frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 10 January 2023
DOI 10.3389/feduc.2022.1033100

OPEN ACCESS

EDITED BY
Douglas F. Kauffman,
Medical University of the Americas – Nevis, United States

REVIEWED BY
Carlton J. Fong,
Texas State University, United States
Tamarah Smith,
Gwynedd Mercy University, United States

*CORRESPONDENCE
Ordene V. Edwards
✉ oedward4@kennesaw.edu

†These authors have contributed equally to this work

SPECIALTY SECTION
This article was submitted to Educational Psychology, a section of the journal Frontiers in Education

RECEIVED 31 August 2022
ACCEPTED 14 December 2022
PUBLISHED 10 January 2023

CITATION
Edwards OV and Dai T (2023) Differential relations among expectancy, task value, engagement, and academic performance: The role of generation status. *Front. Educ.* 7:1033100. doi: 10.3389/feduc.2022.1033100

Differential relations among expectancy, task value, engagement, and academic performance: The role of generation status

Ordene V. Edwards[1*†] and Ting Dai[2†]

[1]Department of Psychological Science, Kennesaw State University, Kennesaw, GA, United States, [2]Department of Educational Psychology, University of Illinois at Chicago, Chicago, IL, United States

Introduction: We investigated differences in domain-general expectancy, value, and engagement in school by generation status and how the relationship among these constructs and academic performance differ by generation status.

Methods: A total of 573 college students enrolled in introductory psychology courses participated in the study. We collected data on generation status, expectancy-value beliefs, school engagement, and official GPA data from participants, tested measurement invariance of expectancy-value beliefs and engagement between first-generation college students (FGCS) and continuing generation college students (CGCS), and conducted multigroup modeling to understand the differential relations of expectancy-value, engagement, and GPA between the two groups.

Results: We discovered that the latent mean of expectancy beliefs differed significantly by generation status, with FGCS reporting higher expectancy than CGCS. There were no differences in the latent mean of task value. Multigroup structural equation modeling revealed that the effect of expectancy-value motivation on behavioral engagement was similar across groups, but its effect on cognitive engagement was greater for the FGCS than for the CGCS. For both groups, expectancy impacted academic performance *via* behavioral engagement. Finally, neither expectancy-value motivation nor cognitive engagement directly predicted academic performance for either group.

Discussion: The findings have important theoretical implications for understanding motivation and achievement of FGCS and CGCS and critical practical implications regarding undergraduate education.

KEYWORDS

first-generation college students, continuing-generation college students, situated expectancy-value theory, school motivation, school engagement

1. Introduction

The distinction between first-generation college students (FGCS; neither parent has attained a bachelor's degree) and continuing generation college students (CGCS; at least one parent has obtained a bachelor's degree; Lauff and Ingels, 2014) primarily represents a marker for variations in students' academic experience, often shaped by structural, cultural, and psychological factors (see Redford and Mulvaney Hoyer, 2017; Stephens et al., 2019; Ives and Castillo-Montoya, 2020). Because motivation and engagement are at work in all aspects of students' educational experience, it is important to examine how these constructs may vary and impact school outcomes as a result of generation status. These findings can inform policy initiatives geared toward addressing social class disparities in higher education institutions.

In this study, we used situated expectancy-value theory (SEVT; Eccles et al., 1983; Renninger et al., 2019; Eccles and Wigfield, 2020; Wigfield and Eccles, 2020) to examine the effect of generation status on expectancy ("Can I do this task?"), task value ("Why should I engage in this task?"), and engagement and explore the relationships among these constructs and academic performance by generation category. Our study extends the literature in a critical way in that we examined motivation, engagement, and achievement across generation status at the domain-general level. Prior studies guided by the SEVT primarily examined these constructs in specific academic domains when accounting for generations status (e.g., Part et al., 2020; Goldman et al., 2021, 2022). While this work provides useful information about domain-specific motivation, engagement, and achievement between generation status, less is known about college students' expectancy, task value, and engagement for school in general and their impact on school outcomes, taking into account generation status. This requires full consideration for two reasons. First, higher education institutions throughout the United States have placed greater emphasis on expanding access to education for all students, including FGCS (Babineau, 2018), necessitating more empirical research on the experiences of these students to inform policies of inclusion and equity. Research has demonstrated that broad support for education policies and their efficient implementation are predicated on the incorporation of perspectives from multiple stakeholders, including students (Stosich and Bae, 2018). Using the concept of value co-creation inspired by marketing research, experts have recommended that institutions consider students' experiences both inside and outside of the classroom as they collaborate with students to optimize the college experience (Dollinger et al., 2018). Importantly, research has documented the benefits of value co-creation for students (Navarro-García et al., 2015). To that extent, policy implications considering student motivation and engagement and their predictive value beyond the classroom are critical. Hence, initiatives to widen participation for all students should be informed by empirical evidence about students' motivational and engagement experiences in college in general and how these experiences impact school outcomes across student groups.

Second, expectancy, task value, and engagement are multilevel constructs, meaning that their manifestations can range from within a general context to more specific settings. For instance, students endorse expectancy and task value for school and adopt these constructs for particular subjects and tasks (Bong, 2004; Parrisius et al., 2021). Similarly, students engage with school work in general while simultaneously displaying engaged activities in specific classes (Sinatra et al., 2015; Dierendonck et al., 2020). It is therefore conceivable that generation status can influence school expectancy, task value, and engagement and moderate their effects on learning outcomes. For instance, the level of school expectancy-value motivation may differ between FGCS and CGCS, with one group having a higher level than the other. It is also likely that the influence of expectancy-value motivation for school on engagement may differ by generation status, with expectancy-value motivation having a stronger influence on engagement for one group than the other. Prior SEVT research has largely overlooked this line of inquiry with an emphasis on domain-specific data.

This study thus investigated the impact of generation status on students' domain-general expectancy, task value, and engagement and focused on how college students with first- and continuing-generation status differ when considering the effect of expectancy and task value on engagement and academic performance. Moreover, we considered how school engagement differentially impacts academic performance as a result of generation status. Finally, we compared the mediating effect of engagement in the relationship between expectancy-value motivation and academic performance by generation status.

2. Literature review

2.1. Situated expectancy value theory (SEVT): Domain-general expectancy value motivation, engagement, and academic performance

The SEVT's most central assumption is that expectancy and task value predict performance, engagement, and other academic behaviors (Eccles et al., 1983). In other words, individuals are more motivated to engage in a task and perform well if they expect success and value the activity. There are four types of task value, each representing distinct reasons for valuing an activity. One may value a task because of its personal importance to one's sense of identity (attainment value), interest (intrinsic value), and relevance for accomplishing goals (utility value). The cost or negative consequence of task engagement also impacts overall value (Wigfield and Eccles, 2020). Expectancy-value motivation researchers commonly combine attainment, intrinsic, and utility value as a composite measure of value (e.g., Gniewosz and Noack, 2012; Kosovich et al., 2015; Dietrich et al., 2019; Part et al., 2020; Brown and Putwain, 2022). We followed this tradition in the present study.

Particularly relevant to our research goals are theoretical presumptions and empirical findings about the structure of expectancy and task value. While Eccles and colleagues (e.g., Eccles et al., 1983; Eccles and Wigfield, 2020) have defined expectancy-value motivation from the perspective of a specific task that is likely to change as a function of varying situations, they have also acknowledged trait-like manifestations of these constructs. For instance, Wigfield and Eccles (2020) suggested that children develop *distinct* expectancy and task value for particular academic domains. This means that a child's task value and expectancy for math might be higher than their task value of and expectation for science, and vice versa. Examining this assertion from a latent state–trait theoretical perspective, which proposes that most psychological factors have trait- and state-like features (see Geiser and Lockhart, 2012; Steyer et al., 2015), the *distinctiveness* of expectancy-value motivation could represent a trait or a domain/time-consistent component of motivation. In contrast, expectancy-value motivation for specific tasks would be a state with situation-specific elements. The expression of expectancy and task value at the subject-specific level is more general than manifestations for specific tasks.

Prior research has confirmed the existence of expectancy and task value for different domains. For instance, Part et al. (2020) demonstrated that college students adopted a general task value for their STEM courses. Similarly, Dietrich et al. (2019) revealed that German education majors adopted various profiles of general or dispositional task value, expectancy, and costs for their course. Other researchers documented similar results, including when examining the relationship between domain-specific expectancy-value motivation and achievement outcomes (e.g., Gaspard et al., 2019; Perez et al., 2019; Robinson et al., 2019; Fong et al., 2021). Additionally, these studies reveal that expectancy and task value for specific subjects have powerful effects on academic performance, supporting the presumption of the SEVT.

Importantly, however, there is evidence that students adopt expectancy and task value in settings beyond the classroom, for example, expectancy and task value for school. For instance, Bong (2004) found that young students adopted task value and self-efficacy for school in general, which had varying relationships with motivation for specific courses. Other studies also confirmed the existence of school expectancy and task value (e.g., Bong, 2005; Wang and Eccles, 2013; Zhang et al., 2016; Galla et al., 2018; Edwards, 2021). Similar to domain-specific expectancy-value motivation, school expectancy and task value predict academic performance (e.g., Zhang et al., 2016; Brown and Putwain, 2022).

These findings suggest that expectancy and task value constitute an organizational structure that ranges from general expressions to endorsements in particular situations. However, general expectancy-value motivation is further stratified into broader domain-general motivation for school and subject-specific expectancy and task value. Each of these academic settings can serve as a student's immediate situation that could impact their motivation and academic decisions (see Eccles and Wigfield, 2020). As such, expectancy-value motivation for school could provide critical information about students' academic experience that might be overlooked in investigations within classes. For instance, Bong (2005) demonstrated that school task value was positively linked to task value for math and Korean but not English. Galla et al. (2018) documented that whereas intrinsic value for school work predicted ninth graders' academic self-control, utility value of school work played no role. These findings demonstrate more nuance about the role and function of school motivation in the education process. Importantly, these findings reveal the influence of school-level expectancy-value motivation on academic experiences in domain-specific contexts. Moreover, in the transition from high school to college, new challenges and difficulties manifest in student learning in all courses (Venezia and Jaeger, 2013). Thereby, studying motivation in the larger context of undergraduate studies in general is meaningful in capturing possible hindrances in motivation and learning. This is especially critical for first-year students, who comprised the majority of the current study's sample. Furthermore, there is evidence that school motivation declines over time, starting in the early years (Taylor et al., 2014; Scherrer and Preckel, 2019), so there is utility in exploring domain-general expectancy-value motivation to possibly inform targeted motivation-enhancing interventions, especially in the first year of college. Taken together, it is important to examine all manifestations of expectancy-value motivation, including at the domain-general level, which we explored in the current study. We turn now to engagement, an important outcome of expectancy and task value.

Student engagement, defined as active participation in academic-related activities, is widely regarded as multifaceted (Fredricks et al., 2004). Therefore, researchers testing the SEVT have investigated expectancy and task value's influence on various types of engagement – *behavioral* (effort, perseverance, and persistence on a task), *cognitive* (use of effective learning strategies), and *emotional* (emotional responses to academic-related activities; Fredricks et al., 2004; Blumenfeld et al., 2005). We measured cognitive and behavioral engagement. Our approach is consistent with previous research targeting specific components of engagement (e.g., Jones and Carter, 2019; Putwain et al., 2019; Sutter et al., 2022).

In an effort to better clarify engagement and its dimensions, researchers have identified additional subdimensions, including global and context-specific engagement (e.g., Stefansson et al., 2016; Wang et al., 2016; Dierendonck et al., 2020; Olivier et al., 2020; Dierendonck et al., 2021). For instance, Dierendonck et al. (2021) demonstrated that high school students' behavioral and cognitive engagement can be represented in a bifactor structure model with global and specific engagement. The specific manifestation is conceptualized as engagement in classroom-related activities, while global engagement includes engagement in school. Based on prior findings, we can infer that students adopt engaged behaviors and cognitive strategies for specific classes and adopt more holistic engagement for school in general, distinct from their class engagement.

A myriad of research across contexts has confirmed SEVT'S postulation that expectancy and task value influence engagement, irrespective of the level of measurement (e.g., Chouinard et al., 2007; Fan, 2011; Wang and Eccles, 2013; Phan, 2014; Putwain et al., 2019; Fong et al., 2021; Salmela-Aro et al., 2021; Upadyaya et al., 2021; Sutter et al., 2022). Additionally, engagement is critical for optimal academic performance both at the course level (e.g., Stefansson et al., 2016) and in school (e.g., Wang and Eccles, 2012; Borofsky et al., 2013; Dotterer and Wehrspann, 2016; Stefansson et al., 2016). However, researchers have also found null results (for a review, see Lei et al., 2018).

Finally, engagement can mediate the relationship between college students' subject-specific expectancy-value motivation and academic performance. For instance, Jones and Carter (2019) found that utility value predicts learning *via* cognitive engagement. Cole and Osterlind (2008) also documented a significant effect of value on performance *via* effort. Similar results were found among young students (e.g., Putwain et al., 2019) and at the school level (e.g., Martin et al., 2017).

2.2. Contextualizing differences by generation status

First-generation college status has been defined in varied ways in the literature (Nguyen and Nguyen, 2018; Toutkoushian et al., 2021), encompassing studies of students at both two- and four-year institutions. Some of the many variations include having parents without a four-year college degree (Stephens et al., 2012; Nichols and Islas, 2016; Tibbetts et al., 2016; Covarrubias et al., 2019), neither parent attending two-year or four-year institutions (e.g., Redford and Mulvaney Hoyer, 2017), being the first person in the immediate family to attend college (e.g., Covarrubias et al., 2015; Azmitia et al., 2018), and neither parent obtaining a four-year degree although having some college experience (e.g., Ishitani, 2003, 2016). The current study defined FGCS as students with neither parent obtaining a bachelor's degree from a college or university.

FGCS and their continuing-generation peers experience college differently, with FGCS facing more hardships in pursuit of an education (Sirin, 2005; Beattie, 2018). Experts have identified various barriers that might pose challenges to FGCS, primarily implicating structural, cultural, and psychological factors (e.g., Wilbur and Roscigno, 2016; Stephens et al., 2019; Phillips et al., 2020). From a structural perspective, FGCS compared to CGCS are less adequately prepared for college (Atherton, 2014), face more family conflicts (Wilson and Kittleson, 2013), receive less parental support (Blackwell and Pinder, 2014), experience more financial constraints (Pratt et al., 2019), bear more job and family responsibilities (Wilbur and Roscigno, 2016; Pratt et al., 2019), and confront more food and housing insecurity (Goldrick-Rab et al., 2017).

When compared to CGCS, students whose parents lack a college education are also at a cultural disadvantage, often struggling with adjusting to college and its culture (Wilbur and Roscigno, 2016; Gibbons et al., 2019). Typically, these students endorse an interdependent model of self, prioritizing connection to the group instead of an independent model, empowering the individual (Stephens et al., 2012). Given that the independent rather than the interdependent model of self is the most dominant culture in higher education institutions in the United States, unlike their continuing generation counterparts, FGCS find themselves navigating through unfamiliar territory (Stephens et al., 2019; Phillips et al., 2020).

In addition, FGCS face more psychological adversities than their continuing generation counterparts. For example, they are more stressed (Amirkhan et al., 2022), carry guilt about their educational success relative to their family (Covarrubias et al., 2015), experience imposter syndrome (Canning et al., 2020), report a lower sense of belonging in their higher education institutions (Tibbetts et al., 2016; Phillips et al., 2020), and encounter more discrimination and devaluing in college (Allan et al., 2016).

Any one or a combination of these experiences can explain deficiencies in expectancy-value motivation and engagement among FGCS compared to CGCS. With respect to structural resources, evidence suggests that parental support is needed to foster expectancy, task value, and engagement (e.g., Williams and Weiss, 2018; Lee et al., 2020; Simpkins et al., 2020; Šimunović and Babarović, 2020). Hence, it is conceivable that FGCS would report lower expectancy and value for school compared to CGCS. Furthermore, because maladaptive motivation (Sommet et al., 2015) and engagement (Beasley, 2021) are outcomes of poor perceived cultural fit, it is likely that perceptions of school culture might also influence school expectancy, task value, and engagement. Specifically, FGCS would report lower expectancy-value motivation and engagement than CGCS if they experienced cultural mismatch. Finally, psychological factors, including sense of belonging (Gopalan and Brady, 2020; Ladewig et al., 2022) and stress (Simons and Steele, 2020), are predictors of motivation and engagement, suggesting that FGCS would be at most risk of experiencing lower expectancy-value motivation and engagement for school compared to CGCS.

However, the majority of prior investigations into generation status highlight FGCS deficits compared to CGCS (Ives and Castillo-Montoya, 2020). Despite this, there is growing paradoxical evidence of FGCS' strengths that could also shape their expectancy, task value, and engagement in school. More specifically, researchers have documented that FGCS show incredible resilience while pursuing a college education (e.g., Azmitia et al., 2018; Soria and Roberts, 2021; Wilbur, 2021). For instance, Wilbur (2021) found that while FGCS experience more stress in college, they display a similar number of depressive symptoms as CGCS. Likewise, Alvarado et al. (2017) discovered that although FGCS express lower emotional intelligence than CGCS, they report higher resilience. Azmitia et al. (2018) documented that over 80 % of FGCS who participated in a

mixed-methods longitudinal study graduated despite reporting a lower sense of belonging and more marginalization than their peers. Further, FGCS are proactive, goal directed, optimistic, and reflective, which evolve from prior experiences and influence their college experience and desire to persist in school (Garrison and Gardner, 2012). In addition, FGCS learn to be resourceful as a coping mechanism for stress, which has been associated with positive outcomes (Collis and Reed, 2016; Reed, 2016).

Moreover, with the increasing emphasis on broadening participation for FGCS in higher education (see Babineau, 2018), they have access to a plethora of support resources to mitigate adverse experiences and outcomes. Indeed, FGCS use and benefit from these programs (Becker et al., 2017; Bassett, 2021). Furthermore, experts have demonstrated that educational interventions can be consequential for these students (e.g., Stephens et al., 2014, 2015; Harackiewicz et al., 2016; Hecht et al., 2021; Townsend et al., 2021). Finally, FGCS possess an abundance of prior knowledge that can aid in their learning (Smith and Lucena, 2016). Together, these factors could minimize the effects of the negative risk factors discussed above, resulting in FGCS expressing comparable or higher expectancy, task value, and engagement in school than their peers.

Prior research has examined college students' generation status within the SEVT, providing insights into expectancy-value motivation and engagement by generation status and their impact on outcomes. We discuss this next.

2.3. Differences in expectancy, task value, and engagement by generation status

As scholarly interest in the experiences of FGCS and CGCS increases, so does SEVT research on the influence of generation status on expectancy-value motivation. The findings reveal variations across studies. For instance, Goldman et al. (2021) found that FGCS endorsed task values and cost similar to those of their continuing generation peers in introductory psychology courses. Later, Goldman et al. (2022) revealed that FGCS reported higher cost for their introductory psychology course over the semester than CGCS, but there were no group differences in utility, attainment, or intrinsic values. Similarly, Part et al. (2020), when measuring these constructs among students enrolled in a life science course, revealed similarities between the groups. There were also nonsignificant group differences in expectancy and task value among undergraduate neuroscience students (Gaudier-Diaz et al., 2019). Harackiewicz et al. (2016) found that FGCS in an undergraduate STEM course endorsed levels of utility value, interest, and academic competence similar to those of CGCS. Finally, Jiang et al. (2020) found lower math and science self-concept (i.e., expectancy) but similar task value among FGCS and CGCS. These results suggest that irrespective of generation status, college students generally perceive similar task value for their course work. However, first-generation status could play a significant role in the expectancy for and cost of engaging in course activities. These findings may shed light on the impact of FGCS resilience and negative risk factors on motivation. However, most of the investigations targeted specific academic domains. To our knowledge, no research to date has examined differences between generation status in domain-general expectancy and task value among college students.

Recently, Brown and Putwain (2022) examined the impact of parental level of education on expectancy and task value for A-level exams, a high-stakes secondary school exit exam in England. Expectancy-value motivation was measured from a general context. While the researchers did not group students into two generational statuses, their findings showed that students whose parents lacked a college education were more likely to report lower levels of expectancy and task value than students whose parents had earned a college degree. These results differ from those reported among college students, particularly in terms of task value. This suggests that researching expectancy-value motivation in broader contexts could reveal crucial information on generation status differences in motivation that may not be observed in specific domains. Furthermore, if administrators and educators are to promote educational equity for all students, they must understand how motivation for school varies by generation status and how these constructs impact school outcomes as a function of generation status. We pursued this endeavor.

In contrast to research on domain-general expectancy-value motivation, there is a wealth of research on generational status differences in engagement (for a review see, Ives and Castillo-Montoya, 2020), with a substantial amount of work focusing on school engagement. Inconsistencies exist, however, with some studies indicating that FGCS are less likely to engage in school than CGCS (e.g., Soria and Stebleton, 2012; Dong, 2019), others reporting that FGCS are more engaged than CGCS (e.g., Boyett, 2010), and others documenting no group differences in school engagement (e.g., Gibson and Slate, 2010). Insofar as there are discrepancies in the findings, additional research is required to explain these variations. Moreover, examinations of engagement as a function of generation status guided by the SEVT are, to our knowledge, uncommon. As one exception, Goldman et al. (2021) examined transformative experiences (conceptualized as deep engagement) by generation status using the SEVT but at the domain-specific level. They found no differences in engagement between the groups. There is a need for additional research on school engagement by generation status. In addition, there is a need for a greater understanding of how generation status moderates the impact of school engagement on academic performance. Regarding these linkages, the SEVT literature is limited.

Further, on the influence of general expectancy-value motivation on academic achievement and engagement, there remains a lack of clarity regarding the differences between

generation status. Primarily, research in this area has focused on domain-specific expectancy-value motivation. For example, Jiang et al. (2020) discovered that STEM self-concept and task value had comparable effects on achievement across generation status. In the case of engagement, Goldman et al. (2021) found that generation status played no predictive role in the effect of task value on engagement. At the domain-general level, however, the effect of expectancy-value motivation on academic performance and engagement may differ by generation status. Given the disparate domain-general and subject-specific results in expectancy-value motivation between FGCS and CGCS that we mentioned previously, this is even more likely.

Finally, to our knowledge, no studies to date have examined the moderating role of generation status in the association among school expectancy-value motivation, engagement, and academic performance. Specifically, it is unknown how engagement mediates the relationship between expectancy-value motivation and achievement. There is evidence that parental education level is critical to academic success at the domain-general level. For instance, Brown and Putwain (2022) found that parental level of education predicted exam performance, and expectancy was a significant mediator between parental education and exam performance. In college settings, additional research is required to examine generation status as a moderator in the relationship between domain-general expectancy-value motivation, engagement, and academic performance.

3. The current study

Based on the assumptions of the SEVT, students' expectancy and task value are potent predictors of academic performance and engagement inside the classroom and in school (Renninger et al., 2019; Eccles and Wigfield, 2020). Moreover, prior research revealed that engagement can directly influence academic performance (Stefansson et al., 2016) and can mediate the link between expectancy-value motivation and academic performance (e.g., Putwain et a., 2019). Considering that college students' generation status can impact their academic experiences (see Beattie, 2018), it is prudent to examine expectancy-value motivation, engagement, and academic performance from this perspective. Although prior SEVT research has explored this line of inquiry among college students, this body of work is limited to examinations of expectancy, task value, and engagement for particular subject areas (e.g., Gaudier-Diaz et al., 2019; Jiang et al., 2020; Part et al., 2020; Goldman et al., 2021). This, despite the evidence of the existence of both domain-general and subject-specific expectancy-motivation and engagement (e.g., Dietrich et al., 2019; Dierendonck et al., 2020; Part et al., 2020), which can influence academic outcomes (e.g., Stefansson et al., 2016; Fong et al., 2021; Brown and Putwain, 2022). Therefore, better clarification is needed about these constructs at the domain-general level when considering generation status. We intended to address this gap.

Thus, the goals of our study were (1) to investigate the differences in expectancy, task value for school, and school engagement between FGCS and CGCS and (2) to examine the relations among expectancy-value motivation, school engagement, and academic performance as a function of generation status (see Figure for a conceptual model). To meet our research objectives, we surveyed students' expectancy and task value for school and used their grade point average (GPA) and self-reported cognitive and behavioral engagement in school as our outcomes. We posed the following research questions:

1. How do the latent means of expectancy, task value, and engagement differ by generation status?
2. What is the effect of expectancy and task value on engagement and academic performance by generation status?
3. What is the effect of engagement on academic performance by generation status?
4. How does engagement mediate the relationship between expectancy-value motivation and academic performance by generation status?

Our study was exploratory due to the paucity of empirical evidence on college students' school expectancy, task value, and engagement as a function of generation status and their impact on performance. Furthermore, we recognize that FGCS have diverse experiences (e.g., resilience, availability to support, and psychological and institutional hurdles) that may influence their motivation differently than CGCS. Therefore, the results of our questions were left open.

Moreover, studies investigating expectancy-value motivation by generation status have shown mixed results across academic settings, especially when considering task value (e.g., domain-general: Brown and Putwain, 2022; domain-specific: Jiang et al., 2020; Part et al., 2020). Inconsistencies also surfaced when comparing school engagement between the two groups (e.g., Boyett, 2010; Gibson and Slate, 2010; Dong, 2019). Domain-specific SEVT research has also revealed discrepancies in expectancy. Our results could shed light on these disparities.

4. Materials and methods

4.1. Participants and procedure

The participants were 573 students enrolled in introductory psychology courses at a relatively large university in the southeastern United States. The sample was predominantly White (56.5%), female (75.7%), and Freshmen (62.1%). The mean age was 19.69 (SD = 4.07), with a range of 18–66 years and a median of 19 years. There were 207 FGS, 365 CGS, and one student who did not provide their generation status. A full breakdown of the demographic information by group appears in Table 1.

TABLE 1 Demographic information by generation status.

Variables	FGCS%	CGCS%
Gender		
Female	80.7	72.9
Male	18.8	26.3
Other	0.5	0.3
Prefer not to answer	0.0	0.5
Age		
18–22	92.6	92.9
23+	7.5	7.4
Race		
White	49.3	60.8
Black/African American	23.7	27.4
Asian	13.0	6.0
American Indian/Alaskan	3.9	1.1
Mixed Race	2.9	2.7
Hispanic	2.9	0.3
Prefer Not to Answer	4.3	1.6

FCGS, First-generation college students; CGCS, Continuing-generation college students.

Participants completed all questionnaires online *via* Qualtrics across two semesters. The spring administration included 275 students, and 298 participated in the fall. The study's description was posted on a university subject pool website and made available to all students enrolled in introductory psychology courses. The study's procedures were approved by the first author's institutional review board (IRB).

4.2. Materials and measures

All surveys were anchored along Likert-type scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Students were asked about their task value and expectancy for college in general. Participants also responded to survey items about their cognitive and behavioral engagement in *school*, which was a conceptual context consistent with that in the measure of expectancy and task value. Finally, the outcome measure in the present study was grade point average (GPA), which took into account students' grades on *all* college courses available at the time of data collection. As such, all survey measures and academic outcomes consistently pertained to the domain-general (rather than domain-specific) level for college students.

4.2.1. Expectancy and task value

Expectancy was measured using the Patterns of Adaptive Learning Scales perceived competence subscale (PALS; Midgley et al., 2013), consisting of five items ($\alpha = 0.87$). One sample item is "Even if the work is hard, I can learn it." We measured task value with a nine-item scale adapted from Linnenbrink-Garcia et al. (2018). The scale assessed attainment value (e.g., "For me, doing well in college is very important"), utility value (e.g., "The things I learn in college help me in my daily life outside of school"), and intrinsic value (e.g., "I enjoy what I'm learning in college"). We dropped one item from the attainment value subscale because of a mechanical error that could have misrepresented the construct. After the change, the composite task-value scale maintained good internal reliability, moving from $\alpha = 0.89$ to $\alpha = 0.90$.

4.2.2. Engagement

We adapted Linnenbrink's (2005) four-item scale to measure behavioral engagement in course activities (e.g., "I force myself to finish my coursework even when there are other things I'd rather be doing"; $\alpha = 0.85$). The MSLQ's (Pintrich et al., 1993) 10-item scale assessing effective metacognitive strategies was utilized to measure cognitive engagement ($\alpha = 0.82$). One sample item is "When studying for my courses, I try to determine which concepts I do not understand well."

4.2.3. Academic performance

Academic performance was represented by students' official GPAs. The data were obtained from the Office of Institutional Research (OIR) of the study institution after the data collection semester concluded and final course grades were recorded. A total of 48 (8.4%) participants did not have GPA data, which was due to participants entering incorrect university email addresses, which did not match those the OIR had on file. For confidentiality considerations, the OIR did not provide the GPA data on these participants.

4.3. Data analyses

To answer our research questions, we conducted structural equation modeling and multigroup SEM (see Figure 1 for conceptual model) using M*plus* v8.6 (Muthén and Muthén, 1998–2021). To evaluate individual models' overall fit, we used criteria for excellent model fit in three categories, including an absolute fit index, Standardized Root Mean Squared Residual (SRMR <0.08), incremental fit indices, comparative fit index (CFI > 0.95), and Tucker-Lewis Index (TLI > 0.95), and one that accounts for model parsimony, root mean square error of approximation (RMSEA <0.06), per recommendations by Hu and Bentler (1999). We used the robust maximum likelihood estimator (MLR) under the larger full information maximum likelihood (FIML) framework for model parameter estimation, and we used chi-square difference testing using Satorra–Bentler scaled chi-square to compare nested models for the multigroup modeling analyses (Satorra and Bentler, 2010).

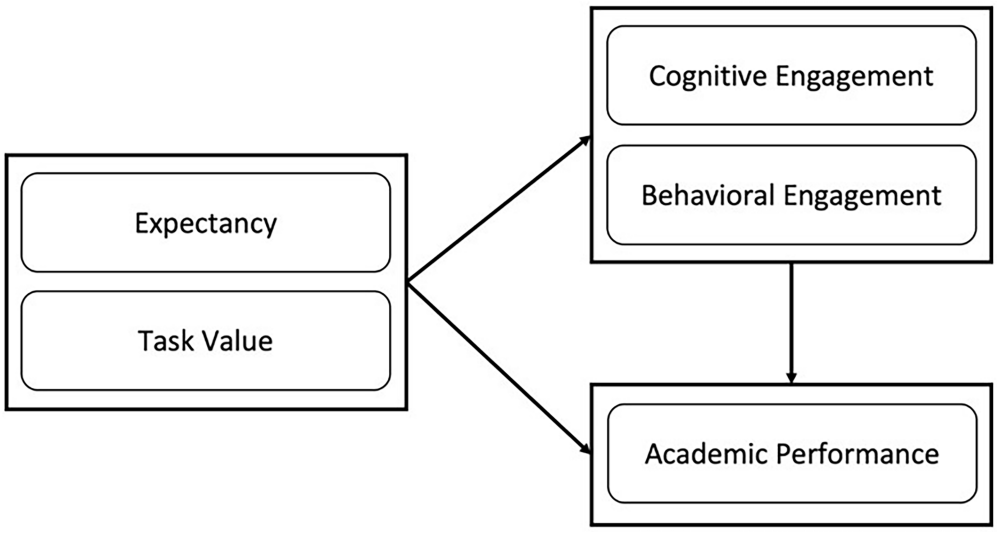

FIGURE 1
Conceptual model of relations between expectancy-value beliefs and academic performance mediated by engagement.

5. Results

5.1. Preliminary analyses and missing data

We obtained descriptive statistics and bivariate correlations for the item-level scores for the expectancy-value motivation and engagement measure and GPA by generation status. The mean GPA was 3.303 (SD = 0.689) for CGCS and 3.313 (SD = 0.681) for FGCS. An independent-samples *t* test, the two groups did not significantly differ in GPA ($t[522] = -0.160$, $p = 0.873$, Hedge's $g = -0.015$). Most of the item scores on expectancy-value and engagement were correlated with GPA at a significant but low level, but among the expectancy-value motivation and engagement items, bivariate correlations were moderate (see Supplementary Tables 1, 2 for descriptive statistics and bivariate correlations by generation status). These patterns were observed for both the FGCS and CGCS groups. We examined the distribution of racial groups by generation status. We found that although a chi-square test was significant (χ^2 [2] = 26.77, $p < 0.001$), the result was primarily driven by an "Other Race" group ($n = 100$, 17.5%). Participants in this group self-identified as either Native American, Asian, or Unidentified—there were 11.8% of CGCS vs. 27% of FGCS self-identified in this group, whereas White and Black students were proportionately distributed by generation status. Although we were aware of the distribution difference of the "Other Race" group, we did not have a sizeable subsample or clear racial identification to meaningfully include the race variable as a covariate to consider in combination with generation status. We acknowledged this limitation of the current study. As suggested by a Fisher's exact test, female and male students were similarly distributed by generation status ($p = 0.052$). We also screened for potential violations of assumptions for structural equation modeling, including nonnormality, multicollinearity, and outliers. We did not find significant outliers or violations of assumptions.

Missing data were found for GPA (8.4%). Given the known cause for the missing data, we have no reason to assume a nonignorable (NMAR; Little and Rubin, 2019) missing data mechanism for this missingness. A Little's MCAR test did not indicate our data as *Missing Completely At Random* (MCAR; Chi-square = 686.85 [437], $p < 0.001$). Therefore, we assume our missing data mechanism to be *Missing At Random* (MAR). We found that GPA observed or missing (missing = 1, observed = 0) was distributed proportionately by generation status (Fisher's exact test $p = 0.435$). We handled the missing data using the full information maximum likelihood MLR estimator provided by the M*plus* program, which is widely recommended for handling ignorable missing data in structural equation modeling (Enders and Bandalos, 2001; Graham et al., 2013).

5.2. Measurement model and inter-factor correlations

We conducted confirmatory factor analyses with the whole sample for expectancy, task value, behavioral and cognitive engagement, where all four latent factors were specified to be correlated with one another. The model fit our data excellently (χ^2 [df] = 551.58 [310], $p < 0.001$; RMSEA = 0.037 (0.032, 0.042); CFI = 0.961, TLI = 0.956; SRMR = 0.064). All items were loaded on their designated factors by a standardized loading of 0.350 or above (except one task value item, loading = 0.298), and the factors were moderately to highly correlated (r = 0.237 - 0.538, $p < 0.001$).

To the CFA model for expectancy, task value, and engagement variables, we added the observed GPA variable to gauge the correlations between GPA and the latent factors—expectancy, task value, behavioral and cognitive engagement. The model fit our data excellently (χ^2 [df] = 579.871 [333], $p < 0.001$; RMSEA = 0.036 (0.031, 0.041); CFI = 0.961, TLI = 0.956; SRMR = 0.062). GPA correlated with three factors significantly: the highest correlation was with behavioral engagement ($r = 0.225$, $p < 0.001$), and the correlations with cognitive engagement ($r = 0.091$, $p = 0.045$) and expectancy ($r = 0.129$, $p = 0.008$) were lower. We did not observe a significant bivariate correlation between GPA and task value ($r = 0.047$, $p = 0.281$). With these correlations, we expected possible directional relations between the expectancy-value motivation and engagement variables and students' academic achievement for FGCS and CGCS.

5.3. How do the latent means of expectancy, task value, and engagement differ by generation status?

To test differences in expectancy-value motivation and engagement by generation status, we aimed to first establish group invariance at the measurement level because the variables in question are latent factors manifested by observed item scores. We followed Lance et al.'s (2000) recommendations to test for measurement configural, metric, and scalar invariance of the factor models of expectancy, task value, cognitive and behavioral engagement between the two groups—FGCS and CGCS. Given scalar invariance between groups, we would be able to proceed with examining the mean differences in these latent factors between the two subpopulations.

As shown in Table 2, measurement invariance testing results indicated that we had established full configural invariance and full metric invariance between groups but not full scalar invariance (Model 3)—one of the five expectancy items (EX5) showing a significant intercept difference. Accordingly, we freely estimated the EX5 intercept between groups. This partial scalar invariance model (Model 4) was retained. As such, we established a partial scalar invariance model for our measurement model and proceeded with testing the differences in the latent means of expectancy-value and engagement.

The partial scalar invariance model (Model 4) fit the data excellently (χ^2 [df] = 978.058 [665], $p < 0.001$; RMSEA = 0.041 (0.035, 0.046); CFI = 0.952, TLI = 0.950; SRMR = 0.077). Estimation results showed a significant group difference in the latent mean of expectancy, with FGCS having higher expectancy than CGCS by a medium effect size (" $M = 0.150$, $p = 0.016$, Hedge's $g = 0.222$). No differences were observed for the latent means of task value or the two engagement factors between FGCS and CGCS.

5.4. What is the effect of expectancy and task value on engagement and performance by generation status?

Building on the partial scalar invariance model, we tested additional between-group constraints for equal factor variances and equal factor covariances (Models 5 and 6 in Table 2), which was necessary for conducting the multigroup SEM analyses to detect differences in directional relations between groups (Lance et al., 2000). The model with equal factor variances and covariances between groups (Model 6) was retained after model comparisons, and it fit the data well (χ^2 [df] = 997.138 [675], $p < 0.001$; RMSEA = 0.041 (0.035, 0.046); CFI = 0.951, TLI = 0.949; SRMR = 0.09). Factor variances and covariances did not significantly differ between groups, which guaranteed proceeding with testing group differences in directional relations among GPA, expectancy-value motivation, and engagement.

We constructed a series of multigroup (FGCS vs. CGCS) structural equation models based on our conceptual model (Figure 1): the measurement part was specified to hold measurement invariance between groups, and the hypothesized directional relations were specified in the structural part of the model for group comparisons—GPA being predicted by expectancy and task value and cognitive and behavioral engagement serving as mediators. Model comparisons were conducted in the following sequence (Table 3): All direct paths in the structural part were first constrained to be equal between

TABLE 2 Model comparisons for measurement invariance testing.

M	Description	χ^2	Df	p	Comp.	$\Delta\chi^2$	Δ df	p	Retained
1	Full configural invariance	934.04	620	<0.001	--	--	--	--	--
2	Full metric invariance	947.29	643	<0.001	2 vs. 1	15.701	23	0.868	2
3	Full scalar invariance	985.50	666	<0.001	3 vs. 2	38.957	23	0.020	2
4	Partial scalar invariance	978.06	665	<0.001	4 vs. 2	30.485	22	0.107	4
5	M4 + Factor variance invariance	984.09	669	<0.001	5 vs. 4	5.974	4	0.201	5
6	M5 + Factor covariance invariance	997.14	675	<0.001	6 vs. 5	12.544	6	0.051	6

Satorra–Bentler scaled chi-square was obtained and used for nested model comparisons per recommendations by (Satorra and Bentler, 2010). M, Model; Comp., Comparison; $\Delta\chi^2$, Satorra–Bentler scaled chi-square.

TABLE 3 Multigroup SEM model comparisons.

M	Model constraints	χ^2	df	*p*	Comp.	$\Delta\chi^2$	Δ df	*p*	Retained
a	All paths equal between groups	1,055.402	725	<0.001	--	--	--	--	--
b	Free Exp ➔ GPA, others equal	1,055.675	724	<0.001	b vs. a	0.077	1	0.782	a
c	Free TV ➔ GPA, others equal	1,055.039	724	<0.001	c vs. a	0.107	1	0.744	a
d	Free Beh ➔ GPA, others equal	1,052.74	724	<0.001	d vs. a	2.837	1	0.092	a
e	Free Cog ➔ GPA, others equal	1,053.932	724	<0.001	e vs. a	1.475	1	0.225	a
f	Free Exp ➔ Beh, others equal	1,055.083	724	<0.001	f vs. a	0.154	1	0.695	a
g	Free TV ➔ Beh, others equal	1,055.671	724	<0.001	g vs. a	0.003	1	0.956	a
h	Free Exp ➔ Cog, others equal	1,045.271	724	<0.001	h vs. a	14.150	1	<0.001	h
j	Free Exp ➔ Cog & TV ➔ Cog, others equal	1,041.016	723	<0.001	j vs. h	3.939	1	0.047	j

Satorra–Bentler scaled chi-square was obtained and used for nested model comparisons per recommendations by (Satorra and Bentler, 2010). M, Model; Comp., Comparison. $\Delta\chi^2$, Satorra–Bentler scaled chi-square.

FGCS and CGCS (Model a), and then the between-group constraints were relaxed one by one (Models b – j).

Based on the model comparisons using Satorra–Bentler scaled chi-square difference tests, Model j was retained, which indicated that two paths significantly differed between groups. Model j had excellent model-data fit (χ^2 [df] = 1041.016 [723], $p < 0.001$; RMSEA = 0.039 (0.034, 0.044); CFI = 0.953, TLI = 0.950; SRMR = 0.08). Model j suggested two significantly different paths between FGCS and CGCS (Figure 2). First, the influence of expectancy on cognitive engagement was significantly higher for FGCS ($b_{FGS} = .378$, $\beta = 0.362$, $p < 0.001$) than for CGCS ($b_{CGS} = .168$, $\beta = 0.193$, $p = 0.008$). Second, the influence of task value on cognitive engagement showed significant difference in the same direction ($b_{FGS} = .360$, $\beta = 0.442$, $p < 0.001$ vs. $b_{CGS} = .222$, $\beta = 0.327$, $p < 0.001$).

Particularly for the first-generation students, a substantial 43.4% of variance in cognitive engagement was explained by expectancy-value motivation, implying the importance of expectancy and task value for FGCS' cognitive engagement in school, and for CGCS, the variance explained in cognitive engagement was at 18.6%—smaller than for FGCS but still considerable. Expectancy and task value played an important role in cognitive engagement for both groups, but the two appeared to be particularly essential for first-generation students' cognitive engagement in school.

Behavioral engagement was also significantly predicted by both expectancy ($b = 0.296$, $\beta = 0.304$, $p < 0.001$) and task value ($b = 0.099$, $\beta = 0.130$, $p = 0.032$). These effects, however, did not differ by group, and the explained variance in behavioral engagement was the same at approximately 13.6%. Expectancy and task value also played an important role in behavioral engagement in school for FGCS as well as CGCS, and because behavioral engagement had a direct effect on GPA, these relations are of practical meaning. We discuss this in the following section.

5.5. What is the effect of engagement on academic performance, and how does it mediate the effect of expectancy-value motivation on performance?

Model j showed that GPA was significantly predicted by behavioral engagement ($b = 0.238$, $\beta = 0.231$, $p < 0.001$), which was not significantly different by generation status. This was the only significant direct effect on GPA of the four predictors, which may have contributed to the smaller explained variances in GPA ($R^2_{FGS} = 5.3\%$ and $R^2_{CGS} = 5.8\%$).

The only significant indirect effect in the model was the influence of expectancy on GPA mediated by behavioral engagement ($\beta_{ind.} = 0.071$, $p = 0.004$; see bolded paths in Figure 2). Although with a small magnitude, this was a *full* mediation by behavioral engagement because the direct effect of expectancy on GPA was nonsignificant ($p = 0.419$), which highlights the important role of behavioral engagement in understanding how expectancy may impact academic achievement. In addition, this indirect effect did not differ by generation status, indicating the importance of behavioral engagement as a mediator for both FGS and CGS.

Unlike behavioral engagement, cognitive engagement did not significantly mediate the effect of expectancy or task value on academic performance. As shown in Figure 2, this was due to the nonsignificant direct effect of cognitive engagement on GPA ($b = 0.059$, $\beta = 0.051$, $p = 0.332$).

6. Discussion

Due to the preponderance of studies assessing domain-specific expectancy, task value, and engagement when examining differences across generation status, the literature lacks a clear understanding of how school motivation and engagement vary by generation status and how school motivation, engagement, and academic performance relate as

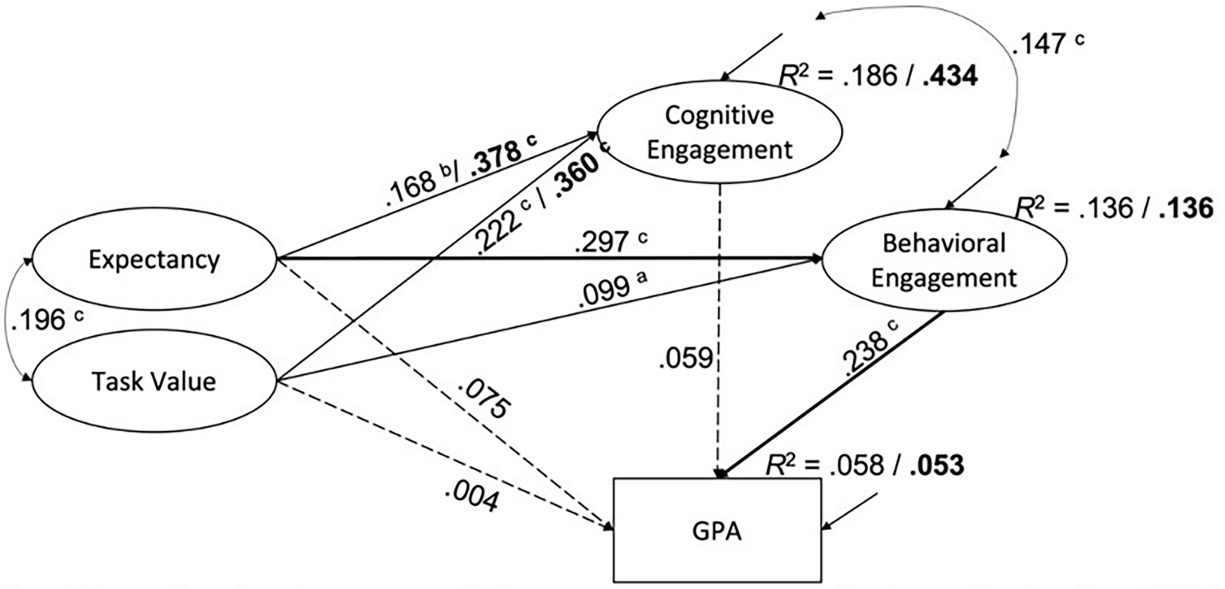

FIGURE 2
Model estimates of the retained multigroup SEM of GPA, expectancy value, and engagement. For paths showing group differences, normal font indicates estimates for CGCS and boldface for FGCS. Bolded paths represent the only significant indirect effect of expectancy on GPA via behavioral engagement, β=0.071[b]. [a]$p < 0.05$; [b]$p < 0.01$; [c]$p < 0.001$.

a function of generation status. Using domain-general data and the SEVT as a guiding framework, the study aimed to add to the existing body of knowledge. Hence, we examined how generation status may contribute to differential relations among expectancy and task value for school, engagement in school, and academic achievement. We also investigated the mediating effect of engagement in the relationship between expectancy-value motivation and academic performance by generation status. Although some relationships were found to be similar between groups, we uncovered that generation status played a significant role in influencing student motivation in school, and it determined, to some extent, how school motivation affected school engagement. In the following sections, we explain our results and their implications.

6.1. Expectancy, task value, and engagement by generation status

We found no statistically significant differences in school task value and engagement between FGCS and CGCS. These results are consistent with previous research demonstrating that FCGS and CGCS similarly value their course work (e.g., Gaudier-Diaz et al., 2019; Jiang et al., 2020; Part et al., 2020; Goldman et al., 2022). This indicates that students' endorsement of task value generalizes across specific domains and school in general. Similarly, the results are consistent with prior research demonstrating comparable domain-specific engagement (Goldman et al., 2021) and school engagement between the two groups (e.g., Gibson and Slate, 2010).

Considering sociocultural experiences through the lens of FGCS may shed light on our findings. FGCS face more academic challenges while completing a college education than their continuing generation peers (See Falcon, 2015), which may predispose them to adopt maladaptive engagement strategies and discourage them from valuing school work. However, these students possess certain characteristics that uniquely position them to experience outcomes comparable to their more privileged peers. Azmitia et al. (2018) discovered in a recent longitudinal mixed-methods study that FGCS persisted in school despite obstacles due to their perseverance and lingering fear of failure (e.g., not being a good role model for siblings and facing similar challenges as family members without a college degree). Similarly, Garrison and Gardner (2012) demonstrated that FGCS are goal-directed in their actions in that they learn to persist despite obstacles. Perhaps the FCGS in our sample possessed similar resiliency and beliefs regarding engaging in schoolwork in the face of a myriad of stressors. As a result, they adopted levels of engagement comparable to those of their peers, contrary to what the literature has primarily documented (see Beattie, 2018; Ives and Castillo-Montoya, 2020).

A similar argument could be made for the task value results. Wilbur (2021) proposed that the coping mechanisms of FGCS in the face of stress may involve social comparisons with more disadvantaged family members, as opposed to more privileged CGCS. This comparison could allow them to have a more optimistic outlook on their college education and future prospects. This, according to Wilbur, could mitigate the stressors that lead to depression. We suggest that this type of coping could also result

in FGCS recognizing the value of their schoolwork, thereby buffering any deficit in comparison to CGCS in light of their structural, cultural, and psychological barriers.

In terms of expectancy for school work, we discovered that FGCS reported higher levels than their continuing generation peers. This result contradicts previous findings in classroom settings revealing lower expectancy among FGCS compared to CGCS (e.g., Jiang et al., 2020) and similar endorsements across groups (e.g., Gaudier-Diaz et al., 2019), suggesting that investigating expectancy across generation status at the domain-general level can provide additional crucial information about student motivation. We provide a few plausible explanations for our findings.

First, as stated previously, FGCS can be resilient in the face of adversity (e.g., Alvarado et al., 2017; Azmitia et al., 2018; Covarrubias et al., 2019). These experiences can result in hopefulness, self-confidence, and positivity (Ricks and Warren, 2021). Therefore, it is probable that when FGCS evaluate their overall expectation of success in school, they will view their academic performance favorably. In contrast, CGCS are not confronted with these obstacles and may not have access to this level of self-reflection. Moreover, recent qualitative evidence indicates that CGCS view college as merely the next academic step, primarily encouraged by their parents (Cuellar et al., 2022). If these students view college education as a priority for others rather than themselves, they may be less likely than FGCS to be optimistic about their future performance.

Nonetheless, the level of optimism among FGCS may be more salient when considering school motivation than when FGCS evaluate their performance in particular courses. Although they may be more positive about school in general, their outlook may be more nuanced in regard to specific courses. Prior research has demonstrated that FGCS experience more negative emotions (i.e., imposter syndrome) than CGCS when placed in competitive classroom environments (i.e., STEM; Canning et al., 2020). At the class level, they may have difficulty expressing resilience and optimism due to certain classroom characteristics, allowing them instead to report expectancy levels that are lower than or comparable to CGCS (see Gaudier-Diaz et al., 2019; Jiang et al., 2020). We urge additional research to test this assertion.

Although our assumption may be accurate, it is important to note that our results contradict those of Brown and Putwain (2022), revealing lower school expectancy among secondary school students in England with less educated parents. The cultural contexts may explain this discrepancy, particularly since recent evidence demonstrates that the resourcefulness and resilience of FGCS vary by culture and geographic regions (Reed et al., 2019). However, we acknowledge that FGCS' lack of college preparation and understanding of what it takes to succeed (see Atherton, 2014) may have also contributed to our results. Consequently, these students may exaggerate their expectation of academic success or inaccurately report task value and engagement. Further study is required to investigate this.

Last, we believe it is essential to elaborate on the probable explanation for why we observed greater expectancy among FGCS but not task value. We propose that students' cultural models of self may help explain our findings (for more details, see Markus and Kitayama, 2003). Specifically, whereas CGCS endorse an independent model of self (i.e., the self, distinct from others), FGCS primarily adopt an interdependent model of self or see the self as connected to others, including their family and community (Stephens et al., 2019). This cultural orientation influences motives for pursuing a college education. FGCS, for example, report interdependent motives for attending college, such as giving back to family and community (e.g., raising their socioeconomic status), while CGCS endorse independent motives whereby they seek self-improvement and development (Stephens et al., 2012; Cuellar et al., 2022). Given that FGCS believe that the upward social mobility of their family and community depends on their success in college, they place greater emphasis on expectancy than on the value of schoolwork. However, we recommend additional research to investigate this hypothesis.

6.2. The relations among expectancy, task value, engagement and academic performance by generation status

The results showed that school task value and expectancy played a greater, positive role in the cognitive engagement of FGCS than their continuing-generation counterparts. This means that the expectancy-value motivation of FGCS is more critical to the cognitive effort they devote to school than that it is for CGCS. These findings mirror prior SEVT research demonstrating group differences in the influence of expectancy and task value on course-specific engagement. For instance, Fan (2011) found that intrinsic value was a powerful predictor of engagement among female students, whereas expectancy was a significant predictor of engagement among male students. Further, Watt et al. (2012, 2017) demonstrated that attainment value is more predictive of girls' math career choice, intrinsic value more strongly predicts boys' STEM career goals, and expectancy and prior achievement predict girls' aspirations.

Notwithstanding, the dissimilar experiences of students across generation status may help explain our results. Specifically, compared to their continuing generation peers, FGCS are less likely to be adequately prepared for the rigor of college course work (Atherton, 2014) and are generally less *college-ready* (Royster et al., 2015; DeAngelo and Franke, 2016). This implies that FGCS would lack the essential learning strategies required for effective cognitive engagement in school. In other words, these skills would not be as accessible or readily available to them as they would be for CGCS. Recent research supports this claim, as FGCS scored lower than their peers on several indicators of self-regulated learning in school, including information processing and test-taking strategies (Antonelli et al., 2020). In addition, Antonelli and colleagues demonstrated that generally, the self-regulatory strategies of FCGS do not improve over time. As such, given that FGCS may enter college less equipped to use effective cognitive

strategies when completing schoolwork than CGCS, it is reasonable to assume that motivation will be more important to them when they are required to use these skills. In other words, their cognitive engagement would depend on whether they anticipate completing school tasks successfully and the value of those tasks.

In contrast, however, we discovered that the influence of expectancy and task value on behavioral engagement was comparable between the two groups. In other words, students' expectancy and task value for school were important for their behavioral engagement regardless of their generation status. These results are consistent with the assumptions of the SEVT (Eccles et al., 1983; Eccles and Wigfield, 2020) and prior research demonstrating a significant effect of expectancy and task value on behavioral engagement in specific domains across academic settings (Hsieh et al., 2021; Wu and Kang, 2021; Sutter et al., 2022) and school in general (e.g., Suárez et al., 2019). These findings suggest that classroom motivational experiences and engaged behaviors may be generalized to school.

Nonetheless, when we consider FGCS' experiences, the results may shed light on the importance of motivation for their cognitive engagement but not their behavioral engagement. While cognitive engagement is not a readily available skill for FGCS, behavioral engagement may be more likely to emerge from their personal experiences. As we have demonstrated, FGCS face a plethora of challenges (see Ives and Castillo-Montoya, 2020), but from these difficulties, they develop proactivity, flexibility, persistence, positivity, hopefulness (Garrison and Gardner, 2012), and resilience (Alvarado et al., 2017; Covarrubias et al., 2019). Persistence and resilience in the face of difficulty were indicators of the behavioral engagement measure utilized in this study. These important markers of behavioral engagement appear to be assets among FGCS, thereby making engaged behavior a readily available skill. Given this, it would make sense for expectancy-value motivation to play a lesser role in the behavioral engagement of FGCS than it did in their cognitive engagement.

In addition, we found that across the two groups, neither school expectancy nor task value significantly directly influenced academic performance. This is somewhat contrary to prior research demonstrating the predictive value of these constructs for achievement in specific subject domains (e.g., Jiang et al., 2018; Meyer et al., 2019; Robinson et al., 2019; Jiang et al., 2020) and in school overall (for a review, see Kriegbaum et al., 2018). It may be likely that other factors that were not assessed in this study are more important to academic performance than expectancy-value motivation. A recent qualitative study conducted by Ricks and Warren (2021) revealed that family support, high school experience, and environmental factors had the greatest influence on successful senior FGCS who succeeded in college. It is likely that these and similar factors are more important than motivation for FGCS students. The lived experiences of CGCS may also reveal other, more influential factors than motivation that contribute to their academic success. Recent evidence indicates, for instance, that compared to FGCS, students with continuing generation status continue to exhibit depressive symptoms throughout college (Wilbur, 2021). Continuous stress may have a greater effect on CGCS' performance than expectancy-value motivation, especially as stress is strongly associated with achievement (for a review, see Pascoe et al., 2020).

Furthermore, it is plausible that cost as operationalized in the SEVT could explain the academic performance of our sample. Prior research has documented the importance of cost in determining achievement in particular domains (e.g., Jiang et al., 2018; Perez et al., 2019; Jiang et al., 2020; Part et al., 2020). FGCS were also found to have a higher perceived cost than CGCS (e.g., Goldman et al., 2022). Perhaps the impact of cost on academic performance varies by generation status, or perhaps cost is a better predictor of academic engagement than expectancy and task value. We recommend additional research in the area.

Last, our findings revealed that behavioral engagement predicted academic performance similarly across groups, whereas cognitive engagement was not a significant predictor. However, we observed low proportions of variance in GPA that was explained in the structural equation model for both FGCS and CGCS. Behavioral engagement being the only significant direct predictor of the four (i.e., expectancy, task value, cognitive and behavioral engagement) may be the reason for the low variances. This is not a surprising finding, however, as researchers have documented contradictory results when testing the impact of engagement on achievement, with some reporting positive effects and others finding null results (Lei et al., 2018). We propose that our measurement of engagement could be a plausible explanation. We relied on self-reported engagement. In a recent meta-analysis, Lei et al. (2018) reported that there was a weaker relationship between engagement and academic performance when self-reported engagement was used. In the future, researchers could test these relationships using alternative measures of engagement. Other factors associated with students' experiences related to their social class may also explain our results. For instance, access to social and cultural capital is critical to FGCS' success (Stephens et al., 2019; Ives and Castillo-Montoya, 2020; Ricks and Warren, 2021). Perhaps these factors are also more predictive of their academic performance than their engagement, especially cognitive engagement.

6.3. The mediating effect of cognitive and behavioral engagement

We found that, regardless of generation status, behavioral engagement mediated the relationship between expectancy and academic performance. This indicates that the expectancy-behavioral engagement-performance model functions similarly across both groups. Specifically, greater expectancy promoted academic performance across generation status *via* its positive impact on behavioral engagement, and this was a full mediation because expectancy did not also directly influence academic performance. This result clarifies the relationship between expectancy and academic performance by demonstrating that behavioral engagement is required to facilitate this connection.

We discovered, however, that cognitive engagement played no role in the relationship between expectancy and performance for either group. We also did not observe any indirect effects for task value of schoolwork.

Overall, our findings support prior research showing that behavioral engagement mediates the link between expectancy for subject-related activities and achievement (e.g., Putwain et al., 2019; Wu and Kang, 2021). However, our cognitive engagement finding is inconsistent with existing evidence (e.g., Metallidou and Vlachou, 2007). Additionally, prior research has shown that engagement can mediate the relationship between task value and academic performance (e.g., Jones and Carter, 2019). Nonetheless, at the domain-general level, only expectancy, behavioral engagement, and academic performance were linked for our participants. It is possible that other types of motivational variables were more strongly associated with engagement and academic performance than expectancy and task value. For instance, goal orientations have been linked to academic performance through engagement (e.g., Putwain et al., 2018; Zhou and Wang, 2019). Additional research is required to explore the mediating effect of school engagement on the relationship between other motivational constructs and academic performance by generation status.

Nonetheless, when we examine our findings from the perspective of generation status, we can gain valuable insight. Building on our prior argument about participants' lived experiences taking precedence over motivation and engagement to uniquely influence academic performance, it appears that their expectancy can also impact their performance. However, it will only impact performance across groups through behavioral engagement. This is significant for FGCS because their experiences may contribute to the development of behavioral engagement (Azmitia et al., 2018; Ives and Castillo-Montoya, 2020; Ricks and Warren, 2021). Moreover, our results suggest that expectancy is more important to them than task value, as their levels were higher than those of CGCS. If FGCS regularly use engaged behaviors, this is an asset because it can help support the connection between their expectancy and academic performance. We, however, recommend additional research in this area of inquiry.

6.4. Implications

Our findings have important theoretical implications. First, the study makes a novel contribution to the literature regarding the moderating effect of generation status on expectancy-value motivation and engagement. To our knowledge, our study is the first to investigate school expectancy, task value, and engagement among college students, with generation status as a moderator. Prior studies guided by the SEVT have primarily examined generation status differences in expectancy, task value, and engagement in specific subject domains (e.g., Harackiewicz et al., 2016; Gaudier-Diaz et al., 2019; Part et al., 2020; Goldman et al., 2021). Importantly, our results revealed that there were different patterns of results among college students at the domain-general level versus the domain-specific level. Whereas prior research has documented comparable and lower levels of expectancy across generation status in various subject domains (e.g., e.g., Gaudier-Diaz et al., 2019; Jiang et al., 2020), our FGCS sample reported higher expectancy for school work than their peers. Consequently, our study makes a significant contribution to the literature by demonstrating the usefulness of assessing domain-general expectancy-value motivation and engagement when considering generation status differences.

Most importantly, our study demonstrates the strengths of FGCS by revealing that they have higher expectancy than their continuing generation peers. Generally, in the social class and generation status literature, FGCS are positioned from weakness, facing greater academic challenges than CGCS (for a review see Ives and Castillo-Montoya, 2020). However, our findings presented a picture of FGCS that emphasized their strengths when compared to CGCS. Our research revealed that despite their difficulties, FGCS students have high expectations for academic success and value schoolwork similarly to their peers. In light of our findings, future empirical research could be framed from an asset perspective as opposed to a deficit framework, and future intervention work could consider utilizing the high expectancy and its effect on engagement to further enhance FGCS's school outcomes. This could better inform the literature about the academic and motivational experiences of FGCS.

Furthermore, our study provides crucial information regarding the relationship among domain-general expectancy, task value, engagement, and academic performance by generation status. First, we add to the sparse body of research examining these relationships through the lens of generation status. We found only a handful of SEVT studies examining these relationships (i.e., Jiang et al., 2020; Goldman et al., 2021), albeit in specific subject domains. Our study expanded on this research by examining school expectancy-value motivation differences between generation statuses and illuminating how school motivation impacts cognitive engagement, behavioral engagement, and academic performance because of generation status. We also investigated the impact of engagement on performance and the role of engagement as a mediator in the relationship between expectancy-value motivation and performance by generation status.

Last, we uncovered that the effect of expectancy-value motivation for school on cognitive engagement varies across groups. These results contrast with previous findings within subject domains that demonstrated that task value has no impact on engagement based on generation status (e.g., Goldman et al., 2021). This suggests that domain-general data uncovered differences that domain-specific measurement may have masked. Hence, our methodological approach highlights the significance of considering domain-general motivation and engagement when accounting for generation status differences in regard to the relationship between these constructs.

Our results also have important implications for practice. Utilizing domain-general data makes our study salient to policy

initiatives that take student experiences outside of the classroom into account. We recognize that mechanisms aimed at increasing the participation and completion of FGCS in college have been primarily informed by the deficit framework. However, our findings and a small body of research (e.g., Garrison and Gardner, 2012; Reed et al., 2019; Wilbur, 2021) support the need for policies that highlight the strengths of FGCS rather than their shortcomings. Because the perceived misfit of norms between FGCS and their institutions may be detrimental for them (see Stephens et al., 2012; Phillips et al., 2020), it is important that higher education institutions norms reflect the experiences of their students. Continuing to implement initiatives based on the assumption that FGCS are primarily "disadvantaged" could be detrimental to these students, particularly given that they recognize their own strengths (Garrison and Gardner, 2012). In this case, institutions could foster the cultural values of FGCS (Stephens et al., 2012; Townsend et al., 2021), which could account for their motivation.

Moreover, institutions could implement a variety of measures to acknowledge and support FGCS motivation. The significance of the role of expectancy-value motivation in cognitive engagement demonstrated by our research supports the need for these interventions. To better support FGCS motivation, it would be prudent for institutions to gain clarity on the sources of their motivation. This is especially significant because first-generation status typically entails the integration of multiple social identities (Nguyen and Nguyen, 2018), indicating that these students' experiences are more heterogeneous than monolithic. This is also important because incorporating FGCS prior knowledge into the educational process can enhance their learning (Castillo-Montoya, 2017; Delima, 2019). Institutions may collect this information through a variety of methods, including focus groups, interviews, and surveys.

Finally, the present study revealed that despite generation status, students shared some similarities. In particular, we discovered that expectancy-value motivation is essential for student behavioral engagement, that behavioral engagement influences achievement, and that behavioral engagement facilitates the effect of expectancy on academic performance for all students. This suggests that school expectancy-value motivation and behavioral engagement are important for academic success. These findings have important policy implications. Institutions may wish to implement practices that promote student motivation and behavioral engagement throughout the school curriculum. For example, institution-wide orientation classes could include lessons emphasizing the significance of motivation and engagement for academic success as well as strategies for sustaining these processes and behaviors.

6.5. Limitations and future research

The current findings provide important knowledge about expectancy, task value, engagement, and academic performance by generation status. Nonetheless, we acknowledge that the study may be limited by a number of factors. We focused on domain-general expectancy-value motivation and engagement in school, and the domain-general operationalization of these constructs was fully aligned with the outcome variable, GPA, which accounted for multiple courses students had taken rather than specific to one course or one domain. Nevertheless, this approach may have concealed differences that would be found at the classroom level. Although the explanations we offered for the null results we found are plausible, using domain-general data could have been a determining factor. Future research should employ multiple methodological approaches (e.g., domain-general and domain-specific measurement) to better comprehend differences in motivation, engagement, and academic performance by generation status.

Moreover, because we focused on expectancy-value motivation and engagement in school, the generalizability of our results is limited to domain-general motivation and school engagement. We do not know if our findings can be applied to specific subjects. We recommend that future researchers replicate this study in domain-specific contexts. Considering the paucity of research in the area, we encourage further research into the impact of expectancy-value motivation on engagement and academic performance by generation situation. Related to the issue of generalizability, we also acknowledge the lack of generalizability to other school settings. The study was conducted at a single university in the southeastern United States with students enrolled in introductory psychology courses, limiting its applicability beyond this context. Consequently, additional research is needed in different academic contexts, including diverse university and course settings.

In addition, a cross-sectional design was utilized to answer our research questions. Specifically, expectancy, task value, and engagement were evaluated simultaneously and prior to the measurement of academic achievement (i.e., GPA). As we have demonstrated, prior research supports our findings that expectancy and motivation can impact engagement, and engagement can mediate the relationship between expectancy and academic performance. However, we cannot draw any conclusions about the direction of the effects. Students' expectancy and task value could likely result from their engaged behaviors and cognitive effort. Prior engaged behaviors of FGCS may have also promoted their expectancy. Our findings will be clarified further by future longitudinal research.

Moreover, other factors, including race, gender, culture, and socioeconomic status (SES) when intersected with social class, may account for our findings. FGCS students, for instance, are overwhelmingly low-income, nonnative English speakers and racialized minorities (Redford and Mulvaney Hoyer, 2017). For example, it is likely that race interacted with FGCS status, explaining our results (see Nguyen and Nguyen, 2018 for a detailed discussion). In addition, FGCS may integrate multiple cultural identities in college (Herrmann and Varnum, 2018a), which can lead to positive academic experiences (Herrmann and

Varnum, 2018b). Therefore, it is crucial that future researchers investigate how the intersection of race, SES, gender, cultural identity, and generation status may influence expectancy-value motivation and engagement, as well as how expectancy, value, engagement, and academic performance relate by these interactions. Furthermore, although FGCS are disproportionately ethnic minorities (Rodini et al., 2018), in the current study, the FGCS sample comprised primarily White students (49.3%). This distribution was proportionate in the FGCS and CGCS groups, and a similar distribution was also observed in our sample for Black students. However, this precluded a more accurate portrayal of the motivation, engagement, and academic performance of minority FGCS, whose lives are most affected by their status. In the future, researchers should collect a sample that is more representative of FGCS.

Finally, our research revealed significant differences across generation status on the latent mean of expectancy and the impact of expectancy-value motivation on cognitive engagement. We speculated that these differences may result from the unique experiences of students of different generation status. Limited by our quantitative methodology, we did not have in-depth data (e.g., interviews) on the lived experiences of students to better explain our findings. A growing body of research has used qualitative methodology to gain a deeper understanding of the assets of FGCS (see Ives and Castillo-Montoya, 2020). Thus, we recommend that future researchers incorporate qualitative or narrative approaches to better comprehend students' expectancy-value motivation, engagement, and academic performance in school.

7. Conclusion

Considering that students' generation status can result in dissimilar academic experiences, it is critical to examine aspects of these experiences, such as motivation and engagement and their relationship to academic performance, as a function of generation status. There is a body of research examining these factors by generation status; however, the studies are focused on specific subject domains. Therefore, little is known about the effect of generation status on motivation and engagement in school or the relationship between these factors and academic performance by generation status. Guided by the SEVT, we documented differences in expectancy between the two groups and revealed that motivation impacts engagement differently by generation category. In particular, we found that FGCS have higher expectancy than CGCS and that expectancy-value motivation is more significant for cognitive engagement among FGCS than among CGCS. Importantly, our study revealed differences at the domain-general level that were not apparent at the subject-specific level, thereby making a significant contribution to the literature. Our work also confirms the assumptions of the SEVT, providing more insight into the relationships among expectancy, task value, engagement, and academic performance as a result of generation status.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: https://osf.io/zyp3s/?view_only=4f7d16beb9774e90ad7be1f1c90ab749.

Ethics statement

The studies involving human participants were reviewed and approved by Kennesaw State University Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

Author contributions

OE conceptualized and designed the research, developed the methodology, supervised the project, data collection, and data curation, wrote the original and final drafts, and reviewed and edited the manuscript. TD analyzed the data, wrote the data analysis and results sections of the manuscript, created tables and figures, contributed to portions of the method section, and reviewed and edited the entire manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer TS declared a past co-authorship with one of the authors TD to the handling editor.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2022.1033100/full#supplementary-material

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