Chapter 10
Student Motivation: Current Theories, Constructs, and Interventions Within an Expectancy-Value Framework

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10.1 Introduction

Amanda and Rachel are two students who, on the surface, look quite similar as they begin their first year of high school. They attend the same school and were placed into all of the same classes with the same teachers. However, by the time they graduate, they will look very different. Amanda will barely earn a high school diploma, whereas Rachel will graduate with honors and have her pick of which university to attend to continue her education. The question is why. Why does Amanda struggle and Rachel thrive? Importantly, what could teachers and the school have done to intervene to change Amanda's outcome?

The answer lies in how Amanda and Rachel respond to academic challenges. In response to lagging performance on international tests, as well as low graduation rates, K-12 school systems have been pushed to increase academic expectations and standards. However, without proper support for students, increasing standards for student learning heightens the risk that more students will fail and leave the educational system (Dweck, Walton, & Cohen, 2011). This raises an important

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question: Even though adults see these standards and associated learning activities as necessary and important to facilitate student learning, why would students be motivated to engage in these academic tasks? After all, having rigorous standards means that more pressure is placed on students to exceed expectations on increasingly difficult academic tasks. So understanding how students approach more rigorous tasks, and their accompanying type and quantity of motivation, is an essential component of school reform efforts. That is, without attending to student perspectives, how will increases in rigor lead to desired learning outcomes, such as increased performance on standardized tests, and the kind of deep learning that enables complex problem solving to occur? Further, when students fail to respond to increased challenge and pressure, what can educators do to increase student engagement in learning?

The motivation for students to enter into a setting where achievement is highly valued, and the degree to which students engage in the associated tasks and activities, is known as achievement motivation (Weiner, 1980). Understanding the development of achievement motivation, why individuals differ in achievement motivation, the outcomes associated with higher and lower levels of achievement motivation, and what contextual factors amplify or impede achievement motivation is a central task for both researchers and practitioners.

Within achievement motivation research, an expectancy-value framework has been particularly generative. From their earliest psychological roots, expectancy-value models focused on understanding the factors that predicted behavior within situations where individuals were trying to achieve an outcome (Atkinson, 1958; Lewin, Dembo, Festinger, & Sears, 1944). However, these initial approaches were context-free; that is, much of the research and thinking was focused on arbitrary tasks in laboratory settings (Weiner, 1980). It wasn't until the early 1980s that Jacqueline Eccles and her colleagues proposed a modern version of expectancy-value motivation focused on students' achievement choices within educational contexts (Eccles et al., 1983).

Not only did the Eccles framework bring expectancy and value constructs to prominence in explaining achievement behavior in educational contexts, it also highlighted two critical aspects of motivation that are necessary for students to be optimally engaged. First, students need to believe that they can succeed (i.e., they need to have positive expectancies). Second, students need to perceive an important reason to engage in the behavior (i.e., they need to have positive values). For example, in Amanda's struggle in school, is it an expectancy issue, where Amanda begins to doubt her ability to successfully complete her school work? Is it a value issue, where she fails to see a reason or purpose for her coursework? Or is it some combination of both?

Although the expectancy-value framework offers a multidimensional approach to understanding student motivation, both expectancy and value have their own rich bodies of literature. In fact, one of the original motivators of Eccles and her colleagues (Eccles et al., 1983; Parsons et al., 1980) was to adopt a theoretical model that integrated findings from multiple theoretical perspectives. Thus, in an effort to help organize understanding of this research area, the first purpose of our chapter is

to offer separate reviews of expectancy and value constructs. The second purpose of our chapter is to consider integrative approaches that combine expectancy and value constructs within the same model. The final purpose of our chapter is to highlight an emerging body of intervention work designed to enhance students' expectancies and values. By identifying the sources of expectancy and value amenable to change, we can help practitioners diagnose why students like Amanda struggle and how teachers and schools can purposefully increase student motivation.

10.2 Review of Theoretical Constructs and Research on Expectancy-Related Beliefs

Theories concerned with expectancy-related constructs attempt to address the first critical question about motivation: "Do students think they can do the task?" There are numerous theoretical conceptualizations (e.g., self-efficacy theory, expectancy-value theory, locus of control theories, attribution theories, and implicit theories of intelligence) and specific constructs (e.g., self-efficacy beliefs, expectancies for success, perceived control, perceptions of task difficulty, and growth mindsets) linked to addressing this motivational question (see Pajares, 1996; Pintrich, 2003). Although there are similarities among these theories and proposed constructs, there are also substantive, theoretical differences that distinguish each. We review different theories and constructs briefly below and offer an overall summary in Table 10.1.

10.2.1 Self-efficacy

Bandura (1997) conceptualized *self-efficacy* as a belief in one's ability to plan and execute the skills necessary to produce certain behaviors. Bandura also distinguished *self-efficacy beliefs* from *outcome expectancies*. Whereas self-efficacy beliefs are related to whether an individual can successfully complete a task (e.g., learn how to solve a particular math problem), outcome expectancies are related to whether an individual can successfully obtain a particular outcome or consequence of accomplishing the task (e.g., get an A on a math test). Self-efficacy beliefs are proposed to be determined by previous performance, vicarious learning (observing a model successfully complete a task), verbal encouragement from others, and physiological reactions to a situation or task (Bandura, 1997). Previous performance of a skill is considered a strong source of self-efficacy, representing tangible, authentic evidence that an individual can or cannot perform the requisite skill. Vicarious learning (i.e., seeing others perform a task successfully) also increases self-efficacy, and observing models closer to the individual's peer group is typically more effective than observing an expert performing the skill. When an individual receives positive verbal encouragement from a knowledgeable and reliable source (such as a teacher), then self-efficacy tends to increase. Finally, more positive physiological reactions, such

Table 10.1 Expectancy-related constructs and measures

Construct	Sample item
1. Self-efficacy	
Self-efficacy beliefs[a]	Rate the probability of successfully performing the following task from zero (no chance) to 100 (complete certainty): Writing a one- or two-sentence answer to a specific test question.
Outcome expectancies[a]	How important is writing for getting good grades in school?
Content specific examples:	
Self-efficacy for self-regulated learning[b]	How well can you finish homework assignments by deadlines?
Statistics self-efficacy[c]	How confident are you that you can identify the factors that influence power?
Teaching efficacy[d]	How much can you influence the decisions that are made in your school?
2. Expectancies	
Ability beliefs[e]	How good at reading/English are you?
Expectancies for success[e]	How well do you expect to do in reading/English next year?
3. Self-concept	
Math self-concept[f]	Mathematics makes me feel inadequate (reverse scored).
Self-concept of ability[g]	How well do you expect to do in (domain X) this year?
General school self-concept[h]	I learn things quickly in most school subjects.
4. Perceived control	
External locus of control[i]	Many times exam questions tend to be so unrelated to course work that studying is really useless.
Internal locus of control[i]	In the case of the well-prepared student, there is rarely if ever such a thing as an unfair test.
Strategy beliefs – effort[j]	If I want to do well on my schoolwork, I need to try hard.
Strategy beliefs – ability[j]	If I am not smart, I won't get good grades.
Perceived control – situational level[k]	I have a great deal of control over my academic performance in my psychology class.
5. Attributions	
Causality ability[l]	If I were to receive low marks, it would cause me to question my academic abilities.
Effort[l]	In my case, the good grades I receive are always the direct result of my efforts.
Context[l]	Often my poorer grades are obtained in courses that the professor has failed to make interesting.
Luck[l]	Sometimes my success on exams depends on some luck.
6. Implicit theories of intelligence	
Incremental theory[a]	You can always greatly change how intelligent you are.
Entity theory[m]	You have a certain amount of intelligence, and you really can't do much to change it.

[a]Shell, Murphy, and Bruning (1989); [b]Bandura (1989); [c]Finney and Schraw (2003); [d]Bandura (1993); [e]Durik, Vida, and Eccles (2006); [f]Marsh (1992); [g]Denissen, Zarrett, and Eccles (2007); [h]Marsh (1990); [i]Rotter (1966); [j]Patrick, Skinner, and Connell (1993); [k]Stupnisky, Perry, Hall, and Guay (2012); [l]Lefcourt, von Baeyer, Ware, and Cox (1979); [m]Dweck (1999)

as feelings of excitement, can accompany higher levels of self-efficacy, whereas anxious reactions can accompany lower levels of self-efficacy (for a review see Usher & Pajares, 2008; see also Chaps. 9 and 11).

A large body of research has linked self-efficacy with educational outcomes (Haney & Durlak, 1998). Although a complete description of these associations is beyond the scope of this chapter, examples include positive associations with goal setting (Locke & Latham, 1990), self-regulation (Chap. 9; Zimmerman, Bandura, & Martinez-Pons, 1992), and effort, persistence, and resilience (Pajares, 2002; Robbinset al., 2004; Schunk & Pajares, 2002). In particular, self-efficacy predicts educational outcomes most closely aligned with the referent task. For example, Bong and Skaalvik (2003) found that math self-efficacy was the only predictor of math performance and English self-efficacy was the only predictor of English performance, even when these and other achievement indexes were included in the model (cf. Baranik, Barron, & Finney, 2010). As a result, self-efficacy is often measured at a task- or subject-specific level (see Table 10.1).

10.2.2 Expectancies

Eccles and colleagues (1983) defined expectancies as an individual's perceptions about whether he or she can successfully accomplish a task. In their model, they also proposed two types of expectancies: *ability beliefs* and *expectancies for success* (Eccles & Wigfield, 2002). Ability beliefs refer to a person's current sense of competence in being able to complete a task. In contrast, expectancies for success reflect how successful an individual believes he or she can continue to be in the future. Although these two types of expectancies are theoretically distinguishable (reflecting separate beliefs about one's current ability and future performance, respectively), empirical attempts to measure them separately have not been supported, resulting in one, overall expectancy scale (Wigfield & Eccles, 2000).

Although similar to the construct of self-efficacy, there are important theoretical distinctions that can be drawn between expectancies and self-efficacy (Pajares, 1996). Expectancies relate to more general or broad domains and in turn more strongly relate to general or broad outcomes. Self-efficacy, on the other hand, focuses on more specific tasks that correspond to being able to achieve a specific result. For example, an expectancy measure may evaluate an individual's capabilities in a certain subject area (e.g., English), and this measure may be used to predict course grades in that subject. In contrast, a self-efficacy measure may evaluate an individual's capabilities to perform a specific task within a class (e.g., being able to appropriately use commas when writing), and the responses may be used to predict actual performance on this specific task.

In general, research suggests that expectancies most strongly predict student achievement, such as test scores, course grades, and GPA (e.g., Eccles et al., 1983; Richardson, Abraham, & Bond, 2012; Robbins et al., 2004; Xiang, Chen, & Bruene, 2005), but also predict choice of course enrollment, persistence, career aspirations, and task engagement (e.g., Durik, Vida, & Eccles, 2006; Robbins et al., 2004).

10.2.3 Self-concept

Self-concept, broadly defined, is an individual's perception of themselves (Shavelson, Hubner, & Stanton, 1976; Chap. 8) and is largely regarded as a multidimensional construct that includes academic and nonacademic forms of self-concept (Marsh, 1990). Together, these more specific types of self-concept form a collective self-concept in the individual. As such, self-concept is considered hierarchical, with a general self-concept formed by both academic and nonacademic components (Marsh, 1990). For the academic domain, research suggests that verbal and math self-concepts might not necessarily form a single dimension together (Byrne & Shavelson, 1986). Therefore, current conceptions specify separate verbal and math self-concepts in addition to a domain general academic self-concept (Marsh & Shavelson, 1985).

Positive academic self-concept has been associated with higher levels of achievement, particularly for grades and standardized test scores, while controlling for previous achievement (Marsh, Byrne, & Yeung, 1999). Academic self-concept also has been shown to predict teacher ratings of student engagement and persistence (Skaalvik & Rankin, 1996; Skinner, Wellborn, & Connell, 1990), self-reported effort (Skaalvik & Rankin, 1995), and adaptive help-seeking behaviors (Ames, 1983). Furthermore, Marsh and Martin (2011) found that the relationships are reciprocal. For instance, positive educational outcomes can enhance self-concept just as higher levels of self-concept can yield more positive outcomes.

Once again, the distinctions between self-concept and other expectancy-related constructs correspond to levels of specificity. Self-concept at the more general level is similar to the more broad ability beliefs, whereas the more specific types of self-concepts are more aligned with self-efficacy and tend to be more distinct. The level of specificity corresponds to the predictive power of self-concept, with more specificity in the self-concept construct and outcome yielding more powerful results. In two separate meta-analyses of academic self-concept and academic achievement, Huang (2011) and Richardson et al. (2012) found that the effect of self-concept was smaller on achievement when studies used more global, as compared to subject-specific, measures of academic self-concept.

10.2.4 Perceived Control

Rotter (1966) first proposed the term *locus of control* to describe the perceived control an individual possesses over certain outcomes. An individual's locus of control can comprise one of two types: *external locus of control* and *internal locus of control*. If an individual perceives that outcomes occur due to factors outside of his or her control (such as luck or fate), then that individual maintains an *external locus of control*. In contrast, if an individual perceives that outcomes occur due to factors within his or her control or capacity (such as effort), then that individual holds an

internal locus of control. Locus of control is hypothesized to be a continuum between internal and external forms and is influenced by environmental, cultural, and personal variables (Rotter, 1966).

Skinner (1996) proposed that individuals develop their locus of control over time with repeated behavior-outcome contingencies. This might include how individuals perceive that certain behaviors subsequently lead to favorable or unfavorable outcomes. These associations thus inform the individual as to the level of control they have over future outcomes. Over time, the habitual endorsements individuals ascribe to these outcomes reinforce attributions and their locus of control (Weiner, 2010). Research supports that higher levels of an internal locus of control are associated with higher levels of academic achievement (Skinner, 1995), perceptions of competence (Connell & Wellborn, 1991), and hours spent studying (Bodill & Roberts, 2013), particularly for students whose perceptions remain stable over time (Stupinsky, Perry, Hall, & Guay, 2012). In contrast, higher levels of an external locus of control are associated with higher levels of anxiety, less autonomy, lower levels of motivation to make behavioral changes (Lavender, 2005), and fewer hours spent studying (Bodill & Roberts, 2013).

In addition to the internal/external distinction, other researchers have further differentiated control beliefs. For example, Skinner and colleagues (Skinner, Wellborn, & Connell, 1990) proposed three types of perceived control beliefs: (1) *means-end* or *strategy beliefs* ("the extent that potential causes produce given outcomes"; Schunk, 1991, p. 208), (2) *agency* or *capacity beliefs* ("whether the individual has or can acquire the potential causes"; Schunk, 1991, p. 208), and (3) *control beliefs* ("whether the individual can produce the desired outcome without reference to any particular means"; Schunk, 1991, p. 208). In the control-value model, Pekrun (2006; Goetz & Bieg, 2016) proposed two dimensions of control: attributions for past success/failure and expectations for future success. Research from both of these perspectives reveals positive associations between control and achievement outcomes, including performance and emotions.

10.2.5 Attributions

Weiner (1972) proposed that the attributions individuals ascribe to success or failure have particular bearing on expectancies and associated educational outcomes. For example, attribution theory posits that individuals frequently attribute success and failure to perceived causes such as ability, effort, perceived task difficulty, or luck. Like theories of perceived control, ability and effort are considered to lie within the individual (*internal*), whereas perceived task difficulty and luck are considered to lie outside of the individual (*external*). However, in addition to an internal vs. external locus of causality dimension, Weiner (2010) further differentiates attributions into stable vs. unstable and controllable vs. uncontrollable dimensions. Perceived causes like ability and task difficulty are consistent across contexts (*stable*), whereas effort and luck are more variable across contexts and potentially unpredictable (*unstable*).

Moreover, effort and task difficulty can be influenced directly by the student and teacher (*controllable*), whereas current ability and luck cannot (*uncontrollable*).

Expectancies for success will increase if the individual perceives that successful completion of a task is a result of causal factors that are internal and stable – that is, the conditions that resulted in the successful outcome are likely to occur again in the future and are within his or her control. Conversely, expectancies for success will not increase if successful task completion is attributed to external and unstable factors because of the instability surrounding the conditions that caused the outcome to occur and the belief that these factors are outside of one's control (see Weiner, Nierenberg, & Goldstein, 1976). Weiner (2010) also stressed the importance of the associations between attributions and emotions as they relate to success or failure depending on internal/external, stable/unstable, and controllable/uncontrollable dimensions. These include feelings such as pride (internal-success), guilt/regret (internal-controllable-failure), shame/humiliation (internal-uncontrollable-failure), hopelessness (stable-failure), and hope (unstable-failure). These hypotheses are generally supported by the research literature which reveals that attributing success to external, unstable causes – compared to internal, controllable causes – is associated with worse achievement outcomes (e.g., Glasgow, Dornbusch, Trover, Steinberg, & Ritter, 1997) and emotional well-being (Ciarrochi, Heaven, & Davies, 2007).

10.2.6 Implicit Theories of Intelligence

Implicit theories of intelligence (see Dweck & Leggett, 1988; Dweck, 1999) posit that individuals generally possess one of two different theories regarding their intelligence: (1) that intelligence is dynamic, malleable, and amenable to change given sufficient effort and hard work (*incremental view of intelligence*) or (2) that intelligence is fixed, static, and resistant to change regardless of effort and hard work (*entity view of intelligence*). In more recent writing, Dweck (2006) refers to these two views as a growth or fixed mindset, respectively. These mindsets may develop as a result of the messages individuals receive from parents and teachers (Mueller & Dweck, 1998) and can therefore be manipulated or changed (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003). Thus, environmental factors and social structures are important sources contributing to an individual's theory of intelligence.

Whether or not individuals attribute their success or failure on a task to effort (incremental view) or fixed ability (entity view) substantially impacts a number of outcomes. For instance, correlational field studies have demonstrated that those with higher levels of incremental views of intelligence are more likely to focus on mastery/learning goals (Dweck & Leggett, 1988), have higher levels of task persistence and task enjoyment (Mueller & Dweck, 1998), and have better long-term academic performance (Aronson, Fried, & Good, 2002; Blackwell et al., 2007; Good et al., 2003; Romero et al., 2014). Furthermore, a recent meta-analysis conducted by Burnette, O'Boyle, VanEpps, Pollack, and Finkel (2013) found that

incremental views of intelligence predicted higher levels of mastery goals, use of more mastery-oriented self-regulation strategies (and less use of helpless-oriented strategies), and higher levels of effective goal monitoring.

The particular theory of intelligence that an individual endorses has bearing on constructs discussed earlier. For example, Dweck and Leggett (1988) noted that entity and incremental theories represent different forms of self-concept. With an entity view, self-concept would be regarded as a collection of fixed characteristics that could reliably be measured and evaluated. With an incremental view, however, self-concept would be regarded as a collection of changeable characteristics that would change over time as a result of concerted effort.

10.2.7 Expectancy-Related Beliefs and Learning Outcomes

Expectancy-related constructs have historically shown strong associations with effort, persistence, achievement, and engagement (Pintrich, 2003). Additionally, many of the expectancy constructs demonstrate a reciprocal relationship with these outcomes, such that expectancy beliefs affect certain outcomes and these outcomes in turn affect subsequent expectancy (e.g., Bandura, 1997; Eccles & Wigfield, 2002; Marsh & Martin, 2011).

Although the relationship between expectancies and outcomes is hypothesized to be present across grade level, the magnitude of the relationship may vary (for reviews see Eccles & Wigfield, 2002; Wigfield & Eccles, 1992, 2000). Unfortunately, there have been no systematic reviews of the relationship between expectancies and outcomes across student grade level. For example, Usher and Pajares (2008) systematically reviewed the self-efficacy literature and did not make conclusions based on age differences because the majority of studies focused on high school and college students. Future research syntheses need to systematically examine age-related differences in the relationship between expectancies and outcomes, and future research needs to explicitly examine age as a moderating factor of expectancy-outcome relationships.

Instead, there have been several meta-analytic reviews that have included expectancy-related constructs at the college level, and their results are worth mentioning here. For example, in their meta-analysis of 13 years of research on the antecedents of college students' GPA, Richardson and colleagues (2012) found that measures of performance expectations and academic self-efficacy/self-concept had the strongest correlations with GPA among all the psychosocial factors included in the paper. In addition, self-efficacy accounted for unique variance in GPA when controlling for high school GPA and SAT/ACT. A separate meta-analysis by Robbins and colleagues (2004) mirrored these results on GPA. In addition, the authors also examined predictors of first-year retention in college and found that academic self-efficacy had the strongest correlation among all psychosocial predictors, accounting for unique variance in persistence when controlling for high school GPA, ACT/SAT, and socioeconomic status.

10.3 Review of Theoretical Constructs and Research on Values

Whereas expectancy-related beliefs focus on the first critical question of motivation, "Can students do the task?," value-related constructs address the second critical motivational question: "Do students want to do the task?" Once again, numerous theoretical conceptualizations (e.g., expectancy-value theory, self-determination theory, and self-worth theory) and specific constructs (e.g., intrinsic value, attainment value, utility value, and extrinsic value) have been proposed (see Pintrich, 2003). We review each of these theories and constructs briefly below and offer an overall summary in Table 10.2.

10.3.1 Subjective Task Values

Subjective task values, as defined by expectancy-value theory, are considered one of the most proximal determinants of achievement behavior. Eccles and colleagues (1983) and Eccles (2005) have consistently proposed four major types: *intrinsic value*, *utility value*, *attainment value*, and *cost*. Together, these different types of task value combine to guide task engagement. In the Eccles and colleagues' model, task values are considered to be subjective because the value of a task is dictated by how an individual perceives and appraises the task.

Intrinsic Value Intrinsic value (also called interest value) is defined as the inherent enjoyment or satisfaction an individual perceives that he or she will obtain from engaging in a task (Eccles et al., 1983). Perceiving an academic task as being intrinsically valuable and interesting leads to focused attention, deeper information processing, and increased learning outcomes (Renninger & Hidi, 2011).

Intrinsic value has been related to a number of other motivational factors. For example, it was found that people who initially set goals to learn material (rather than simply demonstrate competence) reported higher subsequent intrinsic value, task satisfaction, and interest (Hulleman, Durik, Schweigert, & Harackiewicz, 2008). In their study examining the relationship between situational interest, enjoyment, and persistence, Fulmer and Tulis (2013) found that individuals experiencing more enjoyment and situational interest (i.e., intrinsic value) reported more persistence on a task.

Utility Value Utility value is defined as the usefulness or importance of a particular task to an individual's current or future goals (Eccles et al., 1983). Gaspard et al. (2015) identified five different subtypes of utility value. One of the most prominent subcomponents, *perceived instrumentality*, is specifically oriented toward future goals and pursuits (De Volder & Lens, 1982). Other identified components included *social utility*, *utility for school* (Conley, 2012), *utility for daily life* (Hulleman & Harackiewicz, 2009), and *career utility* (Hulleman et al., 2008). The focus on personal

Table 10.2 Value constructs and measures

Construct	Sample item
1. Task values	
Intrinsic value[a]	I enjoy coming to lecture.
Utility value[b]	This technique could be useful in everyday life.
Attainment value[c]	I feel that, to me, being good at solving problems which involve science or reasoning scientifically is: 1 (not at all important) to 6 (very important).
Cost[c]	When I think about the hard work needed to get through my science major [or science track], I am not sure that getting a science degree is going to be worth it in the end.
2. Intrinsic and extrinsic motivation	
Intrinsic motivation[d]	I work really hard because I like to learn new things.
Extrinsic motivation[d]	I work on problems because I'm supposed to.
Motivation regulation continuum	
Amotivation[e]	I don't know why [I go to school]; I can't really see what good it will do for me.
External regulation[e]	[I go to school] because my parents pressure me to go.
Introjected regulation[e]	[I go to school] because if I did not go I'd be angry with myself for a long time.
Identified regulation[e]	[I go to school] because I feel that postsecondary studies will help me to prepare myself for the career I have chosen.
Integrated regulation[e]	[I go to school] because in choosing to continue to study, I'll be the type of person that will be in a better situation to get better job opportunities.
Intrinsic regulation[e]	[I go to school] because I experience pleasure and satisfaction in learning new things.
Psychological needs	
Competence[f]	During this event I felt very capable in what I did.
Autonomy[f]	During this event I felt free to do things my own way.
Relatedness[f]	During this event I felt close and connected with other people who are important with me.
Self-esteem[f]	During this event I felt quite satisfied with who I am.
Self-worth[g]	I don't care if other people have a negative opinion about me.
3. Human values	
Terminal value[h]	As the guiding principle in my life: wisdom [is 7 (of supreme importance) to 0 (opposed to my values)].
Instrumental value[h]	As the guiding principle in my life: intellect [is 7 (of supreme importance) to 0 (opposed to my values)].

[a]Hulleman, Durik, Schweigert, & Harackiewicz, (2008); [b]Hulleman, Godes, Hendricks, & Harackiewicz, (2010); [c]Perez, Cromley, & Kaplan, (2014); [d]Lepper, Henderlong, Corpus, & Iyengar, (2005); [e]Vallerand and Blssonnette (1992); [f]Sheldon, Elliot, Kim & Kasser, (2001); [g]Crocker, Luhtanen, Cooper, and Bouvrette (2003); [h]Schwartz (1994)

meaning for important life goals inherent in utility value helps separate it from intrinsic value, which is more focused on enjoyment. Thus, an academic activity can lack intrinsic value yet have high utility value. For example, a student majoring in biology may not gain much enjoyment from chemistry (i.e., intrinsic value); however, learning chemistry may be valuable because it enables the student to pursue a medical degree (i.e., utility value) or solve an important social problem, such as creating clean water in impoverished nations (Yeager & Bundick, 2009).

Whereas intrinsic value tends to be related primarily to choice-related outcomes, utility value has also been positively linked to performance outcomes (Hulleman, Godes, Hendricks, & Harackiewicz, 2010; Hulleman et al., 2008; Hulleman & Harackiewicz, 2009; Simons, DeWitte, & Lens, 2003). When students perceive a task as more instrumental to their future goals, they are more likely to be persistent and also reach higher levels of achievement (De Volder & Lens, 1982). Moreover, students who focus on intrinsic, future goals are more excited and persistent and demonstrate superior performance (Simons et al., 2003). For example, Updegraff, Eccles, Barber, and O'Brien (1996) found that utility value for mathematics predicted the number of high school math courses taken even when controlling for math GPA, aptitude, and self-concept.

Attainment Value Attainment value is often described as the importance of a task to an individual's self-concept or identity (Eccles, 2009; Eccles & Wigfield, 2002). For example, a student may report high attainment value for math class because demonstrating competence in that situation affirms one's identity as a math major. Attainment value was adapted from early value research that defined it as the importance an individual attaches to competent performance in a specific area of achievement (e.g., Crandall, Katkovsky, & Preston, 1962). When attainment value was subsumed within the expectancy-value framework, it was eventually defined so that it focused on an individual's identity (Eccles, 2009). Attainment value has been found to be positively correlated with intrinsic and utility value, cognitive engagement, and intentions to continue education (e.g., Battle & Wigfield, 2003; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Johnson & Sinatra, 2013; Wigfield et al., 1997).

Cost Instead of the positive aspects of wanting to do an activity, cost reflects the perceived negative aspects of a task. These negative perceptions discourage an individual from engaging in the activity, decrease persistence while engaging in the activity, and lead to a devaluing of the activity (Eccles et al., 1983). Three major sources of cost have consistently been proposed in the literature: the amount of effort required by a task, how engaging in one task results in missing out on other valued alternatives, and the negative emotional states that occur while doing the task. Eccles et al. (1983) suggested that the first two types of cost represent the costs of success (e.g., giving up your time and energy or giving up other valued activities), and the third reflects the costs of failing (e.g., anxiety).

New theoretical and empirical work on the construct of cost suggests that it is a separate construct on par with both value and expectancy (Barron & Hulleman,

2015; Flake, Barron, Hulleman, McCoach, & Welsh, 2015; Kosovich, Hulleman, Barron, & Getty, 2015) that can directly influence an individual's overall motivation. For example, recent research has shown that cost is negatively related to achievement outcomes (e.g., Conley, 2012; Grays, 2013; Kosovich et al., 2015; Perez, Cromley, & Kaplan, 2014; Trautwein et al., 2012). This enables us to consider cost as a distinct source of motivation, in addition to expectancy and value, that could be ameliorated to benefit student outcomes. Returning to our example in the beginning of this chapter, one reason for Amanda's relative underperformance compared to Rachel's could be the perceived costs for learning she experiences due to an undiagnosed learning disability. This requires her to put in additional effort to learn the material. Additionally, her fear of failure could be exacerbated by a high-stakes testing environment.

In the above discussion, we have focused on individual types of value and their relationships with educational outcomes. However, in the research literature, it is not uncommon to find general task value scales that are comprised of many different types of task value (e.g., Durik et al., 2006; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). This research shows a fairly consistent pattern of relationships: Expectancy beliefs primarily affect performance outcomes, and values generally affect achievement choices (Eccles et al., 1983). For example, Eccles and colleagues (1983) found that math value was a strong predictor of the intention to take more math classes in the future. In a study of science achievement using data from the Trends in International Mathematics and Science Study (TIMSS), science value was related to science interest, school connectedness, and active learning, but unrelated to science achievement (Tighezza, 2013).

10.3.2 Intrinsic and Extrinsic Motivation and Value

Similar to Eccles and colleagues' intrinsic value construct, *intrinsic motivation* is represented in a number of theoretical models as a key reason for valuing an activity. Simply put, intrinsic motivation is defined as the enjoyment of an activity for an activity's sake (Sansone & Harackiewicz, 2000). It reflects engaging in the activity as an end in itself for the inherent pleasure and enjoyment of the activity. Intrinsic motivation is routinely proposed as the optimal reason for an individual to engage in a task. A number of reviews showcase the positive relations between intrinsic motivation and other desirable achievement behaviors and attitudes – in particular that intrinsic motivation is directly related to interest in a task, persisting at the task, and reengaging with the task over time (Lepper & Henderlong, 2000; Sansone & Harackiewicz, 2000). In contrast, *extrinsic motivation* (i.e., valuing a task because it leads to some tangible benefit such as a reward or the avoidance of a punishment) is not well represented in Eccles et al.'s framework.

The contrast between the more controlled reasons for task engagement represented by extrinsic motivation and the more autonomous reasons for task engagement represented by intrinsic motivation is the focus of the motivated regulation

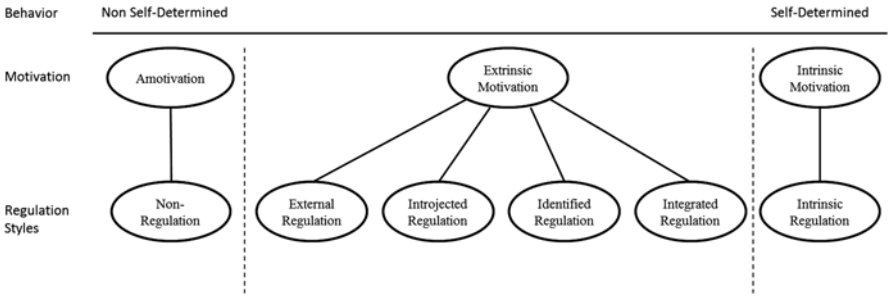

Fig. 10.1 The Motivated Regulation Continuum With Types of Motivation and Regulation Styles (adapted from Deci and Ryan, 2000)

continuum within self-determination theory (Ryan & Deci, 2000). Valuing an activity for extrinsic reasons is on one end of the continuum and valuing an activity for intrinsic reasons is on the other (see Fig. 10.1).

Being extrinsically motivated involves engaging in an activity because of external reward and punishment contingencies and creates compliance to an outside authority. It is considered the least self-determined form of motivation (i.e., the individual need not have any investment in the behavior beyond achieving reward or avoiding punishment). The next form of extrinsic motivation along the self-determination continuum is *introjected motivation*. This category of motivation reflects a shift from responding to external rewards and punishments to internal rewards and punishments. In particular, introjected regulators are still controlled by strong internal pressures that they have certain external obligations that they should or ought to do. When accomplished, ego-related pride is experienced; when unaccomplished, feelings of guilt and anxiety occur. Third on the extrinsic motivation continuum is *identified motivation*. This category reflects an important shift because an individual now sees personal benefits and importance for engaging in the task. This is similar to utility value in the Eccles et al.'s (1983) model. Finally, fourth on the extrinsic motivation continuum is *integrated motivation*. The primary distinction between integrated motivation and true intrinsic motivation is that tasks done to affirm identity (and achieve greater goals) are considered integrated, whereas tasks done for enjoyment are considered intrinsically motivated.

10.3.3 Human Values and Psychological Needs

It is important to define and distinguish values that exist at different conceptual levels. According to Schwartz and Bilsky (1990), *human values* are "beliefs about desirable end states or behaviors that transcend specific situations, guide selection or evaluation of behavior and events, and are ordered by relative importance" (p. 551). These human values can be sorted into two categories, terminal values and instrumental values (Rokeach, 1973). *Terminal values* represent desired end states

that a person or culture holds as important (e.g., social recognition, wisdom, pleasure). *Instrumental values* address modes of conduct to be followed (e.g., honesty, self-control, logic) in order to achieve terminal values. Depending on the theoretical framework, the number of identified human values ranges from 9 (Bilsky, Janik, & Schwartz, 2011) to 36 (Rokeach, 1973).

Self-determination theory also proposes broader human values in the form of three core psychological needs: competence, autonomy, and relatedness. *Competence needs* are fulfilled when an individual has an opportunity to grow, to be efficacious, and to master a task. *Autonomy needs* are met when an individual has choice and feels in control when doing a task. *Relatedness needs* are fulfilled when an individual is able to make meaningful connections to others in a task. When an environment supports an individual's growth on any of these needs, it should hold more value for that individual. This, in turn, is argued to promote that individual's motivation and well-being (Ryan & Deci, 2000). Research on psychological needs reveals that when educators fulfill students' needs for autonomy, relatedness, and competence, they are more intrinsically motivated, regulate their own learning, and perform better (e.g., Niemiec & Ryan, 2009). A number of other psychological needs also have been proposed (Sheldon, Elliot, Kim & Kasser, 2001), such as a need for self-esteem or self-worth (Covington, 1984). This research demonstrates that when achievement is tied to self-worth, thus linking self-esteem to specific levels of performance, then threats to this self-conception (e.g., difficult tasks) undermine achievement, self-regulation, and mental and physical health (e.g., Crocker & Park, 2004).

Both human values and psychological needs are more abstract than task values. *Human* values focus on an individual striving to act a certain way or reach an outcome across situations. In contrast, *task* values focus on the features of a specific task that increase or decrease the relative importance of the task, either compared to other tasks or for attaining an important achievement outcome. Similarly, *psychological needs* appear to be more general – they function as innate values that have the potential to be met in any situation – whereas task values are more specific. To the extent that a task or activity enables a student to meet a psychological need, then the meeting of that need operates as a reason to value the task or activity. To our knowledge, this linkage between needs and values has not been established in the literature, and the field would benefit from further explication of such inter-construct relationships.

10.3.4 Values and Learning Outcomes

Value-related constructs have historically shown moderate to strong associations with achievement choices, task engagement, interest, and achievement (Wigfield & Cambria, 2010). As with the expectancy construct, there have been numerous conceptual reviews of the value construct over the years but no systematic review of the relationship between values and outcomes across student grade level. These reviews

reveal a general decline in mean levels of value across grades (e.g., Jacobs et al., 2002; Lepper, Henderlong, Corpus, & Iyengar, 2005). However, these reviews are silent on how relationships between values and outcomes vary by grade level or change over time.

Instead, two meta-analyses provide empirical support for the relationship between values and student learning outcomes at the college level. In their 2012 meta-analysis of 241 unique data sets, Richardson and colleagues found that valuing education (i.e., academic intrinsic motivation) was positively correlated with college GPA. In their 2004 meta-analysis of 109 studies, Robbins and colleagues found that measures of value (i.e., achievement motivation, academic goals) were predictive of academic performance and persistence in college, even after controlling for socioeconomic status, standardized achievement, and high school GPA.

10.4 Review of Theories that Integrate Expectancy and Value Constructs

By its very name, Eccles' and colleagues' (1983) expectancy-value theory obviously stands out in integrating expectancy and value constructs. Interestingly, Eccles and colleagues shy away from using the term theory. Instead, they refer to their work as an expectancy-value framework or model. As noted at the outset of our chapter, they were motivated to adopt an integrative perspective of various constructs from different motivational theories to better understand students' academic performance, persistence, and choice behaviors. Their framework was also meant to be developmental and contained numerous antecedents of expectancies and values that correspond to terminal and instrumental human values. Elements of the larger expectancy-value framework include the cultural milieu, unique past events, students' perceptions of past events, socializers' behaviors and attitudes, students' perceptions of socializers' attitudes and expectations, and students' goals and self-concept. Thus, in the expectancy-value framework, human values correspond to distal factors in the model of achievement behaviors (e.g., the cultural milieu, student's goals), whereas task values refer to perceptions of the task at hand (i.e., how valuable a task is in attaining a particular goal) (see Fig. 10.2).

Recently, several researchers have noted that the expectancy-value framework promoted by Eccles and colleagues was absent an important element of earlier models. In classic models of achievement motivation, expectancies and values were hypothesized to interact to produce more motivation than either factor alone. In other words, motivation was a product of expectancy times value (i.e., M = E*V). Thus, if either type of motivation was lacking for a given academic task, then a student would not be motivated to engage in it. Using samples from large, international databases, Trautwein and colleagues (2012; Nagengast et al., 2011) found empirical support for the interaction between expectancy and value on engagement in science activities, intentions of pursuing science careers, and academic achievement. These results suggest that students high in both expectancy and value performed better than those high in one or the other or students low in both.

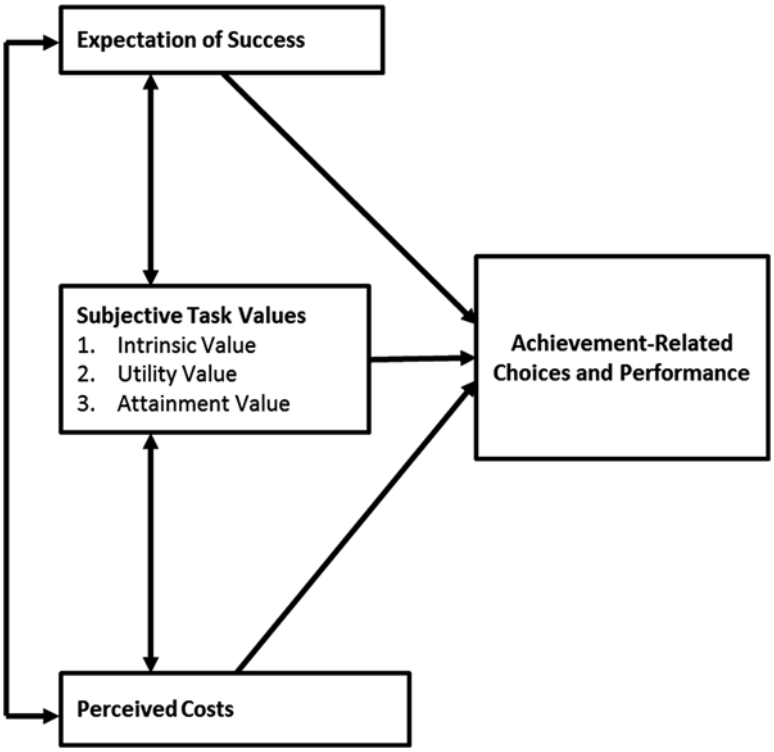

Fig. 10.2 Updated Expectancy-Value-Cost Model of Achievement Motivation (adapted from Eccles et al., 1983; see Barron & Hulleman, 2015)

Besides their own work on expectancy-value models, Eccles and Wigfield (2002) also highlighted numerous other theories that offer integrative perspectives (e.g., Feather, 1988; Weiner, 1992). Although similar in their inclusion of expectancy-related and value-related constructs as sources of student motivation, they vary in focus and motivational mechanisms. For example, self-worth theory includes students' perceptions of their sources of worth and value (Covington, 1984), and control-value theory includes control beliefs (which include both attributions and expectancies) and values as sources of students' achievement emotions (Chap. 11; Pekrun, 2006). More recently, emerging theories of interest also propose an integrative perspective (see Renninger & Hidi, 2011), which defines interest as a combination of expectancy and value (i.e., positive affect, value, and prior knowledge and competence). Our recent theoretical work separating costs from values and expectancies (Barron & Hulleman, 2015) highlights the highly integrative nature of achievement motivation in educational contexts. Instead of being driven by only the positive aspects of task engagement (e.g., success expectancies and task values), students are often mindful of the obstacles to engagement and potential negative affect they will experience.

10.5 Intervention Drivers: Research-Based Sources of Students' Expectancies, Values, and Costs

As our review of the literature demonstrates, an expectancy-value framework serves as a conceptual umbrella under which other motivation theories and constructs can easily fit. Additionally, we have proposed a revised framework that includes cost as a separate, third component (Barron & Hulleman, 2015). To be optimally motivated, students need to have expectancy beliefs that they can be successful in their schoolwork (i.e., *Do students think they can do the task?*) and see value for their schoolwork (i.e., *Do students want to do the task?*). However, even if students believe they can do a task and have a reason to do a task, they still might not be motivated if they experience significant cost preventing them from engaging in that task (i.e., *Are students free of barriers preventing them from investing time, energy, or resources into the task?*). Thus, as teachers encounter motivation problems with their students, deciding if the problem is an expectancy, a value, or a cost problem is a critical first step in determining how to intervene.

Therefore, based on our review of expectancy, value, and cost constructs within educational and social psychology, and a desire to identify pathways for practitioners to enhance student motivation, we have identified research-based sources of expectancy, value, and cost that are potentially amenable to interventions (see Tables 10.3, 10.4, and 10.5, respectively). These sources refer to the underlying psychological processes that both serve as antecedents of expectancy, value, or cost and that are potentially amenable to intervention by educational practitioners, including teachers, parents, and administrators. Importantly, these sources can serve as the targets or drivers of interventions aimed at enhancing student outcomes by boosting students' expectancies and values and reducing their costs. Although there are additional sources of expectancies, values, and costs – such as those identified in the Eccles model, including cultural milieu and socializers' goals and expectations – the sources in our tables have been identified as being the most accessible to change through direct intervention.

We therefore conclude this chapter with a brief introduction to a growing body of intervention work designed to promote student learning outcomes by targeting sources of students' expectancy, value, and costs for their schoolwork.

10.6 Interventions and Programs that Foster Motivation

Much of the work that we have reviewed above was based on correlational research that links self-report measures of expectancy, value, and cost to student outcomes. Although observational and correlational research can generate and test hypotheses, intervention research (i.e., research that formally manipulates an independent variable) provides valuable information about what happens when we attempt to enhance educational outcomes through intentional manipulation. From a theoretical

Table 10.3 Research-based sources of expectancy-related beliefs

Expectancy source	Definition
Perceptions of ability/skill	When students perceive they have a high level of ability and/or skill at an activity, they are more likely to experience high expectancy (Bandura, 1997; Wigfield & Eccles, 2002).
Effort attributions	When students believe that their effort will lead to learning, they are more likely to experience high expectancy (Dweck & Leggett, 1988; Dweck, 1999; Weiner, 1972).
Success experiences	When students are successful at an activity, or watch others have success, they are more likely to experience high expectancy (Bandura, 1997; Eccles et al., 1983).
Support and scaffolding	When students are appropriately supported in completing an activity (e.g., through encouragement and having the resources necessary to complete the task), they are more likely to experience high expectancy (Bandura, 1997).
Clear expectations	When students know what is expected of them on an activity, and have clearly defined goals, they are more likely to experience high expectancy (Pajares, 1996).
Appropriate challenge	When the difficulty of the task or activity matches students' skill levels, they are more likely to experience high expectancy (Eccles et al., 1983).
Feedback	When students receive feedback that effort matters and skills are amenable to change and are task focused (rather than ability focused), they are more likely to experience high expectancy (Dweck & Leggett, 1988; Dweck, 1999).
Growth experiences	When students engage in learning activities that challenge them to grow and learn, and experience growth in their skills and performance improvements, they are more likely to experience both high expectancy and value (Dweck & Leggett, 1988; Dweck, 1999; Hong et al., 1999).
Perceptions of others' expectations	Parents' and teachers' expectancies and attitudes shape children'/students' expectancies; for instance, if teachers have high expectations for their students, these students in turn develop high expectancies (Bandura, 1997; Dweck & Leggett, 1988; Dweck, 1999; Eccles et al., 1983).
Perceived task difficulty	When students perceive a subject or task as being not difficult, they develop higher estimates of their own abilities for the subject or task (Bandura, 1997; Pajares, 1996; Wigfield & Eccles, 2002).
Stability attributions	When students attribute success to a stable factor (ability), then they will have higher expectations for future success; if they attribute it to an unstable factor (good luck), they will be uncertain about future success and have lower expectations for future success (Weiner, 2010).

perspective, intervention research helps move the field forward by providing insight about the causal relationships between motivation constructs and educational outcomes or between educational settings and motivation outcomes (Shadish, Cook, & Campbell, 2002; Tunnell, 1977). Because interventions represent the operationalized theory in action, they provide a strong test of the theory as applied in an educational context.

Table 10.4 Research-based sources of value

Value source	Definition
Intrinsic benefits	When students find the activities and academic content enjoyable and interesting, they are more likely to experience high value (Renninger & Hidi, 2011).
Relevance	When students are able to connect what they are learning to their personal lives and/or the real world, they are more likely to experience high value (Hulleman & Harackiewicz, 2009).
Context and rationale	When students understand that an activity is meaningful and has a purpose, they are more likely to experience high value (Lepper & Henderlong, 2000).
Variety and novelty	When students engage in activities that are varied and novel, they are more likely to experience high value (e.g., catch and hold interest; Hidi & Renninger, 2006).
Enthusiastic models	When students interact with teachers and other adults who are enthusiastic and passionate about learning, they are more likely to experience high value (Patrick, Hisley, & Kempler, 2000).
Growth experiences	When students engage in learning activities that challenge them to grow and learn, and experience growth in their skills and performance improvements, they are more likely to experience both high expectancy and value (Dweck & Leggett, 1988; Dweck, 1999; Hong et al., 1999)
Choice and control	When students feel a sense of control and choice over their learning, they are more likely to experience high value (Patall et al., 2010).
Positive relationships and sense of belongingness	When students experience meaningful student-student and student-teacher relationships, they are more likely to experience high value (Furrer & Skinner, 2003; Walton & Cohen, 2007).
Extrinsic benefits	When students receive external rewards and incentives for learning (e.g., prizes, food), they are more likely to experience high value to complete an activity but low value to produce quality work (Marinak & Gambrell, 2008).

Table 10.5 Research-based sources of cost

Value source	Definition
Effort and time needed for the activity	When students feel that the workload is unreasonable (e.g., 5 hours/night) and/or unnecessary (e.g., busy work), they are more likely to experience increased cost (Parsons et al., 1980; Perez et al., 2014).
Effort and time needed for other competing activities	When student have too many other demands on their time or do not know how to effectively manage their time, they are more likely to experience high cost (Barron & Hulleman, 2015; Flake et al., 2015).
Loss of valued alternatives	When students feel like the learning activity is not worth their time compared to other things they might do (e.g., socializing), they are more likely to experience high cost (Conley, 2012; Perez et al., 2014).
Psychological and physical reactions to the activity	When students feel unsafe and uncomfortable, either physically or psychologically (e.g., nervous, bored, tired), they are more likely to experience high cost (Eccles et al., 1983; Ramirez & Beilock, 2011).

From a practical perspective, intervention studies facilitate our understanding about which interventions are most effective in improving educational outcomes in a way that observational research cannot. This understanding can guide recommendations for educational practice based on appropriate scientific evidence. For example, what is the best way to prevent students like Amanda from disengaging in the learning process? It is not enough simply to know that some motivation constructs are correlated with important student outcomes. What is needed are interventions designed to target motivational constructs and processes that, in turn, enhance educational outcomes.

Although several narrative reviews have highlighted important constructs (Pintrich, 2003) and interventions (Wigfield & Wentzel, 2007; Yeager & Walton, 2011) that are linked to enhanced student motivation and outcomes, we were interested in finding interventions that had the strongest empirical support as implemented within actual educational contexts, as opposed to correlational or laboratory studies. To that end, we recently conducted a meta-analysis of motivation interventions conducted in ecologically valid[1] educational contexts (Lazowski & Hulleman, 2013). As presented in Table 10.6, we found over 63 different interventions designed to enhance student motivation in education contexts. Although these interventions originate from 12 different theoretical frameworks, we were able to categorize these interventions as targeting expectancy-related, value-related, or cost-related sources. We found that these 63 interventions produced an average effect size on behavioral, self-report, and performance outcomes of two-thirds of a standard deviation ($d = 0.58$). Below, we highlight some examples that have the strongest empirical support.

10.6.1 Expectancy Interventions

Attribution Retraining One set of interventions aimed at changing students' success expectancies has focused primarily on changing cognitive attributions for success and failure. Many of these interventions provide students with training about ascribing academic success to things that are within their control (e.g., effort) and that academic difficulties can be overcome. These control-enhancing interventions have been successful in increasing perceived academic control, and these changes mediate effects on academic motivation and achievement outcomes (e.g., Hall,

[1] We used Tunnell's (1977) three dimensions of naturalness to help define ecologically valid: *natural treatments* are naturally occurring events to which the participant is exposed (e.g., pedagogical practices, curriculum); *natural settings* are those that are not perceived to be established for the purposes of research (e.g., a non-laboratory setting); and *natural behavior* occurs on its own within the educational context (e.g., statewide mandated standardized tests will be taken by students whether they are in a study or not). Intervention studies that contain these dimensions of naturalness are more likely to have results that will generalize to other settings; therefore, we selected studies that contained at least one dimension of naturalness and that targeted student motivation.

Table 10.6 Summary table of motivation intervention studies by research-based source of expectancy, value, and cost

Study	Source	Avg. d^c	n_e, n_c[a]	Age[b]
Expectancy interventions				
Boese et al. (2013)	Ability/skill Effort	0.77	84, 42	C
Hall et al. (2007)	Ability/skill Effort	0.31	374, 375	C
Hall et al. (2004)	Ability/skill Etffort	0.35	101, 102	C
Ruthig et al. (2004)	Ability/skill Effort	0.61	118, 118	C
Struthers and Perry (1996)	Ability/skill Effort	0.41	108, 150	C
Wilson and Linville (1985)	Ability/skill Effort	0.36	20, 20	C
Wilson and Linville (1982)	Ability/skill Effort	0.73	20, 20	C
Yeager et al. (2013) Study 1 Study 2 Study 3	Ability/skill Effort	0.76 0.78 0.44	22, 22 22, 22 38, 38	MS MS HS
Craven, Marsh, and Debus (1991)	Ability/skill Effort/feedback	0.08	81, 79	ES
Aronson et al. (2002)	Effort	0.57	37, 37	C
Blackwell et al. (2007)	Effort	0.69	49, 50	MS
Good et al. (2003)	Effort	0.92	69, 69	MS
Mueller and Dweck (1998)	Effort			
Study 1		0.84	64, 64	ES
Study 2		1.17	25, 26	ES
Study 3		0.81	44, 44	ES
Study 4		1.15	25, 26	ES
Study 5		1.03	23, 23	ES
Study 6		1.28	24, 24	ES
Gollwitzer and Brandstatter (1997)	Challenge Feedback	1.24	43, 43	C
Kitsantas et al. (2004)	Challenge Feedback	0.73	48, 48	HS
Morisano et al. (2010)	Challenge Feedback	0.44	43, 42	C
Muis, Ranellucci, Franco, and Crippen (2013)	Challenge Feedback	0.12	198, 52	C
Silva, White, and Yoshida (2011)	Challenge	0.71	20, 21	HS
Hofer and Yu (2003)	Support and scaffolding	0.48	39, 39	C

(continued)

Table 10.6 (continued)

Study	Source	Avg. d^c	n_e, n_c[a]	Age[b]
Greenstein (1976)	Feedback	0.54	87, 84	C
Duckworth, Kirby, Gollwitzer, and Oettingen (2015)	Mental contrasting Challenge	0.51	38, 39	ES
Value interventions				
Acee and Weinstein (2010)	Relevance Context	0.56	41, 41	C
Harackiewicz et al. (2012)	Relevance	0.32	94, 94	HS
Hulleman et al. (2010), Study 2	Relevance	0.38	160, 158	C
Hulleman and Harackiewicz (2009)	Relevance	0.28	136, 126	HS
Patall et al. (2010)	Intrinsic Choice/control	0.12	193, 194	HS
Vansteenkiste, Timmermans, Lens, Soenens, and Van den Broeck (2008)	Intrinsic Choice/control	0.70	68, 70	MS
Vansteenkiste et al. (2005)	Intrinsic Choice/control			
Study 1		0.83	65, 65	MS
Study 2		0.74	57, 56	MS
Vansteenkiste et al. (2004) Study 1 Study 2	Intrinsic Choice/control	1.57 1.49	100, 100 189, 189	C C
Vansteenkiste et al. (2004)	Context Growth	0.47	123, 122	C
Hoyert and O'Dell (2006)	Context Growth	1.08	69, 68	C
Miller and Meece (1997)	Context Growth	0.54	94, 93	ES
Guthrie et al. (2006)	Variety/novelty	0.71	49, 49	ES
Hidi et al. (2002)	Variety/novelty	0.67	90, 90	MS
Schaffner and Schiefele (2007)	Intrinsic	0.46	188, 187	HS
Day et al. (1994)	Context	0.91	42, 41	ES
Oyserman et al. (2002)	Context	0.32	62, 146	MS
Cook, Purdie-Vaughns, Garcia, and Cohen (2012)	Self-affirmation	0.36	61, 60	MS
Miyake et al. (2010)	Self-affirmation	0.21	69, 47	C
Sherman et al. (2013) Study 1 Study 2	Self-affirmation	0.34 0.64	41, 40 26, 29	MS MS
Cost interventions				
Cohen et al. (2006)	Psychological	0.75	121, 122	MS
Cohen et al. (2009)	Psychological	0.51	192, 193	MS
Sherman et al. (2013), Study 1	Psychological	0.36	41, 40	MS

(continued)

Table 10.6 (continued)

Study	Source	Avg. d^c	n_e, n_c[a]	Age[b]
Expectancy and value interventions				
Guthrie et al. (2000)	Growth Scaffolding Belongingness Relevance	0.67	79, 83	ES
Garcia and De Caso (2004)	Effort Relevance Scaffolding	0.47	66, 61	ES
Martin (2008)	Effort Scaffolding	0.48	26, 27	HS
Froiland (2011)	Growth Scaffolding Choice/control	0.73	15, 15	ES
Reeve et al. (2004)	Growth Scaffolding Choice/control	1.69	10, 10	HS
Value and cost interventions				
Hausmann, Ye, Schofield, and Woods (2009)	Belongingness Psychological	0.26	70, 67	C
Walton and Cohen (2007)	Belongingness Psychological	1.03	81, 81	C
Walton and Cohen (2011)	Belongingness Psychological	0.58	49, 43	C
Expectancy and cost interventions				
Jamieson, Mendes, Blackstock, and Schmader (2010)	Attribution Challenge	0.87	14, 14	C
Total		**0.66**[d]	**4738, 4634**	

[a]The sample size for the experimental condition (n_e) is reported first, followed by the sample size for the control condition (n_c).
[b]Grade levels included elementary school (ES), middle school (MS), high school (HS), and college (C).
[c]Types of dependent variables included self-report (SR), behavioral indicator (B), and performance indicator (P).
[d]For more details, see Lazowski and Hulleman (2015).

Hladkyj, Perry, & Ruthig, 2004; Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006; Perry, Stupnisky, Hall, Chipperfield, & Weiner, 2010).

There have been several studies demonstrating that changes in causal attributions relate to changes in academic achievement. Many of these intervention studies sought to alter the attributions that low performing students made regarding their academic achievement from low ability to underscoring the importance of effort and the notion that achievement was amenable to change. These shifts in attribution have been demonstrated to improve course grades (Boese, Stewart, Perry, & Hamm,

2013; Hall et al., 2007, 2004; Yeager, Paunesku, Walton, & Dweck, 2013), exam performance (Struthers & Perry, 1996), GPA (Boese et al., 2013; Ruthig, Perry, Hall, & Hladkyj, 2004; Yeager et al., 2013; Wilson & Linville, 1982, 1985), standardized test scores (Good et al., 2003; Wilson & Linville, 1982, 1985), intrinsic motivation (Hall et al., 2007), and reduction in text anxiety and voluntary course withdrawal (Ruthig et al., 2004).

Growth Mindsets Based on Dweck's theory of the malleability of intelligence, the growth mindset intervention targets students' perceptions about their capacity to learn. There have been several versions of the growth mindset intervention that have been demonstrated to be effective in enhancing student outcomes. Blackwell and colleagues (2007) developed eight, 1-hour sessions for middle school students. Six of the sessions instructed students on the latest research on how the brain develops and grows. Two additional sessions focused on helping students understand that their brains can grow through effort and persistence through difficulty and using appropriate learning strategies. Students who were randomly assigned to the mindset intervention had higher self-reported motivation and academic performance compared to those in the control condition. Other versions of the intervention have replicated this effect in high school and college students (Aronson et al., 2002; Yeager et al., 2013).

10.6.2 Value Interventions

Utility Value Based on Eccles' expectancy-value framework, Hulleman and colleagues developed and tested interventions designed to increase students' perceptions of the relevance of academics to their lives (i.e., utility value). In one set of studies, students were randomly assigned to either write about how the course material related to their lives or write a summary of the material they were studying. The findings revealed that high school science students (Hulleman & Harackiewicz, 2009), college psychology students (Hulleman et al., 2010), college biology students (Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2015), and statistics students (Hulleman, An, Hendricks, & Harackiewicz, 2007) in the utility value treatment condition reported greater topic interest, future intentions, and academic performance than students in the control condition. These effects were particularly strong for students with low actual or expected academic performance. In another study, parents of high school students were randomly assigned to receive information that highlighted the utility value of mathematics and science courses for their teenagers, along with strategies on how to talk to their teenagers about the value of math and science coursework. Students whose parents received the information took more mathematics and science courses in their last 2 years of high school than students whose parents did not receive the information (Harackiewicz, Rozek, Hulleman, & Hyde, 2012).

Choice Several interventions have demonstrated the impact of increasing value through opportunities for choice in the classroom. In one study, Patall, Cooper, and Wynn (2010) randomly assigned high school students to receive a choice of homework assignments or no choice. Students in the choice condition had higher self-reported intrinsic motivation and perceived competence, and also performed better on the unit exam, than students in the no-choice condition. Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) randomly assigned college students to conditions that appeared to have more or less choice. The perceived-choice condition boosted students' depth of processing, persistence, and test performance compared to the no-choice condition.

10.6.3 Cost Interventions

Values Affirmation The emotional cost of academic life can manifest itself when students identify with groups of students who are stereotyped to under-perform. This perceived threat, known as stereotype threat (Steele, 1997), can undermine academic performance and persistence, resulting in a sorting mechanism that reduces minority success and completion rates in high school and college. An intervention designed to ameliorate this perceived threat has been developed and tested by Geoffrey Cohen and colleagues (e.g., Cohen, Garcia, Apfel, & Master, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). Students randomly assigned to the affirmation condition wrote about their top most important values, whereas students assigned to the control condition wrote about their least important values. By writing about their most important values, students are affirming core aspects of themselves, and this affirmation serves as a buffer against threats in a single domain. The results of this brief intervention are startling. In a sample of seventh grade students, the values-affirmation intervention reduced the black-white achievement gap by 40 % (Cohen et al., 2006). In a 2-year follow-up, the benefits of the intervention were particularly acute for low-achieving black students who increased their performance relative to the control group (Cohen et al., 2009). This intervention effect has been replicated with other minority groups, such as Latino American middle school students (Hanselman, Bruch, Gamoran, & Borman, 2014; Sherman et al., 2013) and first-generation college students (Harackiewicz et al., 2014).

Belonging In addition to stereotype threat, students can also experience emotional cost in an academic setting if they feel anxious about not belonging or fitting in with other students. These feelings of belonging uncertainty can lead to students withdrawing from the academic experience and result in poorer learning and health outcomes (Walton & Cohen, 2007). In a series of studies, Greg Walton and Geoffrey Cohen developed an intervention targeting students' feelings of belonging in the academic environment (Walton & Cohen, 2007, 2011). Students randomly assigned to the intervention condition read results of a survey and quotes from other students

that emphasized that everyone struggles with some aspects of college initially and that these initial difficulties were temporary. In essence, students learned that there were other students like them who initially felt like they did not fit in but who eventually succeeded in college. The results indicated students most likely to feel uncertain about belonging in college – African American students – demonstrated increased GPA and self-reported health and well-being (2011).

10.6.4 Multicomponent Interventions

Thus far, we have reviewed interventions that target a single motivational construct or component. However, it is possible that to be maximally effective interventions need to address multiple facets of the student experience. These interventions could target multiple motivational constructs, or these interventions could include pedagogical elements that target particular types of learning, such as reading or mathematics. As a group, such multicomponent interventions have received less experimental evaluation in the literature, so the associated empirical base is not as strong. Below, we review two promising multicomponent interventions in the literature that specifically target motivational processes to enhance student learning outcomes.

An intervention developed by Andrew Martin provides an example of a multicomponent motivation intervention. Designed using an integrative motivation and engagement framework known as The Wheel (Martin, 2008), this intervention targets students' adaptive and maladaptive behaviors and cognitions. Delivered over the course of 13 modules, students are guided through instruction on the 11 aspects of the wheel: self-efficacy and mastery (expectancy); valuing (value); anxiety, failure avoidance, uncertain control, self-handicapping, and disengagement (cost); and persistence, planning, and task management (learning skills). Initial quasi-experimental results indicate that the intervention boosted students' self-reported motivation and persistence (Martin, 2008).

The Concept-Oriented Reading Instruction (CORI) intervention is an example of a multicomponent intervention that combines motivational aspects with reading strategy instruction. Developed by John Guthrie and Allan Wigfield, CORI links reading fiction and nonfiction books to science activities (Guthrie, Wigfield, & VonSecker, 2000). This reading program is organized into thematic units designed to target five motivational processes: self-efficacy and mastery goals (expectancy), perceived autonomy and intrinsically motivating activities (value), and collaborative work that provides social support for learning (cost) (Guthrie, McRae, & Lutz Klauda, 2007). A meta-analysis of 11 quasi-experimental studies demonstrates that the CORI intervention improves students' reading strategy use, self-reported reading motivation, and achievement (Guthrie et al., 2007).

Certainly, examples of additional multicomponent interventions abound in the literature. In a special issue of the *Educational Psychologist* edited by Allan Wigfield and Kathryn Wentzel, the authors of different articles discuss school-wide

reform efforts to create positive social and emotional climates for children (Juvonen, 2007), small learning community reforms (Felner, Seitsinger, Brand, Burns, & Bolton, 2007), and social skills training for aggressive children (Hudley, Graham, & Taylor, 2007). Such interventions connect to broader literature on social-emotional interventions (e.g., Collaborative for Academic, Social, and Emotional Learning, 2013; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011) and may indirectly target motivation through instruction in social and emotional skills (Rimm-Kaufman & Hulleman, in press), such as emotional regulation and decision-making (see Chap. 13).

10.7 Caution: One Size Does Not Fit All

It is important to note that these interventions are not "magic bullets" that can work for all students in all situations (cf. Durik, Hulleman, & Harackiewicz, 2014; Yeager & Walton, 2011). If students already have growth mindsets, then a growth mindset intervention may not be of benefit. However, if students are worried that they may not be able to find friends as they transition from high school to college, then a belonging intervention may buffer their concerns and facilitate their engagement in their academics. In addition, psychological interventions target specific mechanisms that, if not implemented properly or if used inappropriately, can have unintended negative consequences. For example, a common reaction to an apparent lack of student motivation is to offer rewards to students (see Table 10.4). But without knowledge of the reasons for a lack of engagement, provision of rewards may not produce the desired result (Marinak & Gambrell, 2008).

On the one hand, being offered financial compensation for each "A" earned can provide students a reason to value learning, particularly when the student lacks any other value for the activity. In this case, when students see no reason to engage in an activity, then rewards might instigate some engagement in the activity. On the other hand, being motivated by extrinsic reasons can lead to suboptimal outcomes. A host of correlational evidence demonstrates that students' self-reports of extrinsic, compared with intrinsic, motivation is negatively related to outcomes (e.g., Lepper et al., 2005; Vallerand et al., 1993). For example, students who report having higher quality of motivation (high intrinsic, low extrinsic) have higher achievement than students with higher quantity of motivation (high intrinsic, high extrinsic; Hayenga & Henderlong Corpus, 2010). Furthermore, experimental evidence indicates that tangible, extrinsic rewards can undermine students' motivation to engage in academic tasks, particularly if the rewards are unrelated to future task engagement (e.g., Marinak & Gambrell, 2008) and are perceived as controlling or are expected (e.g., Deci, Koestner, & Ryan, 1999, 2001; Tang & Hall, 1995; but see Cameron, 2001; Cameron & Pierce, 1994). The conclusion, besides the fact that rewards are complicated, is that knowledge of the underlying motivational issue is vitally important before implementing any of these interventions as potential solutions to a lack of student engagement.

10.8 Conclusion

From a broader perspective, the conceptual models of expectancy- and value-related constructs, whether integrative or singularly focused, attempt to identify the antecedents and sources of expectancies and values, delineate how expectancies and values develop over time, and determine their contribution to student learning outcomes and success. As we have reviewed, students' expectancy and value beliefs are central predictors of educational outcomes and attainment. In addition, having the skills to learn and persist in the face of challenging academic tasks is central to students' future success, whether it be in attaining educational credentials, choosing a career path, or maintaining long-term employment. Thus, if we are to leverage the relationships between expectancy-value motivation and learning outcomes, it is critical to identify the sources of expectancy and value that are malleable and potentially accessible to educational practitioners. By targeting motivation gaps, educational practitioners, policy-makers, and researchers have a potentially powerful tool to further close achievement gaps and inspire more students to persist academically, both in the short and long term.

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