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Reciprocal modelling of Japanese university students' regulation strategies and motivational deficits for studying

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ABSTRACT

While researchers have proposed a reciprocal relationship between why and how students study, scant research has effectively tested this model. The current study tests this model with first-year students, after one month at university and again in the final month of their first year. Participating students ($n = 933$) enrolled across 6 faculties were studying at one private Japanese university in Western Japan. All students reported their motivational deficits for studying and their regulation strategies at two time points. Longitudinal structural equation modelling, which incorporated gender as a predictor and Grade Point Average as an outcome, was undertaken. Modelling identified: 1) self-regulation and lack of (but not external) regulation as important predictors of future motivations; 2) task valuation and effort beliefs as key determinants of future self-regulation; 3) ability beliefs as the key predictor of future achievement. Implications for theory and practice are discussed.

1. Introduction

Despite widespread concern regarding student motivation in a range of educational contexts in Western (e.g. Eccles, Lord, & Midgley, 1991) and Asian countries such as Japan (e.g. Amano & Poole, 2005), educational research regarding why students do *not* want to study is relatively rare. Rather than examining the nature and role of student reasons for not wanting to study, i.e. their motivational deficits, most studies of motivation in educational settings focus on why students *do* study, and the effects of these reasons on learning strategies and outcomes. The current study addresses this gap by investigating students' motivational deficits and study strategies from a longitudinal reciprocal modelling perspective.

1.1. Motivated study strategies

Research has demonstrated that how students study is an important determinant of their learning outcomes (e.g., Vrugt & Oort, 2008). Over time, the study strategies students use can have positive and/or negative effects on distal achievement outcomes. Consistent with past research in this field (e.g., Hadwin & Winne, 1996; Winne & Hadwin, 1998), the current research examines strategies encompassing the direction, organization and enactment of learning. According to Winne and Hadwin (1998), studying involves some control over the learning environment and results in opportunities for cognitive processing. This description corresponds with definitions of self-regulation, which broadly suggest that self-regulation consists of three essential building blocks: motivation, independence, and metacognition (Zimmerman, 1986).

Vermunt's model of regulation for students' studies (Vermunt, 1988; Vermunt & van Rijswijk, 1988) encompasses three key regulation strategies: self-regulation, external regulation, and lack of regulation. Within Vermunt's model, self-regulation is conceptualized as students acting as their own teachers in the direction of their learning. External regulation occurs when the teacher or study materials regulate students' studies. Lack of regulation in this model occurs when neither the environment nor the student sufficiently regulates the learning process (Vermunt & van Rijswijk, 1988).

Relative to secondary education, tertiary education demands a substantial amount of independent study. In the transition to tertiary education, external regulation is substantially reduced, and students are expected to be more self-regulated. While the role of teaching within this transition has garnered considerable interest (e.g., Vermunt & Verloop, 1999), the potential effect of students' motivational deficits has not been examined. For example, students may fail to study or may study ineffectively, particularly during their first year of university. Low ability, value and effort beliefs (Legault, Green-Demers, & Pelletier, 2006) are three key reasons why students may fail to regulate their motivation and therefore their studies.

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1.2. Motivational deficits

Following Vallerand et al.'s (1992) initial quantitative measurement of amotivation, a multi-dimensional inventory aimed at measuring individual amotivation with regard to environmental behavior was constructed by Pelletier, Dion, Tucson, and Green-Demers (1999). Legault et al. (2006) adapted this measure to construct an inventory for high school students, the Academic Amotivation Inventory (AAI). The AAI consisted of four latent constructs (task characteristics, task valuation, ability beliefs, and effort beliefs). These motivational variables, in addition to their relationship with Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), also have a longstanding theoretical and empirical foundation within theories that have examined the relationship between motivational deficits and behavior (e.g., Attribution Theory and learned helplessness; Abramson, Seligman, & Teasdale, 1978; Weiner, 1985, 2010).

Although considerable theoretical and empirical research has expanded our understanding of the nature and measurement properties of amotivation, much remains to be learnt. The majority of amotivation-related research in academic contexts has examined relationships between a broad lack of motivation and extreme outcomes such as student dropout (e.g., Vallerand, Fortier, & Guay, 1997). However, the effects of amotivation on more common achievement-related outcomes, and the strategies students use to achieve them remains under-researched.

Within SDT, perceptions of ability and value, in particular, are hypothesized as playing a broad role in moving individuals along SDT's continuum of regulated motivation, ranging from lack of regulation, to external-regulation and finally increasing internal regulation. As such, it is reasonable to expect these dimensions of amotivation will predict how students report regulating their studies.

1.3. Motivational deficits at university

As student numbers have grown both in number and diversity, many of the problems educators classically see as related to secondary students are increasingly being observed in many university contexts (McKenzie & Schweitzer, 2001). Japanese higher education was one of the first to reach massification, which is when >50% of the potential 18-year-old population continues from secondary to higher education (Trow, 1974), making Japanese higher education an interesting context for research into these changing student populations.

Transition from high school to university demand considerable social and academic adjustment students need to make during their first year at university (Briggs, Clark, & Hall, 2012; Pascarella, Pierson, Wolniak, & Terenzini, 2004). First year at university is the beginning of students' final formal classroom education, an education upon which many students' futures depend (Pascarella & Terenzini, 2005). It is relevant therefore that we examine the predictive effect of students' initial motivational deficits and study strategies on those same constructs and achievement after one year at university.

1.4. The role of sex (gender) within motivation, strategy and achievement

Research has demonstrated the effect that gender (used across the current study to refer to the biological sex of individuals) can have on key educational predictors, processes and outcomes. Studies have consistently observed subject-specific gender effects on key motivations like interest and ability beliefs (Meece, Glienke, & Burg, 2006). Researchers have also found female students to exhibit greater self-discipline (Duckworth & Seligman, 2006) and behavioral regulation (Weis, Heikamp, & Trommsdorff, 2013). Within higher education (Clark & Grandy, 1984; Mau & Lynn, 2001), and across formal education broadly (Gibbs, Ferguson, & Horwood, 2008; Voyer & Voyer, 2014), female students regularly outperform their male counterparts. Gender is therefore both an essential control variable to be accounted for and at the same time a poorly understood element of the educational puzzle (for an in-depth discussion of this issue see Voyer & Voyer, 2014).

1.5. Modelling and benchmarking achievement

When aiming to model latent variables such as strategies and motivations within education, connections to relevant observed outcomes are essential components. At university, Grade Point Average (GPA) is the most comprehensive and widely utilised measure of observable achievement. A recent meta-analysis (Richardson, Abraham, & Bond, 2012) has presented useful benchmarks for the relationships between a wide range of latent variables and GPA. Furthermore, Richardson et al. have called for "prospective studies testing multivariate models with large samples" (p. 376) and following students across their academic careers. The current study aims to contribute to a better understanding of the first-year study experience by examining the reciprocal interplay between strategies and motivation.

1.6. Reciprocal models of strategies and motivation

Motivated strategy theoreticians have consistently modeled the relationship between the many whys and hows of studying as reciprocal (e.g., Borkowski, Carr, Rellinger, & Pressley, 1990; Borkowski, Chan, & Muthukrishna, 2000; Zusho, Pintrich, & Coppola, 2003). Due to the research design demands, effective tests of this hypothesized relationship have been rare. Three minimum criteria are necessary to effectively assess the predictive validity of constructs (see Tracz, 1992): temporal sequencing, association among variables, and control. Experimental research methods are the most effective means of meeting these criteria but lack the ecological components necessary to test some questions. For regulation strategies that occur in context and over time, the controlled conditions of an experiment are not optimal. The alternative approach to examining these questions in context is a longitudinal research design. A cross-lagged simultaneous regression model is an effective means of utilising the time-based precedence of a longitudinal design (Huck, Cormier, & Bounds, 1974). To effectively test such a model, a considerable sample size is necessary. Furthermore, analysis should rely on latent variables that are error free (Pedhazur, 1982) within a simultaneous regression framework to enable an overall model test. Berger and Karabenick (2011) undertook such an empirical test of the reciprocal predictive relationship of motivation and strategies, concluding that, contrary to theory, a uni-directional relationship existed: motivation predicted future learning strategies but not the reverse. There is, however, reason to retest the potential reciprocal relationship between motivation and strategy. As Berger and Karabenick pointed out, their research design, although longitudinal, was of short duration (12 weeks), which may not have been long enough for clear longitudinal effects to be apparent. It is possible that the young age of the participants (grade 9) and the relatively small sample size (n = 286) may also have played a role in their non-significant results. The current study was conducted with a larger sample of university students and utilised latent variables across a lag of nine months between data collections. The current study thereby aimed to retest the longstanding theoretical assertion that motivation and motivated strategies are reciprocally connected over time.

The current study was undertaken in the non-compulsory context of higher education. Students are therefore studying where and what they choose (at least at the degree level). In such an autonomous context, a straightforward approach to understanding students' study strategies might be through why students are not motivated to engage with their studies—rather than why students are. To this end, the current research examined the relationship between why students lack motivation to study and their study strategies across their critical first year at university.