



Choosing between what you want now and what you want most: Self-control explains academic achievement beyond cognitive ability[☆]



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ABSTRACT

Achieving a university degree is a demanding long-term goal, and students often show varying levels of academic achievement despite similar intellectual abilities. In order to help students, researchers thereby need to understand the origins of these individual differences. However, it remains unclear whether self-control is important for students' academic achievement beyond their general cognitive ability. To answer this question, $N = 150$ German university students completed a measure of general cognitive ability as well as a German translation of the Brief Self-Control Scale. Grade point average (GPA) served as an objective indicator of academic achievement, complemented by personal ratings as a measure of subjective academic achievement (SAA). Both cognitive ability and self-control explained substantial amounts of variance in GPA; however, only self-control accounted for variance in SAA. The study's key finding was that self-control indeed contributed to explaining GPA and SAA, even when cognitive ability was controlled for. On the basis of these results, we argue that self-control holds important explanatory value for both objective and subjective academic achievement, and we discuss the results' practical relevance with regard to student success at university.

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1. Introduction

Since the earliest attempts to measure cognitive ability (e.g., Binet and Simon (1916)), cognitive ability has usually been considered to be the primary factor for determining academic achievement. However, more recent research has suggested that cognitive ability does not appear to be enough when individuals strive for a degree in higher education (e.g., Busato et al. (2000) and Richardson et al. (2012)). Despite possessing adequate levels of cognitive ability, many university students struggle to persist in working toward their degree (Day, Mensink, & O'Sullivan, 2000). Next to being cognitively able to cope with lectures, university students also need to learn study habits for a new academic environment that requires substantially more self-control¹ than high school (Parker, Summerfeldt, Hogan, & Majeski, 2004). They must learn to function as independent adults who will make the right choices rather than give in to leisure-time activities that are more appealing than studying

at any given moment (Steel, 2007)—a widespread problem among students (Day et al., 2000).

To date, however, only a relatively small number of studies have investigated the role of self-control in university success (De Ridder et al., 2012). Moreover, no published studies have investigated the extent to which self-control is related to academic achievement at the university level when individual differences in cognitive abilities are controlled for. This is the question that we addressed in this study. More specifically, we aimed to examine whether self-control could incrementally explain academic achievement above and beyond cognitive ability in a heterogeneous sample of German university students.

2. Academic achievement at university

Grade point average (GPA) is the most commonly used indicator of academic achievement (Richardson et al., 2012) as it reflects a multitude of course assessments throughout a student's academic journey, represents an objective and reliable measure (Bacon & Bean, 2006), and is economical in terms of data collection. GPA has been shown to be important for students' later professional careers (Neisser et al., 1996) and later occupational status (Strenze, 2007).

However, several researchers (e.g., Trost (1985)) have questioned the psychometric quality of GPA because it is strongly related to demographic variables such as socioeconomic status, the field of study, and the referential frame for grading. Moreover, grade inflation—very good grades becoming more and more common—has been observed

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¹ In the present paper, we consistently use the term self-control. However, it should be noted that other researchers use other terms that are close in meaning to self-control such as impulse control, or willpower. Current conceptualizations of emotional intelligence (Goleman, 1996; Mayer et al., 2001) also include competencies that are close to self-control. Thus, many findings described here may be applicable to these terms as well.

in tertiary education. Johnson (2003), and Didier et al. (2006) showed that grading varies substantially across institutions.

An alternative to relying solely on GPA as an indicator of students' academic achievement lies in students' subjective evaluations of their academic achievement. Subjective success is already a well-established criterion for career success (for an overview, see Ng et al. (2005)), and even though it has been neglected in that domain so far, it might serve a similar function in the assessment of academic achievement (Stadler et al., 2015). Subjective success refers to how individuals judge their own achievements in comparison with their personal goals or their colleagues' achievements (Ng et al., 2005); therefore, it is closely related to objective measures but also includes a personal evaluation. This approach is valuable in the academic context because a student's personal frame of reference will determine how that student perceives a particular grade (Komarraju & Nadler, 2013). Thus, the same objective GPA may be regarded very differently by different students and will hence result in different consequences. The fact that about two thirds of students drop out of universities for subjective reasons despite being objectively capable of succeeding (Ulriksen et al., 2010) demonstrates the importance of considering subjective success as an additional measure of academic achievement. Correlations between students' subjective estimates of their academic success and their objective grades have correspondingly been found to be strong but far from perfect (Kornilova et al., 2009).

Regardless of the definition of academic achievement, however, the question of why some students are more successful at university than others remains. In the following section, we will outline how both cognitive ability and self-control contribute to university students' academic achievement.

3. Cognitive ability and academic achievement

Cognitive ability is one of the most well-researched and established predictors of academic achievement today (Jensen, 1998). However, although cognitive ability certainly does influence the academic achievement of university students (Richardson et al., 2012), there is quite a bit of deviation in effect sizes (e.g., Formazin, Schroeder, Köller, Wilhelm, and Westmayer (2015)).

Meta-analyses on the psychological correlates of university students' academic achievement have consistently shown small to medium-sized correlations between cognitive ability and academic achievement. Richardson et al. (2012) reported a corrected average correlation of $\rho = .21$ (80% CI [.08, .34]). Thus, cognitive ability accounts for only 4% to 5% of the variance in university students' academic achievement. This value most likely underestimates the true relation between students' cognitive abilities and academic achievement due to a restriction in the variance of university students' levels of cognitive ability (Formazin et al., 2015). Correspondingly, tests of cognitive ability that are specifically designed for the selection of university students in terms of content and difficulty have shown considerably higher correlations with academic achievement (Hell, Trapmann, & Schuler, 2008). Still, a large part of the variance in students' academic achievement cannot be accounted for by differences in cognitive ability and thus calls for research on the relations between academic achievement and noncognitive constructs such as self-control.

4. Self-control

Baumeister et al. (2007) define self-control as the capacity to voluntarily control one's automatic responses to act in ways that foster the accomplishment of long-term goals with regard to one's values and standards. Self-control is sometimes also referred to as "self-regulation, self-discipline, willpower, effortful control, ego strength, and inhibitory control" (Duckworth & Kern, 2011, p. 2). Thus, self-control is considered a dual system with "quick, involuntary, and often consummatory impulses [opposing] the control of these impulses by deliberate, volitional processes" (Duckworth & Kern, 2011, p. 5) that is central to the

functioning of the self (e.g., Carver et al. (2009) and Hofmann et al. (2009)). As the definitions of self-control in research are heterogeneous, self-control has been operationalized with a great variety of different measures, such as questionnaires, executive function tasks, and delay of gratification tasks (Duckworth & Kern, 2011).

Despite the heterogeneous definitions and ways of operationalizing self-control in research, self-control was found to play an important role in an impressive range of positive, socially desirable behaviors and educational outcomes (De Ridder et al., 2012). Students need to concentrate on their work despite the presence of promising short-term temptations in order to persist in working toward their long-term goal of an academic degree. Correspondingly, measures of self-control in high-school students explain variance in school absences, hours spent doing homework, hours spent watching TV, as well as the time of day a student starts homework (Duckworth & Seligman, 2005). In a longitudinal study of 140 eighth graders (Duckworth & Seligman, 2005), self-control was measured with self-report questionnaires, ratings from parents and teachers, and a behavioral assessment and then related to later high-school GPA and other measures of academic achievement. Self-control was found to explain 30.2% to 44.9% of the variance in high-school GPA, a finding that was supported by a replication of the study with 164 eighth graders (Duckworth & Seligman, 2005).

However, some of the strongest effects of self-control were found in the domain of higher education (De Ridder et al., 2012). This is no surprise as university students are required to budget their own time to a substantially larger degree than is required of high-school students (e.g., Parker et al. (2004)). University students scoring high on self-control measures procrastinate less (Steel, 2007) and get tasks done on time as they manage their study time well (Misra & McKean, 2000). They do not let free-time activities or emotional distractions keep them from doing their work (Tangney et al., 2004). Regarding university success, self-control accounted for 10.2% to 15.2% of the variance in GPA in a sample of 351 university students (Tangney et al., 2004). A second study by Tangney et al. (2004) of 255 university students yielded slightly smaller effects ($r = .19$ to $.23$, $p < .01$). Wolfe and Johnson (1995) found that self-control explained 9% ($p < .01$) of the variance in university GPA beyond high school GPA ($R^2 = 19\%$, $p < .01$) in a sample of 201 psychology students. A meta-analysis conducted by De Ridder et al. (2012) illustrated that self-control was moderately related to university and work performance, accounting for approximately 13% of the variance. Thus, it seems that self-control indeed holds explanatory value in academic achievement, but so far, it is unclear how this finding is validity related to other constructs.

In summary, self-control plays an important role in a wide range of human behaviors, one of the most important being academic performance (De Ridder et al., 2012). Whereas several studies have found that university students' academic achievement and self-control are moderately correlated (for a summary see De Ridder et al. (2012)), none of them controlled for individual differences in cognitive abilities when computing this effect. Therefore, in the current study, we investigated whether self-control would offer incremental validity over and above cognitive ability in predicting university students' academic achievement.

5. Hypotheses

On the basis of the theoretical findings and considerations presented above, we deduced several hypotheses. As cognitive ability is so well-established as a predictor of academic achievement (e.g., Formazin et al. (2015)), we hypothesized that cognitive ability would explain variance in university students' objective and subjective academic achievement in the present study as well.

However, in recent research, there has been a tendency to move beyond the study of cognitive abilities as predictors of academic achievement and to investigate noncognitive capacities instead (e.g., Chamorro-Premuzic and Furnham (2008); Lounsbury et al. (2003); and Poropat

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