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The Currency of Studenthood: Behavioral Economics in the Higher Education Classroom

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Students may not always be intrinsically motivated to complete learning activities in our courses. For these instances, we suggest taking advantage of heuristics, discovered through behavioral economics research, as one way to nudge students toward task completion. To date, most educational applications of behavioral economics' heuristics use grades or points as the "currency." We propose that time and effort may be additional currencies to employ when making use of the heuristics of loss aversion, goal framing, attribute framing, and anchoring. However, educational research first needs to be conducted to determine if using heuristics with these currencies is effective.

A perpetual challenge of the college instructor is to find ways to entice students into doing fully engaged work for the class. Although our course material may be of deep interest to some students in the class, oftentimes we assign tasks that students may not be interested in completing (Ryan & Deci, 2000), either because of the task characteristics themselves or because the course is compulsory (e.g., general education studies) and not necessarily of interest to the student. At such times, we may need to look at particular ways to extrinsically incentivize students to approach the task with the appropriate effort (Ryan & Deci, 2000). Patterns of behaviors that have been discovered through the field of behavioral economics may inform educational approaches to extrinsic motivation, particularly among those students with low motivation. However, these patterns of human behavior have largely been explored as they apply to financial decisions (Tversky & Kahneman, 1991); in the higher education classroom, the influential "currency" takes other forms. Further, these currencies may have interrelationships that impact whether behavioral patterns are as effective in the classroom as they are in financial decision-making. The purpose of this article is to conceptually explore the potential currencies in higher education to which some behavioral economics heuristics may apply.

Motivation in Higher Education

As college instructors, we value our course material and are typically intrinsically motivated to learn more about it. However, we often have students who either do not share those values or do not value a certain assignment, despite its contribution to students' learning of the material. In particular, students' intrinsic motivation is lessened if they do not feel a sense of autonomy or competence, or if the content lacks intrinsic interest for any one individual (Ryan & Deci, 2000). Despite our best efforts, we can often undermine students' intrinsic motivation to learn material in our classes because common instructional behaviors, such as assigning grades (i.e., as performance-contingent rewards; Deci, Koestner, & Ryan, 1999), providing task quality limits (Koestner, Ryan, Bernieri, & Holt, 1984), and setting deadlines (Amabile, DeJong, & Lepper, 1976) are all factors which contribute to a reduction of intrinsic motivation. We must therefore consider methods of enhancing extrinsic motivation for those many instances when students are not intrinsically driven to learn through completing a course task. Extrinsic motivation, however, can be stronger and more agentic or impoverished and more coerced, and thus it is essential for us to enhance self-endorsed extrinsic motivation (Ryan & Deci, 2000).

Ryan and Deci (2000) propose that there are four categories of extrinsic motivation which follow the state of *amotivation*, or an absence of intention to act. For external regulation, external rewards are the primary driver; operant conditioning focuses exclusively on this type of motivation (e.g., Staddon & Cerutti, 2003). External regulation is followed by introjected regulation, wherein one is motivated to act in order to maintain a sense of self-esteem. External regulation and introjected regulation are considered less autonomous than the remaining two forms of extrinsic motivation: Identification, wherein the individual identifies the personal importance of the action, and integrated regulation, in which one associates the outcome of an action with an instrumental value that is separate from the behavior.

As the descriptions of these forms of extrinsic motivation suggest, whether an action aligns with individuals' valuation of its importance has significant impact on their senses of autonomy and subsequent level of externally-derived motivation (Ryan & Deci, 2000). Further, attributional tendencies may impact the level of extrinsic motivation, particularly those related to growth and fixed mindset. Specifically, those with a growth mindset are willing to take on challenging activities because they perceive the benefit to their personal growth in doing so, whereas

those with a fixed mindset are less willing to approach challenges as the outcomes (particularly possible failure) are tied to their self-perception and self-esteem (Dweck, 2006). Thus, students with growth mindsets regarding our course material may be more prone to identification and integrated regulation, whereas those with fixed mindsets may be more influenced, albeit in a less engaged manner, by external and introjected regulation.

Behavioral Economics

Tversky and Kahneman (1974) introduced ground-breaking research about the psychology of judgments indicating that, all benefits being equal, human behaviors and choices vary depending on how the situation is presented. These choices often defy basic logic and remain in place even when the individuals are made aware of the parameters that indicate logical fallacies (e.g., Kahneman, Fredrickson, Schreiber, & Redelmeier, 1993). One reason choices may not be logical is because, in some situational contexts, they are based on heuristics, or mental short-cuts that speed our decision-making but may disregard some important information (Kahneman, 2011).

Although several heuristics identified by behavioral economists could arguably be used within the realm of education, three which seem to easily transfer are loss aversion, framing, and the anchoring effect. Loss aversion is the term used to label the paradox in which individuals are willing to do more to avoid a loss than to achieve an equivalent gain (Kahneman, 2011). For example, people may be reluctant to sell a good, or will increase the price at which they will sell it, whereas to acquire that same item, they would pay less. Loss aversion may at times be influenced by status quo bias, or a preference to keep things as they are. The attraction to the status quo is the valuation of what could be gained by a change, as compared to the risk of what could be lost; losses are more salient than gains, and so the status quo is preferentially retained (Kahneman & Tversky, 1984; Samuelson & Johnson, 1988). In addition, the manner in which a situation is framed can impact individuals' evaluation and subsequent decision (Samuelson & Zeckhauser, 1988); thus, framing an option as a risk of loss if not taken may garner more endorsement than framing it as a gain.

Valence framing effects, or framing, was originally described within Kahneman and Tverksy's (1979) prospect theory. According to this theory, individuals differ in their endorsement of a risky option, as compared to taking a sure option, depending on if the risk is framed as yielding a positive impact or an equivalent negative impact. This type of *risky choice frame* may be less applicable to the classroom than two other types of framing that have been identified under the umbrella of valence framing effects: goal framing and attribute framing (Levin, Schneider, & Gaeth, 1998). Goal framing, or promoting a behavior that will end with a desirable outcome, using either a positive frame (if you engage in this behavior, you will gain the benefit) or a negative frame (if you do not engage in this behavior, you will not acquire the benefit), is similar, if not identical, to the conditions of loss aversion explained above, as the language included nearly always emphasizes loss or gain (Levin et al., 1998). As with loss aversion, studies assessing goal framing typically find that negative framing results in greater persuasiveness (Levin et al., 1998), although individual characteristics, such as independence, an avoidance/approach orientation, or a promotion/prevention regulatory focus, may impact which type of framing works best (Chen, 2016; Holler, Hoelzl, Kirchler, Leder, & Mannetti, 2008; Mann, Sherman, & Updegraff, 2004). Attribute framing, by comparison, occurs when positively or negatively framed descriptions of an object or event, despite being equivalent, differentially impact evaluations of that object or event (Levin et al., 1998). Thus, whereas goal framing impacts the likelihood of engaging in a behavior, attribute framing impacts the likelihood of a favorable perspective regarding an object or event.

The anchoring effect occurs when individuals' judgments or valuations are influenced by some initially presented value, or anchor (Furnham & Boo, 2011). More specifically, judgments change due to a biased adjustment toward the anchoring value (Tversky & Kahneman, 1974). This judgment heuristic has been robustly supported in a broad number of contexts, from probability estimates to valuations and negotiations (Furnham & Boo, 2011).

Behavioral Economics in Education: Applications and Currencies

The researched application of behavioral economics in the context of educational settings exists but is nascent. For educators, behavioral economics may provide a set of methods by which educators can better motivate students to complete required tasks or additional, optional learning tasks. Most often, the existing behavioral economics research in education centers around the use of tangible rewards or grades as the currency to be manipulated (e.g., Grijalva, Koford, & Parkhurst, 2018; Levitt, List, Neckermann, & Sadoff, 2012); however, we posit that other types of "currency" may also be viable when applying behavioral economics to an educational advantage, particularly in the higher education setting. Below, we explore these currencies as possibilities; where empirical support is thin or absent, we encourage an interested research community to investigate whether these methods are effective enough to warrant their practice. Table 1 includes a summary set of examples for these approaches.

Table 1
Definitions and Examples of Behavioral Heuristics Using Currencies in the Classroom Setting

	Loss Aversion/Status Quo Bias		Goal Framing: Prospective Assurance		Attribute Framing		Anchoring
	Individuals will do more to avoid a loss than to earn the same item		*Framing a behavior as the likelihood of a gain (positive) if the behavior is engaged in or a loss (negative) if it is not*		*Describes attributes of an object, event, or person in a positive or negative manner*		*When given an anchor, people bias their estimates nearer the anchor provided*
Currency	Gain	Loss*	Positive	Negative*	Positive*	Negative	
Points/Grades	"If you complete this assignment well, you can earn up to 10 points."	"You already have 10 points for this assignment. If you complete it well, you will keep all of those points."	"If you complete the tutorial, you have an increased chance of getting an A on the exam."	"If you do not complete the tutorial, you have a decreased chance of getting an A on the exam."	"About 75% of students tend to earn a C or above on this assignment."	"About 25% of students tend to get a D or below on this assignment.	"The average score earned on this assignment is about 90%."
Time	"If you make a B or higher on 4 exams, you will earn a buy-out for the 5th exam."	"You currently have a buy-out for Exam 5. If you make a B or higher on Exams 1-4, you can keep that buy-out."	"Those who complete the optional tutorials are more likely to earn their Exam 5 buy-out."	"Those who do not complete the optional tutorials are more likely to lose their Exam 5 buy-out."	"About 75% of students finish reading this chapter in an hour or less."	"About 25% of students take over an hour to read this chapter."	"The amount of time this assignment is estimated to take is 2 hours."
Effort	"If you complete 5 assignments at 90% or above, you will not have to complete Assignment 6 [a task clearly requiring deeper mental effort]."	"You currently do not have to complete Assignment 6. If you complete Assignments 1-5 at 90% or above, you will be able to keep your Assignment 6 buy-out."	"Those who complete the optional tutorials are more likely to do well on course exams and earn their buy-out for the final, comprehensive exam."	"Those who do not complete the optional tutorials are less likely to do well on course exams and will lose their buy-out for the final, comprehensive exam."	"On a scale from 1-10 (10 being maximum effort), about 75% of students rate the level of effort required for this assignment at 6 or below."	"On a scale from 1-10 (10 being maximum effort), about 25% of students rate the level of effort required for this assignment at 7 or above."	"On a scale from 1-10 (10 being maximum effort), I estimate the effort required to successfully complete this assignment at around 6."
Time x Effort	"If you complete three [effortful] activities at B+ or higher, you will earn a buy-out from the final [time-intensive] project."	"You already have a buy-out from a final [time-intensive] project. If you successfully complete these 3 [effortful] activities at a B+ or higher, you will keep that buy-out."	"Those who spend focused, intensive time studying are more likely to earn an A on exams 1-3 and thus earn a buy-out for the final exam."	"Those who do not spend focused, intensive time studying are less likely to earn As on exams 1-3, and will lose their buy-out for the final exam."	"About 70% of students rate the level of effort for this assignment at 7 or below, and took less than an hour to complete it."	"About 30% of students rate the level of effort for this assignment at 8 or above and took over an hour to complete it."	"I estimate the effort required to successfully complete this assignment (i.e., to earn an A) would be around a 7, and that it should take about 2 hours to complete."

Note. *Predicted to be the more impactful application, based on previous research in other domains.

Grades or Points

In an educational setting, grades or other use of points as a currency is the most apparent means by which behavioral economic principles might be applied. The principle of loss aversion, for example, can be tested or applied by first assigning students full points for a course assignment, which they then complete per requirements in order to retain those points. Some educational studies have explored this possibility, with mixed results. Grijalva and colleagues (2018) found that the probability of students in the loss condition for turning in extra credit assignments was no different from those in the gain condition; neither did the effect on overall grade vary by condition. Apostolova-Mihaylova, Cooper, Hoyt, and Marshall (2015) also found no course grade differences by condition when total course points were assigned in advance (loss condition) versus earned over the semester (gain/control condition). However, they did notice gender effects, such that male participants' course grades were higher in the loss condition than control condition, whereas female participants' course grades were lower in the loss condition than control condition (Apostolova-Mihaylova et al., 2015). Finally, McEvoy (2016), also assigning course grades in advance or earned over time, found that after controlling for other factors that might impact student grades, those in the loss condition had significantly higher grades than those in the control condition. Importantly, the extant research on loss aversion in the classroom setting has remained focused on academic outcomes; an exploration of impacts on motivation and other internal processes that may inform these outcomes is warranted.

Goal framing using grades or points may be applied very similarly to those studies reviewed above, with prospective *assurance* of loss or gain. That is, conditions are set such that if a behavior is engaged in (e.g., successful assignment completion), points are either earned or lost. However, another form of goal framing that might be applied to point values or grades is that of prospective *probability* of loss or gain. In this instance, information might be shared with students to encourage their engagement in a desirable behavior, with possible outcomes framed either positively (gain) or negatively (loss). For example, instructors may wish for their students to prepare well for an exam by completing an ungraded tutorial. Framed positively and as a probability, students might be told that those who complete the tutorial have an increased chance of getting an A on the exam, whereas negative framing would state that those who do not complete the tutorial have a decreased chance of getting an A. Corroborating goal-framing results from non-education settings, Zhang (2016) found that those students with a promotion regulatory focus were more persuaded by gain framing, whereas those with a prevention focus were more persuaded by loss framing.

Attribute framing using grades may indirectly impact student behaviors by differentially impacting their attitudes about a task. For example, instructors might present an assignment by stating that 75% of students tend to earn a C or above on it (positive framing); framed negatively, students might be told that 25% of students earn a D or below. In contradiction to typical projected outcomes for goal framing, research indicates that positive attribute framing is more likely to result in favorable evaluations (Levin et al., 1998).

Points may also be used as anchors, as instructors communicate expectations regarding a particular assignment. Many students are disappointed when scores are below full points (Ackerman & Gross, 2018), which are typically the de facto "anchors" provided within a course. Research examining the application of prospect theory in the secondary classroom indicates that as the difference between expected grade and actual grade increased (with the actual grade being lower), so did students' dissatisfaction (Galdón & Gonzálbez, 2013). Therefore, setting a lower anchor that is neither dishonest nor demotivating may help students have a more positive view of their course performance and academic efficacy. This approach may improve students' perception of the course material and the instructor, factors which are related to student performance (Frisby & Martin, 2010). An anchoring example might be to include in assignment instructions a statement such as, "The average score for this assignment tends to run around 90%. Of course, some students score higher and others lower."

Time

Compared to previous generations, college students now spend less time studying outside of class and more time working (Nonis & Hudson, 2006). Further, students now balance additional responsibilities, such as family/caretaking demands (Taniguchi & Kaufman, 2005) and other social demands (e.g., participation in student life organizations). Whether due to time constraints or simply disinterest, students expect to spend very little time for weekly out-of-class studying (Thibodeaux, Deutsch, Kitsantas, & Winsler, 2017). Although we believe students' expenditure of study time is well-spent, it is likely that students who are not intrinsically motivated to learn course material will wish to streamline the amount of time spent studying. Thus, their time becomes a currency, and we may thus be able to use it to potentially impact motivation by applying loss aversion, framing, and anchoring.

When applying time to loss aversion, how do we create conditions in which students earn personal time or lose it, while still encouraging mastery of our course material? In this instance, time may need to be symbolically represented and tied to performance. For

example, a course may have five short assignments (four are deemed necessary to the course; the fifth, no greater in difficulty than its predecessors, is available as a supplement to encourage further mastery). Loss aversion could be applied to this scenario by telling students at the start of term that they have been given a "buy-out" for the fifth assignment (i.e., they have more personal time already given to them). However, if their performance on the first four assignments falls short of some academic criterion, such that the instructor feels it necessary for that student to demonstrate better mastery, the "buy-out" will be removed and the student must complete the fifth assignment.

The buy-out scenario above is again an example of using time within goal framing in a prospective assurance application. To encourage students' engagement in additional course activities (or, alternatively, use good self-regulatory strategies), however, we might instead apply prospective probability goal framing. Notably in this instance, we are encouraging students' *use* of time to *save* time; thus, the expenditure we are encouraging must be less time than the gain of time that is awarded. For example, perhaps each of the four assignments includes a 10-minute interactive, tutorial video. Using positive goal framing, the message might be shared that students who complete the tutorials are more likely to keep their buy-out; if this outcome were framed negatively, students would be told that those who do not complete the tutorials are more likely to lose their buy-out. Similar framing could be used to encourage students' use of checklists or rubrics before submitting assignments, referencing instructor feedback for iterative assignments, or using particularly effective study strategies (shared by the instructor) if the buy-out were to apply to an exam rather than an assignment.

Time may also be effective to use as currency within attribute framing, to influence student perceptions of a course assignment or assessment. For example, letting students know in advance that "about 75% of students read this chapter in an hour or less" may garner a more positive approach to completing the assignment than stating that "about 25% of students spent up to two hours reading this chapter." Admittedly, students will differentially value varying expenditures of time, such that an hour to one student may be perceived as little time, whereas to another it would be perceived as too much. Further, this application should be used judicially, as a low time estimate could result in students rushing through work with little care for its quality. Thus, it may be best to reserve this application of framing to assignments that generally require little time to complete and that are low-stakes but necessary for student success and learning, such as brief (but meaningful) discussion posts, an assigned reading before class, or use of a checklist before submitting an assignment.

Students can be poor estimators of the time required to successfully complete a learning task (Cerrito & Levi, 1999) and thus may have pre-set low time anchors against which they evaluate the demands of a course. In this case, it could be useful to apply a time anchor to certain assignments (or an amount of adequate study time), particularly those that have a history of surprising students. For example, students might be told, "I estimate that the amount of time it takes to successfully complete this assignment is about 3 hours." Students then may be less frustrated when they expend near this amount of time completing the assignment, may have the expectation to set aside more time to complete it, or may be less surprised by a poor evaluation if they spent significantly less time on the assignment than the anchor provided. Buehler, Peetz, and Griffin (2010) examined the manipulation of a time anchor on the prediction and completion of a literature review for students and discovered that although predictions varied in expected directions based on the anchor provided, completion times were unrelated to predictions. However, this study used anticipated "date of completion" as the time anchor, rather than the amount of time required to complete the assignment. Thus, the question remains open as to whether using this specific type of time-based anchor in a class will yield positive benefits for students.

Effort

As Kahneman (2011) notes, we follow a "law of least effort," wherein we are predisposed to complete a task with the minimum effort required. Indeed, Kahneman (2011) states, "In the economy of action, effort is a cost" (p. 35). Prévost, Pessiglione, Météreau, Cléry-Melin, and Dreher (2010) found that greater physical effort (a grip squeeze) was less often chosen in order to receive a larger reward, confirming Kahneman's claim. For our classes, learning and its associated assignments and study practices are inherently effortful tasks. As our students are likely to want less effortful tasks, we may be able to leverage this desire as a currency, perhaps even without giving up the effort required to achieve successful learning in our classes. Although Levitt et al. (2012) speculate that "effort costs" may impede the effectiveness of using financial incentives to increase student performance, we are unaware of any research examining the use of effort as a leveraged currency in instruction; our suggestions remain only conceptually based as a consequence.

The use of effort as a currency introduces the natural question of what kinds of learning or assessment activities require greater or less effort. Westbrook and Braver (2015) caution us that although cognitive effort can be closely related to attention, motivation, difficulty, and cognitive control, we should not confuse

effort with any of these things. Cognitive effort is subjective and may be evaluated based on the demands a task makes on working memory as well as cognitive control (Westbrook & Braver, 2015). Interestingly, although cognitive effort is generally viewed with aversion (Westbrook & Braver, 2015), it may be related to greater engagement (Aston-Jones & Cohen, 2005). It is therefore possible, though remains to be confirmed, that learning tasks categorized as more active, such as discovery learning or guided inquiries, may be viewed by students as both more effortful and more engaging than passive tasks such as viewing videos, and yet will still be avoided by students if given a choice. Further, assessments that require longer cognitive control and greater demands on memory are likely to be perceived as requiring more effort than briefer assessments over a more limited body of material.

Applications using effort as a currency for loss aversion are similar to those using the currency of time. That is, loss aversion using effort can be leveraged with buy-outs; however, in this instance, the buy-out may clearly save the student substantial additional effort as opposed to time. Thus, for example, students may be told that the successful completion of several semi-effortful learning tasks will permit them to keep – or earn – their buy-out of a clearly more effortful task. For purer leverage of effort without the confound of time, the buy-out task should not require significantly more time, only noticeably greater mental effort; it may thus be a relatively short task but one requiring deep mental processing.

Goal framing using effort is again applied similarly to applications using time: in order to save effort, students must first expend some effort. Students will need to perceive that the expenditure of effort is worth the gain of effort removed (or its absence maintained). For example, the buy-out might be a comprehensive, closed-book (and thus very effortful) test of applied knowledge; successful completion of prior exams or quizzes is required for students to earn or maintain the buy-out. Meanwhile, an option provided to students is to complete brief, interactive tutorials which guide students to apply material as it is introduced, perhaps even interleaving prior course concepts. For positive prospective assurance framing, students might be told that those who complete the tutorials are more likely to successfully complete the quizzes and thus earn the buy-out; as a negative prospective assurance, this would be framed such that those who do not complete the tutorials are less likely to keep their buy-out.

As when time was our currency, attribute framing using effort as our currency follows similar suggestions and cautions. For example, students might have a more positive view of an assignment when told, "On a scale from 1-10 (10 being maximum effort), 75% of students rate the level of effort required for this assignment as 6 or below," rather than the reverse statement, "25% of students rate the level of effort required for this assignment as 7 or above." Such statements should not be fabricated by the instructor, but instead should be based upon previous student polling, in order to be relatively honest and accurate. Because students may not have initial ideas of how to approach more vs. less effortful assignments, instructors may wish to provide rough guidance as to what more or less effort looks like, for example: "Levels 1-3: You can probably leave on your headphones; Levels 4-6: Sit in a designated space and put away your cell phone; Levels 7-8: Go to a quiet space and turn off your cell phone and any other distractions; Levels 9-10: Commit to focusing intensely on completing this assignment." Given that the more positive outlook from students will be on the statement emphasizing the lower end of the effort scale, judicious application of this tactic is recommended, as students may interpret such statements as indicating the assignment in question can be done with little effort. Thus, it may be best applied to assignments for which students can be successful with mild to moderate effort.

Finally, and again as for time, anchoring for effort may eliminate student misconceptions about what is required for a particular assignment in terms of their focus and attention. Therefore, adjusting student expectations regarding effort with an anchor may help them to understand the need for greater processing when such is required for their success. For example, students might be told, "On a scale from 1 – 10 (10 being maximum effort), I estimate this assignment to be at approximately a 6."

Time x Effort

We have discussed the possibilities of using time or effort separately as currencies in a classroom setting. However, the two can be interrelated; Kahneman (2011) suggests that more effortful thinking is "slow thinking." However, research indicates that effort, as defined by increased time on task, may not be the best route to success; for example, Plant, Ericsson, Hill, and Asberg (2005) found that time spent studying did not correspond to academic performance, whereas concentrated, deliberate (that is, effortful) practice positively predicted academic success. Thus, when spent with increased cognitive effort, time dedicated to a task or on studying may be shortened, yet success still achieved.

If saved time is the more valued outcome by students – and this is an assumption that would need to be empirically assessed – then there may be ways to leverage student attitudes and motivation by combining both time and effort as currencies. For example, using loss aversion, we could again offer a buy-out that is earned or kept; here, perhaps we require focused, effortful, and excellent completion of several shorter assignments for a buy-out that is not only effortful but

also more time-intensive, such as a longer project. Although some instructors may balk at not requiring all students to complete a more intensive assignment, we posit that the preceding shorter, challenging assignments are likely to ensure students know the material well, and those who do not demonstrate an adequate level of mastery on these shorter assignments will be provided another opportunity for learning, although they may not appreciate it, through the additional assignment (i.e., the lost buy-out). Thus, the strategy is not merely manipulative of students' extrinsic motivation but applies instructional ethics that are in students' best educational interests.

Considering goal framing as we apply both time and effort as currencies, we again can leverage greater front-end effort for a buy-out that saves students both time and effort. For example, students can be encouraged to dedicate intensive, focused study time during the semester, or once again, complete optional but learning-intensive tutorials for the prospective assurance of gain or loss in the course. Thus, framed positively, students might be told that those who regularly dedicate 2 or more hours a week to intensive self-quizzing and review of course material are more likely to earn high scores on exams, and thus earn a buy-out from a longer final exam or a final research paper. Framed negatively, and perhaps with more impact, students could instead be told that those who do not regularly dedicate 2 or more hours a week to review of course material are less likely to earn high scores on exams, and thus may lose their buy-out.

For attribute framing, we should maintain care when communicating levels of effort and time to students; we neither wish to convey that an assignment's completion should be rushed nor done with less effort. However, for assignments that students seem reluctant to begin due to a misinterpretation that it requires greater time or effort than is the case, we can positively frame an assignment. For example, we may be able to beneficially impact student attitude with a positive framing of, "About 70% of students rate the effort for this assignment at 6 or below, and indicated it took them less than an hour to complete it." Framed negatively, and perhaps to lesser benefit, students could be told, "About 30% of students rate the effort for this assignment at 7 or above, and indicated it took them over an hour to complete it." Surveying former students and finding relatively accurate values based upon their experiences will be necessary for the ethical attribute framing of any assignment.

Anchoring for time x effort would adjust both time and effort expectations for students; one possible value to anchoring both is that the value of effort over time can be communicated. For example, students might be told, "I estimate the effort required to successfully complete this assignment is at about a 7, but should only take about 45 minutes to complete." Thus, students can be made aware that effort is required, but the dedicated time is short. Over a semester, with communications such as this, students might begin to understand that learning and academic success lie more in the effort invested rather than the time spent on an assignment (Plant et al., 2005). In addition, students are less likely to be surprised when an assignment is effortful.

Particularly for the use of time, effort, and time x effort as currencies in the classroom, research to determine the efficacy of these approaches is largely absent. Important beginning steps, however, will be to empirically determine where the breakpoint between a "reasonable amount of time" versus "too much time" tends to fall for students, which types of learning activities are perceived as more or less effortful, whether students value time over effort or *vice versa*, and the best methods for delivering frames and anchors for these currencies.

Conclusion

We are strong advocates of active, student-centered instructional methods as the best and most proactive way to garner student engagement in the college classroom (Prince, 2004). However, we recognize that students in higher education must economize their time and effort when balancing the demands not only of multiple classes, but also those of work, family, and their social lives (Choo, Kan, & Cho, 2019; Nonis & Hudson, 2006). These competing demands may be particularly heavy for non-traditional students. In these instances, when arousing the intrinsic interest of all students to complete a class is difficult, taking advantage of the heuristics discovered within behavioral economics to supplement active learning methods may influence students to make decisions to their educational benefit. The instructional strategies related to these heuristics are unlikely to have staggering results but may provide for some students a type of academic "nudge" which can positively impact choices and performance (Feild, 2015).

The application of behavioral economics using the currencies of points, time, and effort have the potential to be effective in any academic setting, from primary grades through higher education. However, as noted above, saving time and effort may be particularly attractive to college students due to increasing, legitimate demands on their time and mental energy, possibly increasing the efficacy of these methods within the college setting. Further, compared to primary and secondary educators, college instructors are likely to have the autonomy and academic freedom to make the necessary adjustments to assignments and grading methods (Maxwell,

Waddington, & McDonough, 2019), and some adaptations could be simple enough to be easily integrated by busy instructors.

Research examining the impacts of the heuristics we've explored (loss aversion, goal framing, and anchoring) in the higher education setting is limited and, to date, seems only to have investigated the use of points or trophies as the manipulated currency. Within this limited research, gender and regulatory focus have already been identified as influencing factors when applying loss aversion and goal framing (Apostolova-Mihaylova et al., 2015; Zhang, 2016). Because our proposals in this paper are conceptual and thus speculative, we encourage empirical examination of the use of points or grades as the currency, particularly for the potential impact of attribute framing and anchoring, as well as how the currencies of time, effort, or their combination can be used to instructional benefit in the college classroom. Outcomes to be examined will vary by heuristic, but should include students' overall learning, motivation, perceived effort, and perceptions of the course, instructor, and content.

Further, as current research already suggests, these heuristics may impact some groups of students more than others; in fact, it may be possible that their use results in negative outcomes for some groups of students, such as those who already were intrinsically motivated to complete course assignments (Ryan & Deci, 2016). Other negative effects for applying loss aversion, goals framing, and anchoring may include students' decreased well-being or quality of performance as a result of being in an instructional environment perceived as more controlling (Moller, Ryan, & Deci, 2006). Thus, future research should not only explore the potential benefits to utilizing behavioral economics methods, but also any negative outcomes, in order to weigh the costs against any benefits. In addition, studies exploring implementation adjustments may help pinpoint methods that utilize these behavioral economics principles but sustain or increase students' sense of autonomy; autonomy opportunities, such as being offered choices, results in more internalization of the value for the activity (Moller, Ryan, & Deci, 2006). Exploring individual characteristics, such as motivation types, mindset, and self-efficacy, as they relate to outcomes using these methods is also warranted. For example, students with growth mindsets may be more influenced by gain conditions or positive attribute framing than those with fixed mindsets, because this mindset is associated with approach rather than avoidance behaviors, in much the same way as a promotion regulatory focus (Karoly & Newton, 2006). Finally, as research accumulates in the educational realm, examining average effect sizes will help to inform the field of whether any of these approaches are beneficial enough to continue advocating their use.

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