Pathways and Barriers to Human Development and Family Science Student Engagement in Undergraduate Research

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ABSTRACT. The value of high-impact practices in undergraduate higher education is well documented. However, very little is known about high-impact practices in Human Development and Family Science (HDFS) programs. The goal of this study was to explore one specific high-impact practice: undergraduate research. Specifically, our study explored the benefits and barriers of undergraduate research for HDFS students as well as the pathways HDFS students use to become involved in undergraduate research. College student identity theory served as a guide for our inquiry. Semi-structured interviews were conducted with 22 undergraduate HDFS students, 13 of whom had participated in undergraduate research and nine who had not. Results revealed three pathways students took to participate in undergraduate research: interest in a specific research topic, connection with the researcher, and preparation for graduate school. Enhanced learning, professional skills, personal growth, and relationships with others were identified as benefits of participation in undergraduate research. Barriers to participation in research included time, lack of awareness, and feelings of fear or intimidation. Specific processes for students and faculty to overcome these barriers are suggested. It is recommended that HDFS faculty and administrators provide multiple pathways and supports for undergraduate students to become involved in research.

Keywords: college student identity theory; high-impact practice; human development & family science; undergraduate research

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Today's higher education landscape requires creative, theoretically grounded strategies to address student development at a holistic level (Kuh, 2018). Human Development and Family Science (HDFS) programs are not exempt from this challenge. In fact, as a relatively "new" discipline (Hamon & Smith, 2014), it may be even more critical that we actively seek out, promote, and research strategies that address student success and development in ways that are efficient and effective in terms of both cost and time for students and faculty (Mintz, 2019).

Current thinking in higher education should also challenge HDFS faculty to provide evidence-based educational experiences that lead to student success. Student success refers to "an undergraduate experience marked by academic achievement, engagement in educationally purposeful activities, satisfaction, persistence, attainment of educational objectives, and acquisition of desired learning outcomes that prepare one to live an economically self-sufficient, civically responsible, and rewarding life" (Kuh et al., 2017, p. 9). Specific educational practices that are associated with positive outcomes for undergraduate students include both in and out of the classroom experiences: first-year seminars and experiences, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity/global learning, service/community-based learning, internships, and capstone courses and projects (Kuh, 2008). These activities, collectively, have been termed "High Impact Practices" (Kuh, 2008; Kuh et al., 2017).

The current study focuses on one of these high-impact practices, undergraduate research, in HDFS programs. Specifically, our study explored the benefits and barriers of undergraduate research for HDFS students as well as the pathways HDFS students may use to become involved in undergraduate research. The results of our study were informed by college student identity theory (Chickering, 1969; Chickering & Reisser, 1993), which is considered to be a foundational theory in the student development field (Harris, 2020). Although college student identity theory is a "student development" or "student affairs" theory and, thus, may be unfamiliar to our HDFS colleagues, we believe it can provide a useful complement to the assumed knowledge that we have related to emerging adult and adult development theories, and in particular, the work we do related to high-impact practices such as undergraduate research.

College student identity theory suggests that seven "vectors" of student identity development should be considered in college programming and curriculum development: developing competence, managing emotions, moving through autonomy toward interdependence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity (Chickering & Reisser, 1993). Developing competence refers to a sense of accomplishment or how students feel about their abilities in a variety of domains (intellectual, physical and manual, and interpersonal. Managing emotions includes the ability to be aware of, accept, and control positive and negative emotions. Moving through autonomy toward interdependence discusses the role of becoming independent while balancing the need for interdependence with others both emotionally and instrumentally (i.e., being able to do things in an independent manner). Developing mature interpersonal relationships refers to the complex challenge of balancing autonomy, interdependence, and intimacy with others. Establishing identity "encompasses all of the other vectors" and allows students to define who they are and who they are not across all domains of identity. Developing purpose concerns plans related to career and vocation, defining priorities, and living and making decisions intentionally. Developing integrity refers to the ability to consider and respect a variety of viewpoints and beliefs

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while acknowledging and recognizing one's own beliefs as well as aligning personal beliefs and behavior. It is important to note that these vectors are not thought to occur in stages, but it is acknowledged that some of the tasks associated with each vector are more likely to occur earlier in a student's development (Reisser, 1995).

Chickering (and colleagues) encourage higher education professionals (including faculty) to create environments that support the unique developmental needs of college students and hold true to the expectations and demands facing higher education today (Chickering & Reisser, 1993; Reisser, 1995).

Undergraduate Research: An Overview

Undergraduate research refers to a wide range of opportunities that provide undergraduate students with an opportunity to make a "scholarly or artistic contribution to knowledge" (Council on Undergraduate Research, 2021, "What are the benefits of undergraduate research?" section). Undergraduate research can take a variety of forms depending on institutional goals, requirements, and supports; curriculum structure; and faculty or student preference. Undergraduate research can be incorporated into required classes or offered as an independent study (for credit hours or not) and may be structured formally or informally. In addition, undergraduate research can be adapted to meet the needs of faculty, students, and programs.

Benefits of Undergraduate Research

The benefits of participating in undergraduate research are well documented and discussed in the literature (Lopatto, 2010; Council on Undergraduate Research, 2021). Critical thinking, written and oral communication skills, and interpersonal skills with diverse individuals are highly valued within the field of family science (Hamon & Smith, 2014). With this, HDFS programs may be particularly interested in the benefits related to the development of personal and professional skills (including critical thinking skills) and preparation for graduate school. Specifically, undergraduate research increases student self-confidence and self-awareness, organization and time management, and communication and presentation skills (Wolf, 2018). Students who participate in undergraduate research also report an increased ability to work independently (Lopatto, 2010), think critically, solve problems, and cope with failure (Wolf, 2018). Undergraduate research provides students with opportunities to experience and experiment with "real world" activities and develop skills specific to graduate school (Craney et al., 2011; Gilmore et al., 2015) or future careers (Craney et al., 2011). Lastly, students who participate in undergraduate research report more interest in graduate school (Kilgo & Pascarella, 2016) and develop more collegial relationships with faculty (Hunter et al., 2006; Wolf, 2018).

Barriers to Participation in Undergraduate Research

Despite the benefits of undergraduate research, barriers to participation must also be acknowledged. Barriers can be instrumental (e.g., lack of time, including the need to work) or informational (e.g., not knowing about opportunities; Mahatmya et al., 2017). Barriers may also be related to students feeling "not ready" for research or simply not interested (Mahatmya et al., 2017). Faculty may also have perceptions of undergraduate students that create barriers to participation. For example, faculty may feel that students lack adequate knowledge of their discipline and the research process or enough time to adequately or effectively engage in the research process (Wolf, 2018).

Pathways to Participation in Undergraduate Research

Currently, very little is known about the pathways students use when choosing to participate (or not) in undergraduate research (Mahatmya et al., 2017). Knowing the paths students take when opting in

or out of undergraduate research could help us better understand, encourage, and promote participation in this high-impact practice. For example, what is the institution's role in promoting undergraduate research? Should undergraduate research be embedded in degree plans or curricula? How does university culture contribute to the framing of undergraduate research for students (Mahatmya et al., 2017)? Do students prefer to hear about undergraduate research from peers or faculty? What types of advertising or promotion would be useful to encourage student participation in research? Answers to these types of questions can help us to better understand and promote this high-impact practice to HDFS students.

College Student Identity Theory

Chickering's theory of college student identity (Chickering, 1969; Chickering & Reisser, 1993) is considered a "foundational" student development theory (Harris, 2020). This theory can add depth to our discussion of undergraduate research in HDFS. Chickering's theory challenges higher education professionals (including faculty) to use considerations of human development as the primary organizer for our efforts in and outside of the classroom. Of course, as HDFS faculty, many, if not most of us, already apply theories of human development in our classroom and student development activities. However, faculty are likely not familiar with student development theories, such as Chickering's theory of college student identity, that can complement and enhance our efforts to best meet our students' needs (Hengesteg et al., 2021). This theory offers seven "vectors" of student identity development that could be of value in our programming and curriculum development: developing competence, managing emotions, moving through autonomy toward interdependence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity. It is suggested that these vectors serve as "highways for journeying toward individuation…each person will drive differently with varying vehicles and self-chosen detours. Eventually, all will move down these major routes**" (Chickering & Reisser, 1993, p. 35). Faculty have a responsibility to provide opportunities for students to put their vehicles on the highway, so to speak. It is our belief that high-impact practices, like undergraduate research, are invaluable because they provide students with multiple "highways" that can provide greater opportunities for actualization and growth.

The Present Study

As faculty, we have observed the transformative nature of undergraduate research in the lives of HDFS students. We have seen participation in undergraduate research lead to students choosing to continue their education at the graduate level, but even more important are the "lightbulbs" we have seen when students make connections between research and real-time questions. It is exciting to see their critical thinking skills activate in real-time and develop skills related to solving problems in a team and professional writing.

These observations led us to the following questions: What is the role of undergraduate research in the lives of HDFS students? What are the benefits of engagement in undergraduate research? What are the barriers? How can faculty better support student participation in undergraduate research? How can we ensure equal access and equity so that undergraduate research is for *all* students and not just for some?

Unfortunately, very little exists in the current literature regarding high-impact practices in HDFS programs, much less undergraduate research. This study attempts to better understand undergraduate research in HDFS programs through the lens of undergraduate HDFS students. The use of college student identity theory in framing our exploration adds depth to our understanding of the role of

undergraduate research in the identity development of college students. Specifically, our study addressed the following research questions:

Research Question 1: What are the pathways that HDFS students use to get involved in undergraduate research?

Research Question 2: Why do HDFS students participate in undergraduate research, and what are the perceived benefits of undergraduate research?

Research Question 3: What barriers do HDFS students face that keep them from participating or restrict their involvement within a research project?

Research Question 4: What can faculty and, ultimately, the university do to make involvement in undergraduate research easier and more rewarding to students?

Methods

Students majoring in HDFS at a Midwestern university were invited to participate in our study. An email was sent to students enrolled in one of three courses: a college common core course, an HDFS introduction to research methods course, or a faculty-led research practicum course. These courses were selected for recruitment because the first two classes included information on undergraduate research, and the practicum course comprised students participating in undergraduate research. The email invited students to participate in a one-on-one interview regarding their experiences with undergraduate research, whether they had participated in undergraduate research or not.

Participants

A total of 22 undergraduate HDFS students participated in the study. Thirteen of the participants had been (or were currently) involved in undergraduate research, and nine participants had not. Of the 22 participants, 20 were female, and two were male. The average age of participants was 22.38 (Range = 19 – 54), and a majority (82%) identified as White. Our sample consisted primarily of upper-division students. A majority (82%) of the participants worked in addition to going to school, and most of the participants (77%) planned to go on to graduate or professional school (see Table 1).

Interview Procedure

Semi-structured interviews were conducted in an office or conference room on campus. Interviews lasted between 20 and 60 minutes, were digitally recorded, and were transcribed verbatim. The interview questions focused on how participants learned about undergraduate research opportunities, their perceptions of barriers to involvement in research, and their suggestions for what could be done to reduce or overcome those barriers. Additional questions were asked of those who were involved in undergraduate research, including pathways students took to get involved in research, what their undergraduate research experience was like (e.g., the project in which they were involved, their responsibilities, etc.), what motivated them to get involved in undergraduate research, their perceived benefits of undergraduate research involvement, and how they overcame any barriers to participate in undergraduate research. Follow-up questions were asked as deemed appropriate by the interviewers. The interview concluded with demographic questions.

Table 1

Sample Demographic and Descriptive Statistics

	Full Sample (*n* = 22)	Involved in Research (*n* = 13)	Not involved in research (*n* = 9)
	n (%)	*n* (%)	*n* (%)
Gender			
Female	20 (90.9%)	11 (84.6%)	9 (100%)
Male	2 (9.1%)	2 (15.4%)	0 (0%)
Race			
White	19 (86.4%)	12 (92.3%)	7 (77.8%)
Black	1 (4.5%)	0 (0%)	1 (11.1%)
Multiracial	2 (9.1%)	1 (7.7%)	1 (11.1%)
Academic class			
Seniors	13 (54.5%)	10 (69.2%)	3 (33.3%)
Juniors	7 (31.8%)	2 (15.4%)	5 (55.6%)
Sophomores	2 (9.1%)	1 (7.7%)	1 (11.1%)
Honors students	3 (13.6%)	3 (23.1%)	0 (0%)
First generation students	6 (27.3%)	3 (23.1%)	3 (33.3%)
Worked while attending school	19 (86.4%)	11 (84.6%)	8 (88.9%)
Planned to attend graduate/professional school	18 (81.8%)	13 (100%)	5 (55.6%)
	M (range)	*M* (range)	*M* (range)
Participant age	22.32 (19-54)	23.7 (20-54)	20.33 (19-22)
Hours worked per week	21.39 (5-47)	21.14 (10-40)	21.75 (5-47)

Data Analysis

     Thematic analysis methods were used to analyze the data (Nowell et al., 2017). Each member of the research team read the interview transcripts and made notes regarding the data and initial coding ideas. Next, we met as a team to discuss initial codes and develop a codebook. Once the initial codebook was established, the research team members independently coded the first transcript, coding smaller pieces of data, often sentences or paragraphs. After coding the initial transcript, all members of the research team met together to review the coding of the transcript, reach a consensus in places of disagreement, and revise the codebook. This process continued for the remainder of the transcripts until all transcripts were coded. At this point, team members engaged in searching for themes (Nowell et al.,

2017). The themes that captured important aspects relating to the research questions were identified. These themes are significant concepts that link the data together (DeSantis & Ugarriza, 2000). After identifying initial themes, the themes were reviewed, defined, and named by the research team (Nowell et al., 2017).

Results

Students involved in undergraduate research shared that there were multiple pathways to becoming involved. These pathways included interest in a specific research topic, connection with the researcher, and preparation for graduate school. Students involved in undergraduate research perceived numerous benefits, including enhanced learning, professional skills, personal growth, and relationships with others. The students who did not participate in the research did so for various reasons, often citing multiple barriers. The most cited reason for not participating in research was lack of time due to work or extracurricular involvement. Students also mentioned that they felt intimidated by the process, discovered the opportunity too late in their undergraduate career, did not want to commit, did not think undergraduate research sounded interesting, had not yet found a project of interest, or failed to connect with a faculty member (e.g., a perceived email communication failure). Both students who were and were not involved in undergraduate research identified barriers to participating in research (i.e., time, being unaware of undergraduate research, and being fearful or intimidated) as well as specific processes for students and faculty to overcome these barriers. Direct quotes from students who participated in undergraduate research are noted with a (P); direct quotes from students who did not participate in research are noted with a (DNP).

Pathways to Participate in Undergraduate Research

There were several pathways students used to participate in undergraduate research. Some were interested in a specific research topic; others connected with the researcher; many students believed that involvement in undergraduate research would help prepare them for graduate school.

Interest in the Topic

Personal interest or passion for the research topic was mentioned as a driver for involvement in undergraduate research. One student explained, "The things that we were researching were things that I was really passionate about, and they were ways for me to try and improve the lives of other people" (P). Another student who wanted to become a Marriage and Family Therapist explained why she selected the research project in which she got engaged.

> It said something about parenting between divorced parents. I was like, "I have a personal interest in that just because of my family history, and then also professional interest because of what I want to do." I thought that was a really interesting topic. (P)

Connection with the Researcher

A personal connection with the researcher was also mentioned as a reason for becoming involved in undergraduate research. For instance, one student who was enrolled in a class about trauma was particularly interested when this professor described a research project in class. She explained:

> I feel like having Dr. [Professor], my own professor, say, 'We have this research and you guys knew about this trauma stuff. This is a way to get more experience and learn more about it,' was really the factor that really pushed me to participate in undergraduate research. (P)

Other students found that when they met the researcher, they felt a connection and wanted to work with that person. One student explained:

> I got connected to [my research mentor], and it was one of those relationships where we started talking and getting to know each other, and he instantly was just like, "We need to do some research together and start thinking about these things more critically." He definitively guided me along that way, but it wasn't difficult; it just felt really natural, like, "This is what I should be doing." (P)

Having a personal connection to the researcher made students more comfortable and increased their likelihood of getting involved in undergraduate research.

Preparation for Graduate School

Students' perception that undergraduate research was a good experience to prepare them for graduate school or that participation was good for one's résumé was a motivator for involvement in undergraduate research. One student said:

> Honestly, I was very skeptical about it in the beginning, but everyone was like, "It looks good on my résumé. It looks good for grad school," and just stuff like that. So, I got involved with it, and I ended up actually liking it, so I just stuck with it. (P)

Another student said, "I wanted to be a competitive student, and I wanted to be prepared for when I applied." (P) Another student echoed this statement.

> I guess a part of this issue is I wanted to go to grad school. I figured that getting involved would set me apart from everyone else. I didn't really know anyone that had done undergraduate research. I figured it would put me apart from everyone else. (P)

Benefits Gained from Research Involvement

HDFS students who were involved in undergraduate research perceived various benefits that were gained through the experience. These benefits included enhanced learning, professional skills, personal growth, and relationships with others.

Enhanced Learning

Students indicated that they learned about the research topic as well as how to conduct research through their involvement in undergraduate research. One student said:

> I knew that I thought family studies concepts were interesting, but I never really thought that I would have opportunities to dive this deep into them. As a result of that and as a result of having enjoyed those experiences, I'm definitely considering going on to master's programs and higher levels of education that I didn't think I was ever going to reach. (P)

Another student explained the importance of the hands-on experience for understanding and retaining what they learned in class.

> I definitely learned a lot because you learn in your classes all this stuff, but then you see it first-hand when you're doing the research and watching the kids on the videos and stuff like that. I was able to apply it. (P)

Professional Skills

Students involved in undergraduate research believed that their participation helped them gain professional skills that were of value to them in their current undergraduate program and that they believed would also prepare them for graduate school or a career. For example, one student said:

> I think it just made me a lot stronger of a writer, a lot of writing skills. I also think it made me a lot better when it comes to…reading research papers in general, like what to look for, and being more of a critical thinker. (P)

Another student explained how what he learned through the research project aided him as he applied to graduate school.

> I know that it helped with the [graduate school application] because I had to write an analytical essay alongside my personal statement. I chose to talk about military sexual trauma and some of the research into alternative treatments or new models for research, and that was my analytical essay. I think the only reason I was able to do that is because of what I'd learned from working with Dr. [Professor] and actually doing research. (P)

Students also perceived value in the presentation opportunities that were provided through their participation in undergraduate research. One student said:

> I've had opportunities to present alongside that first research professor, whether it was at the National Council on Family Relations annual conference, [our university's] Undergraduate Research Forum, or throughout the region at different events…. That definitely gave opportunities for me to develop in that professional sense, but also the community presentations, getting to hear about the impact that the research we had conducted was really meaningful. (P)

Personal Growth

Students in our study believed that they grew personally because of their involvement in research. Personal growth looked different depending on the student, but some ways in which students grew personally are through increased confidence, gaining a new perspective, and being more assertive. One student said, "I think it gave me a new perspective on my education." (P) Another student said, "Undergraduate research has definitely propelled me and my self-confidence." (P) Another student explained:

> I'm not a very assertive person; conflict is not my favorite thing in the world, which the Conflict Analysis and Trauma Studies minor has helped me with…In meetings, as the head undergraduate, it is my role to stick with deadlines and make sure the team is, and I feel I've been more assertive. Not rudely assertive, but just taking charge of a project, so I guess my personality changed. (P)

Relationships with Others

Students also indicated that relationships with their research mentor or members of their research team were a perceived benefit of their participation in undergraduate research. When asked what benefits she gained from being involved in undergraduate research, one student explained:

> Most definitely networking. I've met so many people through being involved in research. It's as if I feel like gaining a huge relationship with Dr. [Professor]. She has written me so many recommendation letters for internships and jobs and everything. It led to a teaching position with her, which is my job. (P)

Another student said:

> Then also, I think just like the mentor relationship that I've developed with Dr. [Professor] has been a huge benefit to me. That's one of the big things I would say I have gotten from it. Just having that professor to be able to go to with anything, school related or otherwise. It's been really awesome. I've learned a lot from her. (P)

Students also explained that they gained relationships with other students who were on the research team.

> I like the relationships that I've built with the team that I'm on right now…We have dinners, and we do fun stuff, too. It's not just like doing research and then you're done. We all interact all the

time; there are always people in and out, and it's just kind of fun. We'll bring food into the lab and stuff. (P)

Although most students initially got involved in undergraduate research to learn more and gain experience that would be beneficial in preparing for graduate school, the benefits students reported were far-reaching and supported the students both personally and professionally.

Barriers to Research Involvement

There were numerous perceived barriers to participation in undergraduate research reported both by students who engaged in undergraduate research and those students who did not participate. These barriers can be described in three main themes: time, unaware of undergraduate research, and being fearful or intimidated.

Time

The most frequently mentioned barrier to involvement in undergraduate research was time. Many students viewed undergraduate research as something that required a commitment, and one had to have the time to devote to their involvement each week. One student said, "I just didn't think I had the time, and I didn't want to commit and not have enough time and to disappoint a professor." (DNP) For others, enrollment in a heavy course load and/or employment interfered with their ability to consider participation.

Unaware of Undergraduate Research

Some students were unaware of opportunities to engage in undergraduate research. For some, this meant they were unaware that undergraduate students could work with faculty on research projects. Other students who had heard general information about undergraduate research did not know about the variety of research topics and the number of projects in which undergraduate students could get involved, particularly within the field of HDFS. One student said, "Yes, because I guess I didn't know how many [opportunities for undergraduate research] there really were on campus. I still don't even know how many different opportunities there are. I saw most of the people [doing] very sciency things." (DNP)

Other students learned about undergraduate research opportunities but felt that it was too late by the time they learned about them. This was particularly true for seniors who felt that by the time they learned what was involved and how they could participate, they either had too many other things that they were already committed to or they did not think it would work for them to be involved for a short amount of time, such as a semester. Some students did not know about the whole process of getting involved until it was perceived to be "too late."

Being Fearful or Intimidated

Some students indicated they were intimidated by the prospect of being involved in research. Students did not think they had the ability to be involved and positively contribute to the research process. One student commented:

I was just like, 'They are really smart, I'm not smart enough to do that,' or something like that. It's really why I deferred from it. I was a girl, and like I must not be good enough to do that. (DNP)

Other students did not understand what was involved in research, particularly within the field of HDFS, and were fearful of the unknown. One student said:

> I think a big part of it was just that I didn't know what undergraduates did in research. I felt like if I had known more about what transcribing really meant and what coding really was [I would have joined a team earlier]. (P)

Another student explained:

> I was just really nervous because I was a freshman and I had little experience. I was getting interviewed by these Ph.D. students, and so it was kind of intimidating. Like how I mentioned earlier, I really feel like research isn't really well explained to undergrads. We just say this word, but no one really tells us what it entails. I think a lot of undergraduates see it as like, "This is something that Ph.D. and faculty, like professors, do. I can't do that stuff." I think it was just those feelings of, "I don't really know if I can do this." (P)

Overcoming Barriers to Research Involvement

Although students in our study identified numerous perceived barriers that made involvement in undergraduate research difficult, many were able to identify strategies that might help overcome these barriers. Two main groups of strategies for overcoming barriers were identified: those related to time and those related to access.

Overcoming Time Barrier

Feeling as though one did not have enough time or that they were over-committed in other areas was a major barrier to undergraduate research involvement. Some students involved in research who experienced this barrier found it helpful to structure their time. One student explained:

> I just, if I'm not doing anything, like right before I came here, I had 45 minutes. I was just working on my research. I just really work on it whenever I have free time, and I set aside time each Tuesday and Thursday morning to do at least 4 hours. (P)

In addition to structuring time, some participants thought it would be helpful to provide incentives to allow students to be able to better fit research into their schedules. One example of this is offering funding for students' undergraduate research involvement. This could help reduce the potential need for students to work outside of school, reducing the time barrier. One student said:

> I'm not sure what actions the university is able to take as far as funding different research teams. I think that might be a barrier for some people….making sure that research teams from the top have the support and have the resources they need in order to operate." (P)

Others described the opportunity to get college credit for their research involvement. This helped students to be able to account for the time in which they are engaged in research through their credit hours. One student explained:

> I actually am taking it for credit. That was the only change as I added it to my credits, which makes it easier to be able to do it because I don't have as many classes. But next semester, I'm not taking it for credit. I will be in 15 hours and then also research; I feel it will be more difficult [laughs]. (P)

Overcoming Access Barriers

Students in our study believed that access to undergraduate research could be improved by (a) using a variety of methods to share information about undergraduate research, (b) having multiple individuals share about undergraduate research, and (c) having a streamlined onboarding process.

    Using a Variety of Methods to Share Information about Undergraduate Research. Students believed that it was important to utilize a variety of methods to help motivate and educate students about the benefits of getting involved in undergraduate research. Numerous ideas were generated, including

activities and communication that could occur at the department, college, and university levels. For example, it was suggested that "fairs" where students could see the options available for participation and talk to others about their experiences would be useful to students.

> I think, definitely having like a fair, others like the career fair and like the major and minor and more fair and have people there to talk about what the experience is like to do undergraduate research. (DNP)

They also believed it useful to hear faculty talk about undergraduate research opportunities in classes or at meetings of student organizations.

> Just, I guess, for me, personally, one barrier that stood in the way as far as faculty and stuff goes is I didn't really know who was who. For me, personally, that's kind of a worrisome thing. Just on a side note that, when you e-mailed me, I was like, "I don't really know who she is. I've never met her." Just stuff like that. I feel, as far as faculty goes, if they-- I know it takes extra work, and I know it's difficult thing because I know everyone has their own schedules. Even if whoever was conducting that research came to a class maybe once a semester and just, I guess, promoted their research, just to get their face out there and just say why they're passionate about it and just hear that from their own mouth, I definitely think that could have made a difference, for me, personally is if they would have come and personally talked about why they got involved in this research, why they do this research. I think that could make a huge difference. (DNP)

Bulletin boards, websites, and emails were also mentioned as ways they learned about undergraduate research and strategies they believed could be useful to other students.

Multiple Individuals Sharing Undergraduate Research. Participants also described the importance of having a variety of individuals involved in promoting research opportunities, rather than just the Primary Investigator or a college or University level contact. These students described the importance of having faculty, GTAs, and advisors knowledgeable about undergraduate research opportunities to promote student engagement when working with students. One student said:

> I talked to my advisor. I've been interested in going into marriage and family therapy since the very beginning. My advisor was always just like, "Research, research, research." Talking about how important that was. I've had it in my head that I needed to get involved. (P)

Other participants believed that peer-to-peer promotion of undergraduate research would be useful. They explained that this would help them to be able to relate better and potentially identify themselves as someone who could get involved in undergraduate research. One student said:

> Because students are going to hear it from professors over and over and over again, but I think hearing it from someone that is their age that has been in their position is a great way to have them understand the benefits that we've gotten from it. (P)

In some cases, students made it clear that explaining the research process and what would be involved was important, essentially advocating for increased transparency about undergraduate research. One student explained, "Don't just say research, give like three examples of things they could participate in research and broad things that most people would be interested in." (DNP) Students also felt it was important to express the benefits students could gain from their involvement. One student said:

> I guess just explaining how it's important and how it can benefit you in the long run because it increases your writing skills and stuff like that. It'll help you in the workplace and be able to go and research something that you think might be useful in your job. (P)

Streamlined Onboarding Process. Students also suggested that reducing unnecessary processes could help more students to participate in undergraduate research. Based on their experiences, having

simple processes for participation helps increase student engagement in undergraduate research. This student provided an example of an "easy" process:

> Dr. [Professor's last name] and [GRA] were the first ones that emailed their [research] team, and within the next day, [the GRA] emailed me and said we could have a meeting. I went and just gave her – she asked for my résumé, and she said, "Okay, perfect. See you in August," and I said, "Okay." (P)

Another student shared:

> It was really easy. I just emailed Dr. [Professor's last name], and he set up a meeting to talk about it. I was interested, then I started coming to their meetings just to see if I would like it, and then I got asked to be on the team. (P)

Discussion

Our study's results support the beneficial role that undergraduate research plays in supporting the success and identity formation of HDFS undergraduate students and the role that high-impact practices (like undergraduate research) can play in HDFS programs. In addition, our study helps us better understand the various pathways HDFS students take when participating in undergraduate research, the barriers students face, and provides suggestions to support students in overcoming these barriers.

Chickering's college student identity theory (Chickering, 1969; Chickering & Reisser, 1993) was used to frame the results of our study. Chickering's theory suggests that participation in undergraduate research does more than provide benefits such as preparation for graduate school or personal and professional growth. Participation in undergraduate research appears to provide opportunities for students to grow and develop at a more in-depth or "holistic" level, which many would argue is the goal of higher education (Chickering & Reisser, 1993; Kuh, 2018; Mintz, 2020). Specifically, our results suggest that HDFS student participation in undergraduate research addresses three unique aspects of college student identity development: developing competence (intellectual and interpersonal), managing emotions, and developing purpose. In other words, undergraduate research provides an "educationally powerful environment" that promotes and encourages college student identity development (Chickering & Reisser, 1993).

Intellectual Competence

Intellectual competence includes gaining knowledge and skills specific to a discipline, increased interest in learning and curiosity about a broader range of topics, and enhanced ways of thinking critically about issues and topics (Chickering & Reisser, 1993). Perhaps not surprisingly, results from our study confirm that participation in undergraduate research supports the development of intellectual competence (Council on Undergraduate Research, 2021; Kilgo et al., 2015) and professional skills (Craney et al., 2011). To our knowledge, our study is the first to offer confirmation of this benefit to HDFS students. Undergraduate research allowed the students in our study to explore topics of interest to them in greater depth and learn more about content areas in our field, as well as the research process. Participation allowed students to go from an initial curiosity about a topic to gaining greater competence on one or more specific topics.

Interpersonal Competence

Interpersonal competence was also a key outcome of participation in undergraduate research. As others have noted (Kilgo et al. 2015), participation in undergraduate research teams provides students with opportunities to interact with others that they might not have normally chosen to or had the opportunity to interact with (Wolf, 2018), develop skills for working with diverse others (Kilgo et al.,

2015), and create friendships (Craney et al., 2011). This provides invaluable opportunities for developing interpersonal competence—skills needed to work effectively with others as leaders, followers, or in teams and collaborations (Reisser, 1995). In our study, the development of interpersonal competence was evident in the examples students shared related to personal growth (conflict management, becoming more assertive) as well as the relationships they developed with others on their research teams. Students who did not see themselves as leaders found themselves in leadership roles and developed new skills because of it. They developed friendships with peers and professional relationships with mentors and grew personally and professionally through these experiences.

Managing Fears and Intimidation

Relatedly, a unique finding of this study is that participation in undergraduate research provided a natural environment for learning to manage one's emotions. Students in our study specifically mentioned that fear and intimidation were emotions they experienced related to undergraduate research. For some, fear or intimidation kept them from participating; others shared that the process of participating in research helped them overcome their fears or feeling of intimidation.

Developing a Sense of Purpose

Lastly, undergraduate research supports students in developing a sense of purpose regarding their career plans, priorities, or choices they make regarding their life and how they spend their time (Reisser, 1995; Wolf, 2018; Yaffe et al., 2014). In our study, students made the connection between undergraduate research and plans for attending graduate school as part of their career plans. In some cases, their desire to attend graduate school was the path that led them to participate in undergraduate research, but in other cases, participation in research led to the decision to attend graduate school. Students also shared that being a member of a research team and the sense of purpose created by their membership led them to prioritize their time to align with their new identity as a researcher, even though it was challenging at times. Others have reported this finding related to time; undergraduate researchers surveyed by Wolf (2018) reported that participating in undergraduate research "forced" them to be more organized and better at structuring time.

Implications

Our results provide initial support for the value of undergraduate research for HDFS student identity development and information on the pathways, benefits, and barriers related to undergraduate research for HDFS students. Based on these results and our personal experiences with undergraduate research, we recommend that HDFS programs include or continue to grow this high-impact practice. Not only is undergraduate research a transformative experience for students (Yaffee et al., 2014), but it also provides benefits to faculty and HDFS programs by enhancing student learning, supporting retention and graduation, preparing students for graduate programs, and creating a culture of thought and innovation (Council on Undergraduate Research, 2021).

We offer a few suggestions as HDFS programs look to add or grow their undergraduate research offerings. First, it is important to ensure that the pathway to participation in undergraduate research is clearly marked with multiple on-ramps for students depending on their stage of development, knowledge of undergraduate research, professional goals, and campus culture (Mahatmya et al., 2017). For some students, an interest in the topic may be the clearest path. For others, connection with the researcher may be the most critical. Others are motivated because of their interest in graduate school. Because of this, we recommend that faculty use a variety of means to educate and invite students to participate based on the unique nature of your campus. For example, campus fairs are a popular way for students to learn

about engagement opportunities, but this may not be true on all campuses. Our study also suggests that it is important for students to hear about undergraduate research from various sources: peers, advisors, teaching assistants, and faculty. Faculty discussions of the benefits of research, which can occur in a variety of ways, is also a strategy suggested by our students. Our students described this as faculty "showcasing" their research. Showcasing could occur in classes, on social media, during events, or in other ways relevant to a particular campus.

HDFS programs should also actively attempt to reach students who may not think that undergraduate research is for them or might be scared or intimidated. Faculty should also reach out to students who may not seem like the undergraduate research type (Kilgo & Pascarella, 2016). Faculty can reach these students by asking students about and working to address specific barriers that may be preventing student participation related to time, awareness, and fear or intimidation of the research process. Messaging related to undergraduate research could also specifically address these barriers.

Limitations & Future Directions

There are several characteristics of our sample that present limitations to this study. First, although our sample is representative of HDFS undergraduate research participation on our campus, it is a relatively small sample (13 involved, nine not involved in undergraduate research). The sample was also majority female, white, and "traditional" (the majority of students were between the ages of 18-24; all were students on campus versus online). Participants in our study were primarily upper-division students, and very few (4) identified as first-generation college students. Additional research on a more diverse sample of participants would be useful as we seek to better understand this experience for HDFS students, including students of non-traditional age and those who attend college online (Faulconer & Gruss, 2019; Levin & Grewe, 2020).

The students in our study who participated in undergraduate research did so voluntarily, not as part of a course curriculum, although some students did choose to apply their research participation to an independent study for credit. Future research could explore if we saw the same type of student development benefits, barriers, and pathways if undergraduate research is embedded into the curriculum or a summer program.

Conclusion

Our research supports the important role participation in undergraduate research may provide HDFS undergraduate students. We encourage HDFS faculty to consider providing multiple pathways for students to participate in undergraduate research and to work to eliminate barriers for students to participate.

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