who is not doing rotations, SOLS needs to ensure the more unique cases, like a student completing rotations, have clear and reasonable expectations.

Finally, another student shared that, though they felt confident about continuing in their degree, they still had some nervousness around completing their comprehensive exams and dissertation prospectus. Typically done in year two or three depending on the specific PhD program, this is historically when PhD students in SOLS are most likely to leave the program. They may switch into master's degrees or exit altogether as a result of being unable to pass or complete their exams. That said, it makes sense that students feel pressure and anxiety over the pending challenge. This particular student shared, "...But I'm not sure I feel prepared for the second year… because we have comps [i.e., comprehensive exams and dissertation prospectus]. I mean, yeah, it's like a big, big thing over there" (focus group). This feedback suggests the importance of ensuring students are prepared for the process of advancing to candidacy. Perhaps peer support during the anticipated semester in which PhD students complete their exams would be beneficial as well. For each of these items (RA/TA positions, lab rotations, comprehensive exams) that students brought up as areas in need of further self-efficacy development, there was only one student discussing each as points of concern. It is possible that social support provided an avenue for students to share their concerns, which may have otherwise not been expressed and discussed. Considering these are typical points of concern for any doctoral student, sharing things they felt insecure about may have actually played a positive role on confidence by having their concerns voiced and heard by others. Given that the majority of PhD students that experienced social support felt an increased sense

of self-efficacy, as suggested through the amount of confidence and increased accessibility codes, it is likely these concerns that were shared did not have much of an impact on self-efficacy altogether, if any.

Self-Efficacy: Quantitative Data

To quantitatively test for changes in self-efficacy, participants were asked to complete a survey before and after participating in social support for 12 weeks. Students rated their self-efficacy, or confidence, on a scale from 0-100 (0 being low, 100 being high) for handling various items related to doctoral study. With 27 total self-efficacy scale questions, the minimum sum self-efficacy score possible is 0 and the maximum possible is 2700. The median sum self-efficacy scores on the pre- and post-surveys are detailed below in Table 10. It is standard to use the median as the measure of central tendency with non-parametric tests, so median scores are shared throughout this study.

Table 10

Social Support Self-Efficacy Pre- and Post-Survey Median Scores

	N	Median
Self-Efficacy Pre-Survey (Sum)	8	2096
Self-Efficacy Post-Survey (Sum)	8	2434

Given the 0-2700 scale for students' self-efficacy scores, the pre-score indicates a 77.6% on the self-efficacy scale, perhaps suggesting an average self-efficacy score. Meanwhile the post-score indicates a 90.1% on the self-efficacy scale, suggesting an above average score. While the posttest sums were higher than the pretest sums suggesting improvement in students' self-efficacy scores, I ran a Wilcoxon signed ranks,

procedure described in Chapter 3, to determine if the difference was statistically significant. Due to the small sample size and uneven distribution, nonparametric tests were used for all quantitative analyses described in this chapter, and the Wilcoxon signed ranks test was selected for its ability to test for differences in two median scores, much like its parametric counterpart, the dependent samples t-test. The null hypothesis is that there is no difference between self-efficacy scores before and after participating in social support. Table 11 below displays the Wilcoxon signed ranks test statistics.

Table 11

Wilcoxon Signed Ranks Test: Social Support Self-Efficacy

	Self-Efficacy Post-Survey – Self-Efficacy Pre-Survey
Z	-1.960[b]
Asymp. Sig. (2-tailed)	.050

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

With a p-value of .05, the null hypothesis is rejected and as a result it can be concluded that there is a statistically significant difference between self-efficacy scores before and after participating in social support. In other words, participants felt less confident before participating in social support, and afterward, they rated their self-efficacy for completing these items higher. This result suggests that receiving advising in a social support condition improves PhD student self-efficacy, discussed further in Chapter 5.

Mastery Experiences. Students in both conditions were asked to complete a mastery experience every four weeks during the 12-week study, including the awareness quiz (discussed in more detail in the sections to follow), submission of a mentoring

compact, and submission of their iPOS (interactive plan of study). While these experiences were intended to be opportunities for students to build confidence, they do provide some quantitative data as well. The table below summarizes the number of submissions and percentages for each mastery experience. These numbers describe how many students completed these components during the study; some submissions were completed after the Fall 2022 semester.

Table 12

Social Support Mastery Experience Outcomes

Awareness quiz	Mentoring compact	iPOS
11 (n=14, 78.6%)	2 (n=14, 14.3%)	10 (n=14, 71.4%)

With high percentages for the awareness quiz and iPOS submissions, 2 of the 3 mastery experiences may have played a role in helping to contribute to student self-efficacy amongst social support recipients. Unfortunately, only 2 of the 14 students submitted a mentoring compact in their first semester, suggesting the possible challenges of coordinating a conversation to complete a mentoring compact with a faculty research mentor.

Awareness: Qualitative Data

Qualitative findings from focus groups, my research journal, and open-ended survey questions offer insight to the impact of social support on awareness. Approximately 26% (32 of the 122 total segments) related to social support. A majority of these awareness codes, about 78%, were coded into a subcategory pertaining to an expressed increase in awareness or knowledge, while the remaining 22% of the segments were coded into a subcategory about students' abilities to teach or advise their peers.

With only positive feedback in the awareness category, these subcategories yielded the following two themes to address social support's impact on awareness: 1) Participating in social support increases new PhD student awareness and knowledge with university and department requirements and expectations, and 2) Awareness gained from participating in social support allowed students to provide peer support and advising to those that were not in the study.

Increased Awareness. One major theme that revealed itself in the qualitative data was the fact that social support participants experienced an increase in awareness and knowledge with their requirements, resources and more. With specific content focuses for each group meeting, participants were being taught important information, and it appears learning this material amongst peers was beneficial. There were multiple expressions from students about the content provided being sufficient, appearing to lack any critical information the students need to seek out in other ways. For instance, one student shared, "... [The] content basically covered… everything that we need to know to fulfill all the requirements for our, uh, for the program that we are currently in. So it's including both the things we… need to think about right now and in the future" (focus group). There were other comments like the following: "So I think the group setting's been great, and we've like gotten all of our questions answered and everything" (focus group); "I think we covered everything. I don't think I'm left with any, like, unanswered questions… But I think part of the difficult thing of being in grad school… if this is the first time at ASU, you don't really know what you're missing out until you're missing it" (focus group); and, "I… liked the content of the meetings. I felt like it gave a really well-rounded idea of exactly what you would need to know for your first semester for your first year" (focus

group).

Other feedback included comments about the helpfulness of the information provided in the social support context. One student commented the following:

> "We have these milestones during this semester, and we can't just… pop up to all the questions… at the beginning of this semester. So all the questions, they just arise within the semester, and from time to time. So I think the time [referring to bi-weekly group advising meetings] is perfect, and this [is] not too much, and not too few… The advising really provides us [with] lots of useful information in our academic, uh, process…" (focus group).

Similarly, another student shared, "It's 100% helpful to me, I think [the advising sessions] even covers the questions or topics I never thought of at the time… at the beginning of the meeting. So I think, yeah, very helpful and beneficial for my career development" (focus group). Another student acknowledged,

> "I like knowing all of the possible things, and then having two different expertises of advising [referring to academic advising through social support groups and guidance from student's faculty advisor] in a sense… gives me, I think, the best possible advantage… [for] doing good in graduate school, for lack of a better term" (focus group).

With more feedback like this, it is clear that the students felt the social support was helpful. It equipped them with information that not only addressed their potential questions and concerns, but may also help them do well in graduate school and benefit their career development.

Some of the increased awareness may come from simply providing structured

support. A bi-weekly recurring meeting provided a level of consistency that influenced the accessibility of information, perhaps giving students the increased self-efficacy to ask any questions they may have. However, that stability and the pre-planned content for each meeting also meant social support participants were receiving proactive support. Instead of waiting for a student to contact our office with their concerns, the social support enabled regular delivery of information and discussions about the most important topics for first semester PhD students before those topics could morph into points of concern. Ultimately, the result according to the qualitative data is that social support increases new PhD student awareness of resources, policies, and more.

Equipped to Teach or Advise Peers. In addition to increasing awareness, one theme relating to awareness was that the social support equipped participants with knowledge to be able to teach or advise their peers that were not participating in social support. One student revealed this idea by sharing the following:

> "...I can also speak for people who don't have this group session… [we] are in like a group chat with, like all of our cohort and a lot of times, we're answering their questions just because we do have this group advising session… especially when it came to like the um, the offer letters and stuff like that. We were able to, like, answer their questions that they were, like, too afraid to set up a meeting or email and ask… So that's been really cool" (focus group).

Another student similarly expressed, "I mean these advising make me a little bit superior to my cohort… They are asking [a question], and I am saying '... this is not too correct. This is the correct way'" (focus group). One student even shared that they decided to create a graduate student group that meets on Fridays.

Proactively learning crucial information meant that these PhD students were able to confidently answer questions that their peers, who were not participating in the group advising, had. They were able to correct and provide the right guidance, perpetuating peer support and social connection beyond the intended groups. This points to possible connections with both self-efficacy and sense of belonging. It could be that the increased awareness contributed to confidence, which then equipped the participants to feel they could address other students' questions. Perhaps this, in turn, contributed to them feeling like an established SOLS PhD student, able to network with other students and even, as exemplified, initiate another graduate group opportunity for interaction. This outcome highlights the way social support increased SOLS PhD students' awareness, and it has implications for self-efficacy and sense of belonging, two important factors contributing to the retention and attrition of PhD students, as discussed in Chapter 2.

Awareness: Quantitative Data

Both social and personal support participants took the same survey to assess awareness. The survey was designed to be a simple 5-question quiz, and since it was intended to be a mastery experience, participants could retake the quiz until they received a 100%. This procedure was discussed in greater detail in Chapter 3. There were 11 quiz responses from social support participants. Amongst those 11 responses, 7 of them received a 100% on their first quiz attempt; 2 students required 4 attempts to receive a 100%; and 2 got their first attempts incorrect but did not continue to retake the quiz. Thus, 64% of the social support participants successfully completed the quiz with 100% accuracy in their first attempt. The remaining 36% experienced some inaccuracy, to the point of 18% requiring 4 attempts. Perhaps social support allowed for knowledge sharing

enough to successfully provide awareness, but it is also possible that learning alongside peers meant the conversations organically flowed in different directions, creating some inconsistency in key takeaways from student to student.

Because the quiz submissions only provided data via the final scores, all complete quiz submissions showed students scoring 100%, even the 2 that required 4 attempts to achieve a perfect score. The 2 participants that did not complete their quizzes reveal some information. They each missed 1 of the 5 questions, and it was the same question for each student: "True or False: I do not need to enroll in any type of class to receive course credit for my research." Both students answered "true" when the correct answer was "false". This could have been a tricky question, or it could reveal an area that SOLS could better teach students about.

Sense of Belonging: Qualitative Data

Qualitative data coded in the sense of belonging category made up the majority of the codes for the social support condition, at about 37% (45 out of 122 total segments), offering valuable data to answer what impacts social support had on sense of belonging. These segments were divided amongst 3 subcategories: collaboration (40%), connection and increasing network of support (29%), and community (31%). These subcategories reveal 3 sense of belonging themes: hearing other students' questions and answers in group advising aided learning, students were able to gain support from other students they may not have met or interacted with much otherwise, and the community established from social support gave students a sense of community.

Collaboration Impacting Learning. Most of the segments in the sense of belonging category (18 of 45 segments) demonstrated how social support facilitated

collaboration. Within these segments, students repeatedly discussed how much they enjoyed and learned from sharing ideas or questions with each other. This was echoed through statements like the following: "... I really enjoy meeting with all the other students and helping each other kind of bounce ideas off of one another" (focus group); "And then it's cool to hear like other people, students', perspectives as well, and like their kind of questions, because then it gets you going on like 'Oh, shoot! I need to know that too', and it kind of keeps everyone on track" (focus group); "...if anything, we all have the same questions, and half the time we just don't realize that…" (focus group); and, "I think it's beneficial for us, because we can learn from all of our peers" (focus group). These statements, and others like it, highlight the positive perspective students had on the collaboration that came from the social support groups. Collaboration is similar to shared learning, a key quality in communities of practice discussed in Chapter 2. This being emphasized heavily by the student participants adds support to the intent for social support to provide communities of practice, and for those communities of practice to contribute to each student's sense of belonging.

Some of the data included more details explaining the collaboration that occurred and its impact. For instance, one student shared:

> "…Hearing other people's questions, kind of, you know, reminds you like, 'Oh, I need to be doing this,' or 'Oh, yeah, I don't know the answer'. So it brings up things that you wouldn't even think to make an advising session for because it wasn't on your radar. But then, hearing other people and them go along through their process kind of connects it back to yours and expands, you know, a lot of ideas and questions that you wouldn't have thought of yourself…" (focus group).

According to this student's feedback during the focus groups conducted at the close of the study, receiving academic support within a group of peers as presented in the social support groups encouraged this student to consider ideas or questions that they were not yet thinking through. Their peers brought up concepts that were not on their radar, but they were able to connect it to their academic process and it opened them up to new possibilities. There were several other examples of these ideas. Another student shared:

> "...I think also having it in a group… advising, uh, session kind of also helped bring up questions that I wouldn't have originally thought about, um, like listening to some questions that other people had, um, making you realize that like, 'Oh, I didn't actually think about it in that way… am I supposed to be doing this in that way, or am I supposed to be doing it in this other way?' And having that opportunity to ask right then and there was also helpful" (focus group).

Though academic support from an advisor is beneficial, receiving support amongst peers brings together more perspectives. Instead of having one academic advisor to bounce ideas off of, the social support participants were able to do so amongst multiple people. This collaboration encouraged students to learn new concepts or new approaches to their inquiries.

Increasing Support Network. With 29% of the sense of belonging codes specifically sub-categorized as referring to connection and increasing a network of support, we observe how social support allowed participants to increase their network of support. Students were simply given the opportunity to meet students they otherwise might not have, which gave the chance for students to connect with more peers. One student shared, "...it's been also nice for us to connect with people, you know, outside of

our cohort" (focus group). Another shared, "...I have support aside from my lab peers" (focus group), and someone else mentioned, "I found this session really helpful in order to like... get out of my bubble, sort of like a branch out" (focus group). These simple statements display how the social support groups met students' needs in terms of connection. Feeling connected to their peers and department may have a significant impact on students' sense of belonging, which is a valuable contributor to student success and retention.

Discussed in Chapters 1 and 2, graduate study can be isolating. PhD students spend a majority of their time in their labs conducting research, which means students may not interact with many students in other labs or other programs. Interacting with more peers provided students receiving social support with the opportunity to grow their network of people they could rely on with their questions and concerns. Another student discussed the fact that they work for a company off campus and that is where they are doing their PhD research. Most of this student's time is spent off campus, so getting to know their social support group was their major connection to ASU and SOLS; the group gave the student comfort as a result, knowing they had people they could ask their questions to. Without connections to their program or department, PhD students could easily feel lost or alone, lacking a feeling that they belong in their program. Ultimately, social support appeared to positively impact students' abilities to connect with more peers and for those connections to add layers of support.

Community. Making up the remaining sense of belonging codes were the 31% allocated to the subcategory, community. Similar to the network of support codes, segments coded into the community subcategory were focused on connection as well.

While the network of support codes were focused on connecting for the purpose of having peers to rely on, community codes involve statements focused on connecting for the sake of connecting. Students identify with one another and feel more grounded due to this identification. For instance, one student shared that social support, "gives me a sense of community to know that we're not the only ones struggling and emailing our advisors for help. We, you know, we're all… struggling with the same issues together" (focus group). The idea that other PhD students were struggling too simply helped this student feel part of the SOLS PhD student community. Another student expanded on this idea by saying the following:

> "I feel like it's even made me more comfortable, as comfortable as I already am. Um, just because it's, I think it's a positive thing to have peers where you can talk about the same issues that you have and know that you're maybe not the only one struggling with something, or not the only one that doesn't know something… So I think it helps with that aspect, and also just getting to know some people, like you know, real people, and not feel like such an imposter with that… feeling or what not" (focus group).

With imposter syndrome impacting many doctoral students, academic support in groups offered a possible avenue for PhD students to confront that. Meeting regularly with peers who shared similar struggles might have made them feel more "normal," as opposed to an outlier imposter.

Other segments coded in the community subcategory included student statements like the following:

> "It was nice to know that I wasn't the only person that was having different

questions, so I didn't feel like, uh... I felt like my questions were valued, I guess. Um, and it wasn't just like a stupid question" (focus group).

"Feel connected instead of an isolated island. I mean, feeling connected, it's really a good feeling" (focus group).

"Um, I have a very hard time connecting with other, like, graduate students, especially at this point in my life, because I am working full time. The only other times that I do interact with are either in instances like this or at classes… So I think, in that regard, these sessions were very useful in terms of, you know, talking about life as a graduate student" (focus group).

"...it was nice connecting with peers and learning we all had the same questions and needs. It was nice to have the support and community" (post-survey).

"It was nice to meet other 1st year PhD students because it allows you to talk to people in similar career steps" (post-survey).

"The interactions helped me feel the support available to me from the SOLS admin office, and it was nice to feel treated as equals, in relation to peers and as a student with some idea of what to do. I was never disregarded and my opinion or suggestions to peers were never shot down" (post-survey).

These statements are examples of how social support provided an opportunity for SOLS PhD students to develop community with other first-year students. The relationships formed through the communities of practice created for each group helped students feel like they were not alone as they embarked on their doctoral journeys. Powerfully, this shows how social support added value to new PhD students' communities, which helped them establish better sense of belonging as a result.

Sense of Belonging: Quantitative Data

Part of the survey participants were asked to complete before and after participating in social support for 12 weeks addressed sense of belonging. Students rated their sense of belonging by indicating the extent to which they did or did not agree with each sense of belonging statement using a Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree). With 22 sense of belonging questions, the minimum sum sense of belonging score possible is 22 and the maximum sum score possible is 110. Three of the 22 questions were reverse worded (e.g., "I feel isolated in my program," where a 1=strongly agree selection indicates a low sense of belonging) and thus recoded so that all responses were in the same direction with lower scores indicating a higher sense of belonging. Table 13 below displays the median sum sense of belonging scores on the pre- and post-surveys.

Table 13

Social Support Sense of Belonging Pre- and Post-Survey Median Scores

	N	Median
Sense of Belonging Pre-Survey (Sum)	8	42.5
Sense of Belonging Post-Survey (Sum)	8	40.5

With similar appearing sense of belonging median scores before, 42.5, and after participating in social support, 40.5, it is difficult to get a clear sense of the impact social support did or did not have on sense of belonging. To test for any statistically significant differences, I ran a Wilcoxon signed ranks test on the sums of social support participants pre- and post-survey sense of belonging scores. Like the self-efficacy data, the Wilcoxon

signed ranks test was selected because the small sample size and uneven distribution called the use of nonparametric tests. The null hypothesis is that there is no statistically significant difference between sense of belonging scores before and after participating in social support. Table 14 below displays the Wilcoxon signed ranks test statistics.

Table 14

Wilcoxon Signed Ranks Test: Social Support Sense of Belonging

	Sense of Belonging Post-Survey – Sense of Belonging Pre-Survey
Z	.0[b]
Asymp. Sig. (2-tailed)	1.0

a. Wilcoxon Signed Ranks Test

b. The sum of negative ranks equals the sum of positive ranks.

With a p-value of 1.0, the null hypothesis is accepted and as a result it can be concluded that there is no statistically significant difference between sense of belonging scores before and after participating in social support. While there is no statistical difference, the medians described above may provide insight as to why this is the case. With a median score of 42.5 on a scale from 22-110, social support participants started their programs with an average answer of 1.9 for each sense of belonging item, meaning their answers averaged between strongly agree and agree, both of which are positive answers. It is possible these participants started their doctoral programs at the ceiling for this measure, so no statistically significant improvement may have been possible. I discuss this concept further in Chapter 5, suggesting the possibility that one semester is not enough time to evaluate changes in students' senses of belonging. Perhaps social support did provide a valuable method for students to maintain their same level of sense of belonging.

RQ1 Summary

In summary, RQ1 asks: What are the impacts of "Social Support" on self-efficacy, awareness, and sense of belonging? Findings suggest that it improves doctoral student self-efficacy, supported by statistically significant pre- and post-survey self-efficacy scores. Qualitative data similarly indicate students experienced gains in confidence, partially motivated by increased awareness and the accessibility of social support. Moreover, findings additionally suggest social support positively influences doctoral student awareness. This was made evident through qualitative data suggesting students gained a better understanding of department requirements and expectations, and through social support participants' abilities to provide peer support to other doctoral students not participating in the study. Furthermore, 7 of the 11 social support participants answered the awareness quiz perfectly on their first attempts, with 2 students persisting to their 4^{th} attempts and 2 others getting 1 question wrong and not continuing to retake the quiz. Though the scores are not perfect, this data adds support to the idea that students gained awareness, especially considering the 5 questions targeted common areas of concern for many SOLS PhD students, based on my experience. Finally, qualitative findings suggest social support positively impacted participants' senses of belonging, with quantitative findings suggesting otherwise. Students had a high sense of belonging to start, and this remained consistent with scores at the end of the semester, suggesting social support helped students maintain high senses of belonging or perhaps suggesting one semester was not a sufficient length of time to observe changes in sense of belonging. Qualitative findings do indicate that social support helps student sense of belonging through students being able to learn from their peers, gain support from peers

they may not have met otherwise, and establish a better doctoral student community.

The Impacts of Personal Support

Self-Efficacy: Qualitative Data

With fewer participants in the personal support condition (n=8), there is less qualitative data to analyze and draw potential conclusions from. The qualitative data is made up of open-ended survey questions and notes from my research journal. Personal support participants were invited to join for focus groups, but there were no attendees, as discussed in Chapter 3. This could have been a result of personal support participants having schedules that made it challenging to attend a meeting held during business hours, the same conflicts that made them unable to join a peer advising group in the first place. It is also possible this occurred because it was the end of the semester with finals approaching, and I had established less of a connection with them that may have helped ensure their participation compared to social support participants. Altogether there are 15 total segments of coded text, 60% of which are coded in the self-efficacy category. Of those self-efficacy codes, 67% were specifically coded as pertaining to student confidence, or their increased ability to cope and accomplish tasks. 22% of the self-efficacy codes were subcategorized as references to the trusted relationship between a student and advisor, and the remaining 11% included comments about hindrances or barriers to gaining confidence. These coding frequencies led to one overarching theme in the personal support condition; one-on-one support provides the chance for a trusted relationship to form between student and advisor, and tackling specific needs together aids student confidence.

Impact on the Advising Relationship and Student Confidence. Feedback from

students confirmed personal support played an overall positive role in student confidence, according to the 67% of increased confidence codes. It is possible that establishing a one-on-one relationship between student and advisor played a role in this outcome, and that this outcome is most prominent amongst students with more vulnerable needs. For instance, one student shared the following:

> "The personal advising has influenced my confidence positively for dealing with challenges in graduate studies. I have a disability that I was trying to navigate during this semester, and I had no clue who to talk to or where to even begin to get help. After the personal advising, I was directed to a few resources that was helpful for where to begin getting help with my disability" (post-survey).

After meeting with this particular student, I shared in my research journal that the student indicated they felt "less backed in a corner than before" (research journal), and after providing the student with resources to pursue, they followed up to share that, "they figured out a plan for information disclosed and received resources from student accessibility" (post-survey). For a unique case like this, personal support provided an avenue for a student to share a need that may not have been expressed otherwise in a group setting, and they received verbal persuasion (encouragement, a source of self-efficacy) and a specific plan to address their need.

In addition, another student shared that the personal support impacted their confidence positively because they, "got lots of questions answered nice and quickly" (post-survey). They expressed that they, "maybe could have done with one more just to go over the next semester, but still feel confident regardless" (post-survey). In this case, the immediate ability to address their specific needs led to them expressing they felt more

confident. Moreover, after another one-on-one meeting with a student where we discussed planning coursework and filling out their interactive plan of study (iPOS), I wrote in my research journal that the student shared that they were confident they could finish and submit their iPOS on their own. Though I offered to walk them through the entire submission process, they were comfortable once they had their questions answered about navigating the system. This suggests that personal support allows a student to disclose their needs and ask their questions, which establishes a relationship with an advisor that contributes to encouraging doctoral student confidence.

Despite the positive feedback, one student did express that personal support both positively and negatively influenced their confidence. They shared the following:

> "I enjoyed the meeting we had because it answered a lot of my questions, but later on, I would hear things from other grad students that I never would have heard were it not for them. For example, I had never heard that I needed to register for the in-person ethics class instead of the online one, but I did hear from another grad student then got an email about it a few weeks later" (post-survey).

The personal support participants did receive newsletters every other week with topics that lined up with those that were discussed among the social support groups. It is possible this student did not read the email when initially sent, or word about this course could have spread through other means (i.e., the actual instructor of the course sharing with students). Regardless of the specific method of delivery, the student initially obtained information from me, and then felt they were missing information as it was spread through other means. Perhaps one personal advising meeting was not sufficient for this student to have increased confidence. It is also possible that relying on one advisor

for all necessary information is insufficient in some way and when information is spread in an alternative method, it could influence the trusting relationship between student and advisor, thus ultimately influencing student self-efficacy.

Self-Efficacy: Quantitative Data

To quantitatively test for self-efficacy, personal support participants were asked to complete a survey (the same survey used in the social support condition) at the beginning and end of the semester. As a reminder, during the semester students in the personal support condition were expected to attend at least 1 personal advising meeting, and they received biweekly newsletters (5 newsletters total). Students rated their self-efficacy, or confidence, on a scale from 0-100 (0 being low, 100 being high) for handling various items related to doctoral study. Note that with 27 total self-efficacy scale questions, the minimum sum score possible is 0 and the maximum sum score possible is 2700. The median self-efficacy scores, the standard measure of central tendency to use for non-parametric data, on the pre- and post-surveys are detailed in the table below.

Table 15

Personal Support Self-Efficacy Pre- and Post-Survey Median Scores

	N	Median
Self-Efficacy Pre-Survey (Sum)	3	2242
Self-Efficacy Post-Survey (Sum)	3	2383

From Table 15 above, we see that before participating in personal support, the median sum self-efficacy score was 2242 and after personal support the median sum self-efficacy score was 2383. This suggests personal support participants started the semester

with a self-efficacy score of about 83.0%, and the ended the semester with an average self-efficacy score of about 88.3%. While these scores are above average, assuming the average is about 75%, the differences between the two may or may not be significant. There may not be a strong improvement in self-efficacy as a result of participating in personal support. To test this, I ran a Wilcoxon signed ranks test on the sums of personal support participants pre- and post-survey self-efficacy scores, procedure described in Chapter 3. Like the other quantitative data presented in this chapter, this nonparametric test was selected because of the small sample size and the non-normal distribution of the data. The null hypothesis is that there is no statistically significant difference between self-efficacy scores before and after participating in personal support. Table 16 below displays the Wilcoxon signed ranks test statistics.

Table 16

Wilcoxon Signed Ranks Test: Personal Support Self-Efficacy

	Self-Efficacy Post-Survey – Self-Efficacy Pre-Survey
Z	-1.07[b]
Asymp. Sig. (2-tailed)	.29

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

With a p-value greater than .05, the null hypothesis is accepted and as a result it can be concluded that there is no statistically significant difference between self-efficacy scores before and after participating in personal support. Perhaps personal support, or the status quo in SOLS, is not the best method for advising students such that it impacts their self-efficacy positively. While this may not seem pertinent when students start their

programs with reasonably high self-efficacy ratings, not all students may begin like this. In this case, 1 of the 3 personal support participant's scores was reasonably higher than the others, influencing the pre- and post-median scores. Additionally, when challenges occur later in the doctoral program that threaten a student's self-efficacy, personal support may not be sufficient to sustain or improve a student's self-efficacy. This idea will be discussed in greater detail in Chapter 5.

Mastery Experiences. Like social support participants, personal support participants were asked to complete the same mastery experiences every four weeks during the 12-week study, including the awareness quiz, submission of a mentoring compact, and submission of their iPOS. These experiences were opportunities for students to build confidence, but they do additionally offer some quantitative data. The table below summarizes the number of submissions and percentages for each mastery experience. These numbers describe how many students completed these components during the study; some submissions were completed after the Fall 2022 semester.

Table 17

Personal Support Mastery Experience Outcomes

Awareness quiz	Mentoring compact	iPOS
5 (n=8, 62.5%)	2 (n=8, 25%)	5 (n=8, 62.5%)

With a decent outcome for the awareness quiz and iPOS submissions, the two mastery experiences may have positively influenced self-efficacy for some students. It is also possible that the outcomes relate to the lack of significant change in students' self-efficacy survey scores. Perhaps higher engagement with the mastery experiences would have influenced different self-efficacy scores.

Awareness: Qualitative Data

Of the personal support qualitative data, 13% of the segments (2 of 15 total segments) addressed awareness, specifically possible increased awareness. Due to the bulk of this feedback relating to self-efficacy and the small personal support sample, confirming a pattern or theme within the data is difficult. What was shared, however, is relevant and adds to the conversation about how personal support influences students. The personal support awareness codes focused on the bi-weekly newsletters the participants received. One student shared, "I did not receive them super often, maybe once or twice a month. I did read them and I could usually find some new information in them" (post-survey). Meanwhile, another student shared, "The newsletters definitely helped. It reminded me of important things and helped me keep a little log of what I needed to do in my email inbox" (post-survey).

Though it is positive the students acknowledge finding new, helpful information in the newsletters, the first comment on the consistency reveals a possible problem in the receipt and reading of the newsletters. Given that they were sent consistently every other week, perhaps newsletters slipped through the cracks for this particular student. Similarly, there was a different comment about the newsletters containing information about upcoming seminars and talks, and another student acknowledged they did not read the newsletters altogether. The reference to seminars and talks is actually a reference to an entirely different newsletter sent by another group about events in SOLS; therefore, both of these comments suggest a lack of reading the newsletters I sent, or possible confusion about the specific newsletter being discussed. When read, the newsletters may have been helpful, increasing awareness and making students more in tune with what is

expected of them. However, it is possible the delivery of that information is flawed and ineffective, causing a lack of positive momentum for student awareness.

Awareness: Quantitative Data

Similar to the social support condition, personal support participants were asked to complete a simple survey assessing their awareness or knowledge of the material they would have learned through reading the biweekly newsletters and meeting with me one-on-one. In essence, the survey was set up like a 5-question quiz. Since the survey was intended to be a mastery experience as well, its simple design allowed participants to retake the quiz until they received a 100%. This allowed them to attain a sense of accomplishment, even if it took them multiple attempts to successfully complete. There were 5 quiz responses from personal support participants. Amongst those 5 responses, 4 of them received a 100% on their first quiz attempt. For the remaining 1 student, they received a 100% on their second attempt. Though it took 1 participant 2 attempts to receive a perfect score, 80% first-time perfect completion suggests personal support participants were well-informed entering the quiz. It is possible that the personal support provided through one-on-one appointments and information delivered via newsletters sufficiently prepared these participants with improved awareness. In fact, personal support participants had the ability to reference newsletters if desired, and the open rates suggest participants read the letters. See the table below for more detail.

Table 18

Newsletter Open and Click Rates

	Newsletter 1 (n=7, sent before a	**Newsletter 2** (n=8)	**Newsletter 3** (n=8)	**Newsletter 4** (n=8)	**Newsletter 5** (n=8)

	social support participant switched to personal support)				
Opens	6 out of 7 85.7%	7 out of 8 87.5%	7 out of 8 87.5%	7 out of 8 87.5%	7 out of 8 87.5%
Clicks	2 out of 7 28.6%	1 out of 8 12.5%	2 out of 8 25.0%	4 out of 8 50.0%	1 out of 8 12.5%

Sense of Belonging: Qualitative Data

Like the personal support qualitative data coded in the awareness category, the sense of belonging codes are also limited in quantity making up 13% of the data. This makes it a challenge to confirm whether the data makes up a true pattern or theme. The data collected included segments coded in the sense of belonging subcategory, community. One student shared that the personal support received positively made them, "realize that I am really doing this!" (post-survey). Though simple in nature, this statement points to the impact personal support may have on helping new doctoral students recognize that they are now part of a graduate student community, completing a degree that relatively few people have completed before them.

Moreover, another student expressed the following:

> "The personal advising positively influenced my sense of belonging as a grad student in SOLS; because of my disability, I felt like I was navigating through the SOLS system all alone and had no help. There were times where I wondered if grad school was meant for a person like me because of how difficult it was to receive any help. Thanks to the personal advising, I was able to find resources of

how to get help with my disability" (post-survey).

This student's journey is an impactful testament to the power of one-on-one support. Not only did it help them feel like they fit within the community of graduate students, it also equipped them with tools to take control of their situation. The relationship between sense of belonging and self-efficacy may be present here, as the verbal persuasion or encouragement received (a source of self-efficacy) gave the student the confidence to have difficult conversations and access resources they needed. Personal support was an avenue for this student realizing and owning their place as a doctoral student within a community of graduate students. It is possible that not having a one-on-one meeting to share this vulnerability would have caused a different outcome for this student. While this may not be applicable to all students, personal support certainly provides a valuable space for students to be vulnerable in a trusted setting when they have something to disclose, and for the advisor to equip the student with the tools they need to be successful, reinforcing their place as graduate students and hopefully influencing their continued stay in their programs.

Sense of Belonging: Quantitative Data

In addition to providing self-efficacy scores, the pre- and post-survey participants completed before and after engaging in personal support yielded sense of belonging scores as well. Using a Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree), students rated their sense of belonging by indicating the extent to which they did or not agree with each sense of belonging statement. With 22 sense of belonging questions, the minimum sum sense of belonging score possible is 22 and the maximum sum score possible is 110. Three of the 22 questions were recoded so that all

responses were in the same direction with lower scores indicating a higher sense of belonging. Table 19 below displays the median sum sense of belonging scores on the pre- and post-surveys.

Table 19

Personal Support Sense of Belonging Pre- and Post-Survey Median Scores

	N	Median
Sense of Belonging Pre-Survey (Sum)	3	52.0
Sense of Belonging Post-Survey (Sum)	3	48.0

Looking over the medians provides some initial insight. Since they are close in number before, 52.0, and after, 48.0, participating in personal support, this suggests the that personal support may have had little impact on the participants' senses of belonging. The impact it did have was positive, since the post-score is lower than the pre-, suggesting better sense of belonging ratings. To test for any statistically significant differences, I ran a Wilcoxon signed ranks test on the sums of personal support participants pre- and post-survey sense of belonging scores. The Wilcoxon signed ranks test was used because the small sample size and uneven data distribution required the use of nonparametric analyses. The null hypothesis is that there is no statistically significant difference between sense of belonging scores before and after participating in personal support. Table 20 below displays the Wilcoxon signed ranks test statistics.

Table 20

Wilcoxon Signed Ranks Test: Personal Support Sense of Belonging

	Sense of Belonging Post-Survey –

	Sense of Belonging Pre-Survey
Z	.000[b]
Asymp. Sig. (2-tailed)	1.000

a. Wilcoxon Signed Ranks Test

b. The sum of negative ranks equals the sum of positive ranks.

With a p-value of 1.0 (greater than .05), the null hypothesis is accepted and as a result it can be concluded that there is no statistically significant difference between sense of belonging scores before and after participating in social support. Ideas surrounding this finding and limitations about the small sample size are discussed further in Chapter 5.

RQ2 Summary

To recap, RQ2 asked the following: What are the impacts of "Personal Support" on self-efficacy, awareness, and sense of belonging? With a small sample and more limited data than its social support counterpart, findings provide suggestions, but they ought to be explored with a larger sample. With a majority of the personal support codes suggesting gains in student confidence and the value of the advisor/student relationship, qualitative data suggests personal support may provide the opportunity for a trusted relationship to be established between student and academic advisor, and the ability to address questions and challenges within the context of individual support may encourage student confidence for some. This may only be applicable when students have significant need or challenges wherein the 1:1 support proves crucial, which could be part of the reason there were no statistical findings suggesting personal support improves doctoral student self-efficacy. Personal support's influence on self-efficacy appears to be minimal. Additionally, personal support appeared to have a mixed impact on student awareness. Newsletters were helpful to some but either unhelpful or confused with other emails for

others. Despite being opened, the content may not have been absorbed or, over time, confused with the plethora of other emails students receive. Personal support participants performed well on the awareness quiz provided at week 4 of the study, suggesting some initial awareness established or students' abilities to use the newsletters to answer the quiz questions. Finally, personal support may impact student sense of belonging when students have a need to be vulnerable, like disclosing something personal to access the help they need to continue in their programs. This was revealed through qualitative findings. Otherwise, with similar pre- and post-survey median scores and no statistical significance, personal support appeared to have no impact on participants' senses of belonging.

Differences Between Social Support and Personal Support

Self-Efficacy

Now that the impact that social support and personal support have on student self-efficacy, awareness, and sense of belonging has been discussed, the differences between the two modes of support can be compared to address the third research question. Through the qualitative data collected, it is clear that social support participants experienced or expressed gains in confidence, such that students repeatedly shared confident responses when asked whether or not they would continue in their degrees. In addition to expressed confidence gains, social support proved to be more accessible, giving students the opportunity for their self-efficacy to be reinforced through repeatedly having their doubts addressed and watching their peers do the same. While there were some student concerns about a new teaching assistant position, completing rotations, and eventually doing their comprehensive exams and dissertation prospectus, those were

outlier responses. The concerns being shared may have also been a positive result of being comfortable amongst peers to express vulnerabilities surrounding areas of concern that are typical for most graduate students. There was no coding pattern suggesting a negative impact social support had on self-efficacy. In addition, the statistically significant difference between students' pre- and post-self-efficacy scores (which improved) suggests social support may have positively contributed to self-efficacy.

Meanwhile, personal support appeared to have a less impactful effect on self-efficacy. Personal support participants still expressed confidence gains, but it is possible that is largely connected to students with unique needs that need the one-on-one setting to be vulnerable, like the student that disclosed a disability. While their reported experiences were positive, there was a mix in feedback, as it was also shared that personal support negatively impacted self-efficacy due to a perceived delay in information being shared through means outside of the advisor/student relationship. Furthermore, there was no statistically significant difference between personal support participants' pre- and post-self-efficacy scores, implying that personal support may have had little impact on student self-efficacy. Table 21 below describes the pre- and post- median self-efficacy scores for the social and personal support conditions.

Table 21

Self-Efficacy Pre- and Post-Median Scores

	N	Pre-Survey Sum Median	Post-Survey Sum Median
Social Support	8	2096.0	2434.0
Personal Support	3	2242.0	2383.0

Though the medians appear to be different, social and personal support participants started the semester with self-efficacy scores that were statistically the same, made evident by running a Mann-Whitney U test to test for statistical differences between pre-scores across conditions (U=9.5, p=.6). Since the two conditions started with scores that were statistically the same, any changes, gains or losses, can be fairly observed.

To evaluate statistically, I used a Mann-Whitney U test to compare the distributions of the gain scores across conditions. Like the other data and analyses that have been presented in this chapter, the Mann-Whitney U test was selected because the small sample size and non-normal data distribution called for nonparametric tests, and the Mann-Whitney U can be likened to its parametric counterpart, the independent samples t-test. The gain scores included the calculated differences between pre- and post-test scores. The null hypothesis is that the distribution of self-efficacy gain scores is the same across the personal and social support conditions. Table 22 below summarizes the median gain scores for each condition.

Table 22

Self-Efficacy Gain Scores Summary

Condition	Median self-efficacy gains
Personal	141
Social	374

On average based on the medians, personal support participants experienced a self-efficacy gain of 141, while social support participants experienced a self-efficacy

gain of 374. This suggests social support participants had self-efficacy scores that increased in greater quantities than personal support participants, indicating a jump toward higher self-efficacy scores. Within these medians, each condition had one participant with a lower post-self-efficacy score than their pre-score, and some participants (2 in the personal support; 7 in the social support) who experience gains. Notably, three participants in the social support condition experienced large gains (greater than 600) suggesting that social support may have played an influential role in improving student self-efficacy. Table 23 below displays the test Mann-Whitney U test statistic.

Table 23

Mann-Whitney U Test for Self-Efficacy Gain Scores

Null Hypothesis	Test	Sig.[a,b]
The distribution of self-efficacy gains is the same across categories of condition.	Independent-Samples Mann-Whitney U Test	.194[c]

a. The significance level is .050.

b. Asymptotic significance is displayed.

c. Exact significance is displayed for this test.

Because the p-value is greater than .05, the null hypothesis is accepted and we conclude that, despite the median gains appearing to be different, the distribution of self-efficacy gains is statistically the same across personal support and social support conditions.

Sense of Belonging

Social support had a positive impact on student sense of belonging, according to

the qualitative data collected. The codes revealed the ideas that hearing other students' questions and answers in group advising aided learning, students were able to gain support from other students they may not have met or interacted with much otherwise, and the community established from social support gave students a sense of community. Instead of pursuing the start of their doctoral journeys in some form of isolation, the social support groups gave participants the opportunity to connect with peers, and in doing so, identify with them such that they felt they were all along similar journeys together. There were no negative segments of text coded; in fact, students enjoyed connecting with peers so much that they wanted the groups to continue over future semesters. By learning together and sharing their questions and confusions, social support participants found their footing as doctoral students.

In contrast, personal support sense of belonging qualitative data was lacking, with primarily one substantive chunk of text coded that emphasized its impact. Though the personal support sample size was small, this also could be indicative of personal support playing a less pertinent role in doctoral student sense of belonging. The student that disclosed their disability in our one-on-one meeting shared about how doing so and receiving resources and encouragement in return helped them feel like they belonged in their program. While social support offers a network of connection with layers of support, personal support provided an opportunity for this particular student to get the specific guidance they needed for a sensitive issue. These outcomes are both strengths, but personal support impacting sense of belonging could be relevant only in situations where unique needs are disclosed. Table 24 below describes the pre- and post-survey median sense of belonging scores.

Table 24

Sense of Belonging Pre- and Post-Median Scores

	N	Pre-Survey Sum Median	Post-Survey Sum Median
Social Support	8	42.5	40.5
Personal Support	3	52.0	48.0

All median scores appear to be rather close in number. I used a Mann-Whitney U test to determine if there was a statistical difference between each condition's pre-scores, which ultimately resulted in determining no significant difference existed ($U=8.0$, $p=.4$). With both conditions starting from statistically the same scores, changes were able to be evaluated. For sense of belonging, the lower the score, the higher the sense of belonging. Both groups started and ended with fairly strong senses of belonging. Personal support participants had an average score of 2.4 across the 22 sense of belonging questions, suggesting they typically "agreed" or had "neutral" responses to the items. Meanwhile social support participants had an average score of 1.9 across the same questions, suggesting they typically "strongly agreed" or "agreed" with the sense of belonging items.

As with self-efficacy, I used a Mann-Whitney U test to compare the distributions of the sense of belonging gain scores across conditions. The null hypothesis is that the distribution of sense of belonging gain scores is the same across the personal and social support conditions. Table 25 below summarizes the median gain scores for each condition. A negative number would indicate an increase in sense of belonging, while a positive number indicates a decrease in sense of belonging.

Table 25

Sense of Belonging Gain Scores Summary

Condition	Median sense of belonging gains
Personal	-6
Social	2

Both conditions experienced some gains and some losses, resulting in median gain scores that contained small numeric changes. Personal support participants saw improvement in their sense of belonging scores (an average decrease of 6, wherein the lower score indicates a higher sense of belonging), while social support participants saw a decrease in their sense of belonging scores (average increase of 2). These score gains and losses were compared statistically across conditions. Table 26 below displays the Mann-Whitney U test statistic.

Table 26

Mann-Whitney U Test for Sense of Belonging Gain Scores

Null Hypothesis	Test	Sig.[a,b]
The distribution of sense of belonging difference is the same across categories of condition.	Independent-Samples Mann-Whitney U Test	1.000[c]

a. The significance level is .050.

b. Asymptotic significance is displayed.

c. Exact significance is displayed for this test.

With a p-value greater than .05, the null hypothesis is accepted and it can be concluded that the distribution of sense of belonging differences is the same across

personal support and social support conditions. While the median gains offer interesting observations, the changes are ultimately minor, yielding no statistical differences.

Awareness

Social support impacted participants' awareness by increasing their knowledge of university and department requirements and expectations, and equipping them to provide peer support and advising to those that were not in the study. There were many codes with text where students shared how the social support provided a steady flow of information, sufficiently giving participants the tools needed to address their concerns as they came up. This extended to some participants sharing how they were able to assist their peers who were not participating in social support. One student even started another student group. These examples display how social support increased participant awareness and gave them the ability to extend that peer support beyond the group they were in.

While there was a clear sense of awareness gained for social support participants, this was not the case for personal support participants. Qualitatively, the personal support data suggest that the participants may have increased their awareness when they engaged with the biweekly newsletters, but the confusion surrounding the newsletters and the admission to not reading them from a couple participants implies that email as an information delivery method may be lacking. It is possible the consistent, biweekly face time with social support students contributed to the ability to learn and gain awareness. Receiving some emailed newsletters amongst a sea of other emails may have led to information being missed or newsletters skimmed over. Perhaps newsletters or email communication is not the most effective way to contribute to doctoral student awareness.

Instead, it is possible that learning alongside peers through consistent meetings, particularly while getting started in a new program, may be more beneficial to doctoral students being able to begin their programs strong and informed.

End of the Year Survey

In Chapter 3, I discussed the process of administering an end of the year self-efficacy and sense of belonging survey at the end of the Spring 2023 semester to all first year SOLS PhD students. With the data provided by 23 participants (10 social support recipients, 3 personal support recipients, and 10 responses from a control group of students that did not participate in the fall intervention), I ran a Kruskal-Wallis test (nonparametric equivalent of a one-way ANOVA) to test for differences between end of the year self-efficacy and sense of belonging scores among the 3 student groups. The median self-efficacy and sense of belonging scores for the 3 groups are detailed below.

Table 27

End of the Year Median Self-Efficacy and Sense of Belonging Scores

	Social support participants	**Personal support participants**	**Non-intervention participating students**
Self-efficacy median scores	2331.5	2448.0	2263
Sense of belonging median scores	42.0	41.0	37.0

Below is the test statistics tables for the Kruskal-Wallis test.

Table 28

Kruskal-Wallis Test: End of the Year Scores

	SB	SE
Kruskal-Wallis H	.078	1.148
df	2	2

Asymp. Sig.	.962	.563

a. Kruskal Wallis Test
b. Grouping Variable: condition_numeric

Given the p-values for both self-efficacy and sense of belonging are greater than .05, the null hypothesis is rejected and it can be concluded that the end of year scores for first year SOLS PhD students across groups are not statistically different. Like other analyses in this study, these findings could be impacted by the small sample size. Finding significance amongst a small sample is challenging, and we want to avoid making Type I or Type II errors. The findings could also be influenced by self-selection bias, as the decision to participate in my research was up to the student, and students that participated may have certain characteristics (e.g., different self-efficacy or sense of belonging levels) than those who choose not to participate in research like this.

Given that statistical significance was found only with self-efficacy scores for social support participants amongst pre- and post-survey data, these findings suggest that first year PhD students may not see score changes yet, if at all. Perhaps some students never experience changes, while others might encounter some depending on how they address challenges during their doctoral study. Most first year SOLS PhD students experience little to no changes between their first and second semesters through factors like the following: they continue to work with the same faculty advisor and likely are not interacting with other committee members yet, they still have a balanced focus on both coursework and research, milestones like comprehensive exams and the dissertation proposal are still 1-2 years away, and more. Given this, a second- or third-year survey might be more telling to determine if and to what extent self-efficacy and sense of belonging scores change.

In addition, I paired the end of the year survey responses with pre- and post-survey responses from social and personal support participants using the 4-digit codes provided. Once paired, I ran a Friedman's two-way analysis of variance by ranks test to test for differences between the pre-scores, post-scores, and end of the year scores. I was only able to run this test for social support participants (n=8 paired responses) because I had only 1 personal support participant's paired responses across the three tests. The null hypothesis for the test was that the distributions of pre-scores, post-scores, and end of the year scores were the same. The table below shows the pre-test, post-test, and end of year test self-efficacy and sense of belonging medians.

Table 29

Self-Efficacy & Sense of Belonging Medians: Pre-, Post-, End of Year

	Pre-test	**Post-test**	**End of year test**
Self-efficacy	2096.0	2434.0	2331.5
Sense of belonging	42.5	40.5	42.0

Since the self-efficacy test has a range from 0-2700 (27 questions with scales from 0-100), these medians imply better self-efficacy ratings at the end of the first semester and end of the first year when compared to the pre-test. Though the end of year test scores are lower than the post-test, students averaged an 86.4% rating on the confidence scale, which still suggests a high self-efficacy. The end of the year sense of belonging score median was higher than the post-test but lower than the pre-, all of which were similar. At the end of the year, students averaged a 1.9, or somewhere between "strongly agree" and "agree", rating across the 22 sense of belonging Likert scale

questions. Social support participants took the post-test right after finishing biweekly meetings with me throughout the semester. Since this is something they did not receive as they continued in their spring semester, this could contribute to the changes seen in the end of year scores. The ranks summary table below for self-efficacy scores reveals a p-value less than .05, suggesting the null hypothesis must be rejected and we can conclude that there are differences between self-efficacy scores across the pre-survey, post-survey, and end of the year survey.

Table 30

Related-Samples Friedman's Two-Way ANOVA: Self-Efficacy

Total N	8
Test Statistic	7.750
Degree of Freedom	2
Asymptotic Sig.(2-sided test)	.021

These findings are further explained through the pairwise comparisons displayed below.

Table 31

Pairwise Comparisons of Self-Efficacy Scores

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Self-Efficacy Pre-Survey and End of the Year Self-Efficacy Survey	-.500	.500	-1.000	.317	.952
Self-Efficacy Pre-Survey and Self-Efficacy Post-Survey	-1.375	.500	-2.750	.006	.018
End of the Year Self-Efficacy Survey and Self-Efficacy Post-Survey	.875	.500	1.750	.080	.240

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

With a p-value below .05 for the pairing of pre- and post-self-efficacy scores, the differences between those two, as discussed earlier, are significantly different. No other pairings have statistically different results. Though the end of year self-efficacy scores were lower on average than the post-scores, it is promising the scores do not significantly drop from the higher scores seen in the post-test. The social support participants were able to retain their self-efficacy scores. I utilized the same test for sense of belonging scores and received the below findings.

Table 32

Related-Samples Friedman's Two-Way ANOVA: Sense of Belonging

Total N	8
Test Statistic	2.774[a]
Degree of Freedom	2
Asymptotic Sig. (2-sided test)	.250

a. Multiple comparisons are not performed because the overall test retained the null hypothesis of no differences.

Since this test yielded a p-value greater than .05, the null hypothesis is retained and we conclude there are no significant differences between pre-test, post-test, and end of year sense of belonging scores. Given that the scores did not significantly drop with the end of year survey findings, social support participants may have some level of retaining their sense of belonging as well. With the possible retention of existing self-efficacy and sense of belonging scores, there are other possible factors that may influence the findings. For instance, the lack of changes between the first and second semester described earlier in this section may contribute to non-significant changes here.

Other Findings

Finally, I found myself reflecting on the experience of providing both personal

and social support throughout this study, revealing the other findings I describe here. As an advisor, I found the ability to explore and execute both 1:1 support and group advising exciting. Familiar with 1:1 support, providing group advising was a new challenge I had not experienced yet in my professional career. Though the group advising sessions were longer (1 hour), they were engaging and unique for each group and each session. While I had planned material to discuss in each meeting, having different minds digesting and discussing the same material resulted in unique conversations. Often, I have felt like academic advising involves having back-to-back 30-minute meetings wherein I am hearing the same questions and providing the same answers again and again. While this is not always the case and there are 1:1 meetings where personal needs are discussed, it is often the case for the majority of my meetings in SOLS. Group advising, as a result, was a refreshing new experience in which I did not feel I was needing to share the same information again and again. In addition, students were able to answer each other's questions, adding layers of advising support and both teaching me and relieving me from answering questions I may not be able to address as well as another SOLS student can. In three hours, I was able to communicate with 14 students. If those were all 1:1 appointments instead, it would have taken me 7 hours to communicate with the same number of students. Therefore, from an efficiency perspective, social support gave me the ability to communicate with more students in a shorter period of time. Granted, over the course of the semester, I met with social support participants more frequently, totaling more time than devoted to personal support participants. Still, meeting frequency could be adjusted and groups could be made larger to further improve the efficiency of social support if implemented more permanently in SOLS. Given that I often feel incredibly

busy and our department is growing with a new online student population, group support in some capacity provides an opportunity for scalability that is not matched with personal support. When a department like SOLS is large and growing, personal support yields more appointments being scheduled. Unless more staff are hired, this means 1 advisor may be taking on more work, which has the potential to impact job satisfaction.

CHAPTER 5

DISCUSSION

Purpose of the Study

Embarking on a journey to complete a higher education degree is a life-changing endeavor. Though it is a significant choice to pursue a degree, the higher education journey is not a one-time decision. Rather, it is a series of continuous choices. Students repeatedly decide which classes to take, which activities to get involved in, what type of research to pursue if any, how they ought to approach their schoolwork, where they spend their time, and so much more. For every choice to keep pressing on, such that the degree may be accomplished, there is also a continuous confrontation with the option to leave. Because of this, it is imperative students have a healthy infrastructure of support provided by their institution to encourage them and reinforce their initial decision to complete their degree.

The School of Life Sciences (SOLS) at Arizona State University (ASU) is a large, fast-growing academic department; this, combined with a small support team, leaves gaps in the supportive efforts we are able to effectively implement. To attempt to fill those gaps and address the unique needs of doctoral students, I conducted a study, guided by the theoretical concepts of self-efficacy and communities of practice, with the goal to

explore possible ways to better support doctoral students. In doing so, I attempted to address their need for developing self-efficacy related to doctoral study, awareness of requirements and policies related to their studies, and provide an opportunity for more interaction with their peers. This two-condition study involved assigning first-year PhD students in SOLS to either a personal or social support condition. Both conditions were designed to be valuable, with the personal support condition mirroring aspects of how we currently support doctoral students. Over the course of their first semester, doctoral students either participated in at least one 1:1 advising session and received biweekly newsletters (personal support), or they were assigned to a group in order to participate in biweekly group advising sessions (social support). Through the use of surveys, focus groups, and my research journal, I collected data to answer the following research questions: (RQ1) What are the impacts of "Social Support" on self-efficacy, awareness, and sense of belonging?; (RQ2) What are the impacts of "Personal Support" on self-efficacy, awareness, and sense of belonging?; and (RQ3) What differences exist between the impacts "Social Support" and "Personal Support" have on self-efficacy, awareness, and sense of belonging?. In this chapter, I review the answers to these research questions and discuss how these findings connect to the larger context and existing literature, limitations encountered, and suggestions for future research.

Social Support Impacts: Self-Efficacy, Awareness, and Sense of Belonging

Doctoral students in the social support condition of this study engaged in biweekly group advising sessions during their first semester. The impact of those sessions on their self-efficacy, awareness, and sense of belonging was evaluated through a combination of surveys, focus groups, and observations made in my research journal.

Self-Efficacy

Participating in social support during their first semester of doctoral study in SOLS positively impacted doctoral student self-efficacy. Since self-efficacy is defined as, "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives," doctoral student self-efficacy is doctoral students' beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their ability to retain, succeed in, and complete their doctoral degree (Bandura, 1994, p. 71). This impact was made evident through comparing the differences between students' self-efficacy scores before and after engaging in social support. Students rated their self-efficacy for dealing with various tasks involved in their doctoral studies on a scale from 0-100; since there were 27 total questions, the minimum score possible was 0 and the maximum was 2700. The higher the score, the greater the student's self-efficacy for handling doctoral study. Before participating in social support, the median self-efficacy score was 2096.0. while the median self-efficacy score after participating in social support was 2434.0. A Wilcoxon signed ranks test shows that this is a statistically significant difference ($Z=-1.96$, $p=.05$) demonstrating a clear improvement in student self-efficacy. The 8 students that had paired responses with pre-, post-, and end of year surveys reported a median self-efficacy score of 2331.5, which was not statistically different from the post-scores, suggesting social support participants were able to maintain their higher self-efficacy to some degree.

The higher average self-efficacy scores post-social support could have been a byproduct of various aspects within the social support condition. Qualitative findings

reveal important details. For instance, one of the qualitative themes was the accessibility of support involved in the social support condition. With biweekly meetings scheduled at the beginning of the semester, students knew when to expect advising and when they could get their questions answered. Rather than facing a possibly intimidating task to set up a one-on-one meeting, social support participants simply had to show up to the recurring meeting in their calendars. As a result, they gained important knowledge while proactively getting their concerns addressed.

Social support participants did not have to wait until a concern became severe to schedule a one-on-one appointment. Similarly, they did not have to sit with their concerns or confusions for long periods of time, trying to figure out how, if, and when those things could be addressed. The consistency and accessibility of the group advising sessions created an opportunity for social support participants' self-efficacies to be continually reinforced through the ease and reliability of getting their academic needs met. It is possible that students saw their concerns as challenges to be overcome. Having their own concerns addressed while additionally watching others find solutions through consistent group advising may have acted like small mastery and vicarious experiences. Furthermore, certain questions may have never been brought up had the advising not occurred in group settings. It is possible that observing peers raise similar concerns as their own helped feed student confidence as they found an ability to relate to one another's questions, as well as an ability to then ask their own. Each challenge they overcame personally and observed in others likely helped to improve their self-efficacy scores. Perhaps they were able to continue relying on peers in the spring semester of their first year, helping contribute to their self-efficacy scores not significantly dropping. Since

the biweekly meetings did not continue in the spring semester, they did not have the same kind of support and may have contacted me for 1:1 advising or emailed questions as needed. Had they been too reliant on the group advising sessions, their self-efficacy scores could have dropped dramatically. It is possible social support may be able to help contribute to more long-lasting, improved self-efficacy.

Though social support positively impacted doctoral student self-efficacy, there were some statements from students about areas of concern. In particular, one student had concerns about a new teaching assistant position they were expecting to have the following semester, another student was doing lab rotations and felt they were not as established as other students as a result, and another student brought up their concern for completing their comprehensive exams and dissertation prospectus. Although these areas of insecurity were introduced, these are typical changes and challenges that doctoral students face and not a result of participating in social support. Positively, each of these three concerns were expressed by one student for each concern; while that means three students mentioned concerns, only one student brought up each, suggesting no pattern for impacting other students. It would not have been unusual for a student to bring up a concern and for that concern to be echoed by others, even to the point of feeding off of one another to exaggerate the concern. This did not occur in the social support setting. In fact, it could be that the social support provided an avenue for students to feel comfortable enough to express these concerns, thus allowing participants to discuss them in their group setting of support.

Awareness

In addition to analyzing the impact social support had on doctoral student self-

efficacy, this study also sought to assess the influence social support had on their awareness of resources, degree requirements, and other information pertinent to completing their degrees. Since each social support meeting had topic focuses, there were key pieces of information the students were able to discuss with myself as the advisor and their peers. This was intended to increase their awareness of things they may need to know to increase their agency for dealing with concerns when they inevitably do arise. Four weeks into the study, after 2 meetings, the social support participants took a simple 5-question quiz to assess their awareness of items that were discussed in those first 2 meetings. If students did not get a 100% on their first attempt, they were prompted to retake the quiz until they did. The quiz was intentionally simple and set up in such a way that students would ideally score well, and in doing so, improve their self-efficacy for mastering that experience. However, the scores provided some insight on the impact social support had on awareness as well.

There were 11 total quiz responses amongst the social support condition participants, 7 of which received a 100% on their first quiz attempts. Two students required 4 attempts to achieve a perfect score while 2 got their first attempts incorrect and did not continue. The quiz was designed such that only the final, submitted results were visible to me. This means that I was unable to see which question(s) challenged the 2 students that took 4 attempts to submit a perfect score. Since they eventually submitted quiz answers reaching a 100%, only those results are visible to me. The 2 students that did not repeat their quizzes until reaching a 100% revealed some insights since their incorrect responses were observable. Both students missed the same question: “True or False: I do not need to enroll in any type of class to receive course credit for my

research." Each student answered "true" when the correct answer was "false"; they are required to enroll in research credit hours to get credit for the research they are conducting. It is possible that reading this question quickly led to their incorrect responses, or the true/false question type may have been a factor in their answers as well. Alternatively, it is possible they did not yet understand how SOLS operates its research courses and what was expected of them.

With 64% of the social support participants successfully completing their quiz with 100% accuracy on the first attempt, it is likely the discussions held in social support group meetings positively helped aid doctoral student awareness, especially since the quiz covers common misconceptions that, from my advising experience, new and returning students often hold. For example, one of the questions asked, "How many minimum credit hours do Teaching and Research Assistants need to enroll in to receive their funding?". Each semester, the SOLS graduate office runs reports to check for Teaching and Research Assistants enrolled in less than 6 credit hours because may students fail to enroll in the minimum amount, which impacts the release of their funds. All students answered this question correctly (either on the first or subsequent attempts) thus hopefully preventing this enrollment issue for them in future semesters. Even if participants did not answer correctly on their first attempt, they persisted, suggesting that the social support condition gave students the inquiry skills and/or persistence to discover the correct answer.

The qualitative data further supports that that social support increased new PhD student awareness and knowledge. Students shared that the meetings provided an avenue for gaining information they were not aware of previously, and the meetings allowed

questions to be asked that students may not have thought to ask themselves. With more perspectives discussing the meeting topics of focus, social support created a space for students to learn from an advisor and multiple peers. Students had the opportunity to not only ask their own questions but listen to the questions raised by their peers, bringing added awareness to all participants in the group. The social support condition also encouraged students to answer each other's questions rather than having to direct everything to me. In some cases, students had more knowledge to more thoroughly address certain questions than I did, proving the value of diverse perspectives and experiences coming together to learn.

There was also an overlap between increased awareness and increased self-efficacy. An interesting outcome of the social support group was the impact it had on participants' desire and ability to engage with students not participating in the study. Multiple participants spoke about their peers coming to them with questions because they were equipped with information to be able to address the concerns of those not experiencing biweekly group advising. The proactive awareness gained amongst peers via social support enabled these students to spread that to other groups of students they interacted with. It is possible that social support participants increased their self-efficacy because of their awareness gained, and that confidence equipped them to address others' needs. Additionally, it is possible that being able to answer other students' questions helped further feed their awareness and self-efficacy, requiring that they recall the information they have learned and have the confidence to share it with others. Furthermore, with the social support participants sharing information to other groups of SOLS students, collaboration and establishing a network of support spread to other

students outside of the study. This could have influenced sense of belonging as new SOLS PhD students established relationships with peers to ask and answer questions. Given the way increased awareness encouraged SOLS doctoral student self-efficacy, the relationship between factors like awareness and self-efficacy or awareness and sense of belonging may be an important consideration for ways to encourage concepts important to retention, like self-efficacy and sense of belonging in particular.

Sense of Belonging

Finally, RQ1 additionally sought to answer what impact social support had on doctoral student sense of belonging. Similar to self-efficacy, sense of belonging was quantitatively measured with pre- and post-survey responses. There were 22 sense of belonging items in the survey, and students were asked to rate the extent to which they did or did not agree with each sense of belonging statement using a Likert scale (1=strongly agree, 2=agree, 3=neutral, 4=disagree, 5=strongly disagree). The minimum total sense of belonging score was 22, and the maximum was 110; the lower the score the stronger the participant's sense of belonging. The median total sense of belonging score before participating in social support was 42.5, and the median total sense of belonging score after participating in social support was 40.5. With similar median scores, no statistically significant difference was found between the pre- and post-survey sense of belonging scores. Furthermore, no statistical significance was found with the end of year sense of belonging scores either, which had a median score of 42.0. This may be because participants were nearly at ceiling on the pre-test with an average score of 1.9 during the pre-, 1.8 during the post-test, and an average score of 1.9 during the end of year survey, suggesting that they entered their first year with a high sense of belonging that was

maintained throughout the year. It would be interesting to compare first year SOLS PhD students' sense of belonging scores with other programs at ASU to see if they differ. Quantitative findings will be discussed further at the end of this section. While the quantitative data do not suggest that participants' sense of belonging changed throughout the study, the qualitative data do suggest multiple points of impact.

A majority of the social support qualitative data consisted of sense of belonging codes at 37%. Important themes were revealed that suggest the important role social support may play in contributing to (or maintaining) student sense of belonging. One of these themes involved the exposure to collaboration that occurred in the social support condition. Discussed earlier in this chapter, the social support condition allowed students to learn from their peers, hear a variety of perspectives, get answers to questions that they had not thought to ask themselves, and expand their ideas and knowledge as a result. This increased awareness, but it also helped students establish a network of support and become well-adjusted to their new programs. In fact, the increase in awareness that came from this collaboration may have directly impacted sense of belonging, as being informed and knowledgeable may contribute to doctoral students feeling like they belong in their programs.

In collaborating with one another, students were able to form connections, increasing their network of support. Students shared that participating in social support gave them support outside of peers they interact with in their labs. It helped them branch out and be less isolated. Since doctoral work can be quite isolating with students spending a majority of their time in their labs across ASU's campus or even off campus, having people they connect with outside of their immediate sphere of work can help them

feel more connected to their program, to SOLS, and to ASU in general. When questions arise throughout their program, they have more folks with different perspectives they can reach out to in order to share ideas. In my experience as an advisor, this impact may be even more important as students get further in their programs. Since most PhD students in SOLS complete coursework during their first year or two, they typically have some level of interaction with students outside of their programs and outside of their labs during this time. However, as they continue, they tend to spend years 3-5 of their programs largely in their labs with no more coursework to complete. Many PhD students in SOLS complete their comprehensive exams in their second or third year, so if students have not established a network of support to ease feelings of isolation early, it is possible they attempt significant program milestones with less support. This has the potential to play into student sense of belonging and possible attrition. Therefore, social support's impact in creating layers of support may prove to be beneficial as these student's face future challenges and have a bigger network on which to rely.

Finally, students shared about how social support helped them build community. It was fruitful for participants to see other students struggling with similar concepts and questions. They were able to identify with other students in similar situations, helping them feel less like imposters. For instance, a social support participant shared in a focus group that social support helped them with, "getting to know some people like, you know, real people and not feel like such an imposter with that… feeling... yeah, I think you could bring a lot of community together [through social support]". If doctoral students feel like imposters in their work and experience isolation, this could be disastrous for their sense of belonging, making it difficult to want to continue when they

experience challenges during their PhD journeys. Therefore, with social support providing community, these participants have peers to identify with, such that they are reminded that they are not expected to have the answers all the time.

With qualitative data pointing to the ways social support aided sense of belonging, it is interesting that sense of belonging scores before and after participating were nearly identical. There are several possible reasons the quantitative findings appear to not match the qualitative findings. First, as mentioned, these doctoral students appeared to begin their programs with a high sense of belonging. With a median score of 42.5 on a scale from 22 to 110, these participants started their programs with an average answer of 1.9 for each of the 22 sense of belonging items on the survey. In other words, their answers averaged between strongly agree and agree, indicating a high sense of belonging from the start of their programs.

This similarly continued with the end of year survey where they still averaged an answer of 1.9 across the sense of belonging items. Like the self-efficacy findings, social support participants did not see statistically significant differences with their end of year results, suggesting there could have been factors at play helping them retain their sense of belonging level established by the end of their first semester. Students may have been able to utilize collaboration or their network of support to prevent sense of belonging from being harmed. Mentioned in Chapter 4, SOLS PhD students often have second semesters that look similar to their first semesters. If they can be taught necessary resources and requirements in their first semester and supported to continue to maintain their sense of belonging scores, perhaps the typical doctoral student challenges of persisting despite research challenges, possible complications with their faculty mentor,

the task of completing comprehensive exams, etc. can be overcome to support retention and degree completion.

It is surprising that many SOLS doctoral students started their first year with such high sense of belonging scores, given that some were new to ASU and SOLS, and as a result they began their programs with fewer connections and less doctoral student community than they may have later established. However, it is also unsurprising in that they begin their programs with, ideally, little to no negative experiences impacting their sense of belonging. Sense of belonging may be challenged when students do not perform well in a course, experience interpersonal challenges with peers, have a personal issue threaten to influence them believing they can stay in their degree, and more. New students may not have encountered any challenges like these during their first semester, thus supporting sense of belonging scores that started and remained high. It would be interesting to see how sense of belonging varies throughout the entirety of a student's time in their PhD program, because it is possible that one semester is not enough time to evaluate changes in a student's sense of belonging. A longitudinal study could explore how these scores do or do not change throughout the degree. Importantly, these participants did not show significant drops in their sense of belonging scores. Perhaps social support helped these students maintain their initial high sense of belonging, or perhaps the impact of social support on sense of belonging will not be evident until this group is further into their programs.

Personal Support Impacts: Self-Efficacy, Awareness, and Sense of Belonging

While social support tested out a new way to advise and support PhD students in SOLS, the personal support condition was a slightly more structured format of current

advising efforts. Doctoral students participating in personal support were required to have at least 1 one-on-one meeting with me as their advisor, and they received biweekly newsletters consisting of information aligned with the topics discussed in the biweekly social support group sessions. The impact of this support on their self-efficacy, awareness, and sense of belonging was evaluated through a combination of surveys and observations made in my research journal. Personal support participants were invited to participate in focus groups but there was no turnout amongst the small sample of students assigned to the personal support condition.

Self-Efficacy

Personal support appeared to carry no significant impact on the self-efficacy of personal support recipients. Participants took the same pre- and post-survey assessing their self-efficacy on a scale from 1-100 across 27 items asking how students deal with various tasks related to their doctoral studies. The minimum score possible was 27 and the maximum was 2700, wherein the higher the score, the greater the student's self-efficacy. Before engaging in personal support, students' median total self-efficacy score was 2242.0, while their median score afterward was 2383.0. While there was an improvement, it was slight, and no significant difference was found between the pre- and post-self-efficacy scores. This suggests that personal support's impact was not compelling enough to influence how students rated their self-efficacy.

There were some qualitative findings that indicated how personal support may be beneficial. One personal support participant disclosed a disability to me during our meeting, something that may not have occurred in a group setting. As a result, I was able to connect the student with resources, discuss their needs, and encourage them to

continue in their program. For this particular student, personal support fit their needs well, likely fueling their self-efficacy to have a conversation with their faculty advisor and contact other departments to obtain help. Personal support may be necessary or beneficial for situations where students need an avenue to disclose something personal or vulnerable. They are then able to get the individualized support they need to address their specific doubts.

Even when students did not have something vulnerable to disclose, qualitative findings suggest that personal support provided a way for these participants to express their questions, receive the help they needed, and in doing so, establish a relationship with an advisor. This relationship is what allowed me to directly encourage their confidence. Personal support participants have the option to continue to rely on this relationship as needed throughout their doctoral journeys. Only one personal support participant, the one that disclosed a disability, scheduled a subsequent meeting later in the semester to receive more guidance. The relationships established with personal support participants were positive, and from my experiences and notes, these participants left their meetings feeling confident about handling what was required of them in their first semester. However, these participants obtained support and information throughout the semester in various ways, given that they largely did not schedule subsequent meetings with me. It is possible that being more on their own within the personal support condition left participants lacking continual reinforcement of their self-efficacy.

One participant did express that personal support played a positive and negative role in their self-efficacy. While the initial meeting was positive, they found themselves hearing information from different graduate students throughout the semester,

information they would later hear about via email. Though personal support participants received biweekly newsletters discussing topics that lined up with topics discussed in the social support group sessions, it is possible they did not read the newsletters or read them later than when they were sent. Social support participants may have been collaborating more, sharing information with one another because they had established connections, and this could have played a role in how personal support participants received information from other graduate students.

It is likely that establishing a connection for academic support with only an advisor and not peers is not sufficient for providing ongoing support to foster self-efficacy. Personal support participants were left to manage much of their first semester on their own. Though they could schedule as many meetings with me as they would like, and though they had regular newsletters, they were expected to take action in order to utilize those resources. If they chose not to use these resources, they were left to seek support on their own, or perhaps not seek it out altogether. Perhaps this left personal support participants too isolated, and the lack of continued support during their first semester led to no significant improvements in their self-efficacy scores. It is positive there were improvements, but the impact of personal support over time could play a role in some students not having the self-efficacy required to accomplish major program milestones and persist in their programs.

Awareness

As mentioned previously, I also sought to assess the impact personal support had on new doctoral student awareness. Key requirements, important resources, and various expectations SOLS has for students were communicated in the one-on-one advising

meetings and the biweekly newsletters delivered to personal support participants. These efforts aimed to provide awareness to students regarding the things they may need to know to be successful in their programs. Like the social support condition, personal support participants took the same simple 5-question quiz four weeks into the study.

There were 5 quiz responses for personal support participants. Four of them received a 100% on the quiz during their first attempt, and 1 of the students required a second attempt to achieve a 100%. With 80% accomplishing first-time perfect scores, perhaps the personal support participants were equipped to sufficiently answer the questions on their awareness quiz. This could be a result of personal support participants receiving concentrated advising in a 30-minute personal advising session, wherein I was able to provide the information that would be asked during the awareness quiz. Mentioned in Chapter 3, 5 of the 8 personal support participants scheduled 1:1 meetings, and 4 of the 5 did so within the first 4 weeks of the study. Since 4 students received a 100% on their first attempts, this could line up with those that had meetings. Additionally, these scores could be the result of students having read the newsletters, which also provided the information asked in the quiz. Alternatively, even if the students did not read the newsletters, they could have pulled the newsletters up and referred back to them as they answered questions.

Interestingly, the qualitative findings suggest that personal support participants may have been confused about which newsletters were from our office. One participant shared that they received them infrequently (despite the personal support newsletters going out consistently) but when they did see them, they found helpful information. Another participant shared that the newsletters were helpful, while someone else

commented about the newsletters providing completely different information from what I shared (suggesting that they were looking at a different email). Since doctoral students receive numerous emails from the university, perhaps relying on an emailed newsletter to deliver information was beneficial for being able to answer quiz questions (i.e., students could sort through their email and pull up the answers if needed), but they may be insufficient for impacting awareness over time.

The awareness quiz was taken about 4 weeks into the study, early in the semester, while the open-ended feedback was received at the end of the semester. Eventually, students could grow tired of checking their emails for answers to their questions, particularly as their inbox fills with more and more content. This could result in what I have experienced as an advisor in SOLS, where students simply email me with questions that I have already answered through other means, like an email sent out at an earlier point in time. During the study, I experienced fewer emails than usual (based on experience from previous years) from students in both conditions, but particularly from social support participants. I did not have the control population to compare this experience to since another advisor was supporting the control students. Overall, personal support may not have provided a permanent solution for delivering information in a way that creates lasting awareness throughout the journey of a doctoral student.

Sense of Belonging

Finally, this study considered what impact personal support may have had on new doctoral student sense of belonging. Like the social support condition, sense of belonging was measured quantitatively with a pre- and post-survey asking participants to rate the degree to which they did or did not agree with a series of 22 statements related to sense of

belonging. The minimum total score possible was 22 and the maximum was 110, with the lower score indicating a higher sense of belonging. Personal support participants had a median sense of belonging score of 52.0 before participating in personal support, and a median score of 48.0 after participating. There was no statistical significance found between pre- and post-survey sense of belonging scores.

There were limited qualitative findings to provide insight into these scores, perhaps because personal support participants did not have much to share about personal support impacting their sense of belonging because there was, in fact, not much of an impact. The only substantive feedback gained was from the personal support participant who disclosed their disability; for them, personal support helped reinforce the idea that they belonged in their program. The initial difficulties to receive help with their disability had them questioning their belonging, but this thought process changed when they received resources via personal support. Though this is an example from one student, it is an important representation of the helpful role personal support can play in guiding a students with varying needs, such that they do not experience a weakened sense of belonging and consider exiting their program.

With the exception of the student who disclosed their disability, there is no evidence that personal support impacted sense of belonging. Considering personal support similarly matches how we currently support students in SOLS, this is an important finding to unpack. While personal advising may provide an avenue for students to share their unique needs when encountered, we are not currently executing practices that facilitate doctoral students interacting with each other. Newsletters or receiving important information via email may be helpful, but this may not be much of a

contributor to whether or not a student feels they belong in their program. Similarly, an occasional one-on-one advising meeting, if requested by the student since these meetings are not required by SOLS, may not provide enough opportunities for student sense of belonging to be supported and encouraged. It is important for students to feel they belong in their doctoral programs because inevitably they will face challenges that require them to confront whether they should stay in their program or not. Having a relationship with and meeting with an academic advisor may be beneficial, but it may not be sufficient to ensure the student persists.

Differences Between Social Support and Personal Support Impacts

Self-Efficacy

Social support and personal support impacted new doctoral student self-efficacy differently. Namely, social support had statistically significant differences between pre- and post-survey self-efficacy scores while personal support did not. Table 21 below, introduced earlier in this chapter, describes the median pre- and post-scores for both conditions.

Table 21

Self-Efficacy Pre- and Post- Median Scores

	N	Pre-Survey Sum Median	Post-Survey Sum Median
Social Support	8	2096.0	2434.0
Personal Support	3	2242.0	2383.0

Social support participants showed more evidence of change in their self-efficacy scores than the changes seen amongst personal support participants. With social support

participants' post-scores reaching 2434.0, this means that across 27 self-efficacy scale questions, students went from an average rating of 77.6 on a scale from 1 to 100 to an average rating of 89 on that same scale. Meanwhile, personal support participants went from an average rating of 79 to an average rating of 90.1 on the same scale from 1 to 100. These self-efficacy ratings are positive, but social support appears to have more evidence of self-efficacy score change compared to personal support. The self-efficacy score gains were compared with one another and, though no statistical significance was found, possible evidence suggests differences between the two conditions that may be further explored with a larger sample size.

Moreover, social support made advising accessible, allowing social support participants to have a consistent time to get their questions answered. Their self-efficacies could be continually reinforced as they had their needs met, found solutions to their problems and observed the same in their peers. Without intent, social support participants may have encountered their own mastery experiences while engaged in the support, and the design of social support may have allowed students to continually overcome their own challenges, strengthening their self-efficacy. Personal support participants, in contrast, were asked to schedule at least one personal advising meeting, a task that one social support participant thought could be intimidating for some students. They may have been right considering 5 of the 8 personal support participants scheduled this meeting. This intimidation factor and the lack of recurring meetings could have impacted the lesser gains in self-efficacy scores for personal support participants.

Personal support participants were able to get their individual questions answered and even, in the case of one student, disclose something personal to receive the support

needed to tackle that challenge. This may have led to some self-efficacy gains, as students could leave their advising sessions with more confidence for dealing with graduate study than before, knowing they had the resources needed to address possible barriers or questions. However, personal support participants may have found themselves learning information from other graduate students, rather than hearing information directly from their academic advisor. This is because the bulk of information shared with personal support participants occurred via emailed newsletters, and if a student missed one or read it a week later, this could have impacted the level of support they felt they received from their advisor. Feeling less supported or uninformed may have impacted personal support participants' self-efficacy scores.

Considering personal support mirrors current efforts for supporting doctoral students in SOLS, these results suggest a serious reconsideration for the way in which first semester doctoral students are supported by the department. Ideally, doctoral student self-efficacy is encouraged and consistently stays at a high level throughout the entirety of their program. Over time, personal support and its possible poor delivery of information may grow tiresome; students may feel consistently uninformed and as a result, their self-efficacy may begin to decline. This could be problematic later when students experience research delays, need to complete their comprehensive exams, or encounter personal challenges. Given that there appear to be benefits to student self-efficacy through providing social support to doctoral students, it may be constructive to explore how social support could be permanently adopted.

Awareness

In addition to impacting self-efficacy differently, social support and personal

support presented information to students in different ways. On the simple awareness quiz, 4 out of 5 personal support participants answered the 5 questions correctly during their first attempts, while 7 of the 11 social support participants answered the 5 questions correctly during their first attempts. It is difficult to compare the quiz findings or make any clear claims based on those numbers, particularly because the quiz was intended to be a mastery experience for students in both conditions, leading to increased self-efficacy. However, it is possible that the different ways of delivering information impacted the different outcomes. Personal support participants, for instance, had newsletters they could pull up and refer to in order to answer the quiz questions. Social support participants, in comparison, did not. Conversations in the social support condition were also more organic, which means that we discussed greater varieties of topics and students could have left conversations with different takeaways than the more straightforward personal advising appointments. Since the newsletters may be valuable resources students can refer back to and social support participants would only have any notes they may have taken during meetings, implementing a hybrid model of social support with the addition of newsletters may be beneficial. For instance, perhaps a summary email is sent after each group advising session that synthesizes and reminds them of the material discussed.

These organic conversations in the social support condition, however, may have been part of what contributed to social support student awareness. Students were able to learn alongside their peers, asking each other questions or hearing answers to others' questions, such that there were more diverse perspectives bringing to light different, valuable answers. Perhaps a shared Google Doc for group advisees to take notes together,

or nominating a different note-taker for each session, could allow students receiving social support to have helpful information to refer back to like personal support participants with the newsletters. Students in the personal support condition learned the expected content during the personal advising session held early in the semester, but they were then responsible for reading newsletters and seeking out additional help if needed on their own, different from the peer support established in the social support condition. Since the awareness quiz was administered 4 weeks into the study, the timing could have impacted the awareness quiz scores and number of attempts required across conditions.

Personal support participants were able to ensure their specific questions were answered, and I was able to have more control over ensuring they were aware of the specific requirements and resources I was attempting to teach them. The 1:1 advising session is more controllable, perhaps why individual student support is at the foundational level of ACPA & NASPA's (2015) advising and supporting competency, as opposed to more intermediate or advanced expressions of this competency. This could have helped lead to personal support participant awareness. While this is positive, this also means that I could become, as their academic advisor, their go-to source of information. The relationship established between student and academic advisor is important, but it could become a safety net for students to rely on any time they have a question, instead of pursuing resources themselves for answers or relying on peers. I have experienced this with my role in SOLS, and it is not a sustainable, scalable way to support students (unless departments can afford more advisors), especially for a growing department. Social support participants created relationships with peers in their groups, and these relationships created another method for students to gain knowledge and

awareness as questions came up.

In fact, for some social support participants, this extended to other students not participating in the study. Several social support participants shared about how they were able to answer questions that other SOLS PhD students had that were not participating in social support. Because they were proactively advised, learning information from me regularly and from their social support groups, these participants were knowledgeable and equipped to share peer support beyond the study. If implementing permanently in SOLS, there could be an option for students to opt into becoming a peer advisor, allowing them to perhaps be a less intimidating point of contact for other students to reach out to with questions. In fact, students in their second year and beyond could volunteer for a role like this to provide guidance to first year students. It is possible the peer sharing that occurred by social support participants even extended to personal support participants, who may have felt uninformed when they felt they learned this information later than their peers. Since personal support participants had mixed reviews on the newsletters, they may have been at peak awareness at or around the time they had a personal advising appointment, and this could have tapered off as more emails flooded their inboxes over the course of their first semester.

Sense of Belonging

Differences may also exist between the impact personal and social support had on sense of belonging as well, though the quantitative data shows no evidence of differences between condition. The sense of belonging pre- and post-survey had 22 statements that students had to rate the degree to which they did or did not agree with using a Likert scale. The lower the sense of belonging score, the stronger the sense of belonging. Table

24 below, introduced earlier in this chapter, shows the median scores for each condition.

Table 24

Sense of Belonging Pre- and Post- Median Scores

	N	Pre-Survey Sum Median	Post-Survey Sum Median
Social Support	8	42.5	40.5
Personal Support	3	52.0	48.0

Across both conditions, there was little to no change between pre- and post-survey sense of belonging scores. Both sets of scores are reasonably strong considering the total scale of 22-110. No significant differences were found between the pre- and post-score differences across conditions. However, it is possible that one semester is simply not enough time to evaluate changes in sense of belonging. Seven of the 22 students received a previous degree from ASU, so this could have contributed to initial high sense of belonging scores. These scores do not negate what occurred in the first semester, but changes may not be evident until students are further into their programs, tackling challenges that may make them question whether they belong.

Cornwall et al., (2019) conducted a study evaluating stress and its impact on doctoral student sense of belonging in their first 6-9 months of study. In their work, they found that the following factors impacted first year doctoral student sense of belonging: time pressure, uncertainty of doctoral processes, social isolation, financial impact of study, anticipation of future workload associated with PhD, doubt regarding abilities or strengths, and several others (Cornwall et al., 2019). Considering the personal and social support provided to SOLS doctoral students was designed to ensure students do not feel

the impact of possible sense of belonging stressors like these, perhaps social and personal support both prevented sense of belonging from being harmed.

For social support participants, they may be equipped differently to handle challenges when they come later in their doctoral study. Social support participants established a network of support as a result of group advising, and students shared about the importance these connections had in fighting isolation. This will only become more important as social support participants continue in their programs. If SOLS PhD students do not establish connections with peers or an academic advisor like me early in their program, they may find it harder to do so in their second year and beyond, as they become more removed from coursework and more isolated in their specific labs. Doctoral students in SOLS typically spend their first 1-2 years completing coursework as they start their research, while years 3-5 typically involve research only, meaning students typically have less interaction with peers and support staff. The benefit of the network established through social support, as reported by social support participants, may not bear fruit until later in a student's doctoral journey.

While personal support participants may not have developed the same network of support as social support participants, personal support proved to offer a unique opportunity to reinforce belonging for a student who disclosed a disability. This may not have been shared in a group setting, so personal support created an avenue for the student to be vulnerable, access the services they needed, and in doing so, their belonging as a graduate student was encouraged. Students endeavor to complete doctoral degrees from widely diverse backgrounds. For instance, some students may have disabilities, some may be underrepresented, and some may be first generation students with few or no role

models to look to. Because we do not know the unique characteristics and challenges doctoral students bring into their studies, establishing one-on-one rapport between a student and an advisor has the potential to create a safe space for needs to be expressed. In turn, individual students who may be doubting their belonging can instead be encouraged. Not every student may need or want this mode of support, but personal support does have a unique ability to impact sense of belonging in a way that social support does not.

The opposite is true as well. Social support participants were able to establish themselves amongst a community of graduate students as a byproduct of establishing more peer relationships. By seeing firsthand how other students shared the same doubts and thoughts, social support participants built community with peers they identified with. Feeling part of their SOLS PhD student community is a powerful tool to counteract possible feelings of isolation, giving students the recognition that they are not the only ones struggling to continue in their program when it gets tough. Perhaps there are other, stronger contributors to doctoral student sense of belonging, or perhaps changes need to be measured over longer periods of time. The qualitative findings support the value social support has in contributing to sense of belonging and that personal support has when students have needs to express that are difficult to disclose.

Connection to Literature

This work is important because of the conversation it encourages and continues with regard to the support graduate students need in order to be successful in their programs and complete their degrees. Discussed in Chapter 1, doctoral students in SOLS interestingly balance the roles of student and staff, admitted to complete a program but

hired into teaching and research assistant roles which allow departments to efficiently operate. Despite the unique roles, we must remember that doctoral students are still students. They require effective support, and future research should explore this concept to add to the body of literature on graduate student support.

Furthermore, this work tests a type of first year in higher education (FYHE) experience for doctoral students. Previous work (James, 2002; Stagg & Kimmins, 2014; Symons, 2001) suggested the need for graduate students to understand university expectations, perhaps with an even higher need than undergraduate students. Additionally, Hardré & Hackett's (2015) work found that graduate students started their programs with high perceived satisfaction scores (which similarly aligns with the self-efficacy, awareness, and sense of belonging scores found in this study), but those scores dropped in the middle of their program and rose again toward the end; they suggested creating a scalable, lasting structure for supporting students during these changes. Comparing the impact of social and personal support allowed me to similarly test perceived satisfaction in doctoral students' first semesters, to provide a structure of support during their first semester, and to attempt a method (social support) that may be more scalable as growth in the department continues. Being able to advise 14 students (social support participants) during 3 hours of time compared to what would require 7 hours of time in the personal support condition signifies the potential social support has to scale and increase advising efficiency.

Furthermore, this study effectively utilized and tested the framework provided by communities of practice (CoP). With social support groups of students coming together regularly to learn how to do doctoral work better, they grew into a CoP. Wenger (1998)

says that CoP are characterized by qualities like collaboration and shared learning, concepts that contributed to SOLS doctoral student awareness, self-efficacy, and sense of belonging according to qualitative findings. Tinto (1993) emphasizes the importance for doctoral students to integrate with their academic system and to develop a positive relationship with the institution in order to fight attrition. The CoP framework for the social support condition put this to the test, creating new opportunities for first-year doctoral students to establish relationships in order to have more support in their integration with ASU.

Moreover, this study used the important work of Albert Bandura (1997) in evaluating the impact support from the university may have on doctoral student self-efficacy. Given that graduate study is incredibly challenging and students encounter myriad obstacles to completing their degrees, a high sense of self-efficacy is important to tackle challenges. With statistically significant differences between the pre- and post-self-efficacy scores for social support participants, there is evidence to support that elements of the social support condition should be more widely implemented to positively impact doctoral student self-efficacy. While the study was designed such that students in both conditions could have mastery experiences (i.e., submitting the interactive plan of study, submitting the mentoring compact, and the awareness quiz), the social support condition created opportunities for vicarious experiences as well. Students observed their peers confronting questions and challenges and overcoming them. Both conditions experienced social or verbal persuasion via direct encouragement from me but given the frequency of our meetings, students in the social support condition may have had more opportunities to experience encouragement.

Finally, this study evaluated the impact support had on sense of belonging, another key concept in the literature that relates to concepts like self-efficacy, motivation, academic success, and persistence (O'Meara et al., 2017; Curtin et al., 2013; Holloway-Friesen, 2021). Because doctoral students may not have connectedness to their residential environments or student organizations like an undergraduate student, this study tested connecting doctoral students with their program, department and disciplines (O'Meara et al., 2017). Qualitative findings suggest the value perceived by students in doing so, particularly social support participants as they provided feedback on the community established amongst their peers and the way it made them feel less isolated in their academic journeys.

Changing Graduate Student Support in SOLS

While every finding may not be significant, the findings do suggest there are aspects of the status quo (i.e., personal support) that can be improved in SOLS. In addition, students in the social support condition expressed a desire for peer support to continue. As a result, I would like to explore making social support a more permanent fixture within the supportive efforts of the SOLS Graduate Office. Social support participants did not think biweekly group meetings were needed throughout the entirety of their programs, but they did think scaling back after the first semester to once a month would be beneficial. Then, they suggested scaling up to biweekly meetings during important milestone semesters, like the semesters they may be completing their comprehensive exams or preparing for their final defense. This would give SOLS doctoral students regular interaction with their department, and it would also encourage the collaboration and sense of community that largely resulted from the social support

groups. Therefore, I would like to implement social support groups more broadly for all SOLS doctoral students, assess the operations of these groups, and evaluate how they impact self-efficacy, sense of belonging, and awareness at multiple points in their degrees. Over time, I would like to see how those outcomes impact retention and graduation rates amongst SOLS doctoral students.

If social support is to be adopted by SOLS, I would like to formalize it and turn it into a seminar-type course. I do not picture this being a letter-graded course with performance measures, but converting it into a course would allow for more structure, it could potentially be added as a degree requirement, and students would not need to feel like they are devoting time without getting credit. The actual course would be offered for students to take during their first semesters, the semester they are completing their comprehensive exams, and their final semesters. It would involve the regular group meetings but could involve more specific preparation for the milestones they are completing during the semesters enrolled.

If social support is effective and adopted by SOLS, I would like to rethink personal support. I do not think removing it is necessary, as it does have merit in being able to address unique and specific student needs that may not be shared in group settings. However, I would like for personal support to no longer be the norm for graduate students receiving academic support in SOLS, and to instead frame it in such a way where students only schedule if they require specialized support. Additionally, I would like to utilize the social support course to teach students about when they need to access personal support, making sure they know when they need to contact Counseling Services, Health Services, Student Accessibility and Inclusive Learning Services

(SAILS) and more - perhaps incorporating talks from representatives within these groups in the actual course. This effort would hopefully fight to normalize what it looks like for students to require these resources and access them.

Suggestions for Future Studies

Beyond testing these concepts further in SOLS and potentially implementing social support more permanently, other studies ought to continue this work in order to study how best to support graduate students. One idea is to test social and personal support amongst a larger sample size in order to see what the impacts look like with more data, perhaps with a large enough sample and normal distribution to be able to evaluate mean differences with parametric tests. Furthermore, demographic data was not a focus of this particular study, but future studies could more closely analyze how something like the demographic makeup of each social support group influences each individual member. Other demographic relationships with factors like self-efficacy, sense of belonging, and awareness could be explored amongst doctoral students.

Another idea for a future study is to create a longitudinal study wherein support is provided in the first semester and then those students are followed throughout the entirety of their doctoral studies. It would be interesting to evaluate how self-efficacy, awareness, and sense of belonging scores do or do not correlate with students exiting their program versus retaining, if they graduate, how quickly they graduate, and more.

Researchers could consider creating their own first-year or first-semester experiences and evaluating their impact on student self-efficacy, sense of belonging, and awareness. They could test it out with different groups, such as master's students, or they could apply it to specific student subgroups, like international students. Ultimately, we

know that concepts like self-efficacy, awareness, and sense of belonging are important to student retention, so studies that expand the conversation to identify more ways to support graduate students are critical.

Limitations

This study had various limitations that may have impacted the study and its findings. Perhaps the most significant limitation was the small sample size. There were issues recruiting doctoral student participants that could have been accounted for in changing some of the recruitment efforts (i.e., being careful about how the study was advertised). Though I tried to frame study participation as beneficial and something they would need during their first semester (academic advising), I was unable to recruit as many participants as I had hoped for. In addition, there were some pre-surveys without matched post-surveys and vice versa, making the sample pool for quantitative data smaller than anticipated. Though these outcomes were not within my control, more regular survey reminders and a bigger sample to start with may have influenced the quantitative findings and allowed for a clearer connection between qualitative and quantitative outcomes.

Because this study is an action research study, another possible limitation is that the participants all have a relationship with me outside of the study. While this had benefits, it also could have contributed to the largely positive qualitative feedback I received from both the social and personal support conditions. This was even more noticeable in the social support condition and may be due to the deeper relationship that was established through our regular meetings. I encouraged students to be honest about their thoughts, but it is possible that students did not want to say anything to negatively

impact their relationship with me or my team.

In evaluating the impact social and personal support had on self-efficacy, awareness, and sense of belonging, it is difficult to measure and definitely say one thing contributed to that outcome. For instance, though social support found statistically significant differences between average pre- and post-self-efficacy scores, we cannot definitively say social support was the only contributing factor to those changes. Because doctoral students work closely with a faculty research mentor during the entirety of their program, this is another key relationship with the power to impact self-efficacy, sense of belonging, and awareness. Students' relationships with their faculty mentors may play a role in these outcomes, which was not assessed in the current study. Other factors may contribute as well, like students' living conditions, the classes they are in, activities they get involved with, their personal affective states, and more.

Finally, this study was limited in its length. It is recommended that futures studies ideally follow students over the length of a year or two of their doctoral study in order to gather more data on the impacts on student retention. All 22 students that participated in this study enrolled in their next semester, and as of Summer 2023, they are all planning to continue into their second year of study. Tracking this into future years would be ideal. The nature of the innovation design was to create a first semester experience, but more data could have been collected over a longer period of time, if possible, in order to tell a fuller story on the relationships between self-efficacy, sense of belonging, and awareness with doctoral student retention and attrition.

Conclusion

In conclusion, this work began with the purpose of exploring support of doctoral

students in SOLS, with an intent to raise awareness to those working in higher education that graduate students require support to be successful, not just undergraduate students. Research on graduate student support has been lacking, so this research was done to continue the conversation. With previous literature supporting the importance of both 1:1 advising and group support, this 2-condition study allowed for a comparison of the two types of academic advising to doctoral students. Despite the small sample size, some statistical significance was found in social support's impact on doctoral student self-efficacy, and qualitative findings suggest social support may have impacted student sense of belonging and awareness in positive ways that personal support (i.e., current practice in SOLS) did not. This, combined with the efficiency of being able to advise more students in less time, suggests implications for adopting group advising or a hybrid version to support SOLS doctoral students moving forward, and perhaps other student groups as well.

Deciding to enroll in a doctoral degree is a meaningful endeavor. With only about 2% of the United States population aged 18 and over having completed a doctoral degree, students may not have role models or peers to rely on in their personal lives as they encounter the stresses and challenges of doctoral study (U.S. Census Bureau, 2022). It is therefore extremely important for staff supporting doctoral students, like academic advisors, to take their roles seriously. Academic advisors have the potential to connect doctoral students with peers, encourage their confidence when they experience challenges, and make sure they understand what is expected of them, all important actions that may remove barriers to success. Doctoral students should be empowered to persist and succeed in their programs. This empowerment can begin with one academic

advisor deciding to intentionally support students in a way that impacts important constructs like self-efficacy, awareness, and sense of belonging.

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APPENDIX A

SELF-EFFICACY AND SENSE OF BELONGING PRE-SURVEY

Survey for School of Life Sciences Incoming PhD Students

This survey's goal is to gather background information on the School of Life Sciences (SOLS) incoming cohort of PhD students, including giving you the opportunity to provide feedback on the challenges you might be facing as a graduate student and the connectedness you feel to the community at SOLS and ASU.

This part of the questionnaire is designed to help us get a better understanding of the kinds of things that are difficult for graduate students. Please rate how certain you are that you can do each of the things described below by moving the slider to the appropriate number that corresponds with your degree of confidence.

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Confidence (1-100)

Get professors to help me when I get stuck on work in a class.

Get research mentors to help me when I get stuck on work in my research context.

Get another student to help me when I get stuck on work in a class or in my research context.

Get someone to help me when I have personal or social problems.

Learn my program's comprehensive exams and dissertation prospectus requirements.

Pass my comprehensive exams and dissertation prospectus.

Finish my course assignments by deadlines.

Hit research and writing milestones.

Create a plan of study that meets degree requirements. (note: a plan of study is a mapped out coursework plan beginning with the first semester through the anticipated graduation term)

Get myself to research, write, or study when there are other interesting things to do.

Always concentrate on the current task I am working on during the time I have planned to work on it.

Use the resources provided by ASU and the SOLS Graduate Office to address questions and problems I encounter.

Organize my coursework and research tasks.

Remember information presented in advising meetings, emails, courses, lab or other research context, etc.

Arrange a place to write, research, and/or study without distractions.

Get myself to do my coursework and research.

Enroll next semester.

Defend my dissertation and graduate.

Learn to collaborate with others in my research context/lab.

Communicate questions, expectations, or help needed with my research mentor.

Learn the scholarly context for my research topic.

Learn my particular degree requirements.

Choose courses that align with my research topic.

Learn to write a dissertation.

Understand my dissertation committee requirements.

Learn how RA/TA funding is done in SOLS. (note: RA = Research Assistant, TA = Teaching Assistant)

Pass my coursework.

Is there anything else you would like to share with regard to how you feel about your ability to handle the challenges that come with graduate study?

This part of the questionnaire is designed to help us get a better understanding of how students connect with others in a graduate program. Please mark the appropriate response correlating with the extent with which you agree with each of the statements below. Your answers will be kept strictly confidential and will not be identified by name.

I feel at home at ASU.

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

I wish I'd gone to a different university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I find SOLS to be welcoming.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel I do not belong in this university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am shown respect by members of staff in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Faculty in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Graduate students in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel valued as a person in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from faculty in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from other graduate students in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff at ASU that support my academic progress.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff on campus that support me personally.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers provide helpful feedback on my research.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers are an important source of professional advice.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers let me know of professional opportunities.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Individuals at ASU make an effort to connect me with important people in my field.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel isolated in my program.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am effectively mentored by someone in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I can count on my mentor even after difficult conversations.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My mentor empowers me to succeed academically.

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

The SOLS Graduate Office empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Positive peer interactions help me feel I belong in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Is there anything else you would like to share with regard to how you feel about your belonging as a graduate student at ASU and in SOLS?

Please answer the questions below to help us get an understanding of your background.

Please provide the last 4 digits of your phone number (to be used for pairing your responses with your other responses).

What gender do you identify as?

- Female
- Male
- Other
- Prefer not to say

Please specify your ethnicity.

- African-American
- Asian
- Caucasian
- Latino or Hispanic
- Native American
- Native Hawaiian or Pacific Islander
- Two or more
- Other/Unknown

- Prefer not to say

Please specify your residency status.

- Arizona resident
- Non-resident
- International

Did you complete a previous degree (any level) at Arizona State University?

- Yes
- No

Are you a first-generation doctoral student?

- Yes
- No

Were you a first-generation undergraduate student?

- Yes
- No

Do you consider yourself an introvert, extrovert, or ambivert? (You may utilize a quiz like this to help you answer: https://ideas.ted.com/quiz-are-you-an-extrovert-introvert-or-ambivert/)

- Introvert
- Extrovert
- Ambivert
- Not sure

How are you funded?

- Research assistantship
- Teaching assistantship
- External funding
- Self-funded

Other

APPENDIX B

POST-SURVEY: SOCIAL SUPPORT SELF-EFFICACY AND SENSE OF BELONGING

Survey for School of Life Sciences Incoming PhD Students

This survey's goal is to gather background information on the School of Life Sciences (SOLS) incoming cohort of PhD students, including giving you the opportunity to provide feedback on the challenges you might be facing as a graduate student and the connectedness you feel to the community at SOLS and ASU.

Please provide the last 4 digits of your phone number (to be used for pairing your responses with your other responses).

This part of the questionnaire is designed to help us get a better understanding of the kinds of things that are difficult for graduate students. Please rate how certain you are that you can do each of the things described below by moving the slider to the appropriate number that corresponds with your degree of confidence.

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Confidence (1-100)

Get professors to help me when I get stuck on work in a class.

Get research mentors to help me when I get stuck on work in my research context.

Get another student to help me when I get stuck on work in a class or in my research context.

Get someone to help me when I have personal or social problems.

Learn my program's comprehensive exams and dissertation prospectus requirements.

Pass my comprehensive exams and dissertation prospectus.

Finish my course assignments by deadlines.

Hit research and writing milestones.

Create a plan of study that meets degree requirements. (note: a plan of study is a mapped out coursework plan beginning with the first semester through the anticipated graduation term)

Get myself to research, write, or study when there are other interesting things to do.

Always concentrate on the current task I am working on during the time I have planned to work on it.

Use the resources provided by ASU and the SOLS Graduate Office to address questions and problems I encounter.

Organize my coursework and research tasks.

Remember information presented in advising meetings, emails, courses, lab or other research context, etc.

Arrange a place to write, research, and/or study without distractions.

Get myself to do my coursework and research.

Enroll next semester.

Defend my dissertation and graduate.

Learn to collaborate with others in my research context/lab.

Communicate questions, expectations, or help needed with my research mentor.

Learn the scholarly context for my research topic.

Learn my particular degree requirements.

Choose courses that align with my research topic.

Learn to write a dissertation.

Understand my dissertation committee requirements.

Learn how RA/TA funding is done in SOLS. (note: RA = Research Assistant, TA = Teaching Assistant)

Pass my coursework.

Is there anything else you would like to share with regard to how you feel about your ability to handle the challenges that come with graduate study?

This part of the questionnaire is designed to help us get a better understanding of how students connect with others in a graduate program. Please mark the appropriate response correlating with the extent with which you agree with each of the statements below. Your answers will be kept strictly confidential and will not be identified by name.

I feel at home at ASU.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I wish I'd gone to a different university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I find SOLS to be welcoming.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel I do not belong in this university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am shown respect by members of staff in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Faculty in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Graduate students in SOLS care about my personal well-being.

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

I feel valued as a person in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from faculty in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from other graduate students in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff at ASU that support my academic progress.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff on campus that support me personally.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers provide helpful feedback on my research.

- Strongly agree
- Agree
- Neutral
- Disagree

- Strongly disagree

My research mentors, other professors, and peers are an important source of professional advice.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers let me know of professional opportunities.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Individuals at ASU make an effort to connect me with important people in my field.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel isolated in my program.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am effectively mentored by someone in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I can count on my mentor even after difficult conversations.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My mentor empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

The SOLS Graduate Office empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Positive peer interactions help me feel I belong in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Is there anything else you would like to share with regard to how you feel about your belonging as a graduate student at ASU and in SOLS?

Did the peer support you received influence your confidence positively or negatively in dealing with the challenges involved in graduate study? Please explain.

Did the peer support you received influence your sense of belonging as a graduate student in SOLS at ASU positively or negatively? Please explain.

Please describe how you felt about the experience of participating in groups with peer support over the last 12 weeks. What was negative? What was positive? If you could change it, what would you change?

Is there anything else you would like to share about your experience with peer support this semester?

APPENDIX C

POST-SURVEY: PERSONAL SUPPORT SELF-EFFICACY AND SENSE OF BELONGING

Survey for School of Life Sciences Incoming PhD Students

This survey's goal is to gather background information on the School of Life Sciences (SOLS) incoming cohort of PhD students, including giving you the opportunity to provide feedback on the challenges you might be facing as a graduate student and the connectedness you feel to the community at SOLS and ASU.

Please provide the last 4 digits of your phone number (to be used for pairing your responses with your other responses).

This part of the questionnaire is designed to help us get a better understanding of the kinds of things that are difficult for graduate students. Please rate how certain you are that you can do each of the things described below by moving the slider to the appropriate number that corresponds with your degree of confidence.

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Confidence (1-100)

Get professors to help me when I get stuck on work in a class.

Get research mentors to help me when I get stuck on work in my research context.

Get another student to help me when I get stuck on work in a class or in my research context.

Get someone to help me when I have personal or social problems.

Learn my program's comprehensive exams and dissertation prospectus requirements.

Pass my comprehensive exams and dissertation prospectus.

Finish my course assignments by deadlines.

Hit research and writing milestones.

Create a plan of study that meets degree requirements. (note: a plan of study is a mapped out coursework plan beginning with the first semester through the anticipated graduation term)

Get myself to research, write, or study when there are other interesting things to do.

Always concentrate on the current task I am working on during the time I have planned to work on it.

Use the resources provided by ASU and the SOLS Graduate Office to address questions and problems I encounter.

Organize my coursework and research tasks.

Remember information presented in advising meetings, emails, courses, lab or other research context, etc.

Arrange a place to write, research, and/or study without distractions.

Get myself to do my coursework and research.

Enroll next semester.

Defend my dissertation and graduate.

Learn to collaborate with others in my research context/lab.

Communicate questions, expectations, or help needed with my research mentor.

Learn the scholarly context for my research topic.

Learn my particular degree requirements.

Choose courses that align with my research topic.

Learn to write a dissertation.

Understand my dissertation committee requirements.

Learn how RA/TA funding is done in SOLS. (note: RA = Research Assistant, TA = Teaching Assistant)

Pass my coursework.

Is there anything else you would like to share with regard to how you feel about your ability to handle the challenges that come with graduate study?

This part of the questionnaire is designed to help us get a better understanding of how students connect with others in a graduate program. Please mark the appropriate response correlating with the extent with which you agree with each of the statements below. Your answers will be kept strictly confidential and will not be identified by name.

I feel at home at ASU.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I wish I'd gone to a different university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I find SOLS to be welcoming.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel I do not belong in this university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am shown respect by members of staff in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Faculty in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Graduate students in SOLS care about my personal well-being.

- Strongly agree
- Agree

- Neutral
- Disagree
- Strongly disagree

I feel valued as a person in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from faculty in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from other graduate students in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff at ASU that support my academic progress.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff on campus that support me personally.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers provide helpful feedback on my research.

- Strongly agree
- Agree
- Neutral
- Disagree

- Strongly disagree

My research mentors, other professors, and peers are an important source of professional advice.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers let me know of professional opportunities.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Individuals at ASU make an effort to connect me with important people in my field.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel isolated in my program.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am effectively mentored by someone in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I can count on my mentor even after difficult conversations.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My mentor empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

The SOLS Graduate Office empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Positive peer interactions help me feel I belong in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Is there anything else you would like to share with regard to how you feel about your belonging as a graduate student at ASU and in SOLS?

Did the personal advising you received influence your confidence positively or negatively for dealing with the challenges involved in graduate study? Please explain.

Do you recall how often you received newsletters? Did you read them? Did you perceive them as valuable? Please explain.

What information was most valuable to you in the newsletters?

Was anything missing from the newsletters that you think should have been included?

Did the newsletters you received influence your confidence positively or negatively for dealing with the challenges involved in graduate study? Please explain.

Did the personal advising you received influence your sense of belonging as a graduate student in SOLS at ASU positively or negatively? Please explain.

Did the newsletters you received influence your sense of belonging as a graduate student in SOLS at ASU positively or negatively? Please explain.

Please describe how you felt about the experience of participating in personal advising and receiving newsletters over the last 12 weeks. What was negative? What was positive? What would you change?

Is there anything else you would like to share about your experience with personal advising and newsletters this semester?

APPENDIX D

AWARENESS OF RESOURCES ASSESSMENT

SOLS PhD Student Resource Awareness Survey

This survey allows you to demonstrate your knowledge of the various ASU and SOLS requirements and resources discussed thus far. Please answer the questions below to the best of your ability. Please note that you will not be able to move to the next question until you answer the current question correctly.

Please provide the last 4 digits of your phone number (to be used for pairing your responses with your other responses).

Which resource provides information about policies, specific processes, and degree requirements in SOLS?

- The Graduate College Policies and Procedures Handbook
- ASU's Graduate Catalog
- The Graduate College TA/RA Handbook
- The School of Life Sciences Graduate Programs Handbook

True or False: ASU's Graduate Catalog (https://degrees.apps.asu.edu/masters-phd) breaks down the formal degree requirements for each graduate program at ASU.

- True
- False

How many minimum credit hours do Teaching and Research Assistants need to enroll in to receive their funding?

- 0
- 1
- 6
- 12

True or False: I do not need to enroll in any type of class to receive course credit for my research.

- True
- False

How many credit hours are required for you to fulfill your PhD credit hour requirement?

- 84

- 90
- 86
- 30

APPENDIX E

END OF YEAR SURVEY: SELF-EFFICACY AND SENSE OF BELONGING

End of the Year Survey for School of Life Sciences First-Year PhD Students

Informed Consent

I am a graduate student under the direction of Professor Ruth Wylie in the Mary Lou Fulton Teacher's College at Arizona State University. I am conducting a research study to evaluate means of support to graduate students in the School of Life Sciences (SOLS). With the end of your first year approaching, this survey is an opportunity for you to provide feedback regarding your sense of self-efficacy and sense of belonging as a SOLS graduate student.

This survey asks you for the last 4 digits of your phone number to anonymously link the data you will be providing with other data you may have provided (if you participated in previous aspects of this study). If you do not wish to provide the last 4 digits of your phone number, any number combination is sufficient so long as they are consistent across surveys.

This survey will take you up to 30 minutes to complete. You have the right not to answer any question, and to stop participation at any time.

Your participation in this survey is voluntary. If you choose not to complete the survey, there will be no penalty. In addition, choosing not to complete the survey does not influence your standing in SOLS or your ability to access advising services and resources.

If you choose to complete the survey, there are no direct benefits, as well as no foreseeable risks or discomforts. Your responses and contributions will remain confidential. The results of this study may be used in reports, presentations, or publications but your name will not be used. Any de-identified data collected will only be shared in aggregate with other industry partners and for future research as needed. Individual data will only be used by the research team.

If you have any questions concerning the research study, please contact the research team at: Kylie.Franse@asu.edu and Ruth.Wylie@asu.edu. If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to complete this survey by consenting below.

Do you consent to these terms?

- ○ Yes, I consent

This survey's goal is to gather background information on the School of Life Sciences (SOLS) first-year cohort of PhD students, including giving you the opportunity to

provide feedback on the challenges you might be facing or have faced this year as a graduate student and the connectedness you feel to the community at SOLS and ASU.

This part of the questionnaire is designed to help us get a better understanding of the kinds of things that are difficult for graduate students. Please rate how certain you are that you can do each of the things described below by moving the slider to the appropriate number that corresponds with your degree of confidence.

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Confidence (1-100)

Get professors to help me when I get stuck on work in a class.

Get research mentors to help me when I get stuck on work in my research context.

Get another student to help me when I get stuck on work in a class or in my research context.

Get someone to help me when I have personal or social problems.

Learn my program's comprehensive exams and dissertation prospectus requirements.

Pass my comprehensive exams and dissertation prospectus.

Finish my course assignments by deadlines.

Hit research and writing milestones.

Create a plan of study that meets degree requirements. If already created, revise that plan of study as needed as desired coursework plans shift from original plans. (note: a plan of study is a mapped out coursework plan beginning with the first semester through the anticipated graduation term)

Get myself to research, write, or study when there are other interesting things to do.

Always concentrate on the current task I am working on during the time I have planned to work on it.

Use the resources provided by ASU and the SOLS Graduate Office to address questions and problems I encounter.

Organize my coursework and research tasks.

Remember information presented in advising meetings, emails, courses, lab or other research context, etc.

Arrange a place to write, research, and/or study without distractions.

Get myself to do my coursework and research.

Enroll in the Fall 2023 semester.

Defend my dissertation and graduate.

Learn to collaborate with others in my research context/lab.

Communicate questions, expectations, or help needed with my research mentor.

Learn the scholarly context for my research topic.

Understand my particular degree requirements.

Choose courses that align with my research topic.

Learn to write a dissertation.

Understand my dissertation committee requirements.

Understand how RA/TA funding is done in SOLS. (note: RA = Research Assistant, TA = Teaching Assistant)

Pass my coursework.

Is there anything else you would like to share with regard to how you feel about your ability to handle the challenges that come with graduate study?

This part of the questionnaire is designed to help us get a better understanding of how students connect with others in a graduate program. Please mark the appropriate response correlating with the extent with which you agree with each of the statements below. Your answers will be kept strictly confidential and will not be identified by name.

I feel at home at ASU.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I wish I'd gone to a different university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I find SOLS to be welcoming.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel I do not belong in this university.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am shown respect by members of staff in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Faculty in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Graduate students in SOLS care about my personal well-being.

- Strongly agree
- Agree
- Neutral

- Disagree
- Strongly disagree

I feel valued as a person in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from faculty in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I receive support from other graduate students in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff at ASU that support my academic progress.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I have relationships with faculty and staff on campus that support me personally.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers provide helpful feedback on my research.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers are an important source of professional advice.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My research mentors, other professors, and peers let me know of professional opportunities.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Individuals at ASU make an effort to connect me with important people in my field.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I feel isolated in my program.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am effectively mentored by someone in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I can count on my mentor even after difficult conversations.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

My mentor empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

The SOLS Graduate Office empowers me to succeed academically.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Positive peer interactions help me feel I belong in SOLS.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Is there anything else you would like to share with regard to how you feel about your belonging as a graduate student at ASU and in SOLS?

Please answer the questions below to help us get an understanding of your background.

Please provide the last 4 digits of your phone number (to be used for pairing your responses with your other responses).

Did you receive any academic advising from SOLS during the Fall 2022 semester?

- Yes, I participated in individual advising session(s) (1:1 with a SOLS academic advisor)
- Yes, I participated in social advising session(s) (Advising sessions with other SOLS PhD students)
- No, I did not participate in any advising sessions.
- I'm not sure if I participated in any advising sessions.

What gender do you identify as?

- Female
- Male
- Other
- Prefer not to say

Please specify your ethnicity.

- African-American

- Asian
- Caucasian
- Latino or Hispanic
- Native American
- Native Hawaiian or Pacific Islander
- Two or more
- Other/Unknown
- Prefer not to say

Please specify your residency status.

- Arizona resident
- Non-resident
- International

Did you complete a previous degree (any level) at Arizona State University?

- Yes
- No

Are you a first-generation doctoral student?

- Yes
- No

Were you a first-generation undergraduate student?

- Yes
- No

Do you consider yourself an introvert, extrovert, or ambivert? (You may utilize a quiz like this to help you answer: https://ideas.ted.com/quiz-are-you-an-extrovert-introvert-or-ambivert/)

- Introvert
- Extrovert
- Ambivert
- Not sure

How are you funded?

- Research assistantship
- Teaching assistantship
- External funding
- Self-funded
- Other

APPENDIX F

IRB APPROVALS

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Ruth Wylie
Division of Educational Leadership and Innovation - Tempe
480/727-5175
Ruth.Wylie@asu.edu

Dear Ruth Wylie:

On 8/5/2022 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Comparison of social versus personal support impacting self-efficacy, sense of belonging, and awareness amongst new School of Life Sciences PhD students
Investigator:	Ruth Wylie
IRB ID:	STUDY00016291
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Citi_completion_certificate, Category: Other; • Consent_withoutHighlights, Category: Consent Form; • Focus_group_topics, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Franse_IRB_Protocol, Category: IRB Protocol; • Newsletter_topic_breakdown, Category: Other; • Post_PERSONALcondition_selfefficacy_belonging_survey, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Post_SOCIALcondition_selfefficacy_belonging_survey, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Pre_selfefficacy_belonging_survey, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Shelly_Potts_Approval, Category: Other; • Student_resource_awareness_assessment, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (1) Educational settings, (2) Tests, surveys, interviews, or observation on 8/5/2022.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

If any changes are made to the study, the IRB must be notified at research.integrity@asu.edu to determine if additional reviews/approvals are required. Changes may include but not limited to revisions to data collection, survey and/or interview questions, and vulnerable populations, etc.

REMINDER - - Effective January 12, 2022, in-person interactions with human subjects require adherence to all current policies for ASU faculty, staff, students and visitors. Up-to-date information regarding ASU's COVID-19 Management Strategy can be found here. IRB approval is related to the research activity involving human subjects, all other protocols related to COVID-19 management including face coverings, health checks, facility access, etc. are governed by current ASU policy.

Sincerely,

IRB Administrator

cc: Kylie Franse