



Is it all about value? Bringing back the expectancy component to the assessment of test-taking motivation

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ABSTRACT

We investigated test-taking motivation in a large-scale assessment context by applying expectancy-value theory as the framework most commonly used to conceptualize test-taking motivation. Specifically, our aim was to explore the complex relationship between expectancy, value, test-taking effort, and test performance using data from a large-scale educational assessment study of German ninth-graders. First, we established a measurement model of test-taking motivation including all aspects of this multidimensional construct. Second, we investigated the predictive power of different facets of test-taking motivation for test-taking effort and test performance. Factor analyses indicated that expectancy, value, and test-taking effort constitute distinguishable components of test-taking motivation. Subsequent latent regression analyses showed that the value component was a strong predictor of test-taking effort and that expectancy, value, and effort taken together explained over a quarter of the variance in mathematics scores. Expectancy and test-taking effort had the most pronounced effects on test performance. We conclude that a comprehensive model of test-taking motivation should include all three components, that is, expectancy, value, and test-taking effort. Implications for future research are discussed.

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1. Introduction

Expectancy-value theory is one of the most important conceptions of achievement motivation. The theory assumes that expectancies and values directly affect achievement behavior, such as test performance, as well as effort, choice, and persistence (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). The expectancy-value model is also the framework most commonly used to conceptualize test-taking motivation, which is a particular type of achievement motivation. However, although the expectancy component is assumed to be a better predictor of test performance than the value component (Schunk, Pintrich, & Meece, 2008), most research on test-taking motivation considers only the value component (Butler & Adams, 2007; Cole, Bergin, & Whittaker, 2008; Eklöf & Nyroos, 2013; Eklöf, Pavešić, & Grønmo, 2014; Swerdzewski, Harmes, & Finney, 2011; Wolf & Smith, 1995). Furthermore, the few investigations including both expectancy for success and value of the test often fail to consider test-taking effort, which is considered the main element in the definition of test-taking motivation (Asseburg, 2011; Freund & Holling, 2011; Freund, Kuhn, & Holling, 2011).

The aim of the present study was to investigate *both* components of expectancy-value theory and test-taking effort in a large-scale assessment context. Specifically, we examined the complex relationship

between all aspects of the test-taking motivation construct (including expectancy, value, and test-taking effort) and test performance using data from a large-scale educational assessment study of German ninth-graders. We pursued three objectives: a) establishing a measurement model including all aspects of test-taking motivation, b) predicting test-taking effort, and c) predicting test performance. Before defining our research questions in more detail, we describe the expectancy-value theory and provide an overview of the current state of research on test-taking motivation.

1.1. Expectancy-value theory as a framework for test-taking motivation

The expectancy-value theory provides a theoretical framework for test-taking motivation (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). Based on Atkinson's (1957, 1964) theory of achievement motivation, the main components of the expectancy-value theory – expectancy for success and the perceived value of a task – are assumed to affect achievement behavior, that is performance as well as effort, persistence, and the decision for (or against) taking on a task. The expectancies refer to the students' beliefs of how well they will perform, and therefore include the individual's perception of his or her own competence at a given task. The value component consists of four distinct aspects: attainment value (importance), intrinsic value (enjoyment), utility value (usefulness of the task), and cost (emotional cost or effort). The value aspects are assumed to explain performance-related decisions based on students' beliefs about how they might benefit from a task. By comparison, the expectancy component has been shown to be a stronger

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predictor of performance while the value component is more closely associated with persistence or choice than the expectancy component (Eccles & Wigfield, 2002; Schunk et al., 2008; Wigfield, 1994; Wigfield & Eccles, 2000). The classification of effort in the expectancy-value model of Eccles and colleagues is ambiguous. On the one hand, effort is defined as an outcome of both expectancy and value. On the other hand, it is associated with the cost aspect of the value component because cost is construed in terms of how much effort is needed to succeed (Eccles & Wigfield, 2002).

Test-taking motivation can be regarded as a special state equivalent of the trait-like achievement motivation and is defined as “the willingness to engage in working on test items and to invest effort and persistence in this undertaking” (Baumert & Demmrich, 2001, p. 441). The expectancy-value theory of achievement motivation provides an appropriate framework in the context of test-taking motivation because it is one way to explain the relationship between motivation and test performance in low-stakes assessments. Low-stakes assessments represent a special situation for the test-takers as their performance in such tests has no personal consequences for them. Therefore, one could ask why the students should perceive a low-stakes test as important or useful and why they should put forth effort to complete the test. Given the inherent low value of low-stakes tests the expectancy-value theory explicates why students report low levels of test-taking effort, and in turn, may have lower test performance than in high-stakes testing situations. Therefore, test-taking motivation is often assessed with questions about effort and importance of the test (Sundre, 2007). On a political level, however, such tests are high-stakes because they provide crucial information on the relative strengths and weaknesses of the educational system in a country (Stanat & Lüdtke, 2013).

In the context of expectancy-value theory, our conceptualization of test-taking motivation in the present paper is composed of three inter-related constructs: expectancy, value, and effort. Thus, test-taking effort is included in the expectancy-value model as a third main component besides expectancy and value. Effort is defined as “a student's engagement and expenditure of energy toward the goal of attaining the highest possible score on the test” (Wise & DeMars, 2005, p. 2) and constitutes an important construct because the students are asked to expend effort even though the test results have no immediate consequences for them. In line with Wigfield and Eccles (2000), we assume that effort is an outcome of expectancy and values and is related to test performance for the remainder of this article. Consequently, effort is part of the test-taking motivation construct and serves as a mediating variable at the same time.

1.2. Previous research on test-taking motivation

In this section we describe the current state of research with regard to the three components of test-taking motivation: expectancy, value, and effort. All studies described in the following, except Eklöf and Nyroos (2013), were undertaken in low-stakes contexts and explored whether test-taking motivation predicted test performance. First, we consider studies that assessed effort and value followed by studies that measured expectancy and value.

Most research on test-taking motivation considers test-taking effort and the value component (Thelk, Sundre, Horst, & Finney, 2009) but neglects expectancy for success, assuming that test-takers cannot conceive of ‘success’ in tests without any feedback or consequences (Cole et al., 2008). For instance, Baumert and Demmrich (2001) explored test-taking motivation in a pilot study of the first *Programme for International Student Assessment* (PISA) survey. In this study, self-reported effort and worry were the most powerful predictors of test performance and taken together explained 28% of the variance in mathematics achievement. The effects of the other motivational variables on test performance, that is, personal value of a successful test and the perceived usefulness of the test, were mediated by effort and worry. Eklöf and Nyroos (2013) investigated test-taking motivation of students in the first

Swedish National Test of 2009 assessing biology, chemistry, and physics. The stakes of this test were “semi-low” because teachers could use the test results as part of their student evaluations but this was not obligatory. The data showed a significant relationship between performance in science and test-taking effort ($r = .25$) as well as between test performance and different aspects of the value component, specifically, perceived importance of the test ($r = .20$) and test anxiety ($r = -.10$). Similar results were obtained for the Swedish TIMSS 2003 data, a typical low-stakes test (Eklöf, 2007). However, in a multiple regression of test performance on test-taking motivation, mathematical self-concept, and value of mathematics using TIMSS 2003 data, test-taking motivation did not significantly predict performance. A total of 31% of the variance in mathematics scores could be explained in the regression analysis, but this was largely due to individual differences in domain-specific perception of competence. Cole et al. (2008) explicitly focused on the value component in a study with undergraduate students in the following subjects: English, Math, Science, and Social studies. The study assessed three aspects of the value component (interest, usefulness, and importance of the test) and effort. Path analyses revealed a similar pattern of results for all subjects: Usefulness and importance of the test were strong predictors of effort (e.g., $R^2 = .26$ for mathematics) which, in turn, was an important predictor of test performance. The authors found that effort fully mediated the effect of importance and usefulness of the test on performance in mathematics. The aspects of the value component and effort taken together had a similarly strong effect on performance as the ACT exam score, a standardized test for college admission (Cole et al., 2008). Recent research supports the mediating role of test-taking effort: In a study by Zilberberg, Finney, Marsh, and Anderson (2014), perceived importance of the test was a significant predictor of test-taking effort which, in turn, significantly predicted test performance. Zilberberg and colleagues controlled for gender and quantitative ability which may explain the rather small magnitude of the indirect effect ($\beta = .09$). However, they did not consider the remaining three value aspects (i.e., intrinsic value, utility value, and cost) or the expectancy component.

Other studies considered both the expectancy and the value component but ignored test-taking effort. For instance, Asseburg (2011) explored the relationship between expectancy for success and perceived value in a low-stakes study with German ninth-graders. In this study, a large number of constructs was measured beyond expectancy and value (i.e., importance of the test) such as ability beliefs (i.e., self-concept and self-efficacy), hope of success, and perceived test performance. The expectancy component explained about 10% of the variance in actual mathematics performance whereas the value component was not a significant predictor of test performance. As a consequence, Asseburg (2011) recommended that an ‘expectancy-model’ of test-taking motivation is adequate for low-stakes test situations. However, test-taking effort was not measured. Freund et al. (2011) assessed motivation of university and secondary school students before taking an abstract reasoning test. The authors used the Questionnaire on Current Motivation (QCM) which captures the expectancy component with the scale ‘probability of success’ and the value component with the scales ‘challenge’, ‘interest’, and ‘anxiety’ (Rheinberg, Vollmeyer, & Burns, 2001). Interest was the only significant predictor of test performance; the effect of probability of success failed to reach statistical significance ($p = .07$). Taken together, all motivation-related scales explained 14% of the variance in the test scores (Freund et al., 2011). These results were confirmed by Freund and Holling (2011) who examined the relationship between expectancy, value, and test performance. They also administered the QCM before the test and found that interest and perceived probability of success significantly predicted scores on a figural reasoning test after accounting for individual differences in general mental ability. Altogether, test-taking motivation and general mental ability explained 32% of the variance in the test scores. In addition, they conducted a retest 7 to 14 days after the first measurement. Current motivation was assessed again before the students took the

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