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WOMEN'S EXPERIENCES WITH PARENTING DURING DOCTORAL EDUCATION: IMPACT ON CAREER TRAJECTORY

Rebecca G. Mirick*	Salem State University, Salem, MA, USA	rmirick@salemstate.edu
Stephanie Wladkowski	Eastern Michigan University, Ypsilanti, MI, USA	swladkow@emich.edu

* Corresponding author

ABSTRACT

Aim/Purpose	This study explored the experiences of women doctoral students and their perceptions of the impact of this experience on their academic careers.
Methodology	In this cross-sectional, descriptive study, women doctoral students and graduates (N=777) completed a survey about their experiences as doctoral student mothers.
Contribution	Little is known about the availability of supports for doctoral student mothers across fields, or their experiences with parenting during their doctoral programs. This study provides a broader view of doctoral student mothers' perspectives as well as their understanding of the impact of their doctoral education experience on their career trajectories.
Findings	Participants reported informal supports were often available (e.g. flexibility (57.1%), peer support (42.9%)) but identified a need for subsidized childcare (67.7%) and paid leave (53.3%). Many found motherhood decreased productivity (70.1%) and 55.8% said it impacted their career, including a new definition of an "ideal" position, changed career goals, professional development opportunities, being less competitive job candidates, delays in completing their program and entering the job market and a positive impact on career.
Recommendations	Implications for doctoral programs are the need for more formal family-friendly policies, including subsidized childcare and conference travel support, improving the quality of mentoring for these students and facilitating access to a diverse array of professional development opportunities.

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Future Research	Future research should explore the impact of supports on measures of doctoral student success (e.g. publications, conference presentations) and the impact of these experiences on students' careers following graduation.
Keywords	parenting, doctoral education, motherhood, supports, academia

INTRODUCTION

While more women than men graduate from doctoral programs in all fields except for physical and earth sciences, mathematics and computer science, and engineering (National Science Foundation [NSF], 2017), and in 2016 women occupied almost half (48.4%) of tenure track positions (Finkelstein, Conley, & Schuster, 2016), women remain under-represented in tenured positions, especially at research intensive universities (Finkelstein et al., 2016; Kulp, 2016; Kulp, 2019; Wolfinger, Mason, & Goulden, 2008). In 2016, women filled only 37.6% of tenured faculty positions and 36.1% of full professor positions (Finkelstein et al., 2016). At research universities, men outnumber women in tenured positions by 2.3 to 1.0 (Finkelstein et al., 2016). Women with young children are less likely to enter tenure track positions than their childless peers (Kulp, 2016; Mason, Wolfinger, & Goulden, 2013; Wolfinger et al., 2008), especially at research intensive universities (Kulp, 2019).

There are many different explanations for the underrepresentation of women in tenure track and tenured positions at research intensive universities. Doctoral student mothers may self-select away from tenure track positions due to a perception that an academic position at a research intensive university is incompatible with raising a young family (Kulp, 2016; Mason, Goulden, & Frasch, 2009; Mason et al., 2013; Wolfinger et al., 2008). Second, they might be at a disadvantage on the job market, because of a lack of professional development experiences and skills necessary to obtain a position at a research intensive institution (e.g. published journal articles, conference attendance and presentations) (Brus, 2006; Hollenshead, Sullivan, Smith, August & Hamilton, 2005; Kennelly & Spalter-Roth, 2006; Mirick & Wladkowski, 2018; Wolfinger et al., 2008). A third explanation suggests that doctoral student mothers may have different experiences and opportunities in higher education due to insufficient support for students with children (Springer, Parker, & Leviten-Reid, 2008). Finally, these different outcomes may be due to the presence of gender biases within academia which can negatively impact the doctoral student experience and job search for doctoral student mothers (Drago et al., 2006; Mirick & Wladkowski, 2018; Wolfinger et al., 2008).

RESEARCH QUESTIONS

In light of the need to better understand the experiences of women doctoral students with children and the impact of these experiences on women's academic careers, this study aims to answer the following research questions about the experiences of doctoral student mothers:

1. What family friendly supports are available? What family friendly supports do students wish were available?
2. How does having a child during a doctoral program impact doctoral student work?
3. How does having a child during a doctoral program impact career decisions after graduation?

LITERATURE REVIEW

In the United States, women with children can have a challenging time combining parenthood and doctoral education due to the culture of academia (Rockinson-Szapkiw, Spaulding, & Lunde, 2017), expectations for doctoral students (Kulp, 2016; Sallee, 2016), decreased opportunities for professional development (Kennelly & Spalter Roth, 2006; Mirick & Wladkowski, 2018), and insufficient family-friendly supports and policies (Hollenshead et al., 2005; Springer et al., 2009). Little research

has specifically explored this experience for women, especially across multiple fields of study. Women with children are disproportionately represented in less prestigious positions (e.g. community colleges and teaching intensive universities) (Kulp, 2016; Mason et al., 2013), and may be more likely to choose job opportunities outside of academia when those opportunities are present (Wolf-Wendel & Ward, 2015). It is unknown how women's experiences in their doctoral programs influence these differences in career outcomes.

Between 13% and 14% of the 25,000 women who graduate from doctoral programs in the United States each year are parents (NSF, 2017). In a study of doctoral graduates from the University of California system, Mason et al. (2013) found that 13% had children at graduation. Kulp (2019), in a study of PhD graduates from United States universities in 2000-2005, reported that 13.7% of the women doctoral students were parents with the majority (84%) parenting one child. Neither study differentiated between students who became parents while enrolled in their doctoral programs versus those who entered their programs as parents.

Expectations for Doctoral Students

Doctoral programs and tenure track positions at research intensive institutions typically expect a student or junior faculty member to be fully committed to academia, devoting the majority of their time and energy to work (Kulp, 2016; Lynch, 2008; Sallee, 2016; Ward & Wolf-Wendel, 2012). Women with children can find these expectations difficult to meet, especially in the evening or on weekends when most childcare programs are unavailable (Brown & Watson, 2010; Kulp, 2016; Lynch, 2008; Trepal, Stichfield, & Haiyasoso, 2014). The challenges at meeting these expectations can create conflict between the role of student and the role of mother (Brown & Watson, 2010; Lynch, 2008; Rockinson-Szapkiw et al., 2017; Rockinson-Szapkiw, Sosin, & Spaulding, 2018). When women perceive these two roles as incompatible, they are at risk of leaving academia (Rockinson-Szapkiw et al., 2017; Springer et al., 2009).

Professional Development

Women doctoral students with children sometimes report fewer professional development opportunities than those without children (Kennelly & Spalter-Roth, 2006; Kulp, 2016; Mirick & Wladkowski, 2018). These opportunities, such as publications, conference presentations, graduate research or teaching positions, and post-doctoral fellowships, provide important skill building and socialization to academia, and influence a candidate's competitiveness on the job market, and therefore, their ability to obtain a competitive academic position (Kennelly & Spalter-Roth, 2006; Kulp, 2016). Kulp (2016) suggests "because mothers accumulate different sorts of funding and support from their programs than other groups, they are at a cumulative disadvantage when it comes to competing for highly valued jobs at research institutions" (p.86).

Family Friendly Policies and Supports

Many institutions focus family friendly policies on the recruitment and retention of faculty members, not students (Springer et al., 2009). Even faculty policies, while offered more frequently in recent years (Kuperberg, 2009), are not provided consistently across universities (Hollenshead et al., 2005). Like supports for faculty members, supports for student parents vary significantly, with a lack of formal policies and supports such as childcare subsidies, paid maternity leave, and lactation spaces at most universities. When these supports are present, mentors and advisors are often unaware of them (Hollenshead et al., 2005; Springer et al., 2009). Formal policies and programs can increase women's availability for professional development opportunities such as scholarship, teaching, and research, and protect against attrition (Holm, Prosek, & Godwin Weisberger, 2015; Rockinson-Szapkiw et al., 2017; 2018).

Most often, no formal policies are in place and accommodations are provided on an individual basis (Hollenshead et al., 2005; Springer et al., 2009). Informal, case-by-case accommodations are difficult to enforce and are vulnerable to a change in department leadership or course instructor (Springer et al., 2009). Even when formal policies are in place, mentors, faculty members, or administrators may advise women not to use the policies due to beliefs that they are unnecessary, inconvenient, or may lead to negative professional consequences (Trepal et al., 2014; Ward & Wolf-Wendel, 2012). As a result, the presence of formal policies and procedures is not always sufficient if institutional culture does not support their use (Kapareliotis & Miliopoulou, 2019; Ward & Wolf-Wendel, 2012).

In addition to formal policies, relational supports are important for doctoral student success. Across the doctoral student literature, the value and importance of mentorship are widely acknowledged and women doctoral students with children may find good mentorship particularly beneficial (Wladkowski & Mirick, 2019). The arrival of a child can disrupt mentoring relationships, especially when mentors are unable to provide support in managing the conflicting roles of mother and academic (Trepal et al., 2014; Wladkowski & Mirick, 2019). Mentors can be important role models for student mothers, providing examples of how to be successful in the roles of both academic and mother (Trepal et al., 2014). A lack of available role models increases the risk of attrition (Rockinson-Szapkiw et al., 2017), especially in male-dominated fields (Hill et al., 2010) such as Physical & Earth Sciences, Engineering, and Mathematics & Computer Science (NSF, 2017). Doctoral student mothers sometimes encounter assumptions that they are less committed to academia or will be less successful due to family responsibilities which limit their time and energy (Armenti, 2004; Kmec, 2013; Mason & Gouden, 2002; Mason et al., 2013; Sallee, 2013; Trepal et al., 2014). Some women respond to these biases by avoiding talking about children or declining to use policies put in place to support parents (Drago et al., 2006; Lynch, 2008; Trepal et al., 2014). For others, these negative responses can create significant stress and frustration (Rockinson-Szapkiw et al., 2017).

Career Outcomes

In a context with a prevailing gender bias and inconsistent availability of formal policies, mentoring opportunities, and role models, women with children are less likely to secure tenure track positions, especially at research intensive universities. Kulp (2016), in a secondary data analysis of 2994 doctoral graduates from 2000 to 2005, found that women with children obtained tenure track positions at lower rates than students without children or fathers, reflecting earlier findings on this topic (Mason et al., 2013; Wolfinger et al., 2008). Women with children were more likely to obtain tenure track positions when they did not first hold a post-doctoral fellowship or non-tenure track position and when they were funded through a graduate research position. Women in the social sciences were more likely to earn a tenure track position than those in other fields, perhaps, as Wolf-Wendel & Ward (2015) suggested, because women in STEM fields have a multitude of career options outside of academia. Surprisingly, Kulp (2016) found that factors such as publications and graduate teaching positions had no impact on the obtainment of a tenure-track position. While this study did not look at the type of institution (e.g. SLAC, research intensive institution), a later examination of the same data set (Kulp, 2019) found that doctoral students with children were less likely to earn tenure track positions at research intensive institutions.

While these quantitative studies provide important information about career outcomes for doctoral student mothers, they do not explain why women with children have different career outcomes than their childless peers. What family friendly supports are available? What family friendly supports do students wish were available? How does having a child during a doctoral program impact doctoral student work? How does having a child during a doctoral program impact career decisions after graduation?

METHODOLOGY

RESEARCH APPROACH & RESEARCH DESIGN

This is a mixed methodology study based in the United States. The study surveyed current women doctoral students and graduates who had tried to have a child or had a child during their doctoral education. Participants were asked about their experiences in their doctoral programs and how parenting during their doctoral program impacted their academic careers.

This is a descriptive, cross-sectional research design exploring current or retrospective data from research participants. Non-probability sampling techniques (purposive and snowball sampling) were used. Purposive sampling targeted six fields of study. The inclusion of snowball sampling allowed for more diversity in terms of field of study and women's experiences.

PROCEDURES

Following IRB approval from both researchers' universities, researchers emailed the doctoral program directors of all doctoral programs in the United States in six fields of study (social work, nursing, sociology, biology, computer science, English) with information about the study and a request to share the survey link (via Qualtrics) with current doctoral students and alumni. The fields of study were selected in order to obtain responses from women in disparate fields (e.g. STEM, Humanities & Arts, Social Sciences, Healthcare). In addition, the study information and survey link were shared in online groups focused on motherhood in and via the researchers' personal and academic networks. Participants were asked to share the research study information with anyone who might be interested in participating.

PARTICIPANTS

While only doctoral programs in the United States were emailed surveys, snowball sampling was used, and current doctoral students or graduates from programs outside of the United States may have completed in the survey. Inclusion criteria for the survey included being a woman and having at least one child while enrolled in a doctoral program.

DATA COLLECTION

The researchers constructed a survey based on previous research on the topic of doctoral student motherhood. Open and closed ended questions asked about demographic and educational information, supports available and desired, and the impact of the experience on academic career. The survey was piloted with academics and revised according to feedback.

Demographic and educational information

The survey asked age, race/ethnicity, sexual orientation, marital status, field of study, type of program, year of graduation, number of children at program entry, and number of children during the doctoral program.

Supports

The survey asked participants to select the supports available, and those they wished had been available (see Table A1 in the Appendix for the list of supports provided to participants).

Impact of parenting on doctoral work and career

The survey provided a checklist of ways in which parenting impacted doctoral work (see Table A2). In addition, participants were asked if having a child during their doctoral program impacted their post-graduation career (yes/no). If yes, an open-ended question asked for a further explanation.

Data Analysis

Because the purpose of this paper is to explore the experiences of women doctoral students who have had children, this data analysis includes only the data from the larger dataset from participants who had had at least one child during their doctoral program. This resulted in a sample of 777 women. Although the exact number of women who have children within their doctoral programs is unknown, approximately 25,000 women graduate each year from American doctoral programs, and 13-14% of doctoral students have children, suggesting that there are currently approximately 32,500 to 35.000 women who have graduated from their doctoral programs in the United States with children in the past ten years.

The quantitative data were analyzed using SPSS software. Descriptive statistics were used to analyze demographic and educational responses, the impact on doctoral work, and supports. In addition, Chi-Square analyses explored relationships between field, supports, number of children and career impact. In order to analyze the qualitative data, a thematic analysis was conducted on the responses from one open-ended survey question about the impact of having a child on post-graduate careers (Braun & Clarke, 2006; Denzin & Lincoln, 2011). No qualitative data analysis software was used. Two researchers independently reviewed the first 20% of the responses in order to identify initial codes. These codes were then reviewed, with a discussion about any disagreements in coding leading to an agreement on a list of preliminary codes. With these preliminary codes developed, one researcher analyzed the remainder of the data, finding the original codes continued to work. When an additional code was added, the researcher re-coded the data to maintain the accuracy of the analysis. The initial codes were then grouped together as overarching themes were recognized (Creswell & Poth, 2018). These themes are presented with exemplars of direct quotations from participants to provide a rich description of the data (Braun & Clarke, 2006).

Findings

Participants

Approximately half of the sample (N=777) were current students (48.6%), while 40.4% had graduated, 1.7% were on leave, and 1.4% had left their program before graduation. The majority had given birth while a doctoral student (97.3%), with 3.1% having a child through a partner's pregnancy, and 2.0% adopting a child. Due to multiple children in families, these percentages do not add up to 100%. The participants' demographic characteristics are described in Table A3. To note, 19.6% entered their doctoral program with at least one child and many (41.3%) were parenting more than one child at the time of the survey.

Experiences in Doctoral Programs

Table A1 reports the supports available to and desired by participants. The most common supports available were flexibility (57.1%), support from a doctoral peer (42.9%), support from a mentor (40.7%), and healthcare (42.3%). The most frequently desired supports were subsidized childcare (67.7%), paid leave (53.3%), childcare for evenings and weekends (48.3%), and official lactation spaces (46.5%). Table A2 describes the impact of parenting on doctoral work. Of note, the majority (70.1%) reported that childcare responsibilities decreased their productivity with many (55.5%) reporting less travel to conferences. Almost half (43.8%) reported that parenting increased their motivation to complete their coursework and/or dissertation and 10.3% experienced increased productivity in terms of research and scholarship.

Impact on Career Plans

Of those who responded to the question (n=724), 55.8% (n=404) reported that motherhood impacted their career after graduation, while 44.2% (n=320) said no. There was a significant relationship between the number of children at program entry and impact on career, with 58.9% of those with no children reporting an impact, 47.0% of those with one child, and 35.1% of those with two or more (χ^2 (2)=12.305, 0=0.002). There was also a significant relationship between field of study and impact ($\chi^2(7)=24.296$, p=0.001). See Table A4 for a description of the relationship between specific supports and impact. Of note, most relationships were insignificant and of the three that were significant (subsidized childcare, unpaid leave, and financial support), two unexpectedly reported higher rates of impact with supports.

Qualitative Responses

An open ended question asked participants (n=404) who reported an impact of having a child on their career post-graduation to describe this impact. Responses fit into three major categories: An impact on "ideal" career post-graduation (n=325), the belief that having children resulted in the loss of opportunities or competitiveness to obtain academic positions (n=216), and for a few, positive impact on post-graduation careers as a result of having children (n=22).

Impact on concept of ideal career

Participants described ways that their concept of the ideal job changed after having a child. Some described including multiple factors in their definition of a "good" job, such as family-friendly policies, location, and flexibility (n=236). Some changed their career goals completely as a result of having children (n=149).

Shift in personal and professional priorities. These participants (n=236) described a shift in personal and professional priorities. When considering what type of position they wanted, they now considered factors such as financial implications, geographic considerations, availability of healthcare, the presence of local family, and institutional culture. Participants described their ownership of these decisions and clearly identified new priorities which guided their decision making. For some participants, the location of a position became more important, especially for temporary positions. One participant said, "*I don't want to uproot my school age children and husband for 1-3 year postdocs."* Another participant talked about the importance of benefits such as health insurance and childcare in an academic position, saying, *"I am now much more interested in positions that include health insurance and low costs for dependents… in locations that allow me to have my child in daycare/preschool nearby."* The ability to balance personal and professional needs became important to many participants after they had a child, as this participant identified:

> *I am a lot more considerate of the places I want to move to and the types of environment the campus and the program will provide. I want a family oriented setting and I want to feel support and not pressure to publish and teach classes. I want a better quality of life when it comes to work life balance. Before my second child I wanted to have a certain number of publications and conference appearances before I was done but now I'm okay with just a few and feeling less anxiety.*

One participant summed up these ideas, saying, *"Becoming a parent has shifted my priorities. I now seek a career that will support and celebrate the importance of parenting rather than look down on it as less important than research."* Like this participant, many participants described a change in priorities in terms of post-graduation careers.

Career goals. Some participants (n=149) described a shift in career goals. These changes included the decision to leave academia, avoid research intensive universities, or not apply for tenure-track positions. Some participants decided against applying to jobs at research intensive universities to pursue teaching positions at community colleges or teaching universities, as this participant said:

> *Prior to a baby, I had considered a higher profile job (R1 [research intensive university] type job). After having a baby, I realized that I didn't want a job that involved that much time in the office, that much travel, etc…So now I'm at a teaching focused, smaller state school.*

Another participant chose to teach at a community college instead of a four year institution, saying, *"Being a mom helped me decide to teach at a Community College, where research is not required, instead of pursuing a career in research, where I would have to periodically move and constantly stress over funding."* As this participant described, there is a perception that community colleges and teaching universities are more supportive of families and work/life balance. This drove some participants to shift their career goals away from more prestigious institutions. These decisions were self-driven, not imposed on the participants, as described here:

> *I am not interested in seeking a faculty position at an R1 institution due to the rigors involved in the tenure process. This would not allow me to be the parent I want to be. I'm focused on finding a position at a liberal arts college.*

This participant describes being satisfied with her career decision as it will allow her to meet both parenting and academic goals.

Some participants decided they wanted to leave academia altogether; instead, aiming for jobs in private practice, government agencies, NGOs, research centers, or leaving the work-force to parent full-time. In particular, R1 positions were not perceived as conducive for parents with children. One participant described this decision, saying:

> *In effect, with young children and a spouse who is not able to do the majority of child care tasks, it would always be an uphill climb, with uncertain rewards at the end. I'm not sure what I am going to do as I just graduated, but I am not pursuing academics.*

Some participants decided not to apply for tenure track positions because they wanted a part-time position. One participant said, *"I chose a part-time job that allows me to raise my son."* Participants changed their career goals after having a child, in particular, avoiding high pressure positions at research intensive institutions.

Negative impact on career opportunities

Some participants (n=216) identified ways in which having children negatively impacted their doctoral work and career opportunities post-graduation, including fewer professional development opportunities during graduate school (n=99), being less qualified upon graduation due to having children (n=88), and delays completing their doctoral program and/or going on the job market due to being parents (n=83).

Fewer professional development opportunities. Many participants (n=99) felt they had fewer opportunities for professional development (e.g. publications, research collaborations, conference presentations, teaching, post-doctoral fellowships) due to having a child. Some participants described being offered fewer opportunities while others were unable to participate in meetings, conferences, and networking events due to family responsibilities. Conference attendance was a frequently identified issue, with the cost and logistics noted as barriers to attendance. One participant said, *"The cost of attending expensive conferences is prohibitive for those supporting a family,"* while another added, *"especially international conferences which are impossible (cost and childcare)."* Teaching could be impacted, as one participant detailed:

> *I was in absentia during much of my program because of my parenting commitments (primarily that we didn't have childcare resources) … the result being that I didn't get to teach as many advanced level courses.*

Post-doctoral fellowships were perceived as unattainable by many participants, as these positions typically connote low salary, large workload, and a temporary move. One participant said, *"I needed to plan to have a job right out of my program. I could not spend time as a low paid post-doc without healthcare."* Participants

described financial, childcare, and logistics barriers to participating in many professional development opportunities.

Some participants attributed their lack of opportunities to negative assumptions and biases about mothers. These included the belief that mothers were less interested or available to engage in research or scholarship, less committed to their doctoral education, and less ambitious post-graduation. One participant described this, saying, *"I think at times I was left out on papers because people assumed that I would be too busy with the baby."* These biases could impact the professional mentoring women received, and the career advice given, as this participant identified, "*Was pushed towards path with a heavier teaching focus versus research. Was viewed as less serious and encouraged to not disclose being a mother, or a wife, during interviews/negotiations."* A few participants noted serious disruptions in relationships with faculty members and administration, as this participant says, "*[I] had to drop out of my doctoral program due to the extreme verbal and emotional abuse from faculty regarding my pregnancy."*

These biases extended outside of the individual programs and onto the job market. Some participants perceived that their pregnancy and/or parenthood status impacted their ability to obtain an academic position, as this participant described:

> *I was on the job market and interviewed while pregnant and as a new mom. I do not know for certain if the pregnancy kept me from landing a job, but I assume it had an impact. Lucky for me, my partner (also an academic) did find a job, and I became a stay-at-home-mom in a new town.*

Participants identified ways that having a child limited the opportunities available to them, both due to lack of time, energy, and assumptions that they would not be interested and available.

Less qualified

Participants (n=88) felt less qualified to obtain a prestigious job because they had less time to devote to academic work, had fewer publications, attended fewer conferences, or were unable to do a postdoctoral fellowship. One participant stated, "*It has made me less competitive due to less conference and published activity."* For some, this decreased productivity had direct career implications as stated here, *"I won't have the publications necessary to market myself to more competitive schools. This is a direct result of lack of time and energy that I have instead chosen to dedicate to caregiving."* One participant summed up this common experience of being perceived as less qualified, saying, *"It moved me out of the group of "star" students that landed in top-tier jobs. I eventually landed a job in a place that fits me well, but I do not have the career I would have had otherwise."*

Participants viewed themselves as less able to obtain more competitive positions on the academic job market. Unlike participants who chose to change their career goals due to new priorities, these participants did not describe having a choice; instead, they felt less prestigious positions were their only option, as this participant described:

> *If I would not have diverted so much time and energy to my pregnancies I would have had more time to engage in research activities and publications that would have helped me be a good candidate for postdoctoral fellowships or tenure track faculty positions. Now I expect to work as an adjunct or community college professor without research.*

Participants described feeling less competitive on the job market because they had had a child during their doctoral program.

Delays in program and career progression

Some participants (n=83) recognized that having a child slowed their progression through the program or postponed their job search. One participant said, "*It definitely slowed my studies waaaay waaay down. I would probably have been one of the first people in my cohort to finish, rather than the last."* For some, this was due to a leave of absence, while for others decreased productivity extended their timelines. This participant reflected on her experience, describing the impact of both of these factors:

> *Having children significantly lengthened the span of my doctoral program, both directly through maternity leave and indirectly through lost productivity. I wonder if I will be as viable a job candidate owing to my extended time as a graduate student.*

Some participants experienced delays going on the job market, either due to timing of pregnancies/birth, a lack of time to prepare for interviews or travel, or just an overall sense of not being ready, as this participant reflected: *"Spent more time in postdoc and temporary teaching positions because I did not feel ready to go on the job market."*

Some programs have inflexible deadlines in terms of the length of the doctoral program. For students in these programs, delays could force them to withdraw from their programs, as shared by this participant, "*I had to quit because I was running out of time to advance to candidacy."* Many participants described the arrival of a child as slowing their progression through the program, the completion of their dissertation, or their entry onto the job market. For a few of these participants, these delays had significant, long-term impacts on their careers.

Positive impact

A very small group (n=22) of participants believed that having a child positively impacted their academic careers. Some found that having children increased their motivation to complete their doctoral work and remain in academia. One participant described this, saying: "*It has made me more focused and driven to pursue a career in academia."* For others, it pushed them to complete the program more quickly, as this participant noted: "*I was more motivated to finish and get a 'real' job more quickly as I couldn't afford daycare while pursuing my doctoral studies."* These participants viewed having a child as a motivator to complete their programs expeditiously.

Some participants identified a long-term career benefit of having children in their doctoral programs versus waiting until they were on the tenure track, as this participant identified: "*Having babies in graduate school will make the tenure experience much more manageable."* Participants thought it was best to avoid a maternity leave or reduction in productivity on time tenure track when timelines are tight and the possible career ramifications of failure are high. Doctoral programs were seen as lower stake periods with more flexibility. There was a sense from this small group of participants that having children while a doctoral student could make them more motivated and benefit their academic careers long-term.

DISCUSSION

The findings of this study demonstrate that women's experiences with parenting as a doctoral student are not monolithic; instead, women have disparate, diverse experiences across programs, universities, mentors, and fields of study. While many reported decreasing productivity (70.1%) after having a child, 43.8% reported being more motivated to finish, suggesting that in contrast to the prevailing assumptions within academia about combining motherhood and doctoral work (Drago et al., 2006; Lynch, 2008; Tower & Latimer, 2016), the impact of motherhood on doctoral work can be both positive and negative. Rockinson-Szapkiw et al. (2017) found that while students with children can find navigating doctoral education stressful, these negative experiences also can motivate some women to persist in their programs.

As is reflected in the literature, family friendly policies were inconsistently available to women across programs (Hollenshead et al., 2005; Mirick & Wladkowski, 2018; Springer et al., 2009). With the exception of healthcare, which was available to 42.3%, the most commonly provided supports were informal relational supports; flexibility (57.1%), peer support (42.9%), and mentor support (40.7%). Springer et al. (2009) emphasize both the importance and limitations of flexibility as a support. Flexibility in terms of deadlines, class schedules, and timelines is a critical support for parenting students, especially around the birth or adoption of a child, but Springer et al. (2009) state unequivocally that

this flexibility must be "supported by official policies and practices …. [without which] the distribution of flexibility options will likely be inconsistent across students and departments, will be subject to the discretion of individual actors, and is implicitly framed as "asking for a favor" rather than using a policy or resource." (p. 10). In agreement with Springer et al. (2009), participants most desired formal policies and programs which financially supported them, created more productive time for academic work, and facilitated work/life balance. These supports included subsidized childcare, paid maternity leave, evening and weekend childcare, and official lactation spaces; supports which are frequently missing in doctoral programs (Springer et al., 2009).

The relationship between the availability of supports and the impact of having a child on career was inconsistent and often, inconclusive. Those with financial supports were less likely to believe their career was impacted by having a child, reflecting previous research (Kulp, 2016). In contrast, those with unpaid leave and subsidized childcare were more likely to report an impact on career. This is an unexpected finding and remains unexplained. It is possible that other factors play a more important role, such as the culture of the program which may or may not support women using supports, provide role models of academic mothers, or expose women to discrimination against mothers. It is also possible that programs which provide these types of supports are different in other, important ways which influence the impact of children on career.

Research suggests that women with children have fewer opportunities for professional development, such as presenting at conferences, publishing journal articles, and working with mentors (Kennelly & Spalter-Roth, 2006; Mirick & Wladkowski, 2018; Trepal et al., 2014), although Kulp (2016) found no differences in publication rates between student mothers and non-mothers. Some women in this study reported a decrease in these types of academic opportunities, including submitting fewer manuscripts for publication (41.3%) and fewer conference abstracts (33.0%) and having fewer opportunities for teaching (20.2%), mentorship (20.0%), and research (25.9%). Only 3.5% reported no impact on their doctoral work but almost half did not believe their career trajectory long-term was affected. These findings suggest that some women find their professional development more significantly impacted than others, although they do not identify the factors that make some women more vulnerable to this effect.

A common theme across the qualitative findings was that for many women, post-doctoral fellowships felt less attainable or feasible due to requirements for a temporary move, low pay, and long hours. However, in contrast to the assumptions inherent in participants' responses, Kulp (2016) found that holding a post-doctoral fellowship negatively predicted the attainment of a tenure track position. Postdoctoral fellowships vary by field, and are more common in biological sciences and physical and earth sciences (NSF, 2017). The role of post-doctoral fellowships on academic hiring, in particular for doctoral student mothers, should be explored by further research, and the findings shared with students.

Research on post-doctoral careers tends to operationalize "successful" outcomes as tenure track positions, especially at research intensive institutions (Kulp, 2016), but it is important to note that changed career goals were not necessarily problematic for participants. The literature suggests that while some women with children feel unable to attain tenure track positions, others intentionally opted out of academia (Brown & Watson, 2010; Gardner, 2008; Kulp, 2016; Mason et al., 2013; Rockinson-Szapkiw et al., 2017; Trepal et al., 2014). The experiences of the participants in this study reflect both voluntary and involuntary pathways out of academia. After having children, some women described finding non-academic factors more important, such as a family-friendly program, geography, flexibility, nearby family, income, and benefits such as healthcare and childcare. The importance of these other factors led many to leave academia or avoid more prestigious positions for non-tenure track, community college, or part-time academic positions. A second group of women perceived themselves as less qualified for academic positions due to a lack of publications, research and teaching experience, or professional guidance and mentorship, and so felt unable to obtain tenure track positions at research intensive universities. A third group of women did not believe that

having children impacted their career choices either positively or negatively. It is important to note that while some women perceived the decision to opt-out of academia or research intensive positions as positive, this individualized perspective overlooks the problematic gendered context of academia. As Springer et al. (2009) point out "the concept of "opting out" ignores the myriad social and institutional constraints that push women out of the labor market, namely workplace inflexibility, inadequate family supports, and discrimination against mothers…choice and discrimination are not mutually exclusive; many women who are "pushed out" of the labor market describe the situation as a "choice"." (p.5).

While some research has suggested that mothers in academia have a similar experience across institutions and fields (Wolf-Wendel & Ward, 2015), Golde (2005) emphasized "the ways in which norms and customs differ among departments and disciplines," highlighting the need be attuned to field and program when researching doctoral education. Some research suggests that in male-dominated fields (e.g. physical and earth sciences, math and computer science, engineering), having a child has a more significant impact on career trajectory (Hill et al., 2010; Wolf-Wendel & Ward, 2015). Kulp (2016) found that women with children in the social sciences, with high rates of women in faculty positions, have a five times greater chance of obtaining a tenure track position than those outside of the social sciences. Others have suggested careers are more impacted by children in fields that require collaborative work with others compared to fields in which work can be solitary and completed on one's own timeline and schedule (e.g. English, History) (Golde, 2005; Wolf-Wendel & Ward, 2015). The findings in this study did not fully reflect the previous literature. While more women in physical and earth sciences, a science field in which women are underrepresented, felt their career was impacted than those in some other fields, this was also true of women in social sciences, in contrast to Kulp's (2016) findings. In addition, fewer women in engineering and mathematics and computer science experienced an impact on careers from having children, which is unexpected considering these both remain male dominated fields. While the numbers in engineering were low, and therefore may not be able to be generalized, the same is not true of mathematics and computer science.

LIMITATIONS

As with all research studies, this study has strengths and limitations. This survey focused on doctoral programs within the United States, and therefore, the findings may not be able to be generalized to doctoral programs outside of the United States. Due to the sampling method and the lack of current statistics on the number of women parenting within different fields, it is impossible to determine a response rate or understand whether the response rate varies by field. The use of non-probability sampling means that the results cannot be generalized to all women doctoral students. Missing data was a limitation of this study. Some applicants did not complete the demographic questions, leading to some data, such as race/ethnicity and sexual orientation, being missing. Some fields, such as engineering, had just a few responses, making it difficult to draw conclusions about those fields. It is unclear whether the response rate was lower in this field or if there are many fewer women within this male-dominated field. The number of single mothers was small (n=32), limiting our ability to fully understand the nuances of their experiences. Another limitation is that the variable "impact on career" was non-directional. While the qualitative responses primarily gave examples of an adverse or less ambitious influence on career, this assumption was not explicit in the quantitative question.

IMPLICATIONS

Doctoral programs can use the findings of this study to support their doctoral student mothers. Students want formal policies and procedures to support doctoral student parents, especially financial supports, which appear to impact career outcomes (Kennelly & Spalter-Roth, 2006; Springer et al., 2009). Women with children are more likely to be self-funded (Kennelly & Spalter-Roth, 2006) and students who are self-funded are less likely to obtain tenure-track positions (Kulp, 2016). Not all supports are as costly as financial support for students. Supports such as official lactation spaces, which

were desired by many students, demonstrate that a program is family-friendly and welcomes doctoral student mothers, and is a fairly inexpensive support to provide to students (Springer et al., 2009).

Lost opportunities for professional development occur frequently (Kennelly & Spalter-Roth, 2006; Spalter-Roth & Kennelly, 2004; Springer et al., 2009). This appears to be due to multiple causes. For some, they were attributed to family responsibilities, suggesting increased financial and childcare supports as a possible solution. For example, conference attendance was frequently identified as less feasible with children. Doctoral programs which want to support conference travel for doctoral students with children should explore financial supports for conference travel, including grants for childcare costs (Springer et al., 2009). Others attributed a deficit of professional development opportunities to assumptions about mothers, including biases and discrimination (Drago et al., 2006; Lynch, 2008; Mirick & Wladkowski, 2018; Tower & Latimer, 2016). Addressing the gendered context of academia is a complex task, but departments interested in supporting doctoral student mothers must reflect on their own culture, intentional and unintentional biases towards mothers, and strategies for changing the implicit environment for mothers (Springer et al., 2009; Wladkowski & Mirick, 2019) in order to address gender inequities in access to important resources are addressed and resolved (Kennelly & Spalter-Roth, 2006).

Mentoring is important for doctoral education, particularly for doctoral student mothers who often lack role models (Rockinson-Szapkiw et al., 2017; Trepal et al., 2014; Wladkowski & Mirick, 2019). Faculty members can shape a department's culture and attitudes towards women with children (Wolf-Wendel & Ward, 2015); mentors have the opportunity to do this work with doctoral student mothers. These findings provide some guidance to mentors. Mentors can focus specifically on helping students increase productivity, including collaboratively creating timelines, providing accountability, and maintaining opportunities for shared authorship and research collaboration while also normalizing a temporary slow-down in academic work. It is important that mentors not only provide this type of support, but also reflect on the gendered context of academia, and their role in supporting, maintaining, or resisting the inherent bias against women caregiving in academia (Wladkowski & Mirick, 2019) in order to best support students.

CONCLUSION

Women who have children while in their doctoral programs describe a diverse experience with informal and formal supports, impact on doctoral work, and decision-making about career trajectories and goals. The negative experiences described by some women highlight the need for doctoral programs to evaluate the culture of their programs around caregiving, including the provision of formal and informal supports, and address existing gender inequities. Currently, some academic positions, especially at research intensive institutions, are perceived as unattainable or unattractive to women with children. It is recommended that doctoral programs consider these findings in order to provide parenting students with more consistent support and opportunities across programs and fields.

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APPENDIX

Table A1. Available and desired supports (N=777)

	AVAILABLE	DESIRED
Supports		
Unpaid leave	263(33.9)	78(10.0)
Paid leave	213(27.4)	414(53.3)
Extensions	160(20.6)	171(22.0)
Childcare (unsubsidized)	76(9.8)	196(25.2)
Childcare (subsidized)	64(8.2)	526(67.7)
Childcare (evenings/weekends)	17(2.2)	375(48.3)
Healthcare	329(42.3)	197(25.4)
Financial	52(6.7)	328(42.2)
Support from mentor	316(40.7)	262(33.7)
Support from peer	333(42.9)	174(22.4)
Support from faculty	292(37.6)	248(31.9)
Support from chair	253(32.6)	235(30.2)
Flexibility	444(57.1)	258(33.2)
Official lactation space	209(26.9)	361(46.5)
Unofficial lactation space	221(28.4)	59(7.6)
None	40(5.2)	45(5.8)

Table A2. Impact of arrival of child on doctoral work (N=777)

IMPACT	F(%)
Decreased productivity due to childcare responsibilities	545(70.1)
Less travel to conferences	431(55.5)
Decreased productivity due to psychological stressors of parenting	401(51.6)
Decreased productivity due to the physical recovery from childbirth	351(45.2)
Increased motivation to complete coursework or dissertation	340(43.8)
Fewer manuscripts submitted for publication	321(41.3)
Fewer conference abstracts submitted	256(33.0)
Decreased attendance at classes or meetings	230(29.6)
Fewer research opportunities	201(25.9)
Fewer teaching opportunities	157(20.2)
Fewer mentorship opportunities	155(20.0)
Increased productivity in terms of research & scholarship	80(10.3)
Academic challenges in the classroom	64(8.2)
Increased productivity in terms of coursework	45(5.8)
It did not impact my doctoral work	27(3.5)
More manuscripts submitted for publication	17(2.2)
More mentorship opportunities	13(1.7)
More teaching opportunities	10(1.3)
More conference abstracts submitted	9(1.2)
More research opportunities	4(0.5)

Table A3. Sample (N=777)

CHARACTERISTIC	F(%)	M(SD)
Age		35.26(5.42)
Race/Ethnicity		
White	508(65.4)	
Asian	38(4.9)	
Latina	34(4.4)	
Black	19(2.4)	
Multiracial	10(1.3)	
Unknown	168(21.6)	
Sexual orientation		
Heterosexual	596(76.7)	
Bisexual/pansexual	43(5.5)	
Lesbian	22(2.8)	
Unknown	116(14.9)	
Student Status		
Current Student	378(48.6)	
Graduated	314(40.4)	
On leave	13(1.7)	
Left before graduation	11(1.4)	
Unknown	61(7.9)	
Years since graduation		4.59(4.52)
Age at graduation		32.65(3.93)
Gave birth	756(97.3)	
Partner gave birth	22(3.1)	
Adopted	14(2.0)	
Number of children added to family during program		
One	578(74.4)	
Two	170(21.9)	
Three	20(2.6)	
Four	3(0.4)	
Unknown	6(0.8)	
Number of children at program entry		
Zero	624(80.3)	
One	116(14.9)	
Two	29(3.7)	
Three	7(0.9)	

CHARACTERISTIC	F(%)	M(SD)
Four	1(0.1)	
Number of children at in program		
One	450(57.9)	
Two	250(32.2)	
Three	51(6.6)	
Four	15(1.9)	
Five	4(0.5)	
Unknown	6(0.8)	
Single Parent		
No	676(87.0)	
Yes	32(4.1)	
Unknown	69(8.9)	
Field of Study		
Healthcare	169(21.8)	
Biological Sciences	153(19.7)	
Social Sciences	146(18.8)	
Humanities & Arts	129(16.6)	
Education	57(7.3)	
Physical Sciences & Earth Sciences	21(2.7)	
Mathematics & Computer Science	21(2.7)	
Engineering	11(1.4)	
Unknown	70(9.0)	

Table A4. Relationships between field of study, and impact on future career

	IMPACT	NO IMPACT	χ^2 (df)	P
Number of children at program entry				
None	337(58.9)	235(41.1)	12.305(2)	0.002
One	54(47.0)	61(53.0)		
Two or more	13(35.1)	24(64.9)		
Single parent				
No	369(55.2)	299(44.8)	1.335(1)	0.248
Yes	21(65.6)	11(34.4)		
Field of study				
Humanities & Arts	87(68.5)	40(31.5)	24.296(7)	0.001**
Physical Science & Earth Sciences	13(65.0)	7(35.0)		
Education	29(50.0)	29(50.0)		
Healthcare	84(50.0)	84(50.0)		
Social Sciences	91(62.3)	55(37.7)		
Engineering	2(18.2)	9(81.8)		
Mathematics & Computer Science	12(57.1)	9(42.9)		
Biological Sciences	72(48.3)	77(51.7)		
Supports				
Subsidized childcare				
Yes	43(68.3)	20(31.7)	4.339(1)	0.037*
No	361(54.6)	300(45.4)		
Unsubsidized childcare				
Yes	44(62.9)	26(37.1)	1.564(1)	0.211
No	360(55.0)	294(45.0)		
Official lactation space				
Yes	102(51.5)	96(48.5)	2.030(1)	0.154
No	302(57.4)	224(42.6)		
Unofficial lactation space				
Yes	124(58.5)	88(41.5)	0.879(1)	0.348
No	280(54.7)	232(45.3)		
Unpaid leave				
Yes	159(62.4)	96(37.6)	6.851(1)	0.009**
No	245(52.2)	224(47.8)		
Paid leave				
Yes	104(50.2)	103(49.8)	3.554(1)	0.059
No	299(57.9)	217(42.1)		
Extensions on assignments				
Yes	84(53.5)	73(46.5)	0.429(1)	0.512

	IMPACT	NO IMPACT	χ^2 (df)	P
No	320(56.4)	247(43.6)		
Childcare for evening/weekends				
Yes	9(52.9)	8(47.1)	.058(1)	0.810
No	395(55.9)	312(44.1)		
Healthcare				
Yes	169(53.7)	146(43.3)	1.123(1)	0.289
No	235(57.6)	173(42.4)		
Financial support				
Yes	21(41.2)	30(58.8)	4.758(1)	0.029*
No	383(56.9)	290(43.1)		
Support from a mentor				
Yes	167(55.1)	136(44.9)	0.009(1)	0.753
No	237(56.3)	184(43.7)		
Support from a peer				
Yes	178(54.9)	146(45.1)	0.177(1)	0.674
No	226(56.5)	174(43.5)		
Support from a faculty member				
Yes	150(37.1)	254(62.9)	0.824(1)	0.364
No	129(40.4)	190(59.6)		
Support from chair				
Yes	131(32.4)	273(67.6)	0.932(1)	0.322
No	115(35.9)	205(64.1)		
Flexibility				
Yes	236(58.4)	168(41.6)	0.361(1)	0.548
No	194(60.6)	126(39.4)		

*p<0.05, **p<0.01, ***p<0.001

BIOGRAPHIES

Dr. Rebecca Mirick, PhD, LICSW earned an MSW from Boston University and a PhD in social work from Simmons University. Dr. Mirick is an Assistant Professor of Social Work at Salem State University in Salem, MA where she teaches practice, human behavior, and research courses in the BSW and MSW programs. She is a licensed independent social worker with direct practice experience is in outpatient mental health, working with children, adolescents, and adults. Dr. Mirick's scholarship focuses on suicide prevention, including both postvention programs and training in current best practices for mental health professionals, and the scholarship of teaching and learning within social work education.

Dr. Stephanie Wladkowski, PhD, LMSW, is an Associate Professor at Eastern Michigan University in Ypsilanti, MI. Dr. Wladkowski has several years of clinical practice as a social worker in hospice and palliative care, which directly informs her research and teaching in health, aging, interprofessional education, and end-of-life care. Dr. Wladkowski's current research focuses on live discharge from hospice, centering on psychosocial factors relevant to this care transition for patients and their caregivers.