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Understanding Interest in Career and Technical Education Course-Taking: Exploring the Impact of Students' Perceptions of Intrinsic and Utility Value

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Abstract

Previous research has linked student participation in Career and Technical Education (CTE) to a variety of factors, including student and family demographic characteristics. Less attention has been paid to how students' attitudes – including their perceptions of the value of CTE courses – impact interest in CTE course-taking. Results of the current study indicated that perceptions of the value of CTE courses are strong and increase with grade level, but primarily among students who have plans to attend college after high school. Although perceptions of both the intrinsic value and utility value of CTE courses predict interest in CTE course-taking, the relationship is strongest for perceptions of intrinsic value. Together, these findings suggest that attention to students' perceptions of both the intrinsic value and the utility value of CTE courses should be an important part of recruitment efforts.

Introduction

Career and Technical Education (CTE) has a long history in public education. Different philosophies, goals, and expected outcomes have influenced its evolution (Gordon & Schultz, 2020; Kim et al., 2021). Today, CTE offers middle and high school students the opportunity to explore career pathways and learn technical skills through courses, apprenticeships, internships, and certificate programs that complement or extend their academic studies. By doing so, CTE not only offers academic, social, career, and economic benefits to individual students, but also plays a potentially critical role in bolstering U.S. economic competitiveness. Specifically, CTE aims to address discrepancies between the number of adults who hold high school diplomas, postsecondary certificates, or postsecondary degrees and the demand for these credentials in the workforce (U.S. Department of Education, 2017, 2019). Consistent with these aims, a host of research studies have provided evidence that CTE participation reduces the likelihood that

students will drop out of high school, increases on-time high school graduation rates, and increases the probability that students will enroll in college and attain relevant credentials (e.g., Dietrich et al., 2016; Dougherty et al., 2023; Glennie et al., 2020; Gottfried & Plasman, 2018). Another benefit of CTE participation is its association with higher wages (Ecton & Dougherty, 2023; Kemple, 2008; Plasman, 2019), both among students who pursued postsecondary education and those who did not (Bishop & Mane, 2004). This is especially true for students who concentrated their studies in health sciences, trades, and agriculture and natural resources (LaForest, 2023; Plasman, 2019).

Although CTE participation declined from 1992 to 2013, there has been a resurgence in student participation in CTE in the past decade (CTE Policy Watch, 2021; Dougherty & Harbaugh Macdonald, 2019; Kim et al., 2021; U.S. Department of Education, 2013). In 2021-2022, more than 8 million students participated in CTE coursework at the secondary level. Among these participants, 2.8 million were deemed to be CTE concentrators by virtue of completing at least two course credits in a single CTE program of study or career cluster (CTE Policy Watch, 2023; Huang et al., 2023; Strengthening Career and Technical Education for the 21st Century Act, 2018).[1]

Demographic predictors of CTE participation

Research examining predictors of CTE course-taking has often focused on student and family demographic characteristics. For example, in a recent study using several nationally representative longitudinal datasets, male students were more likely to be CTE participants and CTE concentrators than female students (U.S. Department of Education, 2019). In addition, students who are White were more likely to be CTE participants than students who are Black, Hispanic, or Asian and more likely to be CTE concentrators than students who are Hispanic or Asian (U.S. Department of Education, 2019).

Importantly, patterns of CTE course-taking are often complex and sometimes surprising. For example, in some cases, gaps in CTE participation based on race/ethnicity are expanding instead of narrowing, with students of color becoming increasingly less likely than their White counterparts to enroll in CTE courses associated with science, technology, engineering, and mathematics (STEM). This trend is especially concerning given that STEM knowledge and skills are not only in high demand, but also linked to elevated earnings and prestige (Leu & Arbeit, 2020). Moreover, while CTE has historically targeted students identified as low-income and students eligible for special education services, one recent study by Aliaga and colleagues (2012) using a nationally representative dataset revealed high rates of participation among economically-advantaged students with highly-educated parents. Indeed, nearly one in three students in the highest socioeconomic status (SES) quartile took three or more CTE credits. Among students in the second highest SES quartile, 43.8% of students did so (Aliaga et al., 2012). Both sets of findings are consistent with the finding that CTE has "moved from being a clearly delineated vocational track for graduates headed to jobs immediately after high school to an exploratory program for an increasing proportion of both academic and general curriculum graduates" (Dalton et al., 2013, p. ix). Reflecting this change, the percentage of students who chose to concentrate in a particular CTE field declined from 1982 to 2004, while the percentage

of students who were CTE "samplers" or "explorers" by virtue of taking one or two CTE courses in a particular occupational area increased (Aliaga et al., 2012; Dalton et al., 2013).

Attitudinal Predictors of CTE Participation

Less attention has been paid to how student participation in CTE might relate to students' attitudinal characteristics, including their perceptions of the importance, worth, or usefulness of CTE coursework (see Schmidtke, 2017). This lack of attention is surprising given decades of research related to Expectancy-Value Theory (Eccles et al., 1983; Wigfield, et al., 2020) which posits that students' subjective task values – that is, students' perceptions of the value of engaging in a particular activity – play an important role in influencing their academic choices.

Originally, subjective task values were conceptualized as being multidimensional and separable into four components. *Intrinsic value* denoted the personal enjoyment an individual experiences from participating in a specific activity. *Utility value* represented the perceived usefulness of an activity in achieving one's future goals. *Attainment value* indicated the significance of the activity for one's sense of self. Lastly*, cost* encompassed the psychological barriers and negative consequences linked to task engagement. However, recent research has cast some doubts on this conceptualization. For example, intrinsic value and attainment value are very highly correlated (*r = 0.97;* Trautwein et al., 2012) and utility value is thought to encompass not only long-term goals (e.g., getting a good job), as originally proposed, but also short-term goals (e.g., strengthening real-world skills; Song & Jiang, 2019). In addition, some research has suggested that cost is a unique construct independent of value (Barron & Hulleman, 2015; Hulleman et al., 2017; but see Eccles & Wigfield, 2020). Based on these findings, the current study focused on student perceptions of the intrinsic value of CTE courses – defined, here, as the degree to which students expect to find enjoyment or satisfaction in CTE coursework – and the utility value of CTE courses – defined, here, as the degree to which students expect CTE courses to be useful in attaining current or future goals.

Consistent with key tenets of Expectancy-Value Theory, the extant literature indicates that, when students perceived activities as having intrinsic value and utility value, they were more likely to express interest in engaging in these activities (e.g., Hulleman et al., 2008). Interest is, in turn, associated with a myriad of achievement-related outcomes including decisions to enroll in specific courses, to exert effort in those courses, and to pursue specific career pathways (e.g., Harackiewicz et al., 2008; see Wigfield & Cambria, 2010 and Wigfield & Eccles, 2020, for reviews). While much of the existing research linking subjective task values to outcomes is correlational, there is growing experimental evidence that interventions designed to change students' subjective task values can be effective in promoting positive learning outcomes (Hulleman et al., 2010; Hulleman et al., 2017). To date, most intervention research has focused on utility-value interventions designed to help students engage with the material they are learning and connect it with their lived experiences. Early evidence has indicated that these types of interventions are effective in increasing academic performance and persistence, especially among low-achieving students and students from historically marginalized groups (Hulleman & Harackiewicz, 2021).

Researchers continue to work to identify the situational factors (e.g., home and classroom experiences) and personal characteristics (e.g., gender, age, and academic goals) that contribute

to both developmental and individual differences in subjective task values. Recent efforts have highlighted that predictors of subjective task values are both complex and context-dependent (Eccles & Wigfield, 2020; Wigfield & Eccles, 2020). For example, although research has indicated that subjective task values generally decrease with age (Fredricks & Eccles, 2002; Watt, 2004), a longitudinal study of subjective task values identified seven distinct trajectories (Archambault et al., 2010). While most students showed declines in subjective task values from Grade 1 to Grade 12, three groups of students – collectively representing more than 25% of the sample – reported *stronger* perceptions of the value of reading and writing as they moved from elementary school into secondary school. Much remains to be learned about the degree to which subjective task values relate to CTE change as students age and the degree to which perceptions of value vary by students' demographic characteristics (e.g., gender, race/ethnicity) or college and career plans.

The current study

Given rapidly changing workforce needs (U.S. Department of Education, 2019), there is growing interest in identifying the factors that influence students' decisions to engage in Career and Technical Education and in crafting messages that effectively convey the value of CTE to both students and their families (Clagett, 2015). Current recommendations from organizations dedicated to the advancement of CTE still focus to a large degree on the utility value of CTE, noting, for example, that CTE messaging should focus foremost on CTE's potential to "provide learners with real-world skills that will help them succeed in college and a career" (Advance CTE, 2021, p. 2; see also Stone, 2014 and USBE, n.d.). This emphasis aligns with – and, perhaps, contributes to – a common belief among college students that their family members, peers, and high school teachers view securing employment as the primary purpose of education, including CTE in the secondary environment (Ashby-King & Anderson, 2022; Brooks, et al., 2021).

To inform messaging efforts, additional empirical research is needed to examine associations between students' perceptions of both the intrinsic and utility value of CTE and their self-reported interest in participating in CTE coursework. Toward these ends, the current study employed survey data collected from a sample of high school students from a large school district in Utah to address three research questions:

> **RQ1.** To what degree do students perceive intrinsic value or utility value in CTE courses?
>
> **RQ2.** Do student perceptions of the intrinsic value or utility value of CTE courses vary by student gender, race/ethnicity, grade level or postsecondary plans?
>
> **RQ3.** Are students' perceptions of the intrinsic value or utility value of CTE courses related to their interest in participating in CTE coursework?

Methods

Context

CTE programming in Utah – as in other states – is guided by Perkins V, or the *Strengthening Career and Technical Education for the 21st Century Act of 2018,* which seeks to provide opportunities for all students to participate in career and technical education programs and pathways and to earn valuable credentials (Advance CTE, 2019). Consistent with the objectives of Perkins V, Utah state law requires that high school students complete at least one credit in CTE prior to graduation (Utah Admin. Code § 277-700-6). Enrollment and outcomes data from Utah are generally consistent with national trends. For example, during the 2021-2022 academic year, 117,959 Utah students enrolled in CTE courses, 47.9% of Utah students concentrated in a CTE Career Pathway, and 15.5% completed the CTE Career Pathway. According to the Utah State Board of Education (2020, 2022), graduation rates among CTE concentrators (96.5%) were higher than the statewide graduation rate (88.2%), and 70.7% of students who concentrated in a CTE Pathway pursued postsecondary education, advanced training, military service, or employment.

Sample

Participants in the current study were 5,763 students in Grades 9 – 12 from a large school district in Utah, who completed a survey designed to assess students' perceptions of CTE courses and pathways, academic choices and plans, decision-making styles, and demographic characteristics. The authors of this article worked in partnership with the school district to develop the survey and conduct this study.

The study was approved as part of the University of Utah's Institutional Review Board Exemption Umbrella protocol. Student participation in the study was voluntary and informed consent was obtained prior to their participation in the study. Invitations to complete the survey were sent via email to all high school students in the district. The overall response rate – calculated by dividing the number of respondents by the number of email invitations – was 29.8%.

The demographic composition of the sample of participating students closely matched that of the broader student population during the 2021-2022 academic year. Among survey respondents, 46% identified as female, 45% as White, and 35% as Hispanic. For comparison, district enrollment data for the same year indicated a student body that was 49% female, 46% White, and 40% Hispanic.

Measures

Interest in Participating in CTE Coursework

Interest in participating in CTE coursework was assessed by asking students to report on their CTE course-taking behaviors and plans. Students who indicated that they had already taken more than the one CTE credit required for graduation in Utah or who indicated that they had already taken or intended to take more than the one required credit were classified as having "high" interest in CTE. Interest in CTE courses was treated as a binary variable, with a code of 1 representing "high" interest and 0 indicating "low" interest.

Subjective task values

Perceptions of the ***intrinsic value*** of CTE courses were assessed with three items designed to tap the degree to which students expect to find enjoyment or satisfaction in CTE coursework (e.g., "CTE classes are enjoyable" and "CTE course are engaging"). Students responded to each item on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Students' ratings were averaged across the three items such that higher numbers indicated stronger perceptions of intrinsic value. The three items formed a reliable scale with Cronbach's alpha (α) = 0.86.

Perceptions of the ***utility value*** of CTE courses were assessed with ten items designed to tap the degree to which students expect CTE courses to be useful in attaining current or future goals. Students responded to each item on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Preliminary factor analyses indicated that these items formed two distinct subscales: *Utility Value for College and Career Readiness* (7 items; e.g., "CTE classes can benefit students by providing real-world knowledge and skills" and "CTE classes can benefit students by allowing them to earn college credit in high school") and *Utility Value for Jobs and Networking* (3 items; e.g., "CTE classes can lead to higher paying jobs" and "CTE classes provide networking opportunities or industry connections"). Students' ratings were averaged across the items for each subscale such that higher numbers indicated stronger perceptions of utility value. The items formed reliable scales with Cronbach's alphas (α) = 0.94 and 0.85, respectively.

Student characteristics

Students were asked to self-report their gender, race/ethnicity, grade level, and postsecondary plans. Gender was coded as a binary variable, with a code of 1 representing students who identified as female. Race/ethnicity was also coded as a binary variable, with a code of 1 representing students who identified as a student of color.[2] Grade level was treated as a continuous variable. Finally, postsecondary plans were treated as a binary variable, with a code of 1 representing postsecondary plans that included college – immediately after high school, after a "gap" period, or while working.

Results

RQ1. To what degree do students perceive intrinsic value or utility value in CTE courses?

Table 1 provides descriptive statistics for all study variables. Forty-four percent (44%) of respondents expressed "high" interest in CTE courses by reporting that they had already taken or planned to take more than the one CTE credit required by Utah state law. Forty-six percent (46%) of respondents identified as female and 52% as a student of color. Seventy percent (70%) of respondents indicated that their postsecondary plans included college.

Comparisons of mean ratings for value measures indicated that students were, as a group, more likely to agree than disagree with items tapping the intrinsic value of CTE courses, the utility value of CTE courses for college and career readiness, and the utility value of CTE courses for jobs and networking, with ratings for all three constructs well above the scale midpoint. Results of a repeated measures analysis of variance (ANOVA) indicated that ratings of the utility value

of CTE courses for college and career readiness (mean = 3.86) were higher than ratings of the intrinsic value of CTE courses (mean = 3.60) which were, in turn, higher than student ratings of the utility value of CTE courses for jobs and networking (mean = 3.55). All pairwise comparisons were statistically significant at $p < .001$.

Table 1. Descriptive statistics

Variable	*n*	Range	Mean	SD
1. Interest in CTE courses	5207	0-1	0.44	0.50
2. Intrinsic value	5231	1-5	3.60	0.73
3. Utility value for CCR	5228	1-5	3.86	0.69
4. Utility value for jobs & networking	5207	1-5	3.55	0.64
5. Female	5763	0-1	0.46	0.50
6. Student of Color	5763	0-1	0.52	0.50
7. Grade	5753	9-12	10.24	1.10
8. College Plans	5622	0-1	0.70	0.46

RQ2. Do student perceptions of the intrinsic value or utility value of CTE courses vary by student gender, race/ethnicity, grade level, or postsecondary plans?

Linear regression analyses were conducted to explore associations between student characteristics and students' perceptions of the intrinsic value of CTE courses, the utility value of CTE courses for college and career readiness, and the utility value of CTE courses for jobs and networking. Models included student gender (coded as a binary variable, where 1 = female), race/ethnicity (coded as binary variable, where 1 = Student of Color), grade level (coded as continuous variable), and postsecondary plans (coded as a binary variable, with 1 = college plans). Initial models also included all two-way interactions among variables. These analyses revealed that the effect of grade level on perceptions of value consistently varied by students' postsecondary plans. As a result, this interaction term was retained in final models.

As shown in Table 2, perceptions of value were consistently stronger among female students than other students, Bs > 0.08, *t*s > 4.03, *p*s < 0.01, while perceptions of intrinsic value and perceptions of utility value for college and career readiness were weaker among students of color than other students, Bs = -0.08 and -0.06, *t*s = -3.88 and -3.04, *p*s < 0.01. In addition, grade level and postsecondary plans interacted to predict all three types of value ratings, Bs > 0.04, *t*s > 1.78, *p*s < 0.10.

Table 2. Summary of linear regression models predicting students' perceptions of the value of CTE courses

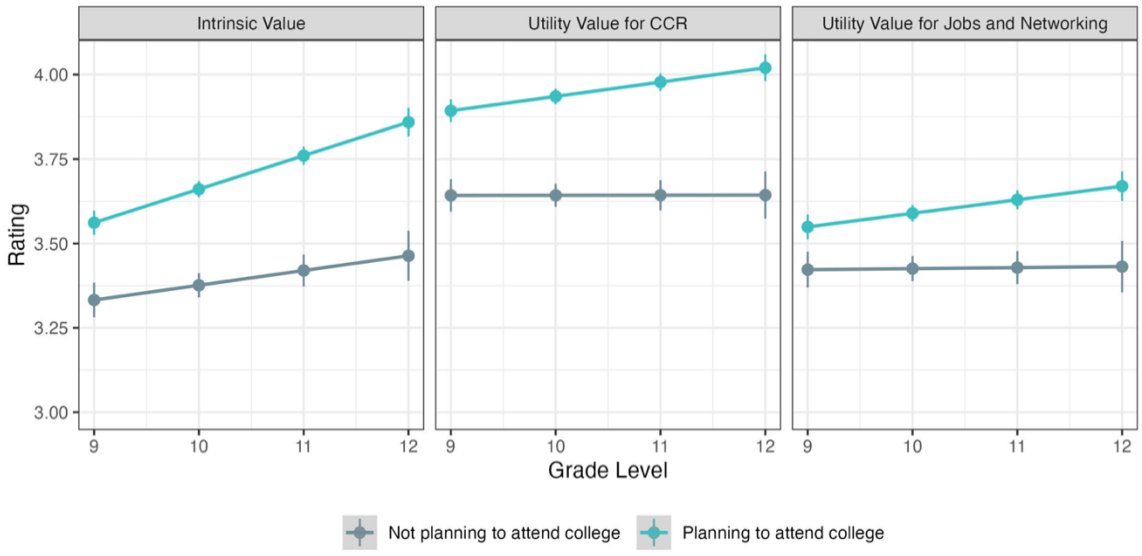
	Intrinsic value			Utility value for CCR			Utility value for jobs & networking		
Predictor	Est.	SE	*t*	Est.	SE	*t*	Est.	SE	*t*

(Intercept)	3.38	0.02	150.14***	3.61	0.02	169.04***	3.37	0.02	143.98***
Female	0.10	0.02	5.07***	0.13	0.02	6.75***	0.08	0.02	4.03**
Student of Color	-0.08	0.02	-3.88***	-0.06	0.02	-3.04**	0.04	0.02	1.85
Grade level	0.05	0.02	2.70**	0.00	0.02	0.02	0.00	0.02	0.87
College plans	0.30	0.02	13.54***	0.30	0.02	14.49***	0.17	0.02	7.55 ***
Grade level * College Plans	0.05	0.02	2.62**	0.04	0.02	2.20*	0.04	0.02	1.78^{+}

Note. Estimates are unstandardized regression coefficients. Gender, Race/Ethnicity, and Postsecondary Plans were all coded as binary variables (e.g., with 1 = female, Student of Color, and college plans). Grade level was treated as a continuous variable and centered before creating the interaction term.
$^{+}$ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

To aid in the interpretation of the interaction terms, Figure 1 presents estimates of marginal means adjusted for other variables in the model. Proportional weighting was employed to account for variations in sample sizes across different levels of the predictors. As shown, ratings of value increased with grade level, but primarily among students who reported plans to attend college after high school.

Figure 1. Estimated marginal means from linear regression analyses predicting value ratings from grade level and postsecondary plans.



Note. Points represent estimated marginal means from regression models. Lines emanating from these points represent 95% confidence intervals.

RQ3. Are students' perceptions of the intrinsic value or utility value of CTE courses related to their interest in participating in CTE coursework?

Logistic regression analyses were conducted to examine associations between students' ratings of the value of CTE courses and their interest in these courses. Models included student gender, race/ethnicity, grade level, and postsecondary plans as covariates. Initial models also included all two-way interactions among variables. These analyses revealed no

statistically significant two-way interactions, indicating, for example, that associations between values and interest were similar across groups. As a result, interaction terms were removed from final models.

As shown in Table 3, interest in participating in CTE coursework was consistently weaker among students of color than other students, but consistently stronger among older students than younger students and among students whose postsecondary plans included college than among students whose plans did not include college, all *z*s < 0.001. Consistent with Expectancy-Value Theory, there were also positive, statistically significant associations between students' ratings of the value of CTE courses and the odds of expressing interest in these courses.

Table 3. Summary of logistic regression models predicting students' interest in CTE courses from ratings of intrinsic value, utility value for college and career readiness, and utility value for jobs and networking.

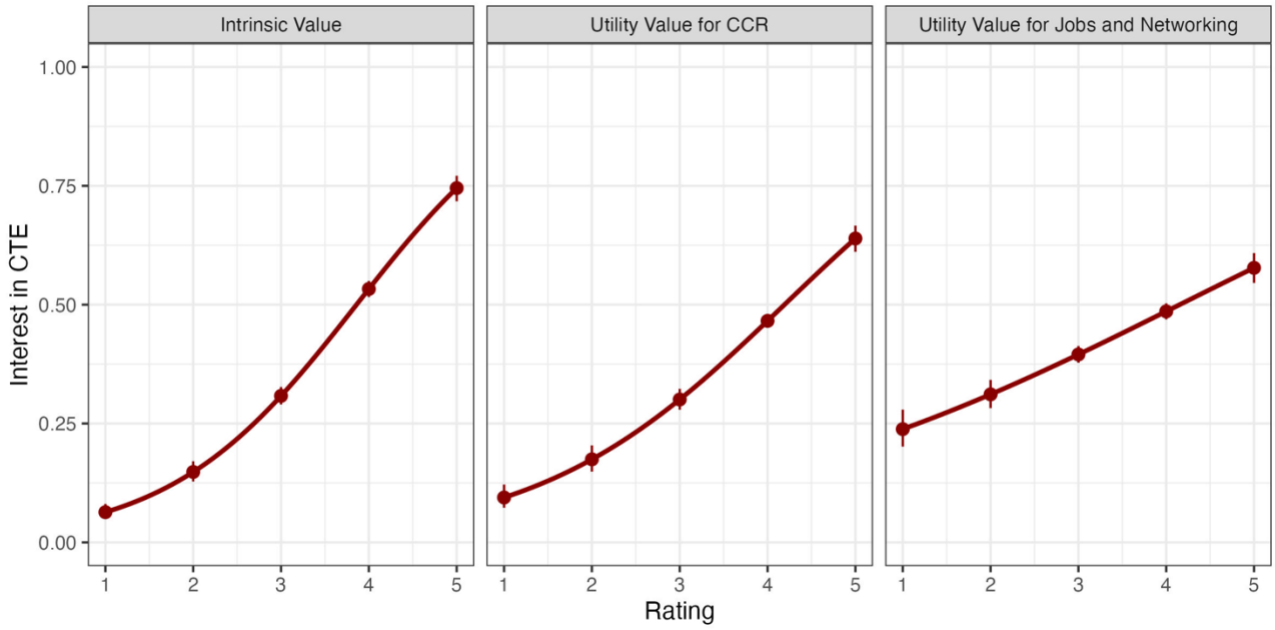
Predictors	Est.	SE	*z*	Odds ratio
(Intercept)	-6.72	0.33	-20.32***	0.02
Intrinsic value	0.94	0.05	19.37***	2.56
Female	0.00	0.06	0.05	1.00
Student of Color	-0.36	0.06	-6.00***	0.69
Grade level	0.27	0.03	9.78***	1.31
College plans	0.67	0.07	9.48***	1.94
(Intercept)	-6.56	0.34	-19.18***	0.00
Utility value for college and career readiness	0.71	0.05	14.56***	2.03
Female	0.00	0.06	0.06	1.00
Student of Color	-0.39	0.06	-6.49***	0.68
Grade level	0.32	0.03	11.71***	1.38
College plans	0.71	0.07	10.25***	2.04
(Intercept)	-5.23	0.31	-16.52***	0.00
Utility value for jobs and networking	0.36	0.04	8.99***	1.45
Female	0.06	0.06	0.93	1.06
Student of Color	-0.43	0.06	-7.23***	0.65
Grade level	0.32	0.03	11.93***	1.38
College plans	0.83	0.07	12.21***	2.30

Note. Estimates are unstandardized regression coefficients.
*** $p < 0.001$.

The strongest associations emerged for ratings of intrinsic value. Specifically, after adjusting for gender, race/ethnicity, grade level and postsecondary plans, for each one-unit increase in ratings of the intrinsic value of CTE courses, the odds of expressing high interest in these courses increased by a factor of 2.56. The weakest association emerged for ratings of utility value for jobs and networking. Specifically, after adjusting for gender, race/ethnicity, grade level, and postsecondary plans, for each one-unit increase in ratings of the utility value of CTE courses for jobs and networking, the odds of expressing high interest in these courses increased by a factor of 1.45.

To further aid in the interpretation of associations between subjective task value and interest, Figure 2 presents estimates of marginal means adjusted for other variables in the model. Proportional weighting was employed to account for variations in sample sizes across different levels of the predictors. The model predicted that, among students with the highest intrinsic value ratings, there was a 75% probability that students have already taken or planned to take additional CTE credits beyond the one required for graduation. Among students with the lowest intrinsic value ratings, the model predicted that there was only a 6% probability that students have already taken or planned to take more than one CTE credit. The effect is weaker for ratings of utility value, especially for ratings of utility value for jobs and networking. Among students with the highest ratings of utility value for jobs and networking, the model predicted that there was a 58% probability that students have already taken or planned to take more than one CTE credit. Among students with the lowest rating of utility value for jobs and networking, the model predicted that the probability was 24%.

Figure 2. Estimated marginal means from logistic regression analyses predicting students' interest in CTE courses from ratings of intrinsic value, utility value for college and career readiness, and utility value for jobs and networking.



Discussion

Recent national reports (U.S. Department of Education, 2019) and national and local strategic planning efforts (Advance CTE, 2021; Utah State Board of Education, 2020, 2022) highlight the importance of effectively communicating the value of Career and Technical Education to students and their families. The current study provides evidence that recruitment efforts should consider – and may be enhanced by – attending to the attitudes that students bring to the course decision-making process.

Current recruitment efforts often focus on the utility value of CTE courses. Reflecting this focus, Advance CTE – an organization that represents State CTE directors and related professionals – recommends communicating three core messages about the value of CTE to students and families: "CTE learners gain real-world skills," "CTE learners explore careers to find their passion," and "CTE learners have options for college and career success" (Advance CTE, 2021). Consistent with the notion that this type of utility-focused messaging is important and can be effective, students who responded to this study's survey were more likely to agree than to disagree that CTE courses have value for helping students meet current and future goals, including by providing hands-on learning experiences, real-world knowledge and skills, opportunities to earn college credit in high school, and networking and credentialing opportunities that can lead to higher paying jobs. Students who reported that they saw high levels of utility value in CTE courses were, in turn, more likely to report interest in taking more than the one CTE credit that is required by Utah state law.

Although students were also more likely to agree than disagree that CTE courses have intrinsic value – that is, that these courses are enjoyable, engaging, and challenging – students' ratings of intrinsic value were lower than students' ratings of utility value for college and career readiness. This finding aligns with the emphasis of current messaging, but it is potentially concerning given that student interest in CTE courses was more strongly predicted by student perceptions that CTE courses have intrinsic value than that these courses have utility value. Notably, interventions designed to change student perceptions of the intrinsic value of CTE coursework have the potential to be transformative given the results of models from the current study which predict that, controlling for grade level and postsecondary plans, students who "strongly agree" with items tapping the intrinsic value of CTE courses have a 75% probability of taking or planning to take more than the one required CTE course required by Utah state law. The predicted probability for students who "strongly disagree" with these items is just 6%.

Together, these results suggest that messaging that focuses on the intrinsic value of CTE courses should be considered as an important part of any CTE recruitment effort. Indeed, ensuring that CTE recruitment efforts focus on *both* the utility value and intrinsic value of CTE courses is consistent with evidence that people are more likely to achieve distal goals (that is, goals that take longer to attain – such as obtaining a college degree) when they are tied to proximal goals (that is, goals that are more immediately obtainable – such as feeling engaged in class; Miller & Brickman, 2004). This type of dual messaging may be especially important for male students, students of color, younger students and for students whose postsecondary plans do not include

college as these groups rated CTE courses as having both less intrinsic and utility value than other students.

Prior research that has employed experimental research designs provides evidence that interventions that are designed to change students' perceptions of the utility value of academic activities are effective and can impact students' achievement-related behaviors and performance (Harackiewicz et al., 2008; Hulleman & Harackiewicz, 2019). These results hold promise for interventions designed to influence students' perceptions of both the intrinsic value and utility value of CTE coursework. However, more research is needed to understand how to better communicate and demonstrate to students that CTE courses have intrinsic value and to document the relative effectiveness of various strategies. Both the achievement motivation literature and the CTE literature offer some testable hypotheses. For example, intrinsic value may be enhanced when CTE teachers are provided with the resources they need to develop strong relationships with students (Dietrich et al., 2015), when CTE teachers create classroom environments that are focused less on letter grades and more on student learning (Shim & Ryan, 2005), and when CTE courses are taught by teachers with relevant, real-world experiences (Theobold et al., 2023). These factors may be especially important in middle school and early high school when students' perceptions of the value of CTE are forming and among students whose postsecondary plans do not include college. Unlike their college-bound peers, students without postsecondary plans to attend college did not show consistent gains in CTE value ratings with grade level. For these students, exposure to CTE (either directly through taking one or more CTE courses or indirectly through messaging from school personnel, parents/guardians, or reports from peers) seems not to be having the intended effect. Future research should explore this finding further. However, it seems likely that low value ratings among this group could reflect a more general lack of interest in school, lower self-efficacy, and/or a perception that pursuing higher education or a career is hindered by personal and financial challenges (Edge Research and HCM Strategists, 2022; Spillers & Lovett, 2022).

Limitations

The current study contributes to the extant literatures on CTE participation and subjective task values and also has the potential to inform CTE recruiting and messaging efforts. Importantly, however, the findings should be evaluated in light of several limitations. First, the current study employed survey responses from a sample of students in Utah. We were unable to determine whether the sample is representative of the larger population on variables other than gender and race/ethnicity as personal characteristics were self-reported by students. Replication of the methods of this current study in different contexts is needed. Second, we cannot infer causality from the current findings. Although we were able to control for several potentially confounding variables, including gender, race/ethnicity, grade level, and postsecondary plans in models predicting student interest in CTE courses, we are not able to rule out the possibility that other variables might partially (or fully) explain the associations between value and interest ratings. Finally, we are not able to determine the directionality of any potential causal effects. It may be that helping students to see the value of CTE courses will increase their interest in CTE course-taking. Alternatively, it may be that increased CTE course-taking enhances students' perception of the intrinsic and utility value of these courses. Likely both are true. Future research employing longitudinal designs that includes qualitative data (e.g., interviews with students that explore

why students do or do not see value in CTE courses) will be important in providing insights into both the direction and mechanisms of influence.

Notes

1. CTE classification systems vary by jurisdiction and have evolved over time (see https://careertech.org/wp- content/uploads/sites/default/files/SecondaryConcentrator Background_2019.pdf). For example, in Perkins V, a CTE concentrator is defined as a *student* who has completed at least two *courses* in a single career and technical education *program or program of study*. This differs from definitions used in federal legislation, by some states, and by the National Center for Education Statistics, the last of which defines a CTE concentrator as a *high school graduate* who has completed two (or three) *credits* in a single *occupational area.* These differences pose significant challenges for examining CTE participation rates and outcomes, especially given that some states, like Utah, include CTE participation in graduation requirements.
2. Consistent with definitions used by the U.S. Department of Education's National Center for Education Statistics (NCES, 2023), students of color included those who identified as African American/Black, American Indian/Alaska Native, Asian, Hispanic or Latino/a, Pacific Islander/Native Hawaiian, or multiple races.

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