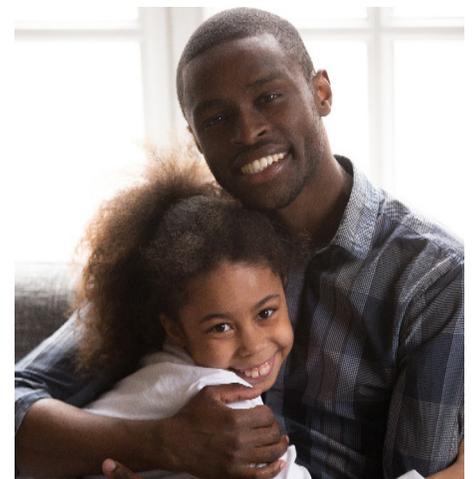


Academic Outcomes of Undergraduate Student Parents Served by the University of Minnesota's Student Parent Help Center

A Retrospective Study (2000-2018)

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Key findings

The Student Parent Help Center (SPHC) at the University of Minnesota Twin Cities (UMN-Twin Cities) provides campus based services and support to student parents. Results from this analysis suggest that undergraduate student parents who interact with SPHC staff and access referrals and programs at the SPHC are significantly more likely to graduate, remain enrolled each semester, and have a higher cumulative grade point average (GPA) than student parents who completed a SPHC intake but never utilized these services at the SPHC.

The SPHC exclusively serves a population of “invisible” undergraduate student parents at UMN-Twin Cities.

Recommendations:

Continue to promote the SPHC services to all student parents on campus, with particular outreach to underrepresented undergraduate parents on campus.

Consider larger outreach to student parents across community college transfer network.

- ✓ Undergraduate student parents served were more likely to be female, first generation, and African American compared to the general UMN-Twin Cities campus undergraduate student population. The strong positive associations between engagement with the SPHC and positive academic outcomes suggest that the SPHC may serve a vital role in advancing equity on the UMN-Twin Cities campus.

Undergraduate student parents who interacted with SPHC staff were more likely to have positive academic outcomes.

Recommendation:

Support availability of trained staff to advise and mentor undergraduate student parents.

- ✓ Undergraduate student parents who interacted with SPHC staff were generally more likely (compared to undergraduate student parents who completed a SPHC intake but who had no further engagement) to:
 - Graduate
 - Remain enrolled each semester
 - Have a higher cumulative GPA

Undergraduate student parents who received referrals or programs at SPHC were more likely to have positive academic outcomes.

Recommendation:

Support undergraduate student parents in multiple ways, including academic advising, referrals for both campus and external community supports, social programming, and financial resources.

- ✓ Undergraduate student parents who received referrals or programs at SPHC were generally more likely to have positive academic outcomes.
- ✓ Undergraduate student parents who were highly engaged with the SPHC were also generally more likely to graduate and remain enrolled each semester compared to students who engaged at low or medium levels. This suggests that there is an especially strong association between high levels of engagement with the SPHC and positive outcomes.

Engaging with the SPHC in specific ways – such as parenting support groups – were associated with positive academic outcomes.

Recommendation:

Provide funding for programs that support undergraduate student parents’ holistic needs for guidance and support, beyond solely financing child care grants.

- ✓ Undergraduate student parents who participated in Parents as Students Support Group were significantly more likely to have positive academic outcomes.
- ✓ Students who engaged with the SPHC in ways beyond receiving a child care grant had similar academic outcomes to those who only received a child care grant. These results suggest that staff contacts and other non-monetary services may be equally important for student parent academic success.

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About the Student Parent Help Center

The Student Parent Help Center (SPHC) at the University of Minnesota Twin Cities (UMN-Twin Cities) provides comprehensive campus based services to support undergraduate students who are also parents. The SPHC is one of the oldest and largest parenting student programs in the country, serving pregnant and parenting students. Students can access support groups, receive a broad range of referrals for academic and family needs, apply for two child care grants managed by the SPHC, attend family friendly events, and build community in the SPHC lounge and computer lab. It is also one of the few student parent support centers in the country that is not associated with student housing, which allows the SPHC to serve all students, not just resident students. Another key difference is that all SPHC staff are master's level social workers or family educators. Students served are primarily undergraduates; in 2016, the SPHC began serving graduate and professional student parents as well, although the current study only analyzed data from undergraduate student parents. Some students served by the SPHC are “traditional students” (those who enter college directly after high school), although recent trends show an increase in transfer students who are slightly older.

The SPHC reaches about one-third of the parenting undergraduate students at the UMN-Twin Cities in any given term and most are served through their entire tenure at the University. SPHC participation is voluntary and there is no mandated minimum participation level required to receive services. Though the SPHC has existed in some form since 1967 and has been specifically serving student parents since 1984, the following report includes data from students who were in the program between 2000 and 2018. These dates were selected due to a consistency in staffing and services offered during this period, as well as availability of data. The SPHC began serving graduate and professional student parents in 2016, but the following report utilizes data only from undergraduate student parents served by the SPHC.

Background

One in five American undergraduate college students are parents (22%), and more than half of undergraduate student parents (55%) are single parents (GAO, 2019). Undergraduate student parent prevalence in Minnesota is comparable to national prevalence: twenty-three percent of all undergraduate students in Minnesota (72,978 students) are parents (Reichlin Cruse, Milli, et al. 2019). Key demographic differences between student parents and students who are not parents are well established in the existing research literature (Goodman & Reddy, 2019).

Although one in five college students are parents, undergraduate student parents remain one of the most “invisible” groups in higher education, despite their considerable need for support (Miller, 2019; Reichlin Cruse, Holtzman, et al., 2019). Key factors such as a reluctance to self-identify, institutional assumptions of student demographics, and a definitive focus on typically aged students living on or near campus all lead to this population being under-identified and underserved, particularly at four-year universities.

Undergraduate college students who are parents represent one in five college students. Compared to non-parents, they are more likely to be...

- Women
- People of color
- Older
- First-generation college students
- Of lower socio-economic backgrounds

(Goodman & Reddy, 2019)

Undergraduate student parents have fewer financial resources and report struggling more financially compared to undergraduate students who are not parents (Goodman & Reddy, 2019; Miller, 2019; Reichlin Cruse, Holtzmann, et al., 2019; GAO, 2019). Student parents report that accessible and affordable child care is their most crucial need (Goodman & Reddy, 2019). While the need for child care access and funding is critical, there is evidence for other key factors to student parent success, such as case management for academic, housing, and parenting support and a community of like peers.

Undergraduate student parents take longer to finish school and are less likely to graduate compared to “traditional” students who are not parents (Ascend at the Aspen Institute, 2019; Zarifa, D. et al., 2018). Within six years, only one-third of undergraduate student parents graduate from college (Miller, 2019). Fifty-two percent of undergraduate student parents drop out of college within six years of enrolling, compared with 32% of non-parents (GAO, 2019). Student parents may be less likely to graduate on time or remain enrolled in classes, yet past research suggests that undergraduate student parents have higher GPAs compared to non-parent students (Reichlin Cruse, Holtzman, et al., 2019).

Previous research also suggests that despite the challenges student parents face, as a group they are extremely motivated to succeed academically (Goodman & Reddy, 2019). Student parents, particularly single mothers, are motivated by the well-documented positive intergenerational benefits – short-term and long-term – that their pursuit of higher education will have on their children (Goodman & Reddy, 2019). Educated mothers are more likely to create high-quality home learning environments for children and utilize parenting strategies that incorporate learning, as well as serve as role models for higher education achievement (Magnuson, 2007; Monaghan, 2016). Additionally, the monetary returns of a parental college education may lead to more stable home environments and an increased ability to invest in the academic activities of their children (Monaghan, 2016). Children

of educated mothers have improved cognitive development, higher test scores, and better academic outcomes compared to children of mothers with high school degrees or less (Magnuson, 2007). Mothers with college degrees are also more likely to invest in child health-promoting behaviors, which may be why children of more educated mothers have improved health outcomes (Prickett & Augustine, 2016). As adults, children with educated mothers are more likely to graduate from high school, attend college, and graduate from college themselves (Monaghan, 2016). This leads to increased wages and creates an intergenerational cycle of family economic security (Reichlin Cruse, Holtzman, et al., 2019; Reichlin Cruse, Milli, et al., 2019).

In light of these challenges facing undergraduate student parents, previous research has delineated key institutional practices that support student parents' needs (Goodman & Reddy, 2019). Evidence shows that investment in supportive services for student parents leads to a strong return on investment: for each dollar invested in child care, financial assistance, and case management for student parents in the state of Minnesota, the return on investment is \$2.95, \$4.70, and \$5.13 respectively (Reichlin Cruse, Milli, et al., 2019).

Improving undergraduate student parents' outcomes is a critical component in college and universities' efforts to promote equity in education access and outcomes (Reichlin Cruse, Holtzman, et al., 2019). In order to improve outcomes (such as graduation, retention, and GPA) for this diverse group of traditionally underrepresented students, higher education institutions need to understand what evidence-based practices exist to address their needs as parents. Additionally, this research will attend to factors previously overlooked in the existing literature. For example, while the need for child care access and funding is critical, there are other key factors critical to student parent success, such as interaction with trained staff and participation in parent-specific programs; these factors will be highlighted in the findings of this study.

Current study

The current study examined multiple variables and sub-populations of students served by the Student Parent Help Center (SPHC). Because of the large amount of results presented in this report, this section clearly outlines what variables were examined and in what order they are presented in the report.

Results are presented by focusing on three independent variables:



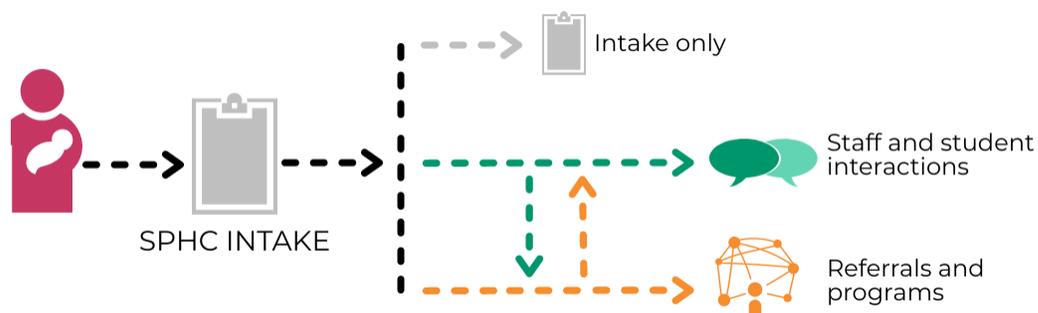
1. **Number of interactions students had with SPHC staff.** Students were stratified into three categories based on whether they had a low number (1-3), a medium number (4-6), or high number (7+) of interactions with the SPHC staff. These three dosage groups were then compared to a comparison group: student parents who completed an intake with the SPHC but did not interact with staff after (“intake only” group).



2. **Number of referrals and programs students received from the SPHC.** Students were stratified into three categories based on whether they received a low number (1-3), a medium number (4-6), or high number (7+) of referrals and programming from the SPHC. These three dosage groups were then compared to a comparison group: student parents who completed an intake with the SPHC but did not receive any referrals or programming after (“intake only” group).



3. **Categories of student engagement with SPHC.** We created five categories based on different types of student engagement with the SPHC: “intake only,” “child care grant only,” emergency grant recipients, Parents as Students Support (PASS) attendants, and “all others: intake only and child care grant only excluded.”



Each of the three independent variables were analyzed on the following academic outcome dependent variables:

- **Graduation.** For the majority of analyses, graduation in “any amount of time” was used as the dependent variable. Within each section, we also present results on graduation in four, six, and ten years.
- **Retention,** or if students graduated or remained an enrolled student each semester.
- **Cumulative Grade Point Average (GPA)**

While the majority of analyses included all SPHC students served from 2000-2018, we also examined the association of staff-student interactions on these sub-populations: *single mothers, single fathers, and General College students*. These analyses are included at the end of the report.

A complete academic literature review and a write-up of results can be found in Appendix A and Appendix C, respectively.

What is a statistically significant change?

Wilder uses statistical analysis when looking at differences in outcomes between different groups of students (i.e., low vs. high staff-student interactions users). Statistical software is used to determine whether a difference detected is “real” and more than likely not due to chance. When the report uses the term “significant” to describe differences between groups, this means the statistical test indicates that we can be confident that actual change existed between groups in a given outcome area.

While a statistical analysis may reveal that a change is statistically significant, the meaningfulness of these differences should be examined further. Relatively small differences between time points or groups sometimes emerge as “statistically significant” because the large number of students yields more “power” in the analysis to detect even small differences. The extent to which this statistical difference suggests a meaningful difference for students from one group to another should be considered for each individual outcome and the broader context in which they occur. For example, a difference of 3 or 5 percentage points, even if statistically significant, is not necessarily practically significant and should not be over-emphasized; in contrast, a difference of 10 or more percentage points suggests a more meaningful difference.

Results

Demographics of students served

Between 2000 and 2018, the SPHC served 1,549 undergraduate students with children. The SPHC served a diverse group of undergraduate student parents, with over two-thirds of the students identifying as female and just under half identifying as students of color (Figure 1). Generally, about half of the students served by the SPHC were single, divorced, or never married, and about half were first generation students. Most students were Pell Grant recipients and two-thirds were transfer students. The median age of students at the SPHC during their first contact was age 23 although student age ranged widely from 16 to 55 years. Slightly more students completed a Bachelor of Science degree than a Bachelor of Arts degree. Complete demographic tables can be found in Appendix B.

1. Demographic information of undergraduates served by the SPHC, 2000-2018 (N=1,549)

71% female

51% first generation student

23 years median age at first term

48% person of color

68% transfer student

40% completed Bachelor of Science degree

51% single, divorced, or never married

89% have been awarded a Pell Grant

28% completed Bachelor of Arts degree



Staff-student interactions

The majority of existing research on supporting undergraduate student parents focuses on providing them with financial resources, particularly the impact of subsidized child care on student parents' outcomes. Prior research has already demonstrated the well-established link between student parents being able to pay for child care and being able to succeed in college. Less well known is the impact that interacting with supportive, trained staff may have on undergraduate student parents' ability to be successful in school. Therefore, one focus of this current study was exploring how interactions with staff at the SPHC were associated with student outcomes. At the SPHC, trained staff are master's level social workers and family educators providing services far beyond standard campus advising and counseling services.

Over the past 20 years, SPHC staff have tracked and recorded each interaction that undergraduate student parents have with SPHC staff. Interactions that students and staff have are often face-to-face, but this analysis includes any phone, email, mail, and in-person (scheduled or walk-in appointment) interactions. Early adoption by SPHC staff of a confidential, electronic database has allowed for this current analysis of almost two decades (2000-2018) of data for students served by the SPHC.

Students were stratified into three categories based on whether they had a low number of interactions with the SPHC staff (1-3), a medium number (4-6), or a high number (7+). These three dosage groups were then compared to the same comparison group: student parents who completed an intake with the SPHC but did not interact with staff after ("intake only" group).

Undergraduate student parent data were analyzed for three main dependent variables: graduation (because student parents are less likely to graduate in four years, this is reported for graduation in any number of years), student retention (measured by whether students were either enrolled or graduated each fall term), and cumulative GPA.

Staff-student interactions: research questions and hypotheses

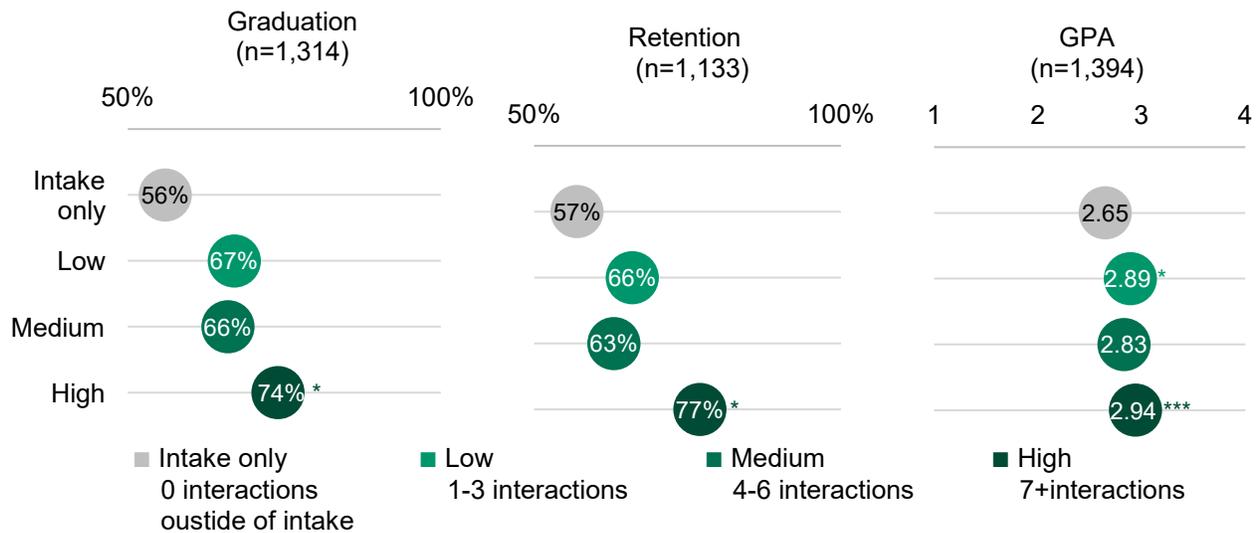
Research question	Hypothesis
Do the number of interactions with SPHC staff impact student graduation?	As staff-student interaction increases, the proportion of students graduating will also increase.
Does the number of interactions with SPHC staff impact student retention (i.e., keep them enrolled at the UMN-Twin Cities)?	As staff-student interaction increases, the proportion of students retained (or graduated) will also increase.
Does the number of interactions with SPHC staff impact cumulative GPA?	As staff-student interaction increases, cumulative GPA will also increase.

Findings

Generally, results suggest that undergraduate student parents who had more interactions with SPHC staff were also more likely to graduate, stay in school, and have higher GPAs. It should be noted that due to the observational nature of this study, we cannot know if staff interaction caused students to have these better outcomes. The direction of the relationship may be the opposite: students who seek out interaction with staff may be more responsible, driven, and committed to school than students who did not interact with staff, and therefore already more likely to have better outcomes. What we can conclude from the results is that there is a strong association between interacting with staff at the SPHC and better outcomes.

- Students with high levels of interaction with SPHC staff were significantly more likely to graduate compared to students with only a SPHC intake (74% and 56%, respectively; Figure 2).
- Students with high levels of interaction with the SPHC staff were significantly more likely to be retained as students each year compared to students with only a SPHC intake (77% and 57%, respectively; Figure 2). Students in the high interaction group also had significantly higher retention compared to students in the low or medium interaction group, indicating that student parents who have high levels of interaction with staff had improved retention outcomes over lower levels of interaction.
- Students with low or high levels of interaction with SPHC staff had a significantly higher cumulative GPA when compared to students who only had an SPHC intake (Figure 2). Students in the high interaction group also had a significantly higher cumulative GPA compared to students in the low or medium groups.

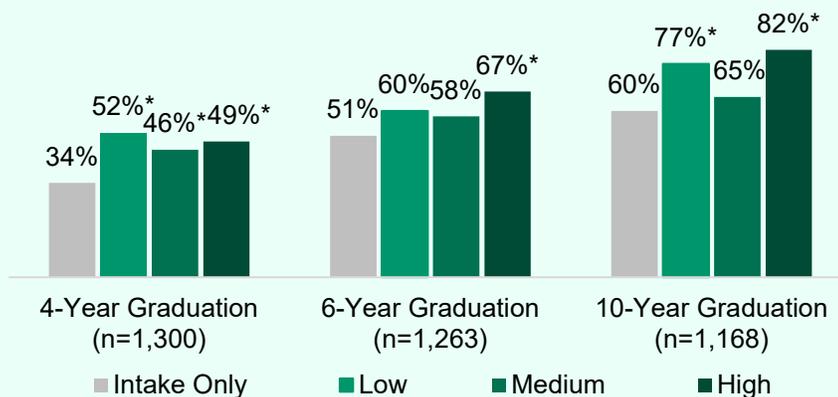
2. Staff-student interactions and graduation, retention, and cumulative GPA



Note. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett's post-hoc tests at all significance levels. Differences between intake only and three dosage groups are significant at ***p < .001. **p < .01, *p < .05.

Consistent with previous literature, student parents at the SPHC were unlikely to graduate in 4 years, regardless of staff interaction level (for comparison, 63% of UMN-Twin Cities students graduate in 4 years, 77% graduate in 6 years). However, similar to the results for graduation in any amount of time, increased interaction with SPHC staff generally correlated with an increased likelihood of graduating within 4 years, 6 years, or 10 years (Figure 3). See Appendix 3 for complete data tables on graduation results by year.

3. Graduation results by year based on staff-student interactions



Note. Differences in graduation were tested using Pearson Chi-square tests. Differences between intake only and three dosage groups are significant at *p < .05.



Referrals and programs received

The SPHC offers an array of referrals to services and programming to undergraduate pregnant and parenting students:

- Academic (academic coaching, Title IX)
- Child-related (on- and off-campus child care, Parenting as Students Support (PASS) group)
- Employment (resume and job search assistance, reference letters)
- Family (legal, custody, relationship issues, divorce)
- Financial (emergency grants, post-secondary child care grants, financial aid, public assistance, scholarships)
- Housing (on and off campus)
- Medical (health insurance, mental health referrals, relationship violence)
- Social (Parenting as Student Support (PASS) group, end of year event, family events, Gifts for Little Gophers)
- Transportation

Over the past 20 years, SPHC staff tracked and recorded each referral that students received and program students attended. In the following section, students are categorized based on the number of referrals they received and programs they attended at the SPHC. Students were stratified into three categories based on whether they received a low number of referrals and programming from the SPHC (1-3), medium number (4-6), or high number (7+). These three dosage groups were then compared to a comparison group: student parents who completed an intake with the SPHC but did not receive any referrals or programming after (“intake only” group).

Undergraduate student parent data were analyzed for three main dependent variables: graduation (because student parents are less likely to graduate in four years, this is reported for graduation in any number of years), student retention (measured by whether students were either enrolled or graduated each fall term), and cumulative GPA.

Referrals and programs received: Research questions and hypotheses

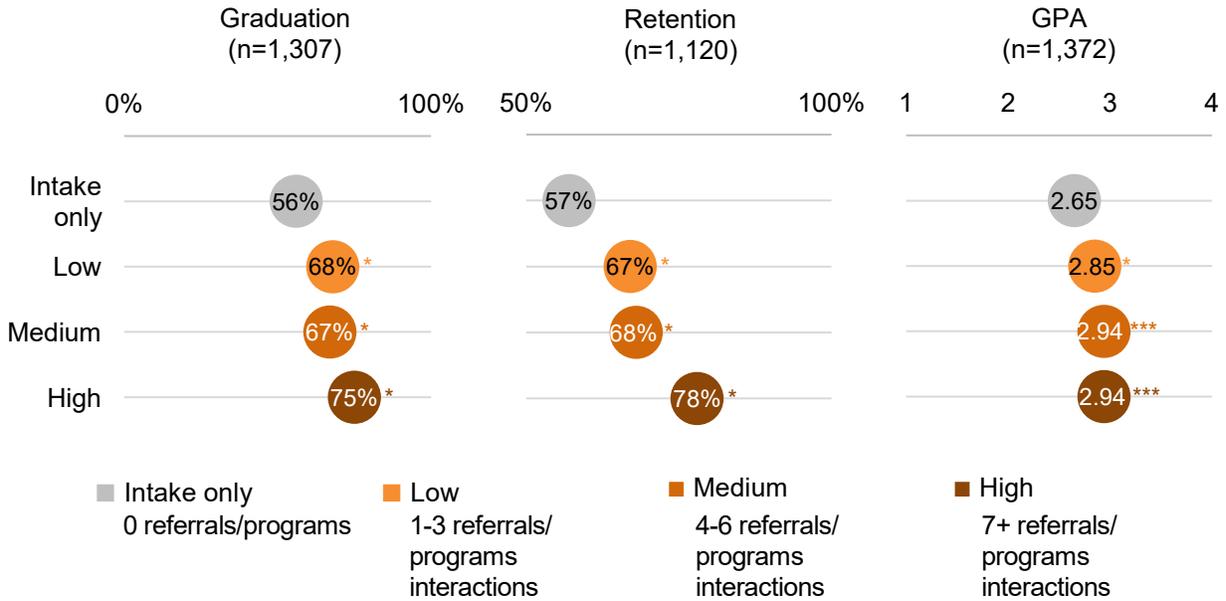
Research question	Hypothesis
Does the number of referrals and programs received impact student graduation?	As referral and program dosage increases, the proportion of students graduating will also increase.
Does the number of referrals and programs received impact student retention (i.e., keep them enrolled at the UMN-Twin Cities)?	As referral and program dosage increases, the proportion of students retained (or graduated) will also increase.
Does the number of referrals and programs received impact cumulative GPA?	As referral and program dosage increases, cumulative GPA will also increase.

Findings

Generally, results suggest that undergraduate student parents who received a higher number of referrals and attended a higher number of programs at the SPHC were also more likely to graduate, stay in school, and have higher GPAs. Attributing referrals and programs to these positive outcomes is not possible due to the observational nature of this study, and results should be interpreted cautiously.

- Students who received any number of referrals and programs at the SPHC had better graduation outcomes than students with only an SPHC intake. Significantly fewer students in the intake only group (56%) graduated compared to students who received a low (68%), medium (67%) or high (75%) number of referrals and programs (Figure 4).
- Students who accessed any number of referrals and programs at the SPHC also had better retention outcomes than students with only a SPHC intake. Significantly fewer students in the intake only group (57%) were retained compared to students who received low (67%), medium (68%) or a high (78%) number of referrals and programs (Figure 4). Students in the high referrals and programs group also had significantly higher retention compared to students in the low or medium referrals and programs group, indicating that student parents who received a high number of referrals and programs had improved retention outcomes over students with lower numbers of referrals and programs.
- Students who accessed any level of referrals and programs at the SPHC had significantly higher average cumulative GPAs compared to the intake only group (Figure 4).

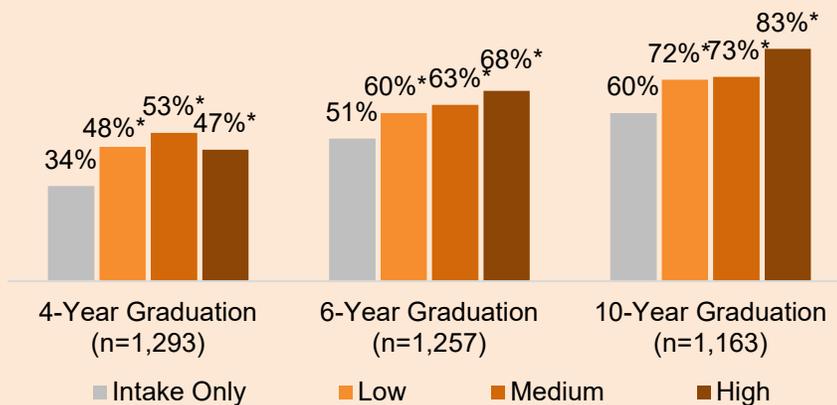
4. Referrals and programs received and graduation, retention, and cumulative GPA



Note. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett's post-hoc tests at all significance levels. Differences between intake only and three dosage groups are significant at ***p < .001. **p < .01, *p < .05.

Student parents who received any level of referrals or programs from the SPHC were significantly more likely to graduate in 4, 6, or 10 years (Figure 5). For comparison, 63% of UMN-Twin Cities students graduate in 4 years, 77% graduate in 6 years.

5. Graduation results by year based on referrals and programs received



Note. Differences in graduation were tested using Pearson Chi-square tests. Differences between intake only and three dosage groups are significant at *p < .05.



Categories of student engagement with SPHC

In addition to examining what effect staff-student interactions and receiving referrals and programs had on student outcomes, we were also interested in learning how undergraduate student parent engagement with specific SPHC supports or resources influenced student outcomes. Five categories were created based on types of student engagement with the SPHC:

- **Intake only** – Undergraduate student parents who completed an intake with the SPHC but did not have any interactions with staff or receive any referrals or programming after. This category served as the “no intervention” comparison group for the results presented below.
- **Parents as Students Support (PASS) Group¹** – Undergraduate student parents who attended at least one PASS group, a weekly meeting for undergraduate student parents to connect, develop support networks, and build community. The group covers topics such as study skills, career planning, financial aid, family finances, stress management, and child development. Little previous research has examined how undergraduate student parent support groups may impact long-term academic success.
- **Emergency grant¹** – Undergraduate student parents who received an emergency grant from the SPHC (a one-time grant of \$500 - \$2,000, provided to undergraduate student parents facing critical financial need). Because students who receive emergency grants are often in crisis, this is an important category to study in order to see the impact of a one-time financial grant on long-term academic success.
- **Child care grant only** – Undergraduate student parents whose *only* interaction with the SPHC (besides intake) was receiving a child care grant. In this sample, the child care grant is a state-sponsored child care assistance grant; student parents who qualify are awarded a grant of \$3,000 - \$5,200 per child age 12 and under per year. Previous literature suggests a strong association between receiving child care grants and positive academic outcomes.
- **All others: intake only and child care grant only excluded¹** – All undergraduate student parents who were not in the intake only or child care grant only categories. This included all students who interacted with staff or received additional referrals and programs at the SPHC beyond just an intake or child care grant only. There is limited literature on what other supports or services (beyond child care grants) may positively impact student parent academic outcomes.

¹ These categories are **not** mutually exclusive: students included in these categories could also be counted in other categories included in this footnote.

Student data for these categories were analyzed for the same three main independent variables: graduation (in any number of years), student retention (measured by whether students were either enrolled or graduated each fall term), and cumulative GPA.

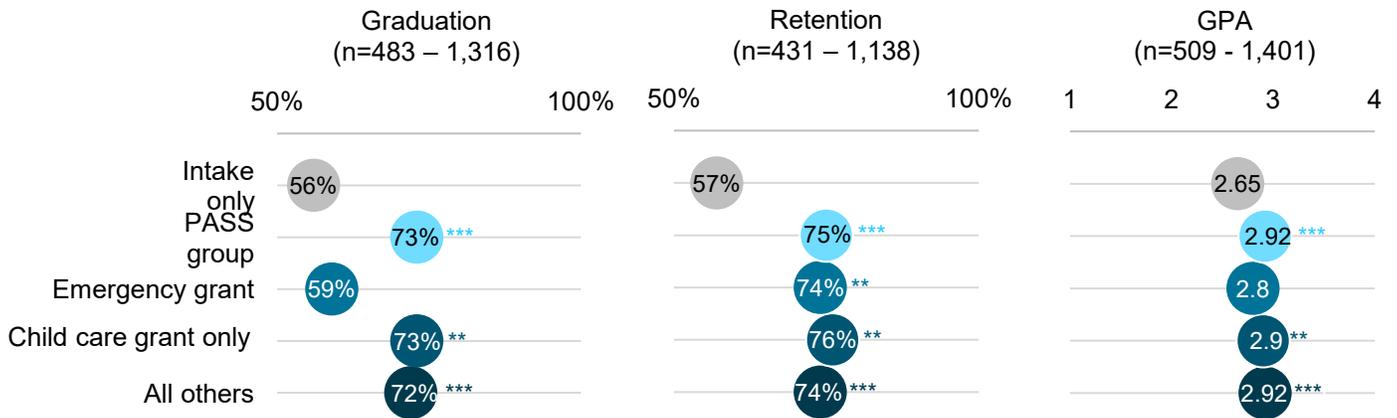
Findings

Results indicate that undergraduate parents who accessed certain resources and supports had significantly better academic outcomes compared to student who only completed an intake.

- Students who attended a PASS group had some of the strongest academic outcomes. Compared to intake only students, PASS group students were significantly more likely to graduate, be retained, and have a higher cumulative GPA (Figure 6).
- Students who received an emergency grant had mixed academic outcomes. When compared to intake only students, emergency grant recipients were significantly more likely to be retained each year, indicating that emergency grant money may help student parents remain enrolled. However, they were not significantly more likely to graduate or have a higher GPA. This is not surprising considering students who receive emergency grants tend to be the lowest income students with minimal support networks and may have only made contact with the SPHC due to the crisis that precipitated the emergency grant request.
- Results from this analysis also demonstrate the already well-known significant impact that receiving a child care grant has on undergraduate student parents. Students whose **only** engagement with the SPHC (besides an intake) was receiving a child care grant were still significantly more likely than intake only students to graduate, be retained, and have a higher cumulative GPA. While students in the “child care grant only” category had significantly better outcomes than students in the intake only category did, they often had *similar* outcomes to students in the other categories. For example, students whose only interaction with SPHC was receiving a child care grant had similar results on all three academic outcomes to students in the “all others: intake only and child care grant only excluded” category. This suggests that while providing child care grants is an integral part of supporting student parents, interactions with staff and participation in programming and referrals may be equally beneficial to student parents.
- Students in the “all others: intake only and child care grant only excluded” category had significantly higher rates of graduation, retention, and cumulative GPAs compared to students in the intake only category. This indicates that any engagement with the SPHC, beyond just child care grants, is associated with better positive academic outcomes. As mentioned above, students in this category also had similar outcomes to students in the child care only category, suggesting that investing resources in training staff

and providing programming and referrals may be equally effective at supporting student parent’s needs versus just financial support.

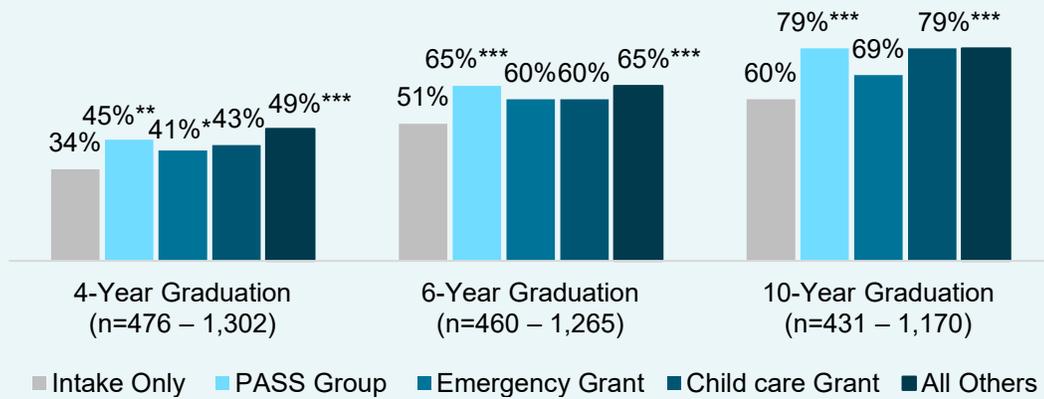
6. Student engagement by graduation, retention, and cumulative GPA



Note. “All Others” refers to the category “All others: intake only and child care grant only excluded.” Differences in graduation and retention were tested using Pearson Chi-square tests. Differences in cumulative GPA were tested using independent t-tests. Differences between intake only and three dosage groups are significant at ***p < .001, and **p < .01.

Students who attended a PASS group and students in the “all others” category were significantly more likely to graduate in 4, 6, and 10 years compared to intake only students (Figure 7). For comparison, 63% of UMN-Twin Cities students graduate in 4 years, 77% graduate in 6 years.

7. Graduation results by year based on student engagement



Note. “All Others” refers to the category “All others: intake only and child care grant only excluded.” Differences in graduation were tested using Pearson Chi-square tests. Differences between intake only and three dosage groups are significant at ***p < .001, **p < .01, *p < .05.

Subpopulations

Single parents

The heightened challenges of single mother undergraduate students are well documented in the research literature. Due in large part to the increased financial strain and lack of support single mothers typically experience in higher education, only 28% of single mothers earn an associate or bachelor's degree within six years of college enrollment, compared to 49% of women who are not mothers (Reichlin Cruse, et al., 2018). Very little previous research documents the academic outcomes of undergraduate student fathers who are single.

In this study, students who identified as single or divorced or never married were categorized as single parents (students who selected married or partnered or separated were categorized as partnered). A large proportion of the students served by the SPHC identified as single mothers: out of all students for whom relationship status was available, 656 (42%) were single mothers. A smaller proportion of students served by the SPHC identified as single fathers: out of all students for who relationship status was available, 125 (8%) were single fathers. Considering that approximately half of the students served by the SPHC identified as single parents, we specifically examined how interactions with SPHC staff were associated with single parents' academic outcomes.

Single mothers and single fathers were stratified into three categories based on whether they had a low number of interactions with the SPHC staff (1-3), a medium number (4-6), or a high number (7+). These three dosage groups were then compared to single mothers and single fathers who completed an intake with the SPHC but did not interact with staff after ("intake only" group).

Findings

Generally, results suggest that single mothers follow similar trends as the entire sample: as the number of staff interactions increased, single mothers had improved graduation, retention, and cumulative GPA. Results suggest that single fathers served by the SPHC did *not* follow the same pattern of "as interaction increases, outcomes improve" as the entire sample or single mothers did.

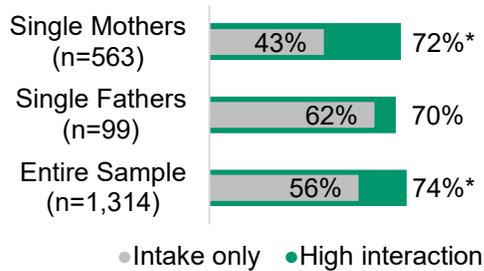
- Single mothers who had a high number of staff interactions were significantly more likely to graduate (72%) compared to single mothers with no interactions beyond an intake (43%; Figure 8). Also important to note is that single mothers with a high number of staff interactions graduated in similar proportions to the entire sample who had a high number of interactions (72% and 74% respectively). This indicates

that single mothers with a high number of interactions with SPHC staff “closed” the academic graduation gap single mothers typically face.

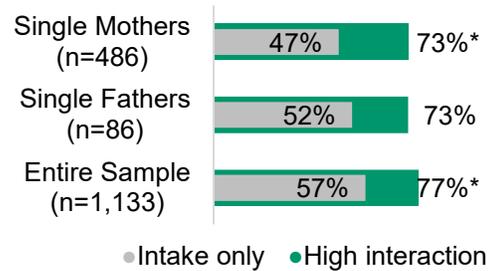
- There were no significant differences in graduation between single fathers across interaction levels. However, of note is that single fathers had relatively high rates of graduation (compared to single mothers and the entire sample) even at intake only (62%) (Figure 8).
- Single mothers with high levels of staff interaction were also significantly more likely to be retained as students each semester (73%) compared to single mothers in the intake only category (47%; Figure 9). This suggests that high levels of interaction with staff are associated with improved retention for single mothers.
- There were no significant differences in retention between single fathers across all staff interaction levels (Figure 9).
- Single mothers with a high number of staff interactions had a significantly higher cumulative GPA than intake only single mothers (Figure 10). Additionally, single mothers with low or medium levels of interaction also had significantly higher cumulative GPAs, suggesting that staff interaction at any level is associated with higher cumulative GPAs for single mothers.
- Single fathers with high levels of staff interaction had a significantly higher GPA compared to intake only single fathers (Figure 10). Additionally, single fathers with medium levels of interaction also had significantly higher cumulative GPAs.

One interpretation of this relative lack of significant findings for single fathers may be that single fathers have more help with childcare from their parents and ex-partners, and more financial and institutional support (i.e. veteran student parents), and therefore enter the SPHC already better resourced than the average single mother. Additionally, smaller sample sizes in the single fathers’ analyses may contribute to the non-significant findings.

8. Graduation: Single parents with high number of interactions versus intake only

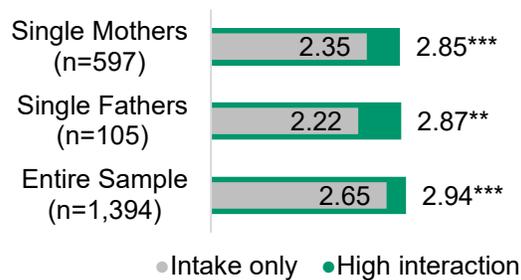


9. Retention: Single parents with high number of interactions versus intake only



Note. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett's post-hoc tests at all significance levels. Differences between intake only and high interaction students are significant at ***p < .001., **p<.01, and *p < .05.

10. Cumulative GPA: Single parents with high number of interactions versus intake only



Note. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett's post-hoc tests at all significance levels. Differences between intake only and high interaction students are significant at ***p < .001, **p<.01, and *p < .05.

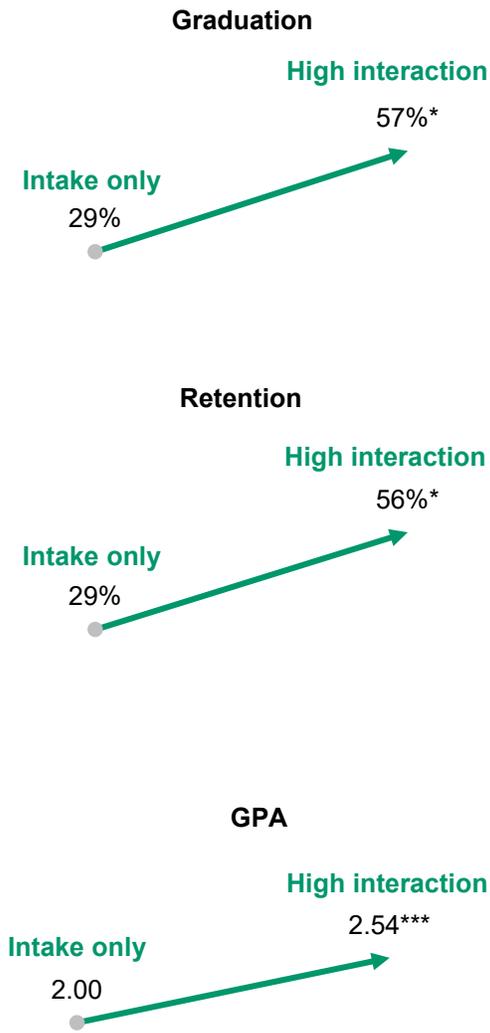
General College

General College (GC) at the UMN-Twin Cities was a non-degree granting two-year undergraduate college (discontinued in academic year 2006) that provided a developmental education academic model for promising students who did not meet the competitive admission standards of the University (University of Minnesota, n.d.). GC served as an access point for promising students, with the goal of helping students successfully transfer to and succeed in a degree-granting college within the University within four semesters. In 2004, GC at UMN-Twin Cities enrolled approximately 1,800 students. The SPHC was founded by the General College and was housed there until General College closed in 2006. However, from its inception, the SPHC served all student parents from across campus, both before and after its administrative transfer to the Office for Student Affairs.

Between 2000 and 2006, the SPHC served 197 GC student parents. GC students are of interest to this current analysis, as approximately 13% (n=197) of students who accessed the SPHC between 2000 and 2018 were GC students; therefore, this population makes up a relatively small, yet important proportion of students in the data set. GC served many students that were first generation, racially and ethnically diverse, single parents, financially reliant on government assistance, and academically under-prepared to enter a four-year University. For comparisons of demographics of GC students served by the SPHC with non-GC students served by the SPHC, see Appendix B. Presented below are analyses of how staff-student interactions were associated with academic outcomes for GC students.

GC student parents with high levels of staff-student interaction (7+ interactions) had significantly better academic outcomes compared to GC student parents with only an intake. While only 29% of intake only GC student parents graduated in any amount of time or were retained each semester, GC student parents with high staff interaction were significantly more likely to graduate (57%) or be retained each semester (56%; Figure 11). The pattern for cumulative GPA was similar: intake only GC student parents had an average cumulative GPA of 2.0, whereas those with high staff interactions had a 2.54 average GPA (Figure 11). These results are important in demonstrating the positive impact interactions with SPHC staff may have even on students with major academic and financial challenges.

11. General College students with high number of interactions versus intake only (N=180-186)



Important to note however, is that even GC students with “high” staff interaction often had graduation, retention, and GPA outcomes that were similar or worse than the intake only category for the entire sample. These results are not surprising based on GC students’ comparable lack of academic readiness for college coursework and the unusually high prevalence of poverty and other risk factors within this sub-population of SPHC students. These findings support what was already known about the notable academic challenges GC students experienced at UMN-Twin Cities.

Note. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett’s post-hoc tests at all significance levels. Differences between intake only and high interaction students are significant at ***p < .001. and *p < .05.

Recommendations

In order to increase equity on campuses, it is integral for higher education institutions to address the needs of student parents. Results from this analysis suggest that the SPHC is a promising model that benefits undergraduate student parents at the UMN-Twin Cities. These findings support the replication of the SPHC model at other institutions wishing to improve student parent academic outcomes. Student parents who had interactions with SPHC staff and received referrals and programs at the SPHC were significantly more likely to graduate, be retained each semester, and have a higher cumulative grade point average (GPA) than student parents who did not engage with the SPHC. Based on these strong findings, we propose the following recommendations for the UMN-Twin Cities and other institutions:

- ✓ Continue to promote the services available at the SPHC to all student parents on campus, with particular outreach to underrepresented undergraduate parents.
- ✓ Consider larger outreach to student parents across community college transfer network.
- ✓ Support availability of trained staff to advise and mentor undergraduate student parents.
- ✓ Engage undergraduate student parents in multiple ways, including through parent-specific advising, referrals, programming, and financial resources.
- ✓ Provide funding for programs that support undergraduate student parents' holistic needs for guidance and support, beyond solely financing child care grants.

To the best of our knowledge, this study was one of the first comprehensive, third-party evaluations of a campus-based, university student parent program. Strengths of this study include the nearly two decades of undergraduate student parent data, and the SPHC's location within a large, publically funded University. While the current study is specific to the SPHC at the UMN-Twin Cities, the results from this study lend far-ranging insights to a broad range of institutions and programs across higher education wishing to serve undergraduate student parents.

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- B. Demographic tables**
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Appendix A

Academic literature review

Prevalence and characteristics of student parents

One in five American undergraduate college students are parents (22%), and more than half of undergraduate student parents (55%) are single parents (GAO, 2019). Undergraduate student parent prevalence in Minnesota – the site of this current study – is comparable to national prevalence: 23% of all undergraduates in Minnesota (72,978 students) are parents (Reichlin Cruse, Milli, et al., 2019). Key demographic differences between student parents and students who are not parents are well established in the existing research literature. Across the U.S., undergraduate student parents are more likely to be women (71%), to be black (23%), to be older (average age 33 years), to be first-generation college students, and to come from lower socio-economic status backgrounds (Goodman & Reddy, 2019; GAO, 2019). Single mothers are one group of undergraduate student parents who receive specific attention, due in part to their high prevalence as student parents and their considerable need of support. Eleven percent of all undergraduate students are single mothers, 89% of whom are low-income and 63% live in poverty (Goodman & Reddy, 2019). Therefore, fostering undergraduate student parent success goes hand-in-hand with fostering equity in higher education for traditionally underserved populations.

Undergraduate student parents are more likely to attend community colleges and private for-profit colleges compared to students who are not parents (GAO, 2019). Community colleges serve a disproportionate number of undergraduate student parents: 42% of student parents attend community college, 18% attend private for-profit colleges, 17% attend public four-year colleges, and 13% attend private not-for-profit four-year colleges (Reichlin Cruse, Holtzman, et al., 2019). However, relative to the student body population, private for-profit schools have the largest share of undergraduate student parents. Forty-five percent of all for-profit college students are student parents, compared to 26% of the community college student body, and 12% of the public four-year college student body (Reichlin Cruse, Holtzman, et al., 2019). Forty percent of all women at community colleges are single mothers (Goodman & Reddy, 2019).

Unique needs of student parents

Although one in five undergraduate college students are parents, student parents remain one of the most least visible groups in higher education, despite their considerable need for support (Miller, 2019; Reichlin Cruse et al., 2018; Reichlin Cruse, Holtzman et al., 2019). Undergraduate student parents have fewer financial resources – and report struggling more

financially – compared to students who are not parents (Goodman & Reddy, 2019; Miller, 2019; Reichlin Cruse, Holtzman, et al., 2019; GAO, 2019). This is due in part to the fact that students with children do not have *their* parents contributing financially to their education. Two-thirds of undergraduate student parents had an expected family contribution of zero dollars, compared to one-third of undergraduate non-parenting students who reported expecting no contribution (GAO, 2019). Additionally, for all students who expect their parents to contribute funds to their education, students without children have an average expected *parental* contribution to their education of \$17,506, while student parents on average can expect about half of that *parental* contribution (\$9,180).

Undergraduate student parents report that accessible and affordable child care is their most crucial need (Goodman & Reddy, 2019). Student parents are likely to have young children: 55% have children age 5 or younger (GAO, 2019). That student parents report struggling to pay for child care is not surprising considering that in 2017 the average annual cost for full-time, center-based child care in the United States was over \$11,000 (average \$490/month) (GAO, 2019). According to GAO's 2019 Higher Education Report, 60% of undergraduate student parents are enrolled in schools that do not offer on-campus child care for students. While many student parents get Pell Grants to help fund their education, for many these grants are not enough to cover the increased costs student parents carry, particularly the cost of child care (Miller, 2019).

The Minnesota Office of Higher Education has offered the Postsecondary Child Care Grant Program, a program that helps subsidize child care costs for student parents with kids age 12 and under, since the early 1990s (Ascend at the Aspen Institute, 2019). With a maximum award amount of \$5,200 per child per year, this program is a national model for supporting student parents' ability to pay for child care and stay in school (Ascend at the Aspen Institute, 2019). However, it is important to note that Minnesota has the highest cost of child care in the nation; while the Postsecondary Child Care Grant Program exists, it is being used to offset the higher than average child care costs in the state. One study by the Institute for Women's Policy Research found that access to quality, affordable child care tripled the likelihood of on-time graduation for student parents (Reichlin Cruse et al., 2018). Other studies have found that even modest amounts of financial support can be crucial to student parents' ability to remain in school (Goodman & Reddy, 2019).

For many undergraduate student parents, financial challenges extend far beyond graduation. As a group, student parents borrow more for college than other students (Reichlin Cruse, Holtzman, et al., 2019), primarily due to lack of familial support and extended time in college. For student parents who borrow money to fund their education, their median debt is 2.5 times higher than debt among students without children, and one-half of student parents default on their loans within 12 years of starting college (Miller, 2019; Reichlin Cruse, Holtzman, et al., 2019). Considering that undergraduate student parents are on average

older (age 33) than students who are not parents (age 27 for independent students, age 20 for dependent students), this also means that student parents are burdened with student loan debt later in life, with some student parents even entering retirement with student debt (Johnson, 2019; GAO, 2019). This can impede their ability to purchase homes, or even save for their own children's college costs.

In light of these challenges that undergraduate student parents face, previous research has delineated key institutional practices that support student parents' needs (Goodman & Reddy, 2019). Some colleges have centers specific to student parents that offer services including counseling and advising, academic support, workforce development and career training, financial support, on-campus child care and/or child care grants, family-friendly campus activities, and community partnerships (Goodman & Reddy, 2019). Evidence exists that investment in these supports leads to a strong return: for each dollar invested in child care, financial assistance, and case management for student parents in Minnesota, the return on investment is \$2.95, \$4.70, and \$5.13 respectively (Reichlin Cruse, Milli, et al., 2019). Comprehensive data collection of student parent prevalence and outcomes at the institution level, as well as training faculty and staff on student parents' unique needs, are additional activities that can promote the success of student parents on college campuses (Goodman & Reddy, 2019).

Student parent education outcomes

Graduation

Undergraduate student parents take longer to finish school and are less likely to graduate compared to "traditional" students who are not parents (Ascend at the Aspen Institute, 2019; Zarifa et al., 2018). Within six years, only one-third of student parents graduate from college (Miller, 2019). This disparity is particularly stark for single mothers: only 28% of single mothers earn an associate or bachelor's degree within six years of college enrollment, compared to 49% of women who are not mothers (Reichlin Cruse, et al., 2018). This is in part because a majority (64%) of student parents attend school part time (GAO, 2019). Eighty percent of student parents have a full- or part-time job while they are in school (44% work full time; Ascend at the Aspen Institute, 2019). Research demonstrates that working concurrent with school significantly decreases the odds of completing a bachelor's degree on time (Zarifa et al., 2018). Additionally, the multiple obligations that student parents juggle with children, work, and being more likely to commute from off campus, make student parents more likely to have "stop and start" college trajectories (Zarifa et al., 2018). As discussed above, the financial constraints that student parents face decrease the likelihood of remaining in school and graduating within six years. It is not surprising,

then, that past research suggests that increasing financial aid to students decreases the amount of time it takes to graduate (Zarifa et al., 2018).

Retention

Fifty-two percent of undergraduate student parents drop out of college within six years of enrolling, compared with 32% of non-parents (GAO, 2019). A driving factor in this disparity in retention is the “time poverty” – the lack of time student parents have for rest and leisure after taking into account the time spent on work, school, home, and parenting duties – that student parents experience, making continuing school untenable for many (Ascend at the Aspen Institute, 2019).

GPA

Student parents may be less likely to graduate on time or remain enrolled in classes, yet past research suggests that undergraduate student parents have higher GPAs compared to non-parent students (Reichlin Cruse, Holtzman, et al., 2019). One-third of undergraduate student parents have a GPA of 3.5 or higher (Reichlin Cruse, Holtzman, et al., 2019).

Motivation

Previous research suggests that despite the challenges student parents face, as a group they are extremely motivated to succeed academically (Goodman & Reddy, 2019). Student parents, particularly single mothers, are motivated by the well-documented positive intergenerational benefits – short-term and long-term – that their pursuit of higher education will have on their children (Goodman & Reddy, 2019). Single mothers in Minnesota who graduate with a bachelor’s degree are 75% less likely to live in poverty than a single mother whose highest level of education is high school (Reichlin Cruse, Milli, et al., 2019). On average, single mothers with bachelor’s degrees earn \$20,104 more annually (\$571,871 over their lifetimes) compared to single mothers with only a high school education (Reichlin Cruse, Milli, et al., 2019). In short, for every dollar invested in single mothers’ bachelor’s degrees in Minnesota, women receive \$6.77 back in earnings (Reichlin Cruse, Milli, et al., 2019).

The positive impact of a mother’s education on children includes intergenerational benefits beyond increased financial stability for households (Reichlin Cruse, Milli, et al., 2019). Educated mothers are more likely to create high-quality home learning environments for children and utilize parenting strategies that incorporate learning, as well as serve as role models for higher education achievement (Magnuson, 2007; Monaghan, 2016). Additionally, the monetary returns of a parental college education may lead to more stable home environments and an increased ability to invest in the academic activities of their children

(Monaghan, 2016). Children of educated mothers have improved cognitive development, higher test scores, and better academic outcomes compared to children of mothers with high school degrees or less (Magnuson, 2007). Mothers with college degrees are also more likely to invest in child health-promoting behaviors, which may be why children of more educated mothers have improved health outcomes (Prickett & Augustine, 2016). As adults, children with educated mothers are more likely to graduate from high school, attend college, and graduate from college themselves (Monaghan, 2016). This leads to increased wages and creates an intergenerational cycle of family economic security (Reichlin Cruse, Holtzman, et al., 2019; Reichlin Cruse, Milli, et al., 2019).

Current study

Undergraduate student parents continue to be an invisible population of college students nationally, particularly at four-year colleges and universities. Of primary concern is the dearth of research on student parents. Institutions rarely collect surveillance data on student parent admissions and academic outcomes data (Reichlin Cruse, Holtzman, et al., 2019). The lack of reliable and valid data on student parents has led to low awareness of how prevalent student parents are on campuses, as well as their unique needs, and is a significant contributing factor in the limited provision of supports and family supportive policies available to student parents at most colleges and universities. At the same time, there has been a significant rise in donor and institutional interest in serving this population in recent years, which has left a gap in the needed evidence-based research required to advocate for and serve them effectively.

Improving undergraduate student parents' outcomes is a critical component in college and universities' efforts to promote equity in their student population's education access and outcomes (Reichlin Cruse, Milli, et al., 2019). As outlined in this literature review, student parents are more likely to be women, people of color, older, first-generation students, and to be from lower socioeconomic backgrounds. In order to improve admissions and outcomes (such as graduation, retention, and GPA) for this diverse group of traditionally underrepresented students, higher education institutions need to address their needs as parents.

To the best of our knowledge, the current study is one of the first comprehensive, mixed-methods, third-party evaluations of a student parent program. While the current study is specific to one Student Parent Help Center at the University of Minnesota – Twin Cities (a large, four-year public university), the results from this study will lend far-ranging insights for other institutions and professionals wishing to serve student parents, particularly given the relatively large number of students served by the SPHC.

Appendix B

B1. Demographics information of undergraduates served by the SPHC, 2000-2018, compared to UMN-Twin Cities overall undergraduate student population

	SPHC (N=1,549)	UMN Overall %
Gender		
Female	71%	52%
Male	29%	48%
Missing	<1%	0%
Race		
White	52%	74%
Black	23%	5%
Asian	12%	10%
Hispanic	6%	3%
American Indian	4%	1%
International/Hawaiian	1%	6%
Missing	3%	2%
Marital status		
Married/Partnered/Separated	42%	
Single/Divorced/Never married	51%	
Missing	7%	
Pell Grant recipients		
Has been awarded a Pell Grant	89%	23%
Has not been awarded a Pell Grant	11%	77%
First generation		
First-generation student	51%	
Not a first-generation student	49%	
Student type		
High school student	32%	73%
Transfer student	68%	27%

Note: UMN-Twin Cities overall data was received from UMN-Twin Cities, Office of Institutional Research. Data on marital status and first generation status was not publicly available. Based on data availability, data for some demographics are for a different time frame than the SPHC sample (2000-2018). Age is from the 2010-2011 academic year. Pell grants are for 2010-2019.

B1. Demographics information of undergraduates served by the SPHC, 2000-2018, compared to UMN-Twin Cities overall undergraduate student population (continued)

	SPHC (N=1,549)	UMN Overall %
Degree type completed (N=979)		
Bachelor of Science	40%	62%
Bachelor of Arts	28%	39%
Missing	32%	0%
Age at first term		
Average age (years)	24	22
Median age (years)	23	21
Range (years)	16-55	11-84

Note: UMN-Twin Cities overall data was received from UMN-Twin Cities, Office of Institutional Research. Data on marital status and first generation status was not publicly available. Based on data availability, data for some demographics are for a different time frame than the SPHC sample (2000-2018). Age is from the 2010-2011 academic year. Pell grants are for 2010-2019

B2. Additional demographics not included in text: First term of college (year) for study sample

First term of college (year)	All students (n=1,352)	General College (n=197)
1992	<1%	-
2000	7%	20%
2001	6%	20%
2002	6%	13%
2003	8%	14%
2004	8%	19%
2005	7%	15%
2006	6%	<1%
2007	6%	-
2008	5%	-
2009	6%	-
2010	6%	-
2011	5%	-
2012	5%	-
2013	5%	-
2014	4%	-
2015	4%	-
2016	4%	-
2017	3%	-
2018	2%	-

B3. Demographic tables comparing General College students served by the SPHC to non-General College students and all students served by the SPHC

	All students	General College	Not General College
Gender	(n=1,545)	(n=197)	(n=1,348)
Female	71%	78%	70%
Male	29%	22%	30%
Race	(n=1,497)	(n=192)	(n=1,305)
White	52%	29%	57%
Black	23%	39%	21%
Asian	12%	20%	11%
Hispanic	6%	7%	6%
American Indian	4%	5%	4%
International/Hawaiian	1%	0%	<1%
Marital status	(n=1,439)	(n=158)	(n=1,281)
Married/Partnered/Separated	46%	23%	48%
Single/Divorced/Never married	54%	77%	52%

	All students	General College	Not General College
Pell Grant recipients	(n=1,549)	(n=197)	(n=1,352)
Had been awarded a Pell Grant	89%	83%	90%
Had not been awarded a Pell Grant	11%	17%	10%

	All students	General College	Not General College
First generation	(n=1,549)	(n=197)	(n=1,352)
First-generation student	51%	41%	53%
Not a first-generation student	49%	59%	47%

	All students	General College	Not General College
Transfer student	(n=1,549)	(n=197)	(n=1,352)
High school student	32%	92%	24%
Transfer student	68%	8%	76%

Note: All percentages in B3 tables are valid percentages (do not include missing data).

B3. Demographic tables comparing General College students served by the SPHC to non-General College students and all students served by the SPHC (continued)

Degree type completed	All students (n=979)	General College (n=86)	Not General College (n=893)
Bachelor of Science	58%	59%	58%
Bachelor of Arts	42%	41%	42%

Age at first term	All students (n=1,549)	General College (n=197)	Not General College (n=893)
Average age (years)	24	20	25
Median age (years)	23	18	24
Range (years)	16-55	16-44	17-55

Note: All percentages in B3 tables are valid percentages (do not include missing data).

Appendix C

Academic write-up of results

Staff-student interactions

Chi-square tests were conducted to compare the effect of staff-student interaction on student graduation in any number of years. There was a significant difference in graduation by interaction dosage groups $X^2(3, N=1,314) = 34.05$ $p < .001$ (Figure C1). Specifically, significantly fewer students in the intake only group (56%) graduated compared to students who had a high number of interactions with the SPHC (74%). Overall, there was a linear effect in which the more interactions students had with SPHC staff, the better graduation outcomes were (linear-by-linear association = 32.86, $p < .001$).

Chi-square tests were also conducted to compare the effect of staff-student interactions on student retention. There was a significant difference in retention by interaction dosage groups $X^2(3, N=1,133) = 39.30$, $p < .001$ (Figure C1). Specifically, significantly fewer students in the intake only group (57%) were retained or had graduated in the last fall semester compared to students with a high number of interactions (77%). Additionally, significantly fewer students in the low (66%) or medium (63%) groups were retained than those in the high interaction group were. Overall, there was a linear effect in which the more interactions students had with staff, the better the retention outcomes were (linear-by-linear association = 36.07, $p < .001$). This suggests that a high level of interaction with SPHC staff was associated with student retention.

A one-way ANOVA test was conducted to compare the effect of staff-student interactions on cumulative GPA. There was a significant difference in cumulative GPA by interaction dosage groups ($F(3,1390) = 12.84$, $p < .001$). Dunnett's post-hoc test indicated that significant differences existed between the intake only group (2.65) and the low (2.89) and high (2.94) interaction groups (Figure C1). Differences were approaching significance for students in the medium interaction group (2.83) compared to intake only. These results suggest that any level of interaction students have with SPHC staff is associated with a higher cumulative GPA when compared to no interactions, and high levels of interaction are especially associated with higher cumulative GPA.

C1. Staff-student interactions and graduation, retention, and cumulative GPA

	Intake Only (N=319-361)	Low (N=91-93)	Medium (N=121-143)	High (N=601-717)
Graduation	56%	67%	66%	74%*
Retention	57%	66%	63%	77%*
Cumulative GPA	2.65	2.89*	2.83†	2.94***

Note: Differences in significance denoted in the table are all compared to intake. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett's post-hoc tests at all significance levels. Differences between intake and three dosage groups are significant at ***p < .001. **p < .01, *p < .05, and are approaching significance at †p < .10. Significant differences did exist between other interaction dosage levels for some variables: Graduation – medium to high*; Retention – low to high*, medium to high*.

C2. Graduation results by year based on number of staff-student interactions

	Intake Only (n=326-361)	Low (n=78-93)	Medium (n=133-143)	High (n=631-717)
4-year Graduation	34%	52%*	46%*	49%*
6-year Graduation	51%	60%	58%	67%*
10-year Graduation	60%	77%*	65%	82%*
Graduation in any amount of time	56%	67%	66%	74%*

Note. Differences in graduation were tested using Pearson Chi-square tests. Differences between intake and three dosage groups are significant at *p < .05.

Number of referrals and programs received

Chi-square tests were conducted to compare the effect of the number of referrals and programs received on student graduation. There was a significant difference in graduation by referral and program dosage groups $\chi^2(3, N=1,307) = 36.04$ p<.001 (Figure C3). Specifically, significantly fewer students in the intake only group (56%) graduated compared to students who received a low (68%), medium (67%) or high (75%) number of referrals and programs. This suggests that students with some level of referrals and programs received from the SPHC had better graduation outcomes than intake only students. Overall, there was a linear effect in which the more referrals and programs students received, the better graduation outcomes were (linear-by-linear association = 33.30, p<.001).

There was also a significant difference in retention by the number of referrals and programs received $\chi^2(3, N=1,120) = 38.57$, p<.001 (Figure C3). Specifically, significantly fewer students in the intake only group (57%) were retained or had graduated in the last fall

semester compared to students who received a low (67%), medium (68%) or high (78%) number of referrals and programs. Overall, there was a linear effect in which the more referrals and programs students received, the better graduation outcomes were (linear-by-linear association = 37.13, $p < .001$). This suggests that any level of referrals and programs offered by the SPHC is associated with student retention. Students who received a high number of referrals and programs also had significantly higher retention compared to students in the low or medium dosage groups, indicating that student parents who access a high level of referrals and programs have increased retention over other groups.

A one-way ANOVA test was conducted to compare the effect of referrals and programs received on cumulative GPA. There was a significant difference in cumulative GPA by referral and program dosage groups ($F(3,1368) = 12.48, p < .001$). Dunnett’s post-hoc test indicated that significant differences existed between the intake only (2.65) and all three other dosage levels (Figure C3). These results suggest that any level of referrals and programs received from the SPHC was associated with higher average cumulative GPA when compared to no referrals or programs.

C3. Referrals and programs received and graduation, retention, and cumulative GPA

	Intake Only (N=319-361)	Low (N=172-194)	Medium (N=132-168)	High (N=492-584)
Graduation	56%	68%*	67%*	75%*
Retention	57%	67%*	68%*	78%*
Cumulative GPA	2.65	2.85*	2.94***	2.94***

Note: Differences in significance denoted in the table are all compared to intake. Differences in graduation and retention were tested using Pearson Chi-square tests at the .05 significance level. Differences in cumulative GPA were tested using one-way ANOVA tests and Dunnett’s post-hoc tests at all significance levels. Differences between intake and three dosage groups are significant at *** $p < .001$, ** $p < .01$, * $p < .05$, and are approaching significance at † $p < .10$. Significant differences did exist between other referral and program dosage levels for some variables: Graduation – medium to high*; Retention – low to high*, medium to high*.

C4. Graduation results by year based on number of referrals and programs received

	Intake Only (n=326-361)	Low (N=173-194)	Medium (n=150-168)	High (n=514-584)
4-year Graduation	34%	48%*	53%*	47%*
6-year Graduation	51%	60%*	63%*	68%*
10-year Graduation	60%	72%*	73%*	83%*
Graduation in any amount of time	56%	68%*	67%*	75%*

Note. Differences in graduation were tested using Pearson Chi-square tests. Differences between intake and three dosage groups are significant at * $p < .05$.

Five categories of student engagement with SPHC

Chi-square tests were conducted to compare how graduation differed by the five categories of student engagement with the SPHC. There was a significant difference in graduation between the intake only category and the child care grant only category, the PASS group category, and the “all others: intake only and child care grant only excluded” category (Figure C5). Specifically, significantly fewer students in the intake only group (56%) graduated compared to students in the PASS group (73%) $X^2(1, N=836) = 25.10, p < .001$, the child care grant only category (73%) $X^2(1, N=485) = 10.31, p = .001$, and “all others: intake only and child care grant only excluded” category (72%) $X^2(1, N=1,316) = 29.09, p < .001$. This suggests that engaging with the SPHC to attend a PASS group, receive a child care grant, or generally getting any additional services outside of child care grants was associated with increased graduation. Of note is that there were no significant differences in graduation between students in the intake only and emergency grant groups.

Chi-square tests were conducted to compare how retention differed by student engagement categories. There was a significant difference in retention between the intake only group and each of the other four groups (Figure C5). Specifically, significantly fewer students in the intake only group (57%) were retained or had graduated in the last fall semester compared to students in the PASS group category (75%) $X^2(1, N=732) = 24.1, p < .001$, the emergency grant category (74%) $X^2(1, N=431) = 9.83, p = .002$, the child care grant only category (76%) $X^2(1, N=425) = 11.06, p = .001$, and students in the “all others: intake only and child care grant only excluded” category (74%) $X^2(1, N=1,138) = 28.41, p < .001$.

Four independent t-tests were conducted to compare how average cumulative GPA differed by student engagement category. Notably, students who attended a PASS group, only received a child care grant, or who were in the “all others: intake only and child care grant only excluded” category had a significantly higher average cumulative GPA (2.92, 2.90, and 2.92, respectively) than students in the intake only group (2.65), $t(1,399) = -5.99, p < .001$ (Figure C5).

Chi-square tests were also conducted to compare how the child care grant only category compared to the other categories. This choice was based on the abundance of literature calling for child care grants to support undergraduate student parents, and limited literature on what other supports or services may positively impact student parent academic outcomes. Results indicate there were no significant differences in graduation, retention, or cumulative GPA for students who only received a child care grant and students who engaged with the SPHC in ways beyond a child care grant.

C5. Categories of student engagement and graduation, retention, and cumulative GPA

	Intake Only (N=319-361)	PASS Group (N=413-475)	Emergency Grant (N=112-122)	Child Care Grant Only (N=106-124)	All Others: Intake only and child care grant only excluded (N=819-955)
Graduation	56%	73%***	59%	73%**	72%***
Retention	57%	75%***	74%**	76%**	74%***
Cumulative GPA	2.65	2.92***	2.80	2.90**	2.92***

Note. Differences in graduation and retention were tested using Pearson Chi-square tests. Differences in cumulative GPA were tested using independent t-tests. Differences between intake and three dosage groups are significant at ***p < .001. **p < .01, *p < .05, and are approaching significance at †p < .10.

C6. Graduation results by year based on categories of student engagement with SPHC

	Intake Only (n=326-361)	PASS Group (n=426-475)	Emergency Grant (n=105-122)	Child Care Grant only (n=111-124)	All Others: Intake only and child care grant only excluded (n=844-955)
4-year Graduation	34%	45%**	41%	43%†	49%***
6-year Graduation	51%	65%***	60%	60%†	65%***
10-year Graduation	60%	79%***	69%†	79%***	79%***
Graduation in any amount of time	56%	73%***	59%	73%**	72%***

Note. Differences in graduation were tested using Pearson Chi-square tests. Differences between intake and three dosage groups are significant at ***p < .001. **p < .01, *p < .05, and are approaching significance at †p < .10.

Appendix D

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