Beyond level of self-esteem: exploring the interplay of level, stability, and contingency of self-esteem, mediating factors, and academic achievement

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Abstract

Self-esteem plays a decisive role for students in achievement situations. However, it is still unclear how different self-esteem facets and their interactions influence academic achievement and which psychological mechanisms mediate these relationships. In Study 1, we investigated self-handicapping and effort-management as mediators of the effects of self-esteem facets on academic Study 2 achievement in a sample of $N=600$ university students, while in we examined test anxiety as mediating variable in a sample of $N=1052$ school students. Path analyses revealed various relations between self-esteem facets, learning strategies, test anxiety, and academic achievement. Moreover, effort-management and test anxiety were identified as meaningful mediators of the effects of self-esteem facets. Implications for further research and for educational practice are discussed.

Keywords Self-esteem · Contingent self-esteem · Self-esteem stability · Test anxiety · Academic achievement

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1 Introduction

Self-esteem is defined as the evaluation of and the resulting attitude towards oneself (Rosenberg 1965). It has been found to have a decisive influence on one's behavior, experience, thoughts, and emotions (Kernis 2003, 2005). Numerous studies across different disciplines of psychology have explored the effects of self-esteem on various outcomes (e.g., Orth et al. 2014; Pyszczynski et al. 2004; Rice et al. 1998). In the past, researchers considered high levels of self-esteem as something absolutely positive (e.g., Baumeister et al. 1993). High self-esteem was associated with various positive consequences such as satisfaction with life (Diener and Diener 1995) and academic success (Bowles 1999). In contrast, low self-esteem was predominantly linked to negative consequences such as academic failure, depression, and social problems (e.g., Crocker and Park 2004; DeWit et al. 2000). However, findings from a number of studies did not fit in this clear-cut dichotomy, showing for instance that self-esteem is essentially unrelated to aggression and that it is not relevant for predicting the use of alcohol and other drugs (for an overview see Baumeister et al. 2003). Moreover, most of this research lacks a convincing theoretical rationale with regard to psychological mechanisms through which self-esteem is supposed to affect important outcome variables. Therefore, although the relevance of self-esteem for academic performance is universally acknowledged (e.g., Beane et al. 1980; Valentine et al. 2004; Wylie 1979), we still know little about which psychological factors mediate the relationship between self-esteem and academic achievement.

Within the last two decades, researchers have responded to the heterogeneous findings of studies on level of self-esteem (e.g., Baumeister et al. 2003) by adopting a broader approach to self-esteem. This broader approach, particularly including stability and contingency as further relevant facets of self-esteem (e.g., Crocker and Wolfe 2001; Kernis 2003), has produced more homogeneous results and has also led to refined causal assumptions regarding the effects of self-esteem on important life outcomes. Therefore, in line with more current research, we propose that a multidimensional view of self-esteem—i.e. including additional facets of self-esteem—allows for more convincing explanations of causal relations between self-esteem and academic performance. The aim of this article is to examine the effects of level, stability, and contingency of self-esteem as well as their interactions on academic achievement. We also seek to investigate potential mediators of this relationship, namely test anxiety, effort management, and self-handicapping.

1.1 Self-esteem level, stability, and contingency

Global self-esteem, an individual's overall evaluation of the self, reflects a person's appraisal of his or her value, a tendency to feelings of self-liking, self-worth, and self-acceptance. Global self-esteem is different from domain-specific self-esteem, which is typically defined as evaluations of specific abilities or qualities. This evaluation can be more or less negative ("low self-esteem") or positive ("high self-esteem") and most researchers have focused almost exclusively on this *level of*

self-esteem. However, the traditional view of self-esteem seems outdated suggesting that there is “more to self-esteem than whether it is high or low” (Kernis et al. 1993, p. 1190).

One of the constructs that have been successfully used to disentangle the link between self-esteem level and outcome variables is *self-esteem instability* (Zeigler-Hill et al. 2014; since both terms—stability and instability of self-esteem—are used in the literature, we use these terms interchangeably in our article). Stability or instability of self-esteem is the extent of perceived fluctuations as well as robustness of a person’s feelings of self-worth (cf. Kernis 2005; Schöne and Stiensmeier-Pelster 2016), with “fluctuations” referring to temporal stability and “robustness” referring to the ability to return to the initial condition easily and undamaged. We focus on *perceived* fluctuation and fragility instead of the *actual* changes of self-esteem, because we believe that perceiving self-esteem as fragile and fluctuating over time is a more important and more direct influence than showing different self-esteem levels at different points in time. Stable, secure self-esteem is assumed to be associated with the absence of negative emotions, while emotions associated with unstable, fragile self-esteem lie in the field of threat, insecurity, anxiety, and generally increased sensitivity for psychical vulnerability. In conjunction with self-esteem instability, high self-esteem leads to very different outcomes, suggesting two subtypes of high self-esteem (secure vs. fragile; for a review see Jordan and Zeigler-Hill 2013). In an early study by Kernis et al. (1991), the relationship between level of self-esteem and depression was moderated by stability of self-esteem. Self-esteem instability was also found to moderate the link between self-esteem level and aggression (Zeigler-Hill et al. 2014). Self-esteem instability is, however, in part a consequence of another important facet, namely contingent self-esteem. Because none of the studies mentioned above included contingent self-esteem, it cannot be ruled out whether the above mentioned relations are in fact driven by contingent self-esteem.

Contingent self-esteem refers to the degree to which one’s global self-esteem is dependent on meeting particular conditions (Crocker and Wolfe 2001; Schöne and Stiensmeier-Pelster 2016). Unlike unconditional “true” self-esteem, contingent self-esteem does not exist in itself, but, in the view of a person with contingent self-esteem, one’s own value must be earned, which leads to self-validating behavior and to “he costly pursuit of self-worth” (Crocker and Park 2004). Contingency of self-esteem has been conceptualized in two differing ways in the literature. First, according to Kernis (2003), individuals are assumed to have a globally contingent self-esteem where self-esteem may be more or less generally dependent on external outcomes. The second approach, a domain-specific approach proposed by Crocker and colleagues (Crocker et al. 2003), has been found to represent the structure of contingent self-esteem best, yet without invalidating the global approach or a hierarchical approach (Schwinger et al. 2017). Empirically established domains in which people base their self-esteem on meeting their individual standards are, for example, physical appearance, academic competence, or virtue (Crocker et al. 2003). A number of studies reported domain-specific self-esteem contingencies to be related to diverse psychological outcomes such as self-regulation (Crocker et al. 2006) and depressive symptoms (Schöne and Stiensmeier-Pelster 2016; Schöne et al. 2015; Wouters et al. 2013). However, little is known about the specific psychological mechanisms through which contingent self-esteem

affects students' academic adjustment and achievement. Overall, the yet available literature on the interactions of self-esteem level, stability, and contingency makes it seem reasonable to examine all three self-esteem facets simultaneously in order to better understand their joint effects in learning and performance contexts.

1.2 Self-esteem facets and academic performance

Academic performance is regarded as the central outcome of learning (Boyle et al. 2003; Hattie 2009; Pintrich and De Groot 1990). Many studies provide evidence that self-esteem or related concepts of the self (e.g., ability self-concept, self-belief) are related to school performance and the relevance of self-esteem for school grades is generally accepted (e.g., Beane et al. 1980; Wiggins et al. 1994). Results show consistently small to moderate positive correlations ($r=0.20 - 0.40$) between self-esteem or related constructs and academic performance (e.g., Rosenberg 1965; Valentine et al. 2004).

Given the amount and variety of research on this topic, it is remarkable that most studies in the field have relied on the exclusive assessment of level of self-esteem, thereby neglecting possible influences of other self-esteem facets. However, it can be assumed that some of the effects attributed to the level of self-esteem are, to a greater or lesser extent, actually provoked by these further facets of self-esteem and/or their interactions (cf. Crocker and Park 2004; Kernis 2003). Only a few studies have examined the relationship between at least two facets of self-esteem, e.g., level and contingency of self-esteem or self-esteem stability, and academic performance. In an attempt to clarify the relationship between self-esteem and academic performance, Zeigler-Hill and colleagues found self-esteem instability to be substantially correlated with poor academic performance. Contrary to the authors' expectations, self-esteem instability did not moderate the association between self-esteem level and academic performance (Zeigler-Hill et al. 2012).

While there is research on the relationship between contingent self-esteem and achievement-related outcomes, there is a lack of research on the relationship between contingent self-esteem and academic performance itself. The existing studies show different results, leading some authors to suggest that "academic contingencies of self-worth are volatile in predicting academic performance: sometimes they positively predict performance, sometimes they negatively predict performance, and sometimes they are unrelated to performance" (Lawrence and Charbonneau 2009, p. 619). From a theoretical perspective, there are arguments for both negative and positive correlations between contingent self-esteem and academic achievement as well. We will elaborate on these arguments in the next section.

1.3 Mediators of the relations between self-esteem facets and academic performance

Research from other areas (e.g., Tice 1991) suggests that the self-esteem facets mainly influence affective and motivational factors, which then determine academic performance. High levels of self-esteem may result in unspecific positive feelings and reduced threat during learning which would enable higher academic

performance. Unstable self-esteem on the other hand is supposed to lead to feelings of unspecific threat, which may lead to higher performance anxiety, self-protecting behavior, reduced effort, and, subsequently, worse performance. Contingent self-esteem might have the ability to either foster or impair academic performance due to its positive effects on motivation but negative effects on affect: With increasing importance of performing well, the willingness to make an effort should increase, but so should the fear of failure and the need for self-esteem protection. Both the motivational effect and the emotional side effects are due to higher pressure to perform well, which is caused by the pursuit of self-esteem (Crocker and Park 2004).

The need for self-validation resulting from academic contingency requires a certain behavior, namely to continuously perform well in order to maintain or increase one's own subjective value. This striving is based on the fact that contingent persons do not understand their self-esteem as "given" independently of conditions but only by fulfilling conditions. In the case of academic contingency, these conditions lie in the area of competence and performance. If performance fails to meet these standards, the current self-esteem decreases, as the failure experienced is interpreted as failure. The maintenance of self-esteem is one of the central concerns of a person and the loss of self-esteem is accompanied by existential fears (Pyszczynski et al. 2004). As a result, performance-related anxiety and self-protective behavior such as self-handicapping are likely to arise. However, the willingness to invest time and effort may also increase since the learning behavior also serves self-validation and thus has a very high personal significance (Crocker and Wolfe 2001). Overall, we deem it an important research question to investigate which psychological mechanisms and behaviors are elicited by the three facets of self-esteem and their interactions in academic settings. Based on the described theoretical rationale, we seek to examine possible mediation effects of self-handicapping, effort management, and test anxiety.

1.3.1 Self-handicapping

In performance situations that are perceived as self-esteem threatening, learners apply various self-esteem protecting and regulating strategies. A frequently used self-esteem regulation strategy is described in the literature as *self-handicapping* (Berglas and Jones 1978; Schwinger and Stiensmeier-Pelster 2012). If a learner is about to or has already experienced a failure, he can protect his self-esteem with this strategy by consciously seeking an external reason for his failure (e.g., not enough sleep before a graded presentation). This reason allows the learner to protect his self-esteem without having to refer the failure to his own intelligence as an internal and stable attribute (Berglas and Jones 1978). However, various studies indicate that self-handicapping is a maladaptive strategy for regulating self-esteem because it is predominantly associated with worse performances or lower motivation (Schwinger et al. 2014). The use of this strategy requires many cognitive resources that are no longer available for the learning process and finally lead to poorer performance (Schwinger and Stiensmeier-Pelster 2012). An important distinction in the literature has been drawn between *behavioral* and *claimed* self-handicapping (Leary and Shepperd 1986). Behavioral self-handicapping implies an active acquisition of an

impediment, such as drug abuse (Berglas and Jones 1978), while claimed self-handicappers only report the presence of obstacles like, for instance, a bad mood (Baumgardner et al. 1985). These two self-handicapping modes differ from one another in terms of cost–benefit analyses (Hirt et al. 1991). Behavioral handicaps are more credible because they are more convincingly tied to performance than claimed ones, but they are also more costly for the same reason. Claimed handicaps also serve as an excuse for failure but do not necessarily decrease one's chances of being successful as behavioral handicaps do (Hirt et al. 1991; Leary and Shepperd 1986). In the present study, we focused on behavioral self-handicapping.

Kernis (2005) showed that unstable self-esteem is associated with self-handicapping. Moreover, studies show that people with low and unstable self-esteem use self-handicapping more often than people with high and stable self-esteem (Spalding and Hardin 1999; Tice 1991). It can be assumed that people with a low and unstable self-esteem apply this self-regulation strategy which finally leads to an attenuated performance. Since students with a low and unstable self-esteem more often experience situations that threaten their self-esteem, they try to protect themselves from negative consequences with a handicap, while people with a high and stable self-esteem less often seek a handicap in order to stand out in the event of success despite a handicap, which in turn has a more positive effect on performance (Newman and Wadas 1997). So far there are few studies that consider the connection between contingency of self-esteem and self-handicapping. The study of Niiya et al. (2010) provides first indications that people with a contingent self-esteem, due to the higher personal significance of the dependence of self-esteem on external influences, increasingly tend to self-handicapping in order to protect their self-esteem in the case of failure.

1.3.2 Effort management

There are various cognitive learning strategies that learners use to process, absorb, save and recall new information in all learning situations (Wild 2005). With these strategies, learners can monitor, control and regulate their cognitive and motivational processes during self-regulated learning so they can adjust their behavior to their individual goals and their environment (Pintrich 2000). Different authors use different terms and classifications for existing learning strategies (for an overview see Streblow and Schiefele 2006). In addition to the type of learning strategy (e.g., cognitive vs. metacognitive strategies), the quantity and quality of the respective learning strategy is also considered in the literature (Mandl and Friedrich 2006; Wild and Schiefele 1994). One of such strategies is *effort management*, which means the willingness of learners to make efforts and promote the learning process itself. Effort management has the highest correlation of all learning strategies with academic achievement (e.g., Pintrich et al. 1993).

Initial studies also show that *self-esteem contingency* was significantly positively related to the willingness to make an effort (Opelt and Schwinger 2017). Crocker and colleagues found that students invest more time within the domains in which they stake their self-esteem (Crocker et al. 2003) while van der Kaap-Deeder and colleagues found contingent self-esteem to be positively related to self-reported

(but not behavioral) engagement (Van der Kaap-Deeder et al. 2016). Zeigler-Hill and colleagues found self-esteem instability to be substantially positively related to academic disengagement (Zeigler-Hill et al. 2012), i.e. the reduced willingness to invest effort. So far, there is a lack of studies examining the interplay between level, stability, and contingency of self-esteem and effort management. Against this background, it can be assumed that people with a high, stable, and contingent self-esteem are more willing to make an effort to maintain the probability of success for the self-esteem relevant domain. This leads to a greater willingness to learn, to greater confidence in their own abilities, and ultimately to better performance. However, it is also possible that this "forced" effort is perceived as very stressful due to the strong dependence of self-esteem, especially in the domain of academic success.

1.3.3 Test anxiety

Test anxiety is defined as "the set of phenomenological, physiological, and behavioral responses that accompany concern about possible negative consequences or failure on an exam or similar evaluative situation" (Zeidner 2010, p. 17) and is thus conceptualized as a personal disposition to experience test-related anxiety in relevant situations (Spielberger 1972). In representative surveys, 10 to 20 percent of all 8 to 18-year-old German-speaking children and adolescents report test anxiety (Pixner and Kaufmann 2013). Due to the high prevalence rates and the many negative consequences of test anxiety on, for instance, academic performance, motivation, and life satisfaction, test anxiety should be considered a serious problem in academic contexts (Krinzinger and Kaufmann 2006; Seipp 1991).

According to Hodapp's two-factor model of test anxiety (1991), test anxiety consists of an affective-physiological *emotionality* and a cognitive *worry* component. The *emotionality* component is the subjective perception of one's own physical arousal (e.g., shivering, nausea, palpitations) before or during an examination. The cognitive component refers to all thoughts and concerns relating to the requirement, possible failure as well as the consequences of failure during and after the test (e.g., "If I write a bad note, everyone will think I'm stupid."). Several studies show that the worry component of test anxiety had stronger effects on academic performance than the emotionality component (Cassady and Johnson 2002; Liebert and Morris 1967). We therefore expect that both components of test anxiety mediate the relationship between all facets of self-esteem on academic performance but that the worry component shows the larger effect. Like a resource-consuming secondary task in a dual task setting, such anxious worry cognitions block a large part of the cognitive capacities and resources necessary for problem solving and successfully coping with challenging performance situations (Ashcraft and Krause 2007). As a consequence, only a small part of cognitive capacities remains for exam-relevant processes such as concentration and deep thinking leading to diminished performance. In line with this argument, Lawrence and Williams (2013) showed that anxiety mediates the link between contingent self-esteem and low performance in ability-diagnostic tests. In two studies by van der Kaap-Deeder and colleagues, contingent self-esteem was positively related to general test anxiety (Study 1) and feelings on tension during a task (Study 2; Van der Kaap-Deeder et al. 2016).

1.4 The present study

Many studies have investigated the relationship between only one self-esteem facet (predominantly self-esteem level) and different outcomes in different contexts (Baumeister et al. 1993; Crocker and Park 2004). Up to now, there is a lack of studies that take into account the multidimensional view of self-esteem and examine the effects of the three self-esteem facets and their interactions on relevant outcomes like academic performance in the learning and performance context. It is also unclear through which psychological mechanisms the different self-esteem facets influence academic performance. In order to contribute to a deeper understanding of the relationships in question, in two studies we seek to examine (a) direct effects of self-esteem facets and their interactions on academic performance as well as (b) to what extent self-handicapping, effort management (Study 1), and test anxiety (Study 2) mediate those effects.

In detail, we expect the following relations: The lower, less stable, and more contingent a person's self-esteem, the stronger the use of self-handicapping strategies and the worse the resulting performance. At the same time, higher and more contingent self-esteem is supposed to increase the amount of effort invested in learning, which should result in better performance (Study 1). In a similar manner, we expect that the lower, less stable, and more contingent a person's self-esteem, the stronger the student's test anxiety (emotionality and worry) and, as a result, the worse the performance (Study 2). Regarding direct effects, we expect a moderate negative correlation between contingent self-esteem level and academic performance, while level and stability of self-esteem are supposed to be positively related to academic performance to a moderate degree.

2 Study 1

2.1 Method

2.1.1 Sample

The study followed the ethical guidelines of the authors' universities, the professional ethics guidelines of the German Psychological Society (DGPs), the American Psychological Association's Ethical Principles, and was in consultation with the ethics committee of the Department of Psychology at the University of Marburg. A total of 600 students (477 female, 124 male; age: $M=23.90$, $SD=5.06$) from various German universities took part in this study. Students participated in a lottery for Amazon vouchers and they received extra course credits. About 60% of participants were enrolled in Psychology while the remaining students were dispersed across various other subjects (e.g., Mathematics, Law, Sports). In all, 48% were in the first four semesters of their studies while the remaining students were in higher semesters.

2.1.2 Measurement instruments and procedure

2.1.2.1 Self-esteem Level of self-esteem was assessed with the revised German version of the Rosenberg self-esteem scale (von Collani and Herzberg 2003) which is comprised of 10 Items measuring global self-esteem. All items were answered on a four-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Stability of self-esteem was measured with a scale comprising five items (Schwinger 2008). The German version of the contingent self-esteem scale (CSES; Paradise and Kerns 1999; Schwinger 2008) was used to measure students' globally contingent self-esteem with 15 items. The stability and contingency items were answered on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

2.1.2.2 Self-handicapping As a maladaptive regulatory strategy in academic settings, behavioral self-handicapping was assessed with the German-language adaptation of the academic self-handicapping scale (ASHS-D; Schwinger and Stiensmeier-Pelster 2012). Students answered the 5 items on a five-point scale from 1 (*not true at all*) to 5 (*exactly true*).

2.1.2.3 Effort management Students' effort management was assessed by the Effort subscale of the German version of the Motivated Strategies for Learning Questionnaire (MSLQ, Pintrich et al. 1993; Wild and Schiefele 1994). All 8 items were answered on a five-point scale ranging from 1 (*rarely*) to 5 (*very often*). Item examples for all scales are provided in Table 1.

2.1.2.4 Academic performance The questionnaire was completed by the students once at the beginning of the semester and at a second time at the end of the lecture period (approx. 4 months later). At the second measurement point, students were asked to report the marks of their last two examinations which were averaged to get an indicator of students' academic performance. Lower numbers indicate better performance (*6-point grading scale from 1 = excellent to 6 = insufficient*).

2.2 Results

2.2.1 Descriptive statistics

All scales had satisfying to good internal consistencies (see Table 1). Scale means, standard deviations, and intercorrelations are displayed in Table 2. Level of self-esteem was positively correlated with self-esteem stability whereas level and stability of self-esteem were negatively associated with contingent self-esteem. With regard to learning and performance-relevant variables, there were negative correlations between self-handicapping and self-esteem level and stability while contingent self-esteem and self-handicapping were positively related with each other. Effort management was slightly positively associated with all self-esteem facets, but moderately negatively related to self-handicapping. Contingent self-esteem and effort

Table 1 Measures used in Study 1 and 2

Construct	Measures (authors)	Study	N _{Items}	α	Example item
Self-esteem level	Rosenberg-scale (von Collani and Herzberg 2003)	1	10	.91	All in all, I'm satisfied with myself
Self-esteem stability	Own scale (Schwinger 2008)	1	5	.90	My assessments of myself hardly change over time
Self-esteem contingency	Contingent self-esteem Scale (Schwinger 2008)	1	15	.85	For my self-esteem, it's important how competent I am
Self-handicapping	Academic Self-Handicapping Scale (ASHS-D) (Schwinger and Stiensmeier-Pelster 2012)	1	6	.76	Some students go out late in the evening before a written exam. This can be given as a reason if they don't score well in an exam. How much does that apply to you?
Effort management	Effort Management Questionnaire LIST (Wild and Schiefele 1994)	1	8	.83	I also study late at night and on weekends when it has to be
Self-esteem level	Self-esteem Inventory for Children and Adolescents (SEKI; Schöne and Stiensmeier-Pelster 2016)	2	10	.87	I like myself
Self-esteem instability	Self-esteem Inventory for Children and Adolescents (SEKI; Schöne and Stiensmeier-Pelster 2016)	2	10	.88	Whether I like myself or not changes all the time
Self-esteem contingency	Self-esteem Inventory for Children and Adolescents (SEKI; Schöne and Stiensmeier-Pelster 2016)	2	12	.85	I feel more worthy when I get good grades
Test anxiety	Test Anxiety Inventory (TAI-G; Hodapp 1991)	2	15	.86	I'm thinking about how important the exam or exam is to me

Table 2 Scale means, standard deviations, and intercorrelations of all scales (Study 1)

	<i>M</i>	(<i>SD</i>)	(1)	(2)	(3)	(4)	(5)
Self-esteem Level (1)	3.08	(0.56)	1				
Self-esteem Stability (2)	3.05	(0.98)	-.60**	1			
Self-esteem contingency (3)	3.67	(0.52)	-.39**	-.57**	1		
Self-handicapping (4)	1.72	(0.64)	-.22**	-.19**	-.12**	1	
Effort management (5)	3.56	(0.69)	-.13**	-.04**	-.11**	-.50**	1
Exam Grades (6)	7.82	(4.99)	-.01**	-.01**	-.13**	-.25**	-.27**

The variable "exam grades" is made up of the sum of the last two exam grades of the students surveyed. These were captured from 1 to 11 encoded (from 1 = "1.0", 2 = "1.3" etc. to 11 < 4.0. Lower values indicate better performance

** $p < .01$, * $p < .05$

management were found to be positively associated with academic performance while self-handicapping emerged to be negatively related to students' achievement.

2.2.2 Path analysis

To provide empirical support for the hypotheses, students' exam grades were predicted by their level, stability, and contingency of self-esteem, the twofold and three-fold interactions of these self-esteem facets, self-handicapping tendency, and effort management (predictors and mediators were allowed to covary). In addition, direct effects of effort management and self-handicapping on academic achievement were modelled and possible indirect effects of the self-esteem components on academic achievement, mediated by self-handicapping and effort management, were investigated. All statistical analyses were performed using Mplus 7.4 (Muthén and Muthén 1998–2015). The calculated path model for Study 1 showed a good model fit to the data ($CFI = 1.00$, $RMSEA = 0.00$).

Figure 1 shows only the significant paths of the final model for Study 1. For a better overview, the non-significant paths are not displayed. There were no significant main effects of the three self-esteem facets on academic performance. Findings revealed significantly negative paths from level and stability of self-esteem on self-handicapping, whereas level and contingency of self-esteem were found to be significantly positive predictors of effort management. Furthermore, the interaction between stability and contingency of self-esteem negatively predicted effort management while the interactions between level and stability of self-esteem as well as the interaction between self-esteem level and contingency did not show any significant effects on effort management nor self-handicapping. To analyse the interaction effects in more detail, additional simple slope analyses were calculated. These analyses showed significant simple slopes both for students with low self-esteem stability ($t[597] = 6.49$, $p < 0.01$), i.e. 1 SD below the mean, and for students with high self-esteem stability ($t[597] = 2.31$, $p < 0.05$), i.e. 1 SD above the mean. However, the slope for the students with less stable self-esteem showed a steeper gradient which means that contingent self-esteem

Fig. 1 Path model of the effects of self-esteem facets (Study 1; $\chi^2[0, N=600]=0.00, p=.00$; $CFI=1.00$; $RMSEA=.00$). Only statistically significant paths are displayed. The variable “exam grades” in made up of the sum of the last two exam grades of the students surveyed. These were captured from 1 to 11 encoded (from 1 = “1.0”, 2 = “1.3” etc. to 11 < 4.0), lower values indicate better performance. To improve readability, correlations between predictors as well as correlations between mediators are not displayed. * $p < .01$; ** $p < .05$

has a stronger influence on effort management in case of unstable self-esteem (see Fig. 2).

Mediation effects analyses based on 5000 bootstrapped samples (90% confidence intervals) revealed no significant indirect effect from level of self-esteem via self-handicapping ($\beta = -0.02$, CI $[-0.054, 0.013]$, $p = 0.12$) or via effort management ($\beta = -0.03$, CI $[-0.065, 0.009]$, $p = 0.06$) on exam grades. The same pattern was shown for the indirect effect from stability of self-esteem via self-handicapping ($\beta = -0.02$, CI $[-0.048, 0.012]$, $p = 0.12$) on exam grades. A significant indirect effect was found for contingent self-esteem on exam grades via effort management ($\beta = -0.04$, CI $[-0.086, -0.002]$, $p < 0.05$). There was no indirect effect for the interaction between stability and contingency via effort management ($\beta = 0.02$, CI $[-0.01, 0.052]$, $p = 0.14$) on exam grades.

Fig. 2 Interaction effect of self-esteem contingency and stability on effort management (Study 1)

3 Study 2

3.1 Method

3.1.1 Sample

The study followed the ethical guidelines of the authors' universities, the professional ethics guidelines of the German Psychological Society (DGPs), the American Psychological Association's Ethical Principles, and was in consultation with the ethics committee of the Department of Psychology at the University of Giessen. Participants for this study included $N=1052$ students (517 female, 530 male; Age: $M=14.14$, $SD=1.76$) from various German secondary school types, namely the German Gymnasium (highest track), Realschule (middle track), Hauptschule (lowest track) or Gesamtschule (lowest to highest track). Testing took place during regular school lessons. All students provided informed consent from their parents at the day of testing.

3.1.2 Measurement instruments and procedure

3.1.2.1 Self-esteem The self-esteem inventory for children and adolescents (SEKJ; Schöne and Stiensmeier-Pelster 2016) was used to assess the three self-esteem facets. This inventory consists of 3 scales (*self-esteem level*, *self-esteem stability*, and *contingent self-esteem*) with a total of 32 items. Children and adolescents between the ages of 10 to 16 years responded to all items on a five-point scale from 1 (*not true at all*) to 5 (*exactly true*). Please see Table 1 for more information on the number of items, internal consistencies, and an item example for each scale. In the self-esteem stability scale, higher numbers represent higher instability, the term *self-esteem instability* is used, so that at all three scales higher numbers indicate "more of the attribute".

3.1.2.2 Test anxiety As a facet of learning and performance behavior, the fear of examinations was assessed with the test anxiety inventory (TAI-G; Hodapp 1991). Two components of test anxiety (worry and emotionality) were measured with 15 items on a four-point scale ranging from 1 (*this does not apply to me at all*) to 4 (*totally applies to me*). Item examples for all scales are provided in Table 1. Higher numbers indicate higher anxiety.

3.1.2.3 School achievement At the end of the questionnaire, the students were asked to report their last grade (certificate note) in mathematics. Lower numbers indicate better achievement (*6-point grading scale from 1 = excellent to 6 = insufficient*).

3.2 Results

3.2.1 Descriptive statistics

All scales had satisfying internal consistencies (see Table 1). Scale means, standard deviations, and intercorrelations of all scales are displayed in Table 3. Level of self-esteem was negatively correlated with self-esteem instability and contingency whereas contingent self-esteem was positively correlated with instability of self-esteem. With regard to test anxiety, the amount of self-esteem instability was negatively associated with both the emotionality and the worry component. In contrast, instability and contingency of self-esteem were positively correlated with the two components of test anxiety. With respect to school achievement, students' math grades were found to be positively connected to contingent self-esteem and both components of test anxiety.

3.2.2 Path analysis

We specified a path model in which level, instability, and contingency of self-esteem, the twofold and threefold interactions of these self-esteem facets, and the worry and emotionality component of test anxiety were modelled as predictors of students' math grades (predictors and mediators were allowed to covary). Moreover, possible indirect effects of self-esteem facets on math achievement were investigated. All statistical analyses were performed using Mplus 7.4 (Muthén and Muthén 1998–2015). The analysis option Type = Complex was used to account for the nested data structure (students in classes). The calculated model for Study 2 showed a good model fit to the data ($CFI = 1.00$, $RMSEA = 0.00$). Figure 3 shows only the significant paths for Study 2. Only self-esteem instability showed a significant direct path on students' math grades. Students' instability and contingency of self-esteem were significantly related to both components of test anxiety while level of self-esteem had only a significant impact on the worry component. In addition, the interaction between level and instability of self-esteem determined the cognitive component of test anxiety. Supplemental analyses showed a significant simple slope for students

Table 3 Scale means, standard deviations, and intercorrelations of all scales (Study 2)

	<i>M</i>	(<i>SD</i>)	(1)	(2)	(3)	(4)	(5)
Self-esteem level (1)	3.72	(0.78)	1				
Self-esteem instability (2)	2.60	(0.89)	-.55**	1			
Self-esteem contingency (3)	2.71	(0.76)	-.39**	.55**	1		
TA: Emotionality component (4)	2.65	(1.00)	-.25**	.36**	.38**	1	
TA: Worry component (5)	3.50	(1.01)	-.28**	.37**	.41**	.68**	1
Grade in mathematics (6)	2.95	(0.89)	-.09**	.03**	.10**	.18**	.26**

Grade in Mathematics ranged from 1 (very good) to 6 (insufficient) points

TA test anxiety

** $p < .01$; * $p < .05$

Fig. 3 Path model of the effects of self-esteem facets (Study 2; $\chi^2[0, N=600]=0.00, p=.00$; $CFI=1.00$; $RMSEA=.00$). Only statistically significant paths are displayed. Grade in mathematics ranged from 1 (very good) to 6 (insufficient) points. To improve readability, correlations between predictors as well as correlations between mediators are not displayed. * $p < .01$; ** $p < .05$

with low self-esteem instability only ($t[1050] = -2.26, p < 0.05$), i.e. 1 SD below the mean. This means that high self-esteem leads to higher worry about math the more stable the self-esteem is additionally (see Fig. 4) while high self-esteem accompanied with high self-esteem instability ($t[1050] = -0.95, p = 0.33$), i.e. 1 SD above the mean, does not.

Mediation effects analyses based on 5000 bootstrapped samples revealed a significant indirect effect from contingent ($\beta = 0.07, CI [0.017, 0.121], p < 0.01$) and unstable self-esteem via the worry component on students' grade in mathematics ($\beta = 0.04, CI [0.008, 0.080], p < 0.01$). The indirect effect from level of self-esteem via worry ($\beta = -0.02, CI [-0.049, 0.008], p = 0.07$) was marginally significant. Moreover, there were no significant indirect effects from instability ($\beta = 0.01, CI [-0.035, 0.042], p = 0.82$) and contingency ($\beta = 0.01, CI [-0.043, 0.051], p = 0.82$) via emotionality on math grades. There was no indirect effect for the interaction

Fig. 4 Interaction effect of self-esteem level and instability on worry (Study 2)

between level and instability via effort management ($\beta=0.01$, CI $[-0.012, 0.038]$, $p=0.17$) on exam grades.

4 Discussion

Self-esteem research changed in 2003 when Baumeister and colleagues published a review of research on the relationship between self-esteem and many different variables, showing that high vs. low self-esteem was not the “Holy Grail” in predicting let alone causing behavior (Baumeister et al. 2003). This includes the assumed causal role in determining academic achievement, which is the outcome variable of interest in our paper. In line with more current theory and research that views self-esteem as a heterogeneous construct consisting of more facets than just the level of self-esteem, the present paper focused on the relationship between self-esteem and academic achievement. In two studies, the relationship between self-esteem facets as well as mediators of this relationships were analyzed in order to provide a more detailed and enhanced investigation of the mechanisms through which self-esteem might influence academic achievement. Although the studies, due to their correlative design, do not allow conclusive conclusions about causal relations, by investigating mediators they still make a contribution to the open question of the causal role of self-esteem in determining academic achievement.

In Study 1, we tested the hypothesis that self-handicapping and effort management mediate the effects of three self-esteem facets—level, stability and contingency—on academic achievement (exam grades) in a sample of university students. We assumed that the lower, less stable, and more contingent a student’s self-esteem, the stronger the use of self-handicapping strategies and the more effort would be invested, in turn, the worse / the better the academic achievement. Moreover, we analyzed whether the mediation effects were moderated by the other two self-esteem facets. Our path analyses revealed mixed results, in the sense that they are only in part in line with our assumptions. While self-esteem level and self-esteem stability showed the expected negative relations with self-handicapping, the indirect effects on achievement via self-handicapping did not reach statistical significance. Moreover, despite a small but statistically significant positive correlation between contingent self-esteem and self-handicapping, contingent self-esteem did not predict self-handicapping when we controlled for the other self-esteem facets in our model. Also not consistent with our assumptions, none of the interactions between self-esteem predicted self-handicapping. Results regarding the second mediator in our model, effort management, results were mixed as well. While, as expected, self-esteem level and contingency positively predicted effort management (i.e., investing more effort), only the indirect effect from contingent self-esteem through effort management on achievement was statistically significant. Effort management did not mediate the effect of self-esteem level on achievement, but the effect of contingent self-esteem on achievement. Despite a small but significant positive correlation between self-esteem stability and effort management, self-esteem stability did not predict effort management when simultaneously analyzed with the other self-esteem facets in our model. Yet self-esteem stability did predict effort management in interaction with

contingent self-esteem, meaning that stability moderates the effect of contingent self-esteem on effort management: The less stable the self-esteem, the stronger the effect of contingent self-esteem on effort management. However, the indirect effect of this interaction via effort management on achievement did not reach statistical significance.

It cannot be conclusively clarified in this work why no significant correlations between self-esteem facets and their interactions via self-handicapping on exam grades were found. Including both mediators simultaneously may have led to a variance limitation because self-handicapping and effort management are substantially correlated ($r = -0.50$). It is possible that effort management and self-handicapping “stole” each other’s variance, because there is a conceptual overlap between these constructs (Farrar and Glauber 1967; Marsh et al. 2004).

In our second study we analyzed test anxiety (emotionality and worry) as a mediator of the effect of self-esteem facets on achievement (school grades), and whether the expected indirect effects of one facet depend on the other facets. As expected, level, stability and contingency of self-esteem predicted both factors of test anxiety, except for a non-significant path from self-esteem level on emotionality. However, inconsistent with our assumptions, only one of the interactions between self-esteem facets predicted test anxiety: The effect of level of self-esteem on worry is dependent on self-esteem stability. While students with high and stable self-esteem reported less worry cognitions than students with stable but low self-esteem, students with unstable self-esteem showed the same (and higher) amount of worry cognitions regardless of their level of self-esteem. However, only the indirect effects of stability and contingency (but not level or the interaction) via the worry-factor of test anxiety reached statistical significance. This indicates that only the worry component of test anxiety mediated the effects of self-esteem stability and contingency on school grades, and that this effects was not influenced by other self-esteem facets.

Rather unexpectedly, yet still in line with other studies, emotionality showed no relation to academic achievement in the model. This is probably partly due to the fact that test anxiety was assessed as a trait with no direct relation to the test situation. There are a number of studies showing that, in general, the relationship between state anxiety and achievement is not closer than between trait anxiety and achievement (Seipp 1991). However, test anxiety is supposed to be more strongly related to achievement when specifically related to the test and to the subject, partly because then there would be less room for successful coping or increased effort prior to the test.

In sum, these findings are consistent with the theoretical assumptions and findings from previous studies (Crocker et al. 2003). Kernis (2003) and Crocker et al. (2003) support the idea that combinations of the self-esteem facets are decisive, because this approach better reflects the complexity of academic reality and enables more precise behavioral predictions. In both studies, however, the double and triple interactions of the self-esteem facets proved to be predominantly not significant, which contradicts the theoretical assumptions and findings from other studies (Crocker et al. 2003; Kernis 2003; Meier et al. 2009).

In order to explain the missing interactive effects, it is conceivable that some people with a high, stable, and contingent self-esteem achieve stronger effects and at

the same time people with a low, unstable, and contingent self-esteem achieve significantly lower effects, which ultimately average themselves out and thus do not become significant. Kärchner and Schwinger (2018) identified subgroups of students with different self-esteem profiles, which in turn were differently associated with important outcomes. To disentangle these effects of between-person differences of constellations of the three facets, person-centered approaches like latent profile analysis may be promising in further studies.

Overall, the results only partially support the presumed influence of the three self-esteem facets and their interactions on academic achievement. However, the findings are clearly in line with the assumption that learning strategies and other achievement-related factors play a decisive role in mediating the effects of self-esteem facets on academic achievement. For the educational-psychological practice, it can be concluded that motivational and emotional influences (e.g., test anxiety) in learning and achievement situations must be taken into account so that learners are able to perform. In addition, the findings illustrate the relevance of considering the consequences of self-esteem on variables relevant to learning and achievement (e.g., learning strategies and self-regulation strategies), which in turn are associated with achievement.

4.1 Limitations and implications for future research

An important restriction of the present work concerns the generalization, because in Study 2 only the school grades in mathematics were recorded. Further studies should examine whether the results can also be transferred to other school subjects. Also, rather than capturing achievement as well as effort management, self-handicapping, and test anxiety as trait-like, global measure unrelated to achievement, a follow-up study could capture students' willingness to invest time, self-handicapping, and test-anxiety with respect to more specific learning situations like an upcoming exam. Furthermore, a global sum value of the contingency domains of self-esteem was formed in the present work. It would be interesting in further studies to investigate differential effects of certain contingency domains on academic outcomes. Regarding the statistical analyses, we suggest additional studies using a person-centered approaches like latent profile analysis, which might be more adequate for analyzing possible non-linear effects and interactions. In addition, other mediators that could influence the relationship between self-esteem facets and their interactions could also be considered, such as other learning strategies or motivational regulation strategies that are also associated with academic achievement (Pintrich and De Groot 1990; Zimmerman 1990).

4.2 Conclusions

The findings presented extend our understanding of the interplay of various facets of general self-esteem in predicting academic achievement. In both empirical studies, besides the level, the stability and contingency of general self-esteem were found to be significant for academic achievement, although all effects were not direct but

mediated by further affective and motivational factors. Overall, the results point to the need for a broader analysis of possible mediator variables of the effects of different self-esteem facets on academic achievement outcomes.

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Compliance with ethical standards

Conflict of interest The authors declare they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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