



## Target article

## Retrospective utility of educational experiences: Converging research from education and judgment and decision-making



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## ABSTRACT

The review discusses recent findings that bridge the research traditions of achievement motivation and judgment and decision making to ask how building opportunities for students to be successful into the design of learning and assessment tasks (without making them less challenging) affects students' memories of their experiences. The success or failure of an academic outcome matters to student motivation. But the final score is not all that students consider as they evaluate their previous academic experiences. Beyond a specific end state of an academic experience (i.e., the final score), the manner in which students acquire or demonstrate information has a potent influence on their memories and as a result, their achievement preferences and behaviors.

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It's not whether you win or lose, it's how you play the game.

—Grantland Rice, American Sportswriter (1880–1954)

Student motivation is intricately entwined with achievement outcomes, memories of academic experiences and academic choices and behaviors. The focus of the current article is on how students remember their success and failure during difficult academic experiences and how their memory and memory biases influence their future learning and test taking decisions. The review addresses this topic from both the achievement motivation and judgment and decision making research traditions. Both traditions recognize that prior experiences guide future choices. Research in education on achievement motivation, for example, has shown that past failure impacts students' enthusiasm and willingness to participate in similar tasks the future (Eccles & Wigfield, 2002). However, the cognitive factors that influence how and what a student remembers about their prior experiences have not been well described. Judgment and decision making research has documented the dynamics of how people evaluate their previous painful and pleasurable experiences, and the cognitive biases that result in remembering and evaluating these episodes. However, the field has given little attention to evaluations of educational experiences, which can also be painful and pleasurable.

New research will be described that bridges these two traditions. The research asks how building opportunities for students

to be successful into the design of learning and assessment tasks (without making them less challenging) affects students' memories of their experiences, and as a result, how motivated they are to engage in similar tasks moving forward (Finn & Miele, *in press*). The success or failure of an academic outcome matters to student motivation. But, as the research described makes clear, the final score is not all that students consider as they evaluate their previous academic experiences. Over and above a specific end state of an academic experience (i.e., the final score), the manner in which students acquire or demonstrate information has a potent influence on their memories and as a result, their achievement preferences and behaviors.

The experience of success during learning is of interest because of the theoretical and practical insights it provides into how students remember and evaluate the acquisition of knowledge. As compared to a test experience, as the learning process unfolds there is not necessarily an explicit performance measure such as number correct by which to measure success. Rather, success can be inferred from ratings of the experience such as evaluations of comfort or pleasure during math learning, confidence ratings, retrospective evaluations and preferences for future math learning experiences. Also discussed is how students evaluate difficult test experiences. Students' experiences with difficult tests will be contrasted. Do students prefer to take a difficult math test if it includes additional easier items, even if those easier items do not count toward their final score? Is that kind of test experience preferable to a shorter, difficult math test in which there are no additional easier items? If so, it would suggest that opportunities to be successful are highly valued by the student and would point to potential

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interventions for increasing engagement in subsequent classroom assessments.

The article starts with a description of background theory from education and decision making research that is key to understanding how students' memories guide future academic behaviors. Then research investigating how students remember and evaluate the experience of acquiring and demonstrating knowledge will be described.

## 1. Achievement Motivation

Success and failure have long been recognized as drivers of motivation (Atkinson, 1957; Lewin, Dembo, Festinger, & Sears, 1944; Murray, 1938; McClelland, 1951) and there is general consensus that a student's need for competence, via success, is an important, perhaps even fundamental drive (Deci & Ryan, 1985). In addition to cognitive variables, achievement motivation is both a predictor and an outcome of academic success (e.g. Anderson, Shirey, Wilson, & Fielding, 1987; Garofalo & Lester, 1985; Hidi & Harackiewicz, 2000; Schneider & Artelt, 2010; Zimmerman & Schunk, 2003). A meta-analysis of over 2000 studies of academic achievement found motivation reliably mediated the influence of students' prior achievement on later performance (Fraser, Walberg, Welch, & Hattie, 1987). Low motivation during learning and testing experiences diminishes performance. In contrast, academic achievement improves when students are motivated (e.g. Ryan, Connell, & Deci, 1985; Ryan & Deci, 2000). Motivation is also an outcome of academic achievement. Academic success has been shown to provide pleasure, increase feelings of competence and increase motivation (Harter, 1982). Successful academic achievement can increase motivation and have major educational consequences: Greater academic motivation is related to improved academic engagement (Alderman, 2013; Connell & Wellborn, 1991; Pintrich & Schunk, 2002), better academic performance (Eccles & Roeser, 2011; Grolnick & Ryan, 1987; Miserandino, 1996; Niemiec & Ryan, 2009; Schunk, 1991), fewer instances of high school drop-out (Green et al., 2012; Vallerand, Fortier, & Guay, 1997) and greater psychological well-being (Sheldon & Kasser, 1995). Poor performance undercuts motivation to engage in similar experiences (Bandura, 1997; Law, Elliot, & Murayama, 2012; Schunk, 1991) with persistent failure related to high anxiety and low motivation (McDonald, 2001).

### 1.1. Expectancy-value theory

The significance of success and failure to motivation has been formalized in numerous frameworks of achievement motivation (Atkinson, 1957; Connell & Wellborn, 1991; Dickhäuser, Buch, & Dickhäuser, 2011; Dweck, 1986; Eccles-Parsons, 1983; James, 1890; Pintrich, 2003; Weiner, 1972; White, 1959). The expectancy of success and the value associated with engaging in a particular activity have long been identified as having important motivational consequences and are thought to be central in determining a broad range of human behavior (Atkinson, 1957; Atkinson, 1964; Wigfield et al., 2009). Though there are numerous theories of achievement motivation, this review highlights the expectancy-value framework of achievement motivation expectancy value theory for a number of reasons. The expectancy-value framework (Schunk, Pintrich, & Meece, 2008; Wigfield & Eccles, 2000) has been used extensively in educational research to understand how students determine the value of achievement contexts and make achievement related choices. Expectancy value theory emphasizes the importance of success and failure. It has been modeled to include constructs such as subjective value and affective memory which makes it well suited to incorporate theory and findings

from judgment and decision making and cognitive psychology. Expectancy-value theory is best represented by the model developed by Eccles and collaborators (Eccles, 1983, 2005; Eccles & Wigfield, 2002). In the model, achievement behavior is predicted by two components: students' expectations about whether they can or cannot succeed and the subjective value of the educational task.

Expectations of success relate to children's beliefs about their competence in a particular academic domain: "Can I do this task?" (Eccles-Parsons, 1983; Pintrich & Schunk, 1996; Schunk et al., 2008; Wigfield & Eccles, 2000). Students are unlikely to continue working on a task that they expect to fail in, even if they do find it useful (Schunk et al., 2008). Expectations of success are critical to the construct of self-efficacy, with positive achievement leading to increased efficacy and failure diminishing it. According to Bandura, a student's sense of self-efficacy is extremely predictive of future performance and influences activity choice, as well as persistence and the effort given to a particular task. Hackett and Betz (1989) found that students who scored high on math self-efficacy reported lower levels of math anxiety, higher levels of confidence and motivation and showed a greater tendency to see math as useful. All told, these reports suggest that expectations of success and feelings of competence can be enhanced when students have opportunities to succeed.

The value component of the expectancy value model (Eccles-Parsons, 1983; Eccles and Wigfield, 2002) relates to characteristics of the experience that answer the question: "Do I want to do this task, and why?" In the model, value is composed of several achievement value components, such as the importance of doing well at the task, the intrinsic or interest value of the task, the cost of doing the task, and the utility or usefulness of the task. According to the model, a student who expresses that math has no relevance in his life, has little utility value for the domain.

Achievement emotions are an important influence of expectancy-value. Achievement emotions are those emotions that are related to achievement activities or achievement outcomes (Pekrun, Elliot, & Maier, 2006; Pekrun, Goetz, Titz, & Perry, 2002). The model includes an affective memory construct which refers to the students' previous affective experiences with similar tasks (Schunk et al., 2008). In the model, affective memory is a social-cognitive construct and is an important driver of both expectancies and values. For example, recent conceptualizations of the model relate affective memory to socializing factors, such as pressure from teachers or parents to do well, and one's own interpretation of the experience (but see Schunk et al., 2008). Despite the importance of the affective memory construct to the model, and its potentially potent influence on behavior via expectancies and value, it has not been extensively examined. There are considerable questions about how affective memories influence expectancies and value, which the model considers the most proximal determinants of achievement behaviors (Gorges & Kandler, 2012; Pillemer, 2001; Schunk et al., 2008; Wigfield & Eccles, 2000). One such question, which the work reviewed here approaches, is how memory biases and irrational decision making processes following difficult experiences might impact values. Targeting these questions allows the affective memory construct in expectancy value theory, a major model of achievement motivation, to be more clearly defined and allows findings from decision making and cognitive research to inform the understanding of how students' memories guide their achievement behavior.

## 2. Bias in retrospective evaluations of prior experiences

Findings from cognitive psychology and decision making have long shown that when people are asked to evaluate their experiences their memories and judgments can be biased (e.g. Bjork,

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