Using a Utility Value Intervention to Increase Student Academic Success in Online Statistics and Research Methods Courses

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Abstract

Statistics and Research Methods courses are necessary to a holistic education in psychological science (American Psychological Association, 2016). The content of these courses is typically challenging for students, which is exacerbated by the perceived and real difficulty of online learning contexts (DeVaney, 2010; Dunn, 2014; Sizemore & Lewandowski, 2009; Hedges, 2017). Instructors need to adapt pedagogy for these online courses to facilitate student engagement and improve academic achievement. This study examined the impact of a utility value intervention on students' attitudes, motivation, and performance in online statistics and research methods courses. Participants were 119 students who were enrolled in either Research Methods or Statistics in an online course. Each participant was randomly assigned to either the utility value intervention or the control condition. The utility value intervention required participants to watch a short video on the importance of the course content to their everyday experience, and then to respond to a prompt asking them to make their own personal connections. All participants also completed surveys measuring their motivation in the course and attitudes toward the material. There were no significant differences between the experimental and control condition. Implications for future research and psychology courses are discussed.

Introduction

Within any undergraduate psychology program, research methods and statistics courses are central to the curriculum (American Psychological Association, 2016; Gurung & Christopher, 2020; Perlman & McCann, 1999). Not only do undergraduate psychology majors need to pass these courses to continue in the major, but the rapid expansion of online graduate programs is creating a further demand for online statistics and research method courses (Dunn, 2014). Even though these courses provide essential skills and knowledge needed to become a holistic and competent psychologist, they are often met with a strong disliking and unfavorable views by psychology majors (Murtonen, 2005; Sizemore & Lewandowski, 2009). Although disliking may not be problematic per se, previous research has demonstrated a link between perceptions of interest and student academic success (Tempelaar et al., 2012; Silvia, 2006). In online, asynchronous versions of these courses, students' dislike is coupled with higher levels of statistics anxiety and less favorable attitudes toward statistics compared to students taking these courses in an in-person format (DeVaney, 2010; Hedges, 2017). This is also demonstrated at Oregon State University (OSU), as the average DFUW rates for 2019-2020 for these courses were 15% face-to-face and 21.4% for online (CORE, Oregon State University, n.d.). Hence, there is a clear need to improve the success of students in these courses. The aim of the study was to determine whether an easy-to-implement utility value intervention can increase students' motivation and/or performance in online psychological statistics and research methods courses.

Previous research has found a positive connection between perceived course relevance and interest in course content (Heddy et al., 2017; Vittengl et al., 2004). It is therefore possible that taking a research methods or statistics class could change students' valuing of the courses by exposing them to the material (Manning et al., 2006). Although exposing students to course material that is relevant to their lived experience has been effective in other fields such as biology, research that has followed students enrolled in a methods course showed on average a decline in utility perceptions throughout the semester, indicating that the course material itself may not be enough to demonstrate relevance and utility to students (Sizemore & Lewandowski, 2009). Further, students who took an online version of these methods courses found the material to be less favorable and demonstrate higher levels of statistics anxiety compared to those in face-to-face courses, leading to less student engagement and academic achievement (DeVaney, 2010; Hedges, 2017). To help students find more

relevance and success in these courses, more direct action must be taken to increase student interest and perceived utility. One option is to implement a utility value intervention that asks students to articulate the ways in which course content may be useful to them.

Expectancy-Value Theory of Achievement Motivation

A contemporary sociocognitive theory of achievement motivation that speaks to students' valuing of college courses is the Expectancy-Value Theory (EVT). According to EVT, task value is the reason students believe they should engage in a task (Eccles, 2005; Eccles & Wigfield, 2002). For example, task values can be further broken down to specific valuing that is unique to the varied motivations a person has toward a task. According to EVT theory, there are four sub-categories of task value: intrinsic value, attainment value, utility value, and cost value as defined by Eccles and Wigfield (2002). Intrinsic value (also referred to as interest value) is operationalized as a person's liking or feelings of enjoyment of a particular task, for instance engaging in gardening simply for the enjoyment of gardening and not for required food sustenance. Attainment value refers to a person's belief of the value of the task for their sense of self; for example, if a student wants to become a medical doctor they may value doing well in their Biology course because it is relevant to their identity of being a pre-med student. Utility value is defined as a person's belief of the usefulness of the task, especially in reference to their future goals, for example attending college to get a degree to be able to obtain a good paying job. Finally, cost value is described as a person's assessment of the amount of effort and resources that are required to be successful at the task, for example thinking of the time and fiscal costs obtaining a college degree would take. These values have been associated with: 1) academic choices, such as credit enrollment and course difficulty (Bong, 2001; Bruinsma, 2004); 2) success as defined by exam and grade performance (Wigfield & Eccles, 2000); and 3) interest development in the course material (Hulleman et al., 2010).

Task Value Interventions

Although all task values can motivate a student to engage in a task, they may encourage differing types of engagement. For example, research on utility and attainment values have predicted positive course achievement outcomes (Cole et al., 2008). Research on task value interventions, specifically utility value, indicated that simply having college students write about how course material related to their lives and future goals increased levels of utility value, topic interest, and academic performance (Hulleman et al., 2010). Utility value interventions provide an opportunity for students to make explicit connections between course content and their own lives (Hulleman et al., 2016). Studies primarily in biology courses have shown that utility value interventions are effective for improving students' interest, value, and performance in the course (e.g., Canning et al., 2018; Hulleman & Harackiewicz, 2009). Further studies of online courses in psychology have also demonstrated that teaching students the relevance and utility of course material can impact student motivation and achievement (Fritea & Opre, 2015). These utility value intervention-type assignments are also especially effective at increasing utility value and interest for "at-risk" students (e.g., first-generation college students; Harackiewicz et al., 2016a). Given that statistics courses have high failure rates (Allen & Baughman, 2016), and students tend to have negative attitudes and anxieties toward statistics that may be intensified by an online course offering (DeVaney, 2010; Emmioğlu & Capa-Aydin, 2012; Onwuegbuzie, 2004; Ramirez et al., 2012), our research examined the use of a utility value intervention to increase motivation and success in online psychology statistics and research methods courses.

The Current Study

The current study examined the impact of a utility value intervention on students' attitudes,

motivation, and performance in online statistics and research methods courses. Only one previous study (Acee & Weinstein, 2010) has investigated the use of a utility value intervention in statistics (in a laboratory setting) and no research to date has examined the relationship between utility value in online statistics or research methods courses.

The primary research question was to determine whether in an online setting, a utility value intervention improved student motivation and academic performance after viewing videos about the importance of statistics and research methods. Although previous research has investigated students' liking and anxiety about statistics, relatively little research has used a theoretical perspective to examine students' motivation in online psychological statistics and research methods courses. Thus, a secondary research question was to describe students' actual levels of motivation in these online courses at the beginning of the term and changes to student motivation over the time. Previous research has indicated that student motivation and engagement has a tendency to slowly regress to the mean as the term goes on (Cohen et al., 2023), especially in online settings (Bosch & Spinath, 2023). How the various components of motivation fluctuate through the lens of EVT has not been studied. Understanding the variance in motivation throughout the term may provide further clarity on how to help students stay engaged and connected to material, especially in an online setting.

Method

Participants

Participants in this study were directly recruited from students that were currently enrolled in Research Methods or Quantitative Methods for the Psychological Science in the following academic quarters: Winter 2022, Spring 2022, or Fall 2022. All students in these course were required to fill out the surveys for a course assignment. However, students provided their consent for their survey data to be used in the study by completing a separate optional assignment. The surveys were linked to the students' Canvas course in a required assignment, but the consent form was an optional link in Canvas that took students to a Qualtrics survey. The consent form gave an overview of the project, time commitment, goals, and information on who to contact with questions. The surveys included the measures of interest. Students were also asked to indicate which course they were enrolled in, so appropriate course credit could be given. After data were collected, survey responses from students who did not consent were dropped from the study. Over 500 students responded to the surveys; however, only 119 students consented to participate. There were no demographic variables collected directly in the surveys, but the majority of the 119 students who participated in this study were psychology majors. The demographic breakdown for Oregon State University's psychology major are as follows (according to the 2021 graduation records, U.S. Department of Education, National Center for Education Statistics): 74.3% Women, 25.7% Men; 64.7% White, 12.8% Hispanic or Latinx, 5% Asian, 1% Black, and 12% Other or Chose not to Disclose.

Measures

In this study, we examined students' attitudes toward their research methods or statistics course, along with their expectancy values toward the course material. All participants completed the same survey measures, and final grades were collected as a measure of academic performance.

Attitudes Toward Statistics/Research Methods. All items measured students' attitudes toward statistics or research methods that were modified from Harackiewicz and colleagues (2016). These items were measured on a 7-point scale from 1 (Not at all true) to 7 (very true).

- Students' *background in statistics/research methods* was measured with three items. A

sample item is "I have a strong background in statistics/research methods."

- Students' *competence* was measured with two items. A sample item is "It is important to me to do well in this course."

- Students' *confidence* was measured with three items. A sample item is "I expect to get a good grade in this course."

- *Interest* was measured by five items. A sample item is "I am excited about statistics/research methods."

- *Utility value* was measured with four items. A sample item is "This class is important to my future."

Expectancy-Value-Cost. Expectancy, value, and cost measures used a 6-point response scale from 1 (Strongly Disagree) to 6 (Strongly Agree) to measure three distinct values. Expectancy is the assessment of a student's ability to complete a task, value is a student's perception of the importance and relevance of the material, and cost is the assessment of loss of valued alternatives, emotional cost, and effort. Expectancy and value measures were adapted from Kosovich and colleagues (2015). Cost items were from Flake et al. (2015).

- *Expectancy* was measured with three items. A sample item is "I know I can learn the material in my statistics/research methods class."

- *Value* was measured with three items. A sample item is "I think my statistics/research methods class is important."

- *Cost* was measured with 19 items with four subscales: task effort, outside effort, loss of valued alternatives, and emotional cost. A sample item is "This class demands too much of my time."

Academic Achievement. After final course grades had been submitted, course instructors released the students' course grades as percentages.

Procedure

Every term, the School of Psychological Science at OSU provides two sections of Research Methods (301) and two sections of Quantitative Methods (298) in an online format. In the first week of the Winter 2022, Spring 2022, or Fall 2022 quarter, students were randomly assigned to complete either the utility value intervention (experimental condition) or view videos about the importance of statistics and research methods (control condition). The random assignment was conducted using the Randomizer tool in Qualtrics that randomly displayed the control or intervention to participants with an even spread. The utility value intervention is based on previously published work (e.g., Harackiewicz et al., 2016). Students in both conditions first watched 1-2 videos about the importance of statistics/research methods that were embedded in the surveys. In the experimental condition, students then replied to the following prompt: "Discuss the potential relevance of statistics/research methods to your own life. Be sure to include some concrete information, explaining why this specific information is relevant to your life or useful for you. Be sure to explain how the information applies to you personally and give examples." In the control condition, students watched the same videos but replied to the essay prompt: "Describe three new things you learned from the video(s). For each piece of new information, explain why this information stood out to you and why you find it interesting. Be sure to include concrete information from the videos."

In order to measure the variables of interest, surveys were linked to required assignments in the students' Canvas courses. As shown in Table 1, in the first week of the quarter students self-reported their attitudes toward and motivation in the course (expectancy, value, and cost), and these were measured again at mid-term (week 5 of an

11-week term), and again at the end of the term (week 10). These surveys were linked in their Canvas courses as a required assignments to complete for the course. Students received credit for completion. Only the 119 participants who voluntarily consented had their data collected and used for this study; participants who did not consent had their data removed. By using an external link for the consent process, instructors remained blind to student consent. This information was accessed after final grades had been submitted.

Table 1. Measurement timeline during the term.

	Week 1 (Time 1)	Week 5 (Time 2)	Week 10 (Time 3)
Control (n = 66)	Consent Control Videos Motivation Surveys	Motivation Surveys	Motivation Surveys Final Grades
Experimental (n = 51)	Consent Intervention Videos Motivation Surveys	Motivation Surveys	Motivation Surveys Final Grades

Results

The current research examined whether a utility value intervention improved student motivation and performance after viewing videos about the importance of statistics and research methods in an online setting. Across three academic quarters, 119 students consented to participate, with 66 in the Control condition (watching a video about the importance of statistics and research methods with no utility intervention) and 51 in the experimental condition (utility value intervention; see Table 2).

Table 2. Descriptive statistics for dependent measures.

	Experimental			Control		
	Time 1	**Time 2**	**Time 3**	**Time 1**	**Time 2**	**Time 3**
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
Competence	6.85 (0.39)	6.56 (0.87)	6.64 (0.67)	6.84 (0.48)	6.59 (0.63)	6.44 (0.67)
Confidence	5.39 (1.29)	5.65 (1.06)	5.90 (1.27)	5.60 (1.57)	5.53 (1.29)	5.63 (1.35)
Interest	4.36 (0.54)	4.31 (0.46)	4.27 (0.50)	4.27 (0.45)	4.25 (0.51)	4.15 (0.55)
Utility	5.86 (0.94)	5.63 (0.98)	5.42 (1.47)	5.53 (1.17)	5.30 (1.48)	5.35 (1.47)
Expectancy	4.97 (0.91)	5.11 (0.82)	4.92 (1.25)	5.04 (0.92)	4.92 (1.13)	4.87 (1.12)
Value	5.13 (0.91)	5.16 (0.94)	5.03 (1.24)	5.20 (0.87)	4.85 (1.32)	4.82 (1.32)
Cost	2.50 (0.91)	2.62 (1.05)	2.54 (1.33)	2.22 (0.80)	2.40 (1.11)	2.21 (1.11)

Effect of the Intervention on Motivation and Academic Performance

In order to compare the effectiveness of the intervention on increasing student motivation and performance, a 2 (intervention vs control) × 3 (Time 1, Time 2, Time 3) mixed model ANOVA was used with condition as the between subjects factor and time as the within subjects factor. Differences were compared across the following dependent variables: levels of competence, confidence, interest, utility value, expectancy, value, and cost. To assess equal variances between conditions for each analysis, Mauchly's test of sphericity was run on each ANOVA analysis. When there was a violation of this assumption, we used Greenhouse Geisser sphericity corrections to interpret any main effects.

In order to determine the impact on academic performance as measured by final grade percentage, an independent samples t-test was conducted with condition as the grouping variable and grade percentage as the dependent variable.

Multiple 2 × 3 mixed model ANOVAs were conducted on the following dependent variables: confidence, interest, utility, expectancy, value, and cost. For these dependent measures, there were no significant main effects of time ($p > .05$) or condition ($p > .05$), nor were there significant interactions. The only model that yielded a statistically significant result was with competence as the dependent measure.

Competence. A 2 × 3 mixed model ANOVA with competence as the dependent measure revealed a main effect for time, F (2, 154) = 3.437, p = 0.035 , ηp^2 = .016, indicating the competence level changed as the course went on; unfortunately, a Bonferroni post hoc test of this main effect revealed a decrease across the term from Time 1 (M = 6.76, SD = 0.57) to Time 3 (M = 6.49, SD = 0.75), t (83) = 2.62, p = .029. There was no main effect of condition on competence, F (1, 77) = 0.001, $p > .05$, ηp^2 =.0001, indicating that the intervention did not impact competence levels. The interaction between condition and time was not significant F (2, 154) = 2.48, p = .087, ηp^2 =.012).

Academic Performance. An independent samples t-test comparing the control (M = 92.65, SD = 6.95) and experimental condition (M = 91.09, SD = 13.02) on students' final grade percentage was not significant, t (95) = .736, p = .463, d = .150. The intervention did not affect students' final grade percentages.

Discussion

The utility value intervention is a kind of "wise intervention" - a brief, psychologically precise intervention that targets "self-reinforcing processes that unfold over time...to improve people's outcomes in diverse circumstances and long into the future" (Walton, 2014). Although utility value interventions have been shown to benefit a diverse range of students in STEM courses (e.g., biology) and introductory psychology, no research to date has tested the intervention in online psychological statistics or research methods courses. Because the impact of wise interventions is context dependent, the study of the intervention in this particular setting is crucial to understanding whether we may aid students at a critical juncture in their undergraduate psychology education and help students to overcome obstacles that may be unique to online courses.

We hypothesized that students in the utility value intervention would demonstrate better motivation and higher academic performance compared to those in the control condition. However, there were no significant differences between conditions on any of the motivational factors (competence, confidence, interest, utility value, expectancy, value, and cost). There was also no significant difference across conditions on utility value, which this intervention was specifically designed to increase in students.

Implications

Previous research has provided evidence to support the effectiveness of one-shot interventions, interventions that are only administered at one time point but claim to have long-term benefits in educational settings. Specifically, studies have demonstrated the effectiveness of these interventions to change attitudes and behaviors such as increasing growth-mindset (DeBacker et al., 2018;), academic achievement (Blackwell et al., 2007; Yeager et al., 2013), and even reducing stereotype threat (Aronson et al., 2002). Further, utility value interventions like the one used in this study have consistently demonstrated effectiveness in increasing student perceived utility value (Hulleman et al., 2010; Canning et al., 2018; Hulleman & Harackiewicz, 2009) along with other positive motivational and academic achievement outcomes, such as increased interest and higher pass rates (Fritea & Opre, 2015). A study conducted by Acee and Weinstein (2010) also demonstrated the effectiveness of a utility value intervention in a statistics class. Within their study, students who completed the utility value intervention had higher utility value, interest, and exam performance compared to those who did not complete the intervention (Acee & Weinstein, 2010). Based on these previous studies, there is strong evidence to suggest this intervention should translate well to an online intervention for statistics and research methods. Unfortunately, the current study did not find the same success.

Although previous studies demonstrated the effectiveness of the utility value intervention in varying contexts such as general psychology college courses (Hulleman et al., 2010) and introductory science college courses (Harackiewicz et al., 2014), few have made a successful transfer of this intervention to online contexts (Rosenzweig et al., 2019). It is possible that utility value interventions that work well in face-to-face courses are not as effective in online courses. As the intervention requires significant engagement with the material and its connection to students' personal lives, an online environment that provides less direct oversight may lack the engagement to get the intervention to 'stick'. Research by Gaspard et al. (2015) and Rosenzweig et al. (2019) found that essay-based interventions were less effective for online students than a "quote and evaluation" intervention due to this reason. In a "quote and evaluation" intervention, students are asked to read quotes from other students and evaluate how well they match utility valuing of that content (Rosenzweig et al., 2019). Instead of passively connecting material to their own experience, this requires students to engage actively in assessing and applying the utility value perspective. In general, students do not enjoy writing essays and this intervention method had little oversight by those conducting the experiment to ensure that participants were following the directions and engaging in the intervention fully. This may have limited the efficacy of the intervention in this study. Research on the effectiveness of the utility value intervention indicates that the essay-based interventions are more effective in face-to-face courses where the intervention is conducted in a laboratory type setting (Acee & Weinstein, 2010) or within the classroom itself (Durik et al., 2015; Harackiewicz et al., 2014). This could be due to the fact that when there is no real accountability to fully complete or engage in the writing activity from an online and semi-anonymous perspective, having an in-person component that applies some encouragement and accountability may make these type of interventions more impactful.

In addition, it is possible that the students who chose to participate in this study where already highly motivated and high achieving students, limiting our ability to detect effects of our intervention in these online courses. This is evidenced by the high average grades in both the control (93%) and the experimental (91%) conditions. Given that the average grades were at ceiling, *any* intervention would be unlikely to impact what is already considered top academic performance.

Future Research

Future research may benefit from targeting students who are a greater risk for poor academic performance in online statistics courses. Although our intervention was not successful with the students who chose to participate in this study, it is possible that a similar intervention would be more successful with students who are struggling or more likely to struggle. In addition, future research should take the limitations of this study as a learning opportunity to use more appropriate utility value interventions based on the context of the course. Although research on online utility interventions is still quite limited (Rosenzweig et al., 2019), this intervention study suggests that with limited instructor oversight, the essay writing intervention might be less effective for instilling a utility value for course content. Moving forward, researchers interested in administering a utility value in an online course setting should consider using the "quote and evaluation" utility value intervention method, as it has demonstrated effectiveness in an online setting at least with high school math classes (Rosenzweig et al., 2019).

Further, recent work by Rosenzweig and colleagues (2022) provides helpful guidance as to choosing effective utility interventions for specific motivational constructs. The current study used a multiconstruct approach, which was designed to affect more than one motivational construct, whereas a targeted intervention would only target one specific value from Expectancy Value Theory (EVT), such as utility value or attainment value. Rosenzweig et al. (2022) was published after our data collection had begun; thus it is possible that the essay format utility intervention is most effective for a targeted approach to promoting utility value. A more effective approach for a multiconstruct design could be the inclusion of supporting assignments and course curricula to support learning and to help facilitate motivational values (Cromley et al., 2020; Guthrie et al., 2004). Instead of a one-and-done intervention design outside the classroom, the inclusion of other supportive assignments and instructor support are likely paramount in internalizing utility values in online courses. Future studies should also consider using a multifaceted approach rather than just a one-shot intervention to try and increase multiple motivation constructs. Research by Rosenzweig and colleagues (2022) have indicated that a single intervention is not powerful enough to increase multiple motivation constructs, and that a more complex and multi-faceted design is needed to effectively address multiple components. Just as a flu shot cannot prevent all illnesses, one intervention is not a fix all for every motivational outcome.

Concluding Comments

While the results of this intervention were not statistically significant, there is still much value in the results. The current study suggests that an online intervention for utility value may need to be more focused on positively impacting utility value alone as opposed to other motivational constructs. In order for an online intervention for utility value to be effective, there may also need to be more buy-in from student participants that includes a more engaging intervention with some accountability for completion. This may have repercussions for other online curriculum that is transferred from face-to-face contexts as well. Although an assignment or curricula may be effective in a face-to-face setting, it may not demonstrate the same effectiveness in an online format and should be updated accordingly.

References

Acee, T. W., & Weinstein, C. E. (2010). Effects of a value-reappraisal intervention on statistics students' motivation and performance. *The Journal of Experimental Education, 78*(4), 487-512. https://doi.org/10.1080/00220970903352753

Allen, P. J., & Baughman, F. D. (2016). Active learning in research methods classes is associated with higher knowledge and confidence, though not evaluations or satisfaction. *Frontiers in Psychology, 7*, Article 279. https://doi.org/10.3389/fpsyg.2016.00279

American Psychological Association. (2016). Guidelines for the undergraduate psychology major: Version 2.0. *The American psychologist*, *71*(2), 102-111. Retrieved from http://www.apa.org/ed/precollege/undergrad/index.aspx

Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, *38*, 113-125. https://doi.org/10.1006/jesp.2001.1491

Blackwell, L., Trzesniewski, K., & Dweck, C.S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, *78*, 246-263. https://doi.org/10.1111/j.14678624.2007.00995.x

Bong, M. (2001). Between-and within-domain relations of academic motivation among middle and high school students: self-efficacy, task value, and achievement goals. *Journal of Educational Psychology*, *93*(1), 23-34. https://doi.org/10.1037/0022-0663.93.1.23

Bosch, E., & Spinath, B. (2023). Students' Motivation in an Online and a Face-To-Face Semester: A Comparison of Initial Level, Development, and Use of Learning Activities. *Zeitschrift Für Psychologie*, *231*(2), 93–102. https://doi.org/10.1027/2151-2604/a000519

Bruinsma, M. (2004). Motivation, cognitive processing and achievement in higher education. *Learning and Instruction*, *14*(6), 549-568. https://doi.org/10.1016/j.learninstruc.2004.09.001

Canning, E. A., Harackiewicz, J. M., Priniski, S. J., Hecht, C. A., Tibbetts, Y., & Hyde, J. S. (2018). Improving performance and retention in introductory biology with a utility-value intervention. *Journal of Educational Psychology*, *110*(6), 834-849. https://doi.org/10.1037/edu0000244

Cohen, R., Katz, I., Aelterman, N., & Vansteenkiste, M. (2023). Understanding shifts in students' academic motivation across a school year: The role of teachers' motivating styles and need-based experiences. *European Journal of Psychology of Education*, *38*(3), 963-988. https://doi.org/10.1007/s10212-022-00635-8

Cole, J. S., Bergin, D. A., & Whittaker, T. A. (2008). Predicting student achievement for low stakes tests with effort and task value. *Contemporary Educational Psychology*, *33*(4), 609-624. https://doi.org/10.1016/j.cedpsych.2007.10.002

Cromley, J. G., Perez, T., Kaplan, A., Dai, T., Mara, K., & Balsai, M. J. (2020). Combined cognitive–motivational modules delivered via an LMS increase undergraduate biology grades. *Technology, Mind, and Behavior*, *1*(2), 1-19. https://doi.org/10.1037/tmb0000020

DeBacker, T. K., Heddy, B. C., Kershen, J. L., Crowson, H. M., Looney, K., & Goldman, J. A. (2018). Effects of a one-shot growth mindset intervention on beliefs about intelligence and achievement goals. *Educational Psychology*, *38*(6), 711–733. https://doi.org/10.1080/01443410.2018.1426833

DeVaney, T. A. (2010). Anxiety and attitude of graduate students in on-campus vs. online statistics courses. *Journal of Statistics Education*, *18*(1). https://doi.org/10.1080/10691898.2010.11889472

Dunn, K. (2014). Why wait? The influence of academic self-regulation, intrinsic motivation, and statistics anxiety on procrastination in online statistics. *Innovative Higher Education*, *39*, 33-44. https://doi.org/10.1007/s10755-013-9256-1

Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. *Motivation and Emotion*, *39*, 104-118. https://doi.org/10.1007/s11031-014-9419-0

Eccles, J. S. (2005). Subjective task value and the Eccles et al. model of achievement-related choices. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 105–121). New York: Guilford Press.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*(1), 109-132. https://doi.org/10.1146/annurev.psych.53.100901.135153

Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, *61*, 101859. https://doi.org/10.1016/j.cedpsych.2020.101859

Emmioglu, E., & Capa-Aydin, Y. (2012). Attitudes and Achievement in Statistics: A Meta-Analysis Study. *Statistics Education Research Journal*, *11*(2), 95-102. https://doi.org/10.52041/serj.v11i2.332

Flake, J. K., Barron, K. E., Hulleman, C., McCoach, B. D., & Welsh, M. E. (2015). Measuring cost: The forgotten component of expectancy-value theory. *Contemporary educational psychology*, *41*, 232-244. https://doi.org/10.1016/j.cedpsych.2015.03.002

Fritea, R., & Opre, A. (2015). Enhancing situational interest, perceived utility, and self-efficacy in online learning. An instructional design intervention. *Cognition, Brain, Behavior: An Interdisciplinary Journal*, *19*(4), 285–298.

Gaspard, H., Dicke, A. L., Flunger, B., Brisson, B. M., Häfner, I., Nagengast, B., & Trautwein, U. (2015). Fostering adolescents' value beliefs for mathematics with a relevance intervention in the classroom. *Developmental Psychology*, *51*(9), 1226. https://doi.org/10.1037/dev0000028

Gurung, R. A. R., & Christopher, A. (2020). Teaching the Foundations of Psychological Science. Springer International Handbooks of Education, 1–15.

Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K.C., Taboada, A., Davis, M., Scafiddi, N. T., &Tonks, S. (2004). Increasing reading comprehension through concept-oriented reading instruction. *Journal of Educational Psychology*, *96*(3), 122–403. https://doi.org/10.1037/0022-0663.96.3.403

Harackiewicz, J. M., Tibbetts, Y., Canning, E., & Hyde, J. S. (2014). Harnessing values to promote motivation in education. In S.A. Karabenick & T. C. Urdan (Eds.), *Advances in Motivational Interventions* (Vol 18, pp. 71-105). Bingley, UK: Emerald Publishing.

Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2016a). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. *Journal of Personality and Social Psychology*, *111(*5), 745. https://doi.org/10.1037/pspp0000075

Harackiewicz, J. M., Smith, J. L., & Priniski, S. J. (2016b). Interest matters: The importance of promoting interest in education. *Policy Insights from the Behavioral and Brain Sciences*, *3*(2), 220-227. https://doi.org/10.1177/2372732216655542

Heddy, B. C., Sinatra, G. M., Seli, H., Taasoobshirazi, G., & Mukhopadhyay, A. (2017). Making learning meaningful: Facilitating interest development and transfer in at-risk college students. *Educational Psychology*, *37*(5), 565-581. https://doi.org/10.1080/01443410.2016.1150420

Hedges, S. (2017). Statistics student performance and anxiety: Comparisons in course delivery and student characteristics. *Statistics Education Research Journal*, *16*(1). https://doi.org/10.52041/serj.v16i1.233

Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science*, *326*(5958), 1410-1412. https://doi.org/10.1126/science.1177067

Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. *Journal of Educational Psychology*, *102*(4), 880. https://doi.org/10.1037/a0019506

Hulleman, C. S., Barron, K. E., Kosovich, J. J., & Lazowski, R. A. (2016). Student motivation: Current theories, constructs, and interventions within an expectancy-value framework. *In Psychosocial skills and school systems in the 21st century* (pp. 241-278). Springer, Cham. https://doi.org/10.1007/978-3-319-28606-8_10

Kosovich, J. J., Hulleman, C. S., Barron, K. E., & Getty, S. (2015). A practical measure of student motivation: Establishing validity evidence for the expectancy-value-cost scale in middle school. *The Journal of Early Adolescence*, *35*(5-6), 790-816. https://doi.org/10.1177/0272431614556890

Manning, K., Zachar, P., Ray, G. E., & LoBello, S. (2006). Research methods courses and the scientist and practitioner interests of psychology majors. *Teaching of Psychology*, *33*, 194–196.

Murtonen, M. (2005). University students' research orientations: Do negative attitudes exist toward quantitative methods? *Scandinavian Journal of Educational Research*, *49*, 263–280. https://doi.org/10.1080/00313830500109568

Onwuegbuzie, A. J. (2004). Academic procrastination and statistics anxiety. *Assessment & Evaluation in Higher Education*, *29*(1), 3-19. https://doi.org/10.1080/0260293042000160384

Oregon State University. (n.d.). Core education: General education at OSU. Oregon State University. https://core.oregonstate.edu/

Perlman, B., & McCann, L. I. (1999). The most frequently listed courses in the undergraduate psychology curriculum. *Teaching of Psychology*, *26*, 177–182. https://doi.org/10.1207/S15328023TOP260303

Ramirez, C., Schau, C., & Emmioglu, E. (2012). The importance of attitudes in statistics education. *Statistics Education Research Journal*, *11*(2), 57-71. https://doi.org/10.52041/serj.v11i2.329

Rosenzweig, E. Q., Harackiewicz, J. M., Priniski, S. J., Hecht, C. A., Canning, E. A., Tibbetts, Y., & Hyde, J. S. (2019). Choose your own intervention: Using choice to enhance the effectiveness of a utility-value intervention. *Motivation Science*, *5*(3), 269. https://doi.org/10.1037/mot0000113

Rosenzweig, E. Q., Wigfield, A., & Eccles, J. S. (2022). Beyond utility value interventions: The why, when, and how for next steps in expectancy-value intervention research. *Educational Psychologist*, *57*(1), 11-30. https://doi.org/10.1080/00461520.2021.1984242

Silvia, P. J. (2006). *Exploring the psychology of interest*. United Kingdom: Oxford University Press. http://doi.org/10.1093/acprof:oso/9780195158557.001.0001

Sizemore, O. J., & Lewandowski, G.W. (2009). Learning might not equal liking: Research methods course changes knowledge but not attitudes. *Teaching of Psychology*, *36*, 90–95. https://doi.org/10.1080/00986280902739727

Tempelaar, D. T., Niculescu, A., Rienties, B., Gijselaers, W. H., & Giesbers, B. (2012). How achievement emotions impact students' decisions for online learning, and what precedes those emotions. *The Internet and Higher Education*, *15*(3), 161-169. https://doi.org/10.1016/j.iheduc.2011.10.003

Vittengl, J. R., Bosley, C. Y., Brescia, S. A., Eckardt, E. A., Neidig, J. M., Shelver, K. S., & Sapenoff, L. A. (2004). Why are some undergraduates more (and others less) interested in psychological research? *Teaching of Psychology*, *31*(2), 91-97. https://doi.org/10.1207/s15328023top3102_3

Walton, G. M. (2014). The new science of wise psychological interventions. *Current Directions in Psychological Science*, *23*(1), 73–82. https://doi.org/10.1177/0963721413512856

Wigfield, A., & Eccles, J., S. (2000). Expectancy value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68-81. https://doi.org/10.1007/BF02209024

Yeager, D., Walton, G., & Cohen, G. L. (2013). Addressing achievement gaps with psychological interventions. *Phi Delta Kappan*, *94*(5), 62-65. https://doi.org/10.1177/00317217130940051

About the Research Unit at Oregon State Ecampus

Vision

The Ecampus Research Unit strives to be leaders in the field of online higher education research through contributing new knowledge to the field, advancing research literacy, building researcher communities and guiding national conversations around actionable research in online teaching and learning.

Mission

The Ecampus Research Unit responds to and forecasts the needs and challenges of the online education field through conducting original research; fostering strategic collaborations; and creating evidence-based resources and tools that contribute to effective online teaching, learning and program administration.

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