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To cite this article: Rachel Wishkoski, Diana J. Meter, Sarah Tulane, Michael Q. King, Kevin Butler & Laura A. Woodland (2022) Student attitudes toward research in an undergraduate social science research methods course, Higher Education Pedagogies, 7:1, 20-36, DOI: [10.1080/23752696.2022.2072362](https://doi.org/10.1080/23752696.2022.2072362)

To link to this article: <https://doi.org/10.1080/23752696.2022.2072362>



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Published online: 05 May 2022.



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## Student attitudes toward research in an undergraduate social science research methods course

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### ABSTRACT

This study used a mixed-methods longitudinal design to investigate change in students' understanding, attitudes, anxiety, perceptions of relevance, and disinterest in a required social science undergraduate research methods course across a semester. Participants were 78 undergraduates (94% women, 6% men; 92% white non-Hispanic/Latinx,  $M$  age = 25.62,  $SD$  = 7.17) at a university in the United States. Results suggest that participant attitudes toward and perceptions of research methods shifted over the course of the semester. Overall, anxiety decreased, while positive attitudes increased. However, initial perceptions and changes in perceptions varied among the three course sections. Over time, students largely recognized the course's relevance and conveyed positive attitudes toward research and their success in overcoming the challenge of completing the course. Implications for pedagogy include the need for continued assessment of learners, development of students' self-concept as researchers, teaching of research as a process, and connection to application.

### ARTICLE HISTORY

Received 11 August 2021  
Revised 4 February 2022  
Accepted 25 April 2022

### KEYWORDS

Research methods instruction; student attitudes; student perceptions; human development and family studies; undergraduate students

Research methods courses are required in most social science degree programs. For students training for social sciences and human services professions that require research-informed practice, understanding research methods and developing information literacy skills are essential. Despite their importance, research methods courses are often among the most dreaded and anxiety-provoking classes for undergraduate students (Slocum-Schaffer & Bohrer, 2019). Synthesizing 51 articles from a variety of fields, Earley (2014) identified five perceptions shared by students taking research methods courses: irrelevance, nervousness or anxiety, lack of interest or motivation, negative attitudes, and misconceptions about research. Earley's findings emphasize the importance of shifting student perceptions from anxiety and fear to more positive attitudes that facilitate learning. Because students' experiences in social science research methods courses are associated with their attitudes and perceptions of the area of study (Murtonen & Lehtinen, 2003; Vittengl et al., 2004; Woolf, 2017), it is imperative to understand the ideas about research methods students bring to the class, and whether these attitudes and perceptions can change to more positive ones over the course of the semester.

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This exploratory study assessed undergraduate student attitudes toward and perceptions of research in a required research methods course. Using a mixed-methods longitudinal design, we investigated changes in students' understanding, attitudes, anxiety, perceptions of relevance, and disinterest across a semester in a Human Development and Family Studies (HDFS) undergraduate research methods course at Utah State University, a mid-size research institution in the western United States.<sup>1</sup> HDFS is an interdisciplinary program of study that has similarities to Developmental Psychology, Sociology, Anthropology, and other human-centered social sciences. Individuals with an undergraduate degree in HDFS pursue careers in human services, including teaching and education, advocacy and non-profit work, business, health, and research. Students in this major typically join the major after completing general education requirements. They then can choose which courses to take that best match their emphasis in family and community services, child development, family finance, or human development across the lifespan. For any of these concentrations, students are required to take research methods, and typically do so during their third (junior) or fourth (senior) year.

This mixed-method, longitudinal study constitutes a research-based assessment of learner perceptions and attitudes to inform future pedagogical intervention. The study seeks to assess the constructs surfaced in Earley's (2014) analysis within the population of undergraduate students taking HDFS research methods in an academic year, and across course delivery formats and instructors. By seeking quantitative and qualitative understanding of the student experience, we – and other social and behavioral science research methods instructors – are better positioned to frame learning environments that foster student success. This study offers both a model for assessment and implications for practice based on learner-centered pedagogy.

### Attitudes and perceptions

Students' experiences in social science research methods courses are influenced by their attitudes (Murtonen & Lehtinen, 2003; Vittengl et al., 2004; Woolf, 2017), preparation for the course (Kawulich, Garner, & Wagner, 2009), and perceptions of the course content's relevance to their field of study and further professional pursuits (Murtonen, 2015). Students in the United States often delay taking required research methods courses due to reluctance surrounding the topic (Slocum-Schaffer & Bohrer, 2019), hypothesized to develop at different points in education. Some students report that poor knowledge and awareness of research methods prior to enrolling in the course leads to anxiety (Balloo, 2019; Kawulich et al., 2009; Papanastasiou & Zembylas, 2008; Woolf, 2017), while others point to statistics as a particular area of stress before and during research methods courses (Clark & Foster, 2017; Sizemore & Lewandowski, 2009).

Library research also documents students' anxiety and fear about research methods. Issues include 'library anxiety' (Mellon, 1986; Platt & Platt, 2013), fears about the research process (Hulseberg & Versluis, 2017), and worries about the course itself. For example, Slocum-Schaffer and Bohrer (2019) collected data for a 17-year period at two institutions in a Political Science research methods course. 'Fear and loathing' were exacerbated by students' anxieties about their skills and rumors surrounding the course and were mitigated by pedagogical approaches that emphasized the relevance of the course materials to life, active learning, and research as a process (p. 1).

Some studies show that anxiety and perceptions of research methods can improve by the time of course completion (Harlow, Burkholder, & Morrow, 2002; Hosein & Rao, 2017). Improvements are tied to perceived utility of research methods (Owen, 2017; Rubenking & Dodd, 2018), more positive attitudes towards statistics (Ciarocco, Lewandowski, & Van Volkom, 2013), and gaining confidence in research processes through practice (Hosein & Rao, 2017; Woolf, 2017). Because there is variation in student background and abilities upon entering a research methods course (Nind & Lewthwaite, 2018), students also benefit when course learning outcomes are scaffolded throughout a degree program. For example, skills gained in prerequisite courses covering research and writing skills are transferrable to other courses (Cook & Murowchick, 2014). Together, the literature suggests instructors must be aware of students' varied preparation for research methods courses and the anxiety about the course that could impede their success.

### ***Knowledge and performance***

Many studies also assess students' confidence and self-efficacy (Balloo, 2019; Gilbert, Knutson, & Gilbert, 2012; Kawulich et al., 2009; Marchand & Gutierrez, 2012), which may or 'may not coincide with their actual abilities' in research methods and information literacy (Hulseberg & Versluis, 2017, p. 22). Findings are mixed. For example, one study reported student performance improved across the semester, but confidence did not ( $n = 24$  students; Hulseberg & Versluis, 2017), whereas other studies with small sample sizes found the opposite, suggesting that students may overestimate their skill development (Gross & Latham, 2007, 2009; Polkinghorne & Wilton, 2010). However, in a larger study of over 1500 students from five universities, third- and fourth-year students rated their own self-efficacy in information literacy competencies lower than their perceived importance of those competencies (Pinto et al., 2016). This suggests that by the time students reach research methods courses, they may make clearer assessments of their strengths and areas for growth. Knowledge gained and ability to apply research methods skills are important outcomes for any social science research methods course; therefore, understanding students' attitudes and perceptions of research methods, and how they impact learning, is important for instructors and librarians.

### ***Self-determination theory***

Self-determination theory (SDT) is used to understand behavior and examine various contexts focusing on individuals' needs for competence, relatedness, and autonomy (Ryan & Deci, 2017). In educational settings, SDT assists with understanding students' autonomous motivation and subsequent success in the classroom, and the support teachers provide to enhance student autonomy (Reeve, 2004). From a self-determination lens, when autonomy, competence, and relatedness are supported, students experience improved learning outcomes and internalized motivation (Niemic & Ryan, 2009). As mentioned earlier, lack of interest and motivation and negative attitudes (Earley, 2014) are noted perceptions surrounding research methods courses. Using an SDT lens to examine students' experiences in research methods courses can assist with a deeper understanding of contextual elements that can improve

autonomy, subject matter competence, and ultimately motivation. In the current study, we examine baseline and change in concepts that either mirror or potentially contribute to these factors: anxiety/nervousness, b) failure to see relevance, c) misconceptions about research, d) negative attitudes toward research, and e) disinterest/lack of motivation.

### **Current study**

This study is a systematic assessment of changes in students' perceptions of and attitudes towards research in a methods course with a librarian-delivered information literacy component, using established measures that map onto Earley's (2014) framework of student perceptions. In addition, this study fills a disciplinary gap. The disciplines most frequently represented in the information literacy literature on research methods education are Psychology (e.g. Cook & Murowchick, 2014; Henrich & Attebury, 2012; Platt & Platt, 2013; Thaxton, Beth Faccioli, & Mosby, 2004) and Political Science (e.g. Gilbert et al., 2012; Marfleet & Dille, 2005; Polkinghorne & Wilton, 2010; Slocum-Schaffer & Bohrer, 2019), with a handful of studies from other areas such as Sociology and Geography (e.g. Ackerman & Gazley, 2020; Hulseberg & Versluis, 2017). Little to no information literacy or pedagogy research has been published with Human Development & Family Studies (HDFS) undergraduate or graduate student participants (but see Meyer, Bowden Templeton, Stinson, & Codone, 2016 for a study with Marriage and Family Therapy Master's student participants and Arocho, 2021 for an in-progress qualitative study exploring undergraduate HDFS students' anxieties about research methods; neither include a library perspective). This study's focus on HDFS students fills that gap. It is also relevant to research methods pedagogy in related human-centered social science fields and those that prepare students for careers in diverse human service professions.

The two HDFS undergraduate research methods instructors teach their courses differently, but a few learner-centered principles guide the development of assignments and course structure in both courses. These principles are: 1) scaffold student learning through teaching adapted to student baseline knowledge, attitudes, and anxiety, 2) help students develop their identity as junior researchers, and 3) facilitate students' ability to make connections between the course content and application. The online course reaches these learning goals through weekly quizzes, book group discussions, written papers analyzing relevant quantitative publications in the field, and a final article analysis including a presentation. The face-to-face course reaches these learning goals through an original written research proposal and presentation. Each course also includes student reflection throughout the course. Both courses utilize library instructional materials to help students navigate and comprehend quantitative research relevant to the field. Although the goal of this study was to assess change in students, a secondary goal was to understand whether our current courses provided a context in which students could improve their perceptions of and attitudes toward research methods.

The aims of this research are as follows: First, investigate changes in students' reports of anxiety, relevance, attitudes, and disinterest across the course of the semester. Second, explore changes in participants' open-ended responses to questions probing past and current perceptions and understandings of research.

## Materials and methods

### Participants

This study targeted the 100 undergraduate students enrolled in HDFS research methods in fall 2019 and spring 2020, including the face-to-face version taught both semesters (24 students in fall, 19 in spring) and the online version taught in spring only (57 students). See above for descriptions of each course, both of which were based on shared learner-centered principles and included information literacy components (database tutorial and in-person instruction and for face-to-face sections, and a database tutorial and Canvas module content for the online section).

All students were required to complete survey assessments at four approximately equidistant time points during the semester. Students earned credit on a complete/incomplete basis for these assignments. Responses were collected using Qualtrics and were anonymous; a linked survey allowed students to receive credit. Responses were linked across time points using a participant-generated numeric code. At the end of the final survey, students decided whether to have their data included in the study. Seventy-eight students consented to participate, five men and 73 women. Ninety-two percent of the sample identified as white non-Hispanic/Latinx. Participants' average age was 25.62 years ( $SD = 7.17$ , range = 19–54). These characteristics are typical of the major, which includes mostly women traditional students and a predominantly white non-Hispanic/Latinx student body. One student was removed from the analysis because they only participated at the first time point.

### Measures

Participants completed identical pre/posttest surveys at the beginning and end of the course consisting of fixed- and open-response items. The open-response items were repeated at two semester midpoints. Fixed-response items were compiled from two existing measures: The Disinterest, Relevance Argumentation, and Math Anxiety (D.RA.MA) scale (Briggs, Brown, Gardner, & Davidson, 2009) and the Attitudes Toward Research (ATR) scale (Papanastasiou, 2005).

In combination, these measures assessed Earley's (2014) five constructs – a) anxiety/nervousness, b) failure to see relevance, c) misconceptions about research, d) negative attitudes toward research, and e) disinterest/lack of motivation. Two subscales of D.RA.MA, relevance argumentation and research disinterest, mapped to failure to see relevance and disinterest/lack of motivation. ATR assessed research anxiety, positive attitudes toward research, perceptions of usefulness for profession, and relevance to life. Some items were reverse coded before items were averaged into constructs.

### Anxiety

Anxiety was measured using eight items from ATR. Items were scored on a scale from 1 = *Strongly disagree* to 7 = *Strongly agree*,  $\alpha T1 = .93$ ,  $\alpha T2 = .91$ . An example item is 'Research makes me nervous.' Higher scores reflect greater anxiety.

### Relevance

Relevance was measured in three ways: the relevance argumentation subscale from D.RA.MA and the relevance to life and usefulness subscales from ATR. The D.RA.MA relevance argumentation subscale comprises five items measured on a scale from 1 = *Strongly disagree* to 5 = *Strongly agree*,  $\alpha$  T1 = .82,  $\alpha$  T2 = .85. An example item is, 'I will need research methods for my future work.' Higher scores reflect a greater sense of relevance. The ATR relevance to life subscale comprises four items measured on a scale from 1 = *Strongly disagree* to 7 = *Strongly agree*,  $\alpha$  T1 = .83,  $\alpha$  T2 = .83. An example item is 'Research-orientated thinking plays an important role in my daily life.' Higher scores reflect greater relevance. The ATR usefulness subscale comprises eight items measured on a scale from 1 = *strongly disagree* to 7 = *strongly agree*,  $\alpha$  T1 = .93,  $\alpha$  T2 = .93. An example item is 'Research is useful for my career.' Higher scores indicate a greater perception of usefulness.

### Attitudes toward research

Positive attitudes toward research, the inverse of Early's construct 'negative attitudes toward research,' were measured using a subscale of the ATR comprising eight items measured on a scale from 1 = *Strongly disagree* to 7 = *Strongly agree*,  $\alpha$  T1 = .92,  $\alpha$  T2 = .94. An example item is 'I enjoy research.' Higher scores indicate more positive attitudes.

### Disinterest

Research disinterest was measured with the D.RA.MA research disinterest subscale, which comprised five items measured on a scale from 1 = *Strongly disagree* to 5 = *Strongly agree*,  $\alpha$  T1 = .79,  $\alpha$  T2 = .81. An example item is 'I expect a research methods class to be boring.' Higher scores indicate greater disinterest.

Open-response items written by the research team were an opportunity to surface any misconceptions about research and provided qualitative detail about the other constructs.<sup>2</sup>

Q1) Complete the following sentence: 'When it comes to research, I used to think \_\_\_\_\_ but now I think \_\_\_\_\_.' How and when did you arrive at this realization?

Q2) How would you describe 'research' to another student thinking about majoring in Human Development & Family Studies?

### Plan of analysis

#### Quantitative analyses

Means and standard deviations of each of the seven outcome variables were calculated at each time point (Table 1). Our goal was to test for changes in our variables of interest (anxiety, relevance, disinterest, positive attitudes) over time; however, participants were members of three different classes. Although classroom effects (and the effect of different teaching strategies/pedagogies) were *not* the focus of the study, it was important to control for possible class differences within the analyses. We therefore ran seven mixed  $2 \times 3$  ANOVAs, with two time points (within) and 3 classes (between). The mixed ANOVAs allowed us to investigate whether there were differences between students in classes from T1 (beginning of semester) to T2 (end of semester) while accounting for students being situated within different classes. Time and class effects were reported for each outcome variable. All analyses were run in R version 3. 6. 2 (R Core Team, 2019).



**Table 1.** Descriptive statistics by class.

DV	Class	N	T1			T2	
			M	SD	M	SD	
Anxiety (ATR)	2020OL	50	3.26	1.09	4.09	1.18	
	2019FTF	10	2.60	1.05	3.10	1.14	
	2020FTF	18	2.61	1.36	3.00	.96	
Relevance (D.RA.MA)	2020OL	50	4.21	.63	4.20	.67	
	2019FTF	10	3.92	.69	3.92	.99	
	2020FTF	18	3.30	.67	3.30	.80	
Relevance (ATR)	2020OL	50	5.14	1.11	5.28	1.13	
	2019FTF	10	4.88	1.21	4.88	1.14	
	2020FTF	18	3.94	1.37	4.11	1.26	
Relevance: usefulness (ATR)	2020OL	50	5.60	1.04	5.65	1.04	
	2019FTF	10	5.51	1.08	5.44	1.07	
	2020FTF	18	4.55	1.00	4.54	1.20	
Attitudes: positive attitudes (ATR)	2020OL	50	4.44	1.06	4.79	1.12	
	2019FTF	10	4.25	1.08	4.60	1.62	
	2020FTF	18	3.56	1.23	3.97	1.16	
Disinterest (D.RA.MA)	2020OL	50	2.37	.63	2.46	.73	
	2019FTF	10	2.54	.69	2.52	1.12	
	2020FTF	18	3.04	.71	2.91	.82	

Note. Anxiety and difficulty items were reverse coded in the calculations for this table so that higher scores relate to less anxiety and less perceived difficulty. Abbreviations in the class column refer to semester and format, with OL indicating online and FTF indicating face-to-face.

### Qualitative analyses

Pairs of researchers analyzed the open-ended items using an inductive approach. Researchers divided responses, independently read for themes, and met to develop initial codebooks (see Appendix) and plans of analysis, which included further rounds of codebook refinement and peer review to resolve discrepancies. Responses to Q1 were coded with a primary starting and ending point, and if the participant expressed multiple perceptions in their answer, a secondary starting and ending point. Turning points (where participants pinpointed a shift in their thoughts about research) and frequencies of each primary code combination pathway (starting point to ending point) were also compiled.

## Results

### Quantitative

Descriptive statistics for each outcome variable at each time point are included in Table 1. Time ( $F(1,75) = 20.11, p < .001$ ) and class ( $F(2,75) = 6.09, p < .001$ ) and were significant predictors of research anxiety, however their interaction was not. Participants' anxiety decreased over time (estimate = .58,  $p < .001$ ) above and beyond classroom effects. Specifically, the 2020 online class was less anxious than the 2019 face-to-face class (estimate = .83,  $p < .05$ ) and the 2020 face-to-face class (estimate = .88,  $p < .01$ ).

Relevance was measured in three ways, with fairly similar results across the three related outcomes. First, analysis using the relevance argumentation subscale from D.RA.MA showed no significant effect of time, but there was a significant effect of class as a grouping variable on how relevant the students thought research methods was ( $F(2,75) = 14.08, p < .001$ ); there was no significant effect of the interaction between class and time. The 2020 online class had significantly better perceptions of relevance



than the 2020 face-to-face class (estimate = .91,  $p < .001$ ), and face-to-face 2019 was significantly higher than face-to-face 2020 (estimate = .62,  $p < .05$ ), but there was no significant difference between 2020 online and 2019 face-to-face.

Relevance was also measured with an ATR subscale. In this analysis, time was not a significant predictor, nor was the interaction of time and class, but class was a significant predictors of relevance ( $F(2,75) = 8.13$ ,  $p < .001$ ). Specifically, 2020 online attitudes regarding relevance were higher than 2020 face-to-face (estimate = 1.19,  $p < .001$ ) and 2019 face-to-face (estimate = .85,  $p < .05$ ).

Last, in regard to relevance as measured with the ATR, participants reported their perceptions of usefulness at the two time points. Time, nor the interaction between time and class, were not significant predictors of relevance, however class ( $F(2,75) = 8.54$ ,  $p < .001$ ) was significant in predicting attitudes regarding usefulness. In regard to class difference, 2020 online attitudes regarding usefulness were significantly higher than 2020 face-to-face attitudes regarding usefulness (estimate = 1.08,  $p < .001$ ) and 2019 face-to-face attitudes were significantly higher than 2020 face-to-face attitudes regarding usefulness (estimate = .94,  $p < .05$ ).

Both time ( $F(1,75) = 8.58$ ,  $p < .01$ ) and class ( $F(2,75) = 4.26$ ,  $p < .05$ ) were significant predictors of positive attitudes toward research, although the interaction between time and class was not. Specifically, 2020 online attitudes were significantly higher than 2020 face-to-face attitudes (estimate = .85,  $p < .01$ ), and positive attitudes increased significantly over time (estimate = .37,  $p < .01$ ).

In the prediction of disinterest in research, there was not a significant effect of time or the interaction between time and class, but there was a significant effect of class, ( $F(2,75) = 4.93$ ,  $p < .01$ ). Specifically, disinterest was significantly higher among 2020 face-to-face class (estimate =  $-.56$ ,  $p < .01$ ) than among 2020 online students. There was no significant difference between the other groups.

### Qualitative

Q1 asked participants to complete the following sentence: ‘When it comes to research, I used to think \_\_\_\_\_ but now I think \_\_\_\_\_.’ How and when did you arrive at this realization? Common starting point themes across time points included difficult ( $n = 27$ ), boring ( $n = 23$ ), intimidating ( $n = 17$ ), irrelevant ( $n = 15$ ), and not for me ( $n = 15$ ). Common ending points showed a shift to more positive themes, including interesting ( $n = 24$ ), relevant ( $n = 20$ ), manageable ( $n = 19$ ), important ( $n = 19$ ). Numbers decreased for difficult ( $n = 20$ ), boring ( $n = 6$ ), intimidating ( $n = 2$ ), irrelevant ( $n = 1$ ), and not for me ( $n = 3$ ). ‘Difficult to manageable’ was a common shift at all time points. ‘Boring to interesting’ became popular at T2. And at T4, ‘irrelevant to relevant’ became frequent. Turning points mentioned by participants early in the semester included previous statistics courses, prior research experiences, and participants’ college education in general. By the end of the semester, participants were citing the research methods course itself and its major assignments.

Five codes arose from analysis of Q2, which asked participants to describe ‘research’ to a peer: Advancing knowledge, application, academic, scientific method, and emotion. The scientific method code captured responses that focused on research as a designed process. The others connected to students’ attitudes and are discussed below in order of prevalence.

### *Advancing knowledge*

Most participants identified research as a process with a purpose, namely, gaining knowledge and advancing understandings of specific topics. This was discussed at the individual, field, and societal levels. Participants described how research begins with a spark of interest, then moves to asking questions, investigating, and gathering information before drawing conclusions. This process can deepen existing knowledge ('gain a deeper understanding of past discoveries,' 'confirming commonly held assumptions') or challenge previous understandings ('debunk a theory that once was considered true,' 'refuting incorrect stereotypes and biases'). Research is also a means of 'exploring our world,' 'thinking outside the box,' and 'gain[ing] new insights.' A few participants mentioned 'truth' as an ideal outcome of research ('a way we can come closer [to] the truth about human behavior'), while others recognized its iterative nature ('[it] is always changing').

### *Application*

Participants often connected research to life as a consumer and practitioner, addressing the applicability of research to everyday or 'real' life outside the academy. One participant identified research as the bridge 'connect[ing] theory to the real world,' and described how since the products and process of research are pervasive, understanding them is 'a vital life skill.' Another participant stated,

research is involved in a greater part of your life than you realize. It is important to learn and be knowledgeable about research so you can understand what is out there in the world whether it is on the news, magazines or Internet.

Appropriate for students majoring in HDFS, participants recognized research as essential for those who will work in helping professions, informing and improving practice. As one wrote,

learning about research in this field is critical to understand the latest developments and discoveries that you can use to benefit the people you work with. You cannot be cutting edge in your profession without being able to read, understand, and apply research.

In another student's words, 'As professional helpers, we need to be up to date and current on what is out there, the best practices, developmental styles/ideas, and how we can best help our clients and the people around us.' In the professional realm, participants pointed to how research findings inform direct service to clients ('allows you to formulate an action plan to help people'), program design ('help[s] back up that a program is needed or [shows] what to implement into programs to better help others'), and larger scale policy ('a way to improve the human condition, especially when it influences policies').

### *Academic*

Some participants' definitions emphasized HDFS as an academic discipline. Research, explained one, 'is what makes our field a science. It is how we learn about development and understand families.' Responses in this category highlighted the field's focus on human relationships and behavior, its research-intensive nature, and the primacy of observation as 'the best way to know what we know about human behavior.'

### **Emotion**

Because of the framing of the question, many responses took the form of reassurance to newer HDFS students. Participants acknowledged the challenging aspects of the research methods course and urged peers to ‘take it seriously’ but ‘don’t be scared of it.’ Though engaging with research processes and products can sound ‘intimidating’ and ‘hard to understand at first,’ participants explained that the work is doable and that ‘once you start to learn about it, you will realize that it is not as complicated as it appears.’ Some even shared how their own experiences ended up being ‘more fun than expected’ and encouraged other HDFS majors to ‘give research a try; you might surprise yourself and discover that you love it!’ Though most emotions were positive, some were negative (‘hard to understand,’ ‘frustrating,’ ‘complicated,’ ‘time consuming,’ ‘repetitive,’ and a single mention of ‘useless’) or mixed (‘can be stressful but fun at the same time’).

### **Discussion**

Results of this study suggest that participant attitudes toward and perceptions of research methods shift over the course of the semester. Quantitative results in this study showed that overall, anxiety decreased, while positive attitudes increased across the course of the semester. However, initial perceptions and changes in perceptions varied section-by-section. Qualitative results in this study suggest that HDFS research methods students largely recognize the course’s relevance, and although they still find the material challenging, convey positive attitudes toward research methods. Participants also shared their feelings of success in overcoming the challenge of completing the course. From an SDT perspective, improvements in competence can increase motivation (Niemic & Ryan, 2009). We conclude that our pedagogical choices in presenting research methods to the HDFS undergraduate students have been fairly successful in improving attitudes toward and perceptions of research. Although not all of our hypotheses were supported, there is some quantitative and qualitative evidence to suggest that perception change is possible, even in a course typically disliked by students. Implications for faculty and librarians’ teaching of social science research methods courses include the need for continued assessment of learners, development of students’ self-concept as researchers, teaching of research as a process, and connection to application.

### **Improve understandings of where students are and adapt teaching**

Formal and informal assessment of learners is important in order to design course materials and assignments that build on students’ already-developed skills and strengths. Data in this study showed mean differences between course sections for anxiety, relevance, positive attitudes, and disinterest even at the first time point, suggesting that whether or not time had an effect later in the semester, these outcomes varied between the three groups of students enrolled in the same required course for their major. Even so, participants reported decreases in anxiety and increases in positive attitudes over time, suggesting that even among groups of students who began with different initial levels and anxiety and attitudes, there

was growth. The qualitative data supported these findings, with many participants showing change from trepidation to self-efficacy over time. Instructors should recognize and anticipate such variability and design courses that are adaptive and inclusive of it in order to decrease the anxiety and negative attitudes that may impede self-efficacy (Sizoo, Jozkowskia, Malhotra, & Shapero, 2008) and achievement (Betz, 1978).

Instructors should adapt courses to meet students' needs on several levels. On the individual level, student pretests and/or essay assignments can give insight into interest, experience, and attitudes. On the class level, instructors should be aware that there will be variability in anxiety, attitudes and interest, and perceptions of relevance. From an SDT perspective, this awareness can help increase student autonomy through individualized experience and ultimately improve motivation and learning outcomes for students (Ryan & Deci, 2017). Librarians and faculty can work together to have materials available to bolster writing, statistics/mathematics, and information literacy skills depending on the class needs. On the program level, collaboration between departments and librarians in the form of curriculum mapping and conversation about learning outcomes can contribute to continuity across degree pathways. Consistent exposure to research methods concepts in ways that allow for increasing exercise in higher-order thinking (Anderson et al., 2001) might translate into a student culture of reduced 'fear and loathing' of these courses (Slocum-Schaffer & Bohrer, 2019, p. 1).

### ***Develop researcher identity as part of student self-concept***

Some students shifted perspectives in seeing research, as one participated noted, as something 'highly educated professionals' do, to an individually satisfying and socially meaningful process students themselves could conduct to advance knowledge. We see this finding as telling for how to help participants best connect to their course materials in ways that make the content personal. Instructors can encourage this personalization of research methods. Instructors can make the 'implicit' explicit (Balloo, 2019) by identifying prerequisites and expectations for success, clarifying them for students, and providing resources for individualized support. Course assignments could provide specific opportunities to reflect on one's identity as a researcher (Hulseberg & Versluis, 2017). This is supported through an SDT lens, in that an increase in relatedness (individualized connection with instructor/classmates) can ultimately improve student motivation and learning outcomes (Niemic & Ryan, 2009; Ryan & Deci, 2017).

Beyond the research methods classroom, concrete opportunities that demonstrate undergraduate research is possible, valuable, and enjoyable might include students working with peer student researchers, engaging in university research symposia, invitations to attend end-of-semester class presentations, and instructor use of undergraduate research examples in class. Finally, emphasizing research as process may help students' resilience in the face of challenges during the course. As the ACRL Framework for Information Literacy in Higher Education (Association of College & Research Libraries, 2016) explains, 'Research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field' (n.p.).

### ***Help students make connections to application***

When study participants applied course concepts to non-academic and professional contexts, it impacted their motivation and attitudes in positive ways. Students gained perspectives on how research might benefit them personally and professionally and realized how an empirical mindset is a means of understanding the world around them. Instructors should help students to recognize how the ability to read and interpret research is vital for staying up-to-date with cutting-edge knowledge and best practices.

Formal opportunities for students to explore topics of interest to them in research methods courses fosters these connections to application. Participants reported higher motivation and more positive attitudes when exploring an area of personal curiosity and when the connection to helping others was clear. Consistent with past research (e.g. Ackerman & Gazley, 2020; Murtonen, 2015), when students perceived their own research assignments to be meaningful, they saw the course as something relevant, particularly in terms of competence and utility in their future work. As Reeve (2004) noted, ‘autonomously-motivated students thrive in educational settings’ (p. 183). Faculty and librarians can encourage this through their framing of assignments. For example, taking a student-centered approach in assignment descriptions, inviting students to examine social problems of personal interest, and encouraging research as ‘exploration’ (Ackerman & Gazley, 2020).

### ***Strengths and limitations***

This study was strengthened by its longitudinal design, mixed-methods approach, and inclusion of multiple sections of students; however, there are limitations. First, all data were self-reported by a fairly homogeneous sample of participants. Although self-report is a valid way of investigating participants’ inner thoughts and perceptions, these data are susceptible to social desirability bias. We attempted to decrease the chances of this occurring through explicitly stating that answers would be unidentifiable and have no effect on grades, but responses may still have been biased. Across the United States, HDFS majors tend to be women. At a time when efforts are made to understand why women are underrepresented in STEM fields and how to improve this, we believe it is important to understand whether and why attitudes toward more math and science-oriented course(s) in HDFS are entered with trepidation. Rather than see this as a detriment to our study, we believe understanding the experiences of our women students is valuable in developing courses that meet students where they are. However, the lack of students of color in our sample is a limitation, though it does reflect the composition of our university population. A future direction for research – perhaps in collaboration with other universities – is to explore whether there are differences in the experiences of students from diverse racial and ethnic minority backgrounds.

Although having students from multiple sections was beneficial in investigating differences within and between classes, as demonstrated by the data, there were differences between these students on variables measured before the classes even began. There were also likely differences between the students that were unmeasured. Future research

should incorporate more classes of students taking online and face-to-face courses (Marchand & Gutierrez, 2012) so that confounding effects of these variables can be better controlled or their effects investigated.

An unexpected finding was the pattern of class differences in the quantitative results suggesting that even at T1, students from different classes and classes with different teaching formats reported different levels of attitudes and feelings toward research methods. It would be of interest in the future to investigate whether there are systematic T1 differences in attitudes and beliefs between students taking courses during different semesters or in different formats over different years. However, our findings suggesting growth regardless of class are promising in suggesting that perhaps there is room for growth for all students – even those enrolled in courses with more negative T1 attitudes and beliefs.

Relatedly, we were pleased to find no interaction effects between time and class in the quantitative analyses. Although the research methods courses taught by different instructors are designed to reach the same main objectives and goals, there are pedagogical and delivery differences between them. The lack of interaction effects suggests that one course does not seem to be superior to any other course at decreasing anxiety or increasing positive attitudes. Future research could be conducted to examine whether there are particular (pedagogical) features of these courses that aid in student growth in attitudes and beliefs over time.

As with all qualitative analyses, different researchers may have observed different themes in the data. Further, there were fewer responses in the final survey; reasons may include burnout, proximity to the final exam period for the university, and for students in spring 2020, the effects of the COVID-19 pandemic on motivation or capability to complete the survey. Sudden, unprecedented changes for these students increased stress and anxiety levels (Wang et al., 2020; Wilson, Holland, Elliot, Duffey, & Bopp, 2021), and their existing trepidation about the course may have been exacerbated.

## Conclusion

Although this study replicated previous findings indicating anxiety and negative attitudes surround research methods courses, findings demonstrated increases in positive attitudes and changes in self-concept as students developed identities as junior researchers. Student self-efficacy in learning research methods increases as perceptions of relevance between the coursework and future professional pursuits are established. Where there is variability in student perceptions and attitudes, research methods instructors in HDFS can scaffold student experiences in the course through concept application and concrete opportunities to experience the relevance of research. By collaborating in purposeful ways, social science faculty and librarians can provide students with the tools they need to build on their existing information literacy and research skills to overcome their anxiety and succeed in and beyond their research methods coursework.

## Notes

1. This study was approved by the Utah State University Institutional Review Board, Protocols 10441 and 10868.

2. Open-response items are presented here in the order that best facilitates discussion of their results. All open-response items appeared on the same page of the survey, so students may or may not have answered them in the order presented.

## Acknowledgments

The authors would like to thank undergraduate research assistant, Rylie Esparza, who helped with preliminary qualitative data analysis.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Appendix

### Codebooks for open-ended questions

Q1: Complete the following sentence: 'When it comes to research, I used to think \_\_\_\_ but now I think \_\_\_\_.' How and when did you arrive at this realization?

Code	Definition
Boring	Not interesting
Curious	About being curious or understanding the world
Data	Numbers, findings, test results
Difficult	Includes mentions of being hard to understand, confusing, complicated, complex, or 'hard work'
Enjoyable	Includes exciting, fun, awesome
Gross	Includes other mentions of disgust or revulsion (e.g. 'eww')
Important	Includes valuable and meaningful. Other phrases might include: necessary, essential, foundational, beneficial, has a purpose
Interesting	Includes fascinating
Intimidating	Includes mentions of being scary or other expressions of fear, 'can't do it'
Irrelevant	Includes mentions of being useless, not meaningful, unimportant, not being applicable, 'waste of time'
Manageable	Includes mentions or expressions of being doable (e.g. 'I've got this') or 'not bad'
Not for me	Connected to role or identity
Relevant	Includes mentions of being useful and applicable, including to everyday life
Reliable	Includes mentions of facts, truth, being 'solid'
Stressful	Includes overwhelming
Time-consuming	Includes 'a lot of work,' tedious
Unreliable	Includes mentions of needing to be evaluated or being biased, 'bogus'
Other	

Q2: How would you describe 'research' to another student thinking about majoring in Human Development and Family Studies?

Code	Definition
Advancing knowledge	Gaining knowledge, learning about a specific topic, asking questions and finding answers, finding truth, understanding a problem, discovering correlations
Application	More practical definition focused on improving quality of life (consumer/practitioner). Definition gets at applicability of research to everyday or 'real' life outside of scholarly publication, including to personal or professional life. This could include personal/professional growth and improvement, as well as staying up-to-date on best practices.
Emotion	If there's an emotional component/reaction or value label to the description, e.g. scary, difficult, enjoyable, complicated (on its own, rather than as part of the scientific method). Mentions of exploring an interest or of personal interest are included in this code because they indicate curiosity.
Academic HDFS	An academic sense of HDFS as a definition (producer). More abstract definition mentioning the field and its scope, not the application of research findings to clinical or professional life (perhaps a doctoral vs. professional Master's distinction). This includes discussing human behavior, development, family relationships, or moving the field forward.
Scientific method	Mentions of an overall systematic or designed approach to research, including specific parts of that process (data collection/gathering, analysis, interpretation; different methods; discussion of hypothesis testing; etc.). Not just a broad mention of a study, but rather things you'd find in the methods, results, and discussion – what you did and why.
Other	Might include things like curriculum, resources, library research, literature search