Learning and Individual Differences 21 (2011) 191–195

Contents lists available at ScienceDirect

Learning and Individual Differences

journal homepage: www.elsevier.com/locate/lindif

Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement

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ARTICLE INFO

Article history:
Received 25 June 2009
Received in revised form 23 November 2010
Accepted 10 January 2011

Keywords:
Motives
Self-efficacy
Goal orientation
Learning strategies
Academic achievement

ABSTRACT

High school grade point average (HSGPA), self-efficacy, goal orientations, learning strategies, and examination grade were measured in a sample of Norwegian undergraduate psychology students in order to investigate motives and strategies as mediators between preceding and subsequent academic achievement. Correlation analysis showed strong relations between all of the motivational variables (self-efficacy/goal orientations) and deep/surface learning strategies. A path analysis showed a structural relation between these variables, and that preceding academic achievement primarily predicted self-efficacy and subsequent achievement (examination grade). Separate mediator analyses showed several mediator effects between these variables that are comparable to previous research findings and provides theoretical integration between classes of motivational constructs and learning strategy variables.

Motives and learning strategies are important for students' learning, and previous research has focused on the role of academic self-efficacy (Bong, 2001), goal orientations (Elliot & Church, 1997) and the deep/surface dichotomy of learning strategies (cf. Entwistle & Smith, 2002). By relating self-efficacy, goal orientations and learning strategies to both preceding and subsequent academic achievement, it is possible to further investigate the structural relation between these variables. This may provide more knowledge on the antecedents and consequences of motives and learning strategies, investigation of mediator effects between preceding and subsequent academic achievement, as well as a theoretical integration of different variables which often have been investigated separately in previous research.

A meta-analysis of the relationship between perceived self-efficacy with respect to academic subjects and achievements showed that self-efficacy appraisals make a positive contribution to academic achievements (Multon, Brown, & Lent, 1991). Previous research has also shown that expectancy of future grades is both based on previous academic achievement and related to actual subsequent achievement (Vollmer, 1984).

While self-efficacy indicates the level of expected performance and learning, goal orientation represents an integrated pattern of beliefs that leads to "different ways of approaching, engaging in, and responding to achievement situations" (Ames, 1992, p. 261) that influence motivational, cognitive, and behavioral outcomes (Pintrich & Schunck, 2002). A mastery goal implies the development of competence and task mastery. In contrast, performance-approach goal is characterized by attaining competence relative to others, while students with a high level of performance-avoidance goal try to avoid appearing incompetent (Elliot & McGregor, 1999; Harackiewicz, Barron, & Elliot, 1998).

A review of more than 90 studies on the relation between achievement goals and academic achievement showed that both mastery and performance-approach goals had a similar relation with academic achievement, with a positive relation in about 40% of the effects reported, and a negative relation about 5% of the effects reported (Linnenbrink-Garcia, Tyson, & Patall, 2008). Pekrun, Elliot and Maier (2009) concluded that mastery goals are often unrelated (or less strongly related) to performance when all goals are examined together as simultaneous predictors.

Self-efficacy is usually positively correlated with mastery goal orientation (Duda & Nicholls, 1992; Kaplan & Midgley, 1997), sometimes positively correlated with performance-approach (Wolters et al., 1996), and often negatively correlated with performance-avoidance goal orientation (Middleton & Midgley, 1997; Skaalvik, 1997). Elliot and Church (1997) maintained that self-efficacy is an antecedent of achievement goals which affect achievement behavior indirectly, via achievement goal adoption. For example, previous research has shown that self-efficacy predicts both mastery- and performance-approach goals, but not performance-avoidance goals (Elliot, 1999; Elliot & Church, 1997; Greene, Miller, Crowson, Duke, & Akey, 2004). Thus, competence expectancy may function as a general motivating factor which produces achievement outcomes via specific goals (Elliot & Thrash, 2001).

Previous research has shown that both self-efficacy and goal orientations predict achievement relevant outcomes, such as deep/surface learning strategies and examination grade (Greene et al., 2004; Liem et al., 2008; Walker, Greene, & Mansell, 2006). Deep

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doi:10.1016/j.lindif.2011.01.003

strategies implies use of evidence and relating of ideas, while a surface strategies is defined by reproduction of the learning material by engaging in rote learning (Diseth & Martinsen, 2003; Entwistle, 1988). Both mastery and performance-approach have been linked with effective learning strategies, such as the use of cognitive strategies, and the use of deeper processing (Phan, 2009; Pintrich & Schunck, 2002). Furthermore, Sins, van Jolingen, Savelsberg and van Hout-Volters (2008) found that a deep learning strategy mediated between self-efficacy/mastery goal and academic achievement. Similarly, Fenollar, Román, and Cuestas (2007) found that deep learning strategies mediated the relationship between mastery goals and academic performance.

Finally, it is also relevant to consider the predictive power of previous mastery experiences. For example, prior academic achievement is considered to be an important source of expectancy beliefs (Pintrich & Schunck, 2002) and academic self-perceptions (e.g., Ferla et al., 2009; Guay, Marsh, & Boivin, 2003). The assumption that self-efficacy is a predictor of goal orientations (Elliot & Church, 1997) may be supported if self-efficacy rather than goal orientations are more consistently related to prior academic performance.

In sum, theoretical assumptions and previous research findings provide a basis for the investigation of a structural model and the following hypotheses are put forward:

1. The abovementioned variables may be accounted for by a model as follows: Preceding achievement → self-efficacy → goal orientations → learning strategies → subsequent achievement.
2. Preceding achievement will predict self-efficacy and subsequent achievement, but not goal orientation or learning strategies.
3. Self-efficacy will at least partially mediate the effect of preceding achievement on subsequent achievement.
4. Self-efficacy will predict mastery and performance-approach goal orientation.
5. Approach motives (self-efficacy, mastery and performance-approach) will predict deep learning strategies while avoidance motives (performance-avoidance goals) will predict surface learning strategies.
6. Some of the goal orientation and/or learning strategy variables will at least partially mediate the effect of self-efficacy on examination grade.
7. Deep and/or surface learning strategies will at least partially mediate the effect of goal orientation on examination grade.

1. Method

1.1. Participants and context

Of the 211 students who returned the inventory (nearly all of the students who attended the lectures), 10 failed to report their social security number, which was necessary in order to obtain the subsequent examination grade from the study administration (see below for explanation). In addition, 24 students did not take the exam. Thus, the final sample consisted of 177 (36 male and 141 female) students with a mean age of 21.21 years (range 19–39 years, st.dev. 3.08). These students were enrolled in an introductory psychology course (PSYK102) at a Norwegian university, which comprises the topics of personality psychology, social psychology and research methods in psychology.

1.2. Procedure

The students were given specific time to complete an inventory (described below) during one of the final lectures approximately one month before the exam. At this point of the semester, they had sufficient study experience to assess how they were motivated and utilized learning strategies in the PSYK102 course. It took about 15 min to administer the inventory. The course instructor was present during this administration.

1.3. Statistical analyses

Confirmatory factor analysis was performed to test the adequacy of the measurement models (cf. Marsh, Byrne, & Yeung, 1999), and correlation analysis was utilized to explore the bi-variate relations (SPSS, 2006). A path analysis was performed by means of the AMOS 16.0 (Arbuckle, 2007) in order to produce a multivariate model and evaluate goodness-of-fit by means of chi-square (χ^2)/*df* ratio, RMSEA (Root Mean Square Error of Approximation), and CFI (cf. Byrne, 2001).

1.4. Measures

1.4.1. HSGPA

Previous academic performance was assessed by asking the students to report their high school grade point average (HSGPA). Self-reported and transcript-based GPA has shown a correlation of .85 for university students in previous research (Schuman et al., 1985), indicating good reliability. The range of grades was the same for all of the participants (range: 1–6).

1.4.2. Examination grade

The students sat a six-hour exam, and they had to answer one of two essay-like questions for each of the three topics. In addition, the students answered a 90-item multiple choice (MC) test. Because the students in the present study also reported their social security number on the questionnaire, along with a signed consent, it was possible to obtain the final examination grade from the student administration office after the committees had graded the exams. The exam grades (A–F) were converted to numbers for the analysis, such that higher numbers reflected better grades (A = 6, B = 5 … F = 1).

1.4.3. Self-efficacy

Five items were selected on basis of face validity from the self-efficacy subscale of the MSLQ (Motivated Strategies for Learning Questionnaire) by Pintrich and De Groot (1990). An example item is as follows: 1. I expect to do very well in this subject. The participants indicated their relative agreement or disagreement with the statements on a 5-point scale (5—"agree", 1—"disagree"). A confirmatory factor analysis (CFA) indicated good fit for a one-factor solution (chi-square [χ^2] = 6.22, degrees of freedom [*df*] = 3, χ^2/*df* ratio = 2.09, RMSEA = .07, and CFI = 0.99).

1.4.4. Goal orientation

Items were adapted from an inventory developed by Elliot and Church (1997). The original inventory consists of 18 items which measure *performance-approach*, *mastery* and *performance-avoidance* goal orientations (6 items for each factor). For the present study, nine of the items which had the strongest factor loadings in Elliot and Church's original research were selected in order to facilitate data collection. The participants indicated their relative agreement or disagreement with the statements on a 5-point scale (5—"agree", 1—"disagree"). A CFA indicated good fit for a three-factor solution (chi-square [χ^2] = 36.68, degrees of freedom [*df*] = 23, χ^2/*df* ratio = 1.60, RMSEA = .05, and CFI = .98).

1.4.5. Learning strategies

Students' deep and surface learning strategies were measured by means of eight items from an abbreviated version of the Approaches and Study Skills Inventory for Students—ASSIST (Entwistle, 1997). These items were taken from a version of this inventory which was translated using a standard translation-back translation procedure (Diseth, 2001). The participants were instructed to reply according to how they actually study in this particular course, and they indicated