

Relationships Between Narrow Personality Traits and Self-Regulated Learning Strategies: Exploring the Role of Mindfulness, Contingent Self-Esteem, and Self-Control

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Based on Boekaerts' dual-processing self-regulation model, our study seeks to examine to what extent narrow personality traits are associated with different aspects of self-regulated learning. We approach this research question by examining the relationships of the narrow personality traits mindfulness, contingent self-esteem (domain academic competence), and self-control with various self-regulated learning strategies, emotion regulation strategies, and affective well-being during learning in a sample of N = 588 university students. Path analysis revealed the selected narrow personality traits to be significantly related to a variety of the investigated self-regulated learning variables, with more relationships to self-control and the contingent self-esteem domain academic competence than to mindfulness. Our study overall contributes to the understanding of how the selected narrow personality traits of students are associated with various aspects of their self-regulated learning behavior. Practical implications for promoting self-regulated learning via training (self-control) and counseling services (contingent self-esteem) are discussed.

Keywords: *mindfulness, contingent self-esteem domain academic competence, self-control, self-regulated learning, emotion regulation, affective well-being during learning*

Introduction

SELF-regulated learning has various aspects in the context of learning, such as cognitive, metacognitive, motivational, behavioral, and affective/emotional variables (Panadero, 2017). It implies the self-generation of feelings, thoughts, and actions with the purpose of achieving one's own learning goals (Zimmerman, 2001). Self-regulated learners use different learning strategies to improve their learning (de Boer et al., 2012). Given empirical evidence that using self-regulated learning strategies is beneficial for students' academic and psychological outcomes (Parvin et al., 2015; Schwinger et al., 2009; Tavakolizadeh et al., 2012) and that self-regulated learning is underpinned by personality (Bidjerano & Dai, 2007; Sansone et al., 1999), the question arises as to which personality variables are meaningfully related to various aspects of self-regulated learning behavior.

The relevance of personality variables is emphasized in several theories on achievement motivation and behavior (e.g., Bandura, 1999; Dweck, 2017). Research in various areas revealed that focusing on specific, narrow traits—compared, for example, with the rather broadly defined Big

Five—may increase the predictive validity with respect to certain outcome variables. These *narrow personality traits* are mostly defined as Big Five subscales or as traits that the Big Five model does not comprise (Lounsbury et al., 2007). They are thus to be regarded as more specific personality constructs. To date, research on personality and self-regulated learning was mainly conducted regarding rather broadly defined personality dimensions, such as the Big Five. It was found that several self-regulated learning strategies covary with the Big Five dimensions to some degree, which implies that personality underpins self-regulated learning (e.g., Bidjerano & Dai, 2007). However, the relationships between narrow personality traits and self-regulated learning have rarely been explored. Therefore, with our research we intend to contribute to an understanding of to what extent narrow personality traits of adult learners (operationalized as university students in this study), selected from a theoretical framework model, are associated with various aspects of students' self-regulated learning behavior. We will focus on the narrow traits *mindfulness* (a present, nonjudgmental, intentional attention, an open, curious, accepting attitude; Bishop et al., 2004; Kabat-Zinn, 2003), *contingent self-esteem (CSE) domain academic competence*



(self-esteem of persons who make it largely dependent on their academic competence depends on failure and success in academic contexts; Crocker & Park, 2004; Crocker & Wolfe, 2001), and *self-control* (resisting temptations, breaking habits, being self-disciplined; Tangney et al., 2004). We decided to investigate these three narrow traits because each of them is supposed to make specific purposes of self-regulated learning more likely: Mindfulness may lead students to rather intrinsic forms of learning, academic CSE appears to enhance extrinsic approaches to learning, and self-control might be generally helpful to stick to the desired learning path. More detailed information on the selection and definition of the three narrow traits follows in the next sections.

Regarding the practical relevance of our study, the findings could help design training and counseling services for students based on the levels of their narrow personality traits, with the purpose of optimizing their self-regulated learning behavior. It would be difficult, time-consuming, and cost-intensive to promote many specific self-regulated learning strategies through training courses that are directly geared to individual learning strategies. As an alternative, a training of narrow personality traits may result in the promotion of several learning strategies (and/or a positive attitude toward using them) at the same time. Such a training may change basic attitudes toward learning, and as a result, more meaningful learning strategies may be selected and applied (cf. Dweck, 2017). It is important to note, however, that trainings would need to be focused on specific, clearly defined narrow traits or beliefs since research has shown that volitional personality change of broad traits like the Big Five requires a substantial investment in time and effort to create at least modest change (e.g., Hudson & Fraley, 2015).

Theoretical Framework Model for the Relationships Between Narrow Personality Traits and Aspects of Self-Regulated Learning

An initial exploration of the role of narrow personality traits in self-regulated learning necessarily requires a guideline that helps select the most promising narrow traits for investigation. In this study, we align our selection of narrow personality traits to Boekaerts's *dual processing self-regulation model* (formerly called *adaptable learning model*, Boekaerts, 1991; Boekaerts, 2011; Boekaerts & Cascallar, 2006; Boekaerts & Niemivirta, 2000), which represents one of the most recognized frameworks in self-regulated learning research. Boekaerts's model was originally developed for school students but is applicable to other groups of (adult) learners, such as university students. According to the dual processing self-regulation model, self-regulated learning takes place—depending on the appraisal of the learning situation—in a mastery/learning or a coping/well-being processing mode. In mastery mode, learning tasks are appraised as congruent with personal goals, aspirations, and

needs. Experienced cognitions and emotions are dominantly positive (e.g., confidence), and focus is on the task (e.g., the exam itself). In coping mode, learning situations are appraised as a threat to well-being. Experienced cognitions and emotions are dominantly negative (e.g., anxiety), and focus is on the self (e.g., the threat of losing face; Boekaerts, 2011). Learning strategies are used in mastery mode to pursue the learning intention, while coping strategies are used in coping mode to follow the coping intention. Emotions play an important role because the perception of negative emotions leads to the activation of the coping/well-being mode and the use of coping strategies such as emotion regulation strategies (Boekaerts & Niemivirta, 2000; Panadero, 2017).

The various purposes of self-regulated learning are (1) to expand your own knowledge and skills in mastery mode, (2) to avoid threat and harm to yourself and ensure your well-being in coping mode, and (3) to protect your own engagement with learning activities by a change from coping to mastery mode (Boekaerts, 2011; Panadero, 2017).

Reason for the Choice of Narrow Personality Traits. Our selection of the three narrow personality traits to be examined in this study is based on Boekaerts's (2011) three purposes for self-regulated learning. Each narrow trait is intended to make the pursuit of one of the purposes more likely. *Mindfulness* was chosen for the first purpose. More mindful students tend to have a more intrinsic approach to learning so that they can focus on the task in mastery/learning mode. *CSE domain academic competence* was selected for the second purpose. Students who make their self-esteem more dependent on their academic competence show a more extrinsic approach to learning, so that they must mainly focus on the self in coping/well-being mode to protect their self-esteem. *Self-control* was chosen for the third purpose. It serves as a general basic skill for the learning context. Depending on their current motivational situation, it is possible for students with stronger self-control to start their learning process in mastery/learning or in coping/well-being mode. If students with more self-control are initially in coping mode, their ability for stronger self-control enables them to switch to mastery mode and shift their focus from the self to the task. The three selected narrow personality traits can also be located in other theoretical models, for example, in Dweck's (2017) unified theory for motivation, personality, and development at the "beliefs" level. We therefore think that it is conceptually justified to suggest these three factors to be meaningfully related to aspects of self-regulated learning. They are described in more detail in the next subsection.

Reason for the Choice of Self-Regulated Learning Variables. The variables of self-regulated learning to be examined in the present study were selected on the basis of Boekaerts's model (e.g., Boekaerts, 2011; Boekaerts &

Niemivirta, 2000), but they are also based on the broad diversity of self-regulated learning strategies described in the literature, including cognitive, metacognitive, motivational, and emotional as well as affective variables (Panadero, 2017). Thus, we investigate the narrow traits in relation to a wide range of self-regulated learning variables that are also in line with Boekaerts's framework model.

The self-regulated learning strategies examined in this study can be categorized into four main categories. *Cognitive* strategies are mainly used for specific domains and tasks (de Boer et al., 2013). They can be divided into surface and deep-learning strategies (Leopold & Leutner, 2002). *Metacognitive* strategies relate to the planning, monitoring, and evaluation of one's own learning behavior. *Management* strategies are used to optimize learning conditions; they are directed internally, such as to the learner's effort management, or externally to others or to the environment. *Motivational regulation* strategies aim to increase the motivation of the learner (de Boer et al., 2013). They can be grouped into intrinsic and extrinsic strategies (Schwinger et al., 2007). Some of these learning strategies could also be coping strategies in Boekaerts's adaptable learning model (Boekaerts & Niemivirta, 2000). Effort management, surface, as well as extrinsic strategies such as performance avoidance self-talk could serve the purpose of protecting the self from threats such as academic failure and creating well-being in the learning context by ensuring short-term learning success. Furthermore, *emotion regulation strategies* function as coping strategies to (re)establish well-being.

In the theoretical framework model, it emerged that affective well-being plays an important role in the context of self-regulated learning (e.g., Boekaerts, 2011; Panadero, 2017). Affective well-being comprises the intensity and frequency of perceived positive and negative affect in terms of general mood states as well as specific emotions (Luhmann, 2017). Since the present study focuses on the learning context of adult learners, we investigate narrow traits in relation to their *affective well-being during learning* for their studies.

Narrow Personality Traits and Their Assumed Relationships to Self-Regulated Learning Variables

Mindfulness. According to Kabat-Zinn (2003), mindfulness reflects "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 145). Following this, mindfulness conceptualizes attention as intentional, focused on the present, and nonjudgmental. Bishop et al. (2004) mention as components of mindfulness "the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment" and "a particular orientation toward one's experiences in the present

moment, an orientation that is characterized by curiosity, openness, and acceptance" (p. 232).

Both the ability to self-regulate one's intentional, present, and nonjudgmental attention and a curious, open, and accepting attitude seem to be helpful in focusing one's attention on and persistently dealing with the learning matter despite its sometimes boring or difficult content. This implies that more mindful students can better regulate and enhance and thus *manage their own effort* (see Hillgaard, 2011). The metacognitive aspect of mindfulness (Bishop et al., 2004) suggests a positive association with *metacognitive strategies* (see Hillgaard, 2011), which require monitoring and evaluation of individual learning behavior. For this purpose, an enhanced awareness of immediate mental events via the self-regulation of attention seems conducive. Since mindfulness is likely to be associated with a more intrinsic approach to learning (see also Brown & Ryan, 2003; Jankowski & Holas, 2014) as well as with the need for a deeper cognitive processing (see also Hyland, 2009; Zeidan et al., 2010), more mindful individuals are assumed to choose particularly *intrinsic motivation regulation strategies* (e.g., *enhancement of personal significance*) as well as *deep cognitive strategies* (e.g., *elaboration*).

To face one's present experiences in a nonjudgmental, accepting, open, and curious way includes the handling of one's perceived emotions. This attitude implies that, if necessary, *adaptive emotion regulation strategies* such as cognitive problem solving are chosen instead of using *maladaptive strategies* such as self-devaluation. In the research literature, mindfulness is accordingly associated with adaptive emotion regulation (e.g., Jermann et al., 2009; Roemer et al., 2015; Teper et al., 2013).

The ability of more mindful people to self-regulate their attention allows increased attention to their own goals and an improved possibility to act in harmony with them, which is likely to be beneficial for affective well-being in learning contexts (Brown et al., 2007; Howell & Buro, 2011). There is empirical evidence that mindfulness relates to higher positive and lower negative affectivity (Brown & Ryan, 2003). Corresponding relations to *positive* and *negative affect during learning* are to be expected. In one study, higher mindfulness predicted accordingly a more beneficial difference value between positive and negative achievement-related emotions (Howell & Buro, 2011).

Contingent Self-Esteem Domain Academic Competence. CSE describes the extent to which one's own self-esteem is dependent on external circumstances (Crocker & Wolfe, 2001; Kernis, 2003). In the literature, there are essentially two different concepts for CSE. Kernis (2003) views CSE as a global construct in which self-esteem generally depends on external factors. On the other hand, Crocker and colleagues (e.g., Crocker & Wolfe, 2001; Crocker et al., 2006) regard CSE as a domain-specific construct in the

sense of various contingencies of self-esteem. There are interindividual differences in how important these external circumstances are in terms of self-esteem (Crocker & Wolfe, 2001). This implies that self-esteem depends on success or failure experienced in certain domains relevant to one's self-esteem (Crocker & Park, 2004).

A study has already investigated the extent to which global CSE is associated with different learning strategies (Opelt & Schwinger, 2017). Taking the domain-specific perspective, the present study examines the relationships of a specific CSE domain with diverse self-regulated learning variables. There are various findings that students' self-esteem significantly depends on success and failure in studies (Crocker & Park, 2004). For the academic context of self-regulated learning, CSE domain academic competence is assumed to be particularly relevant.

People with a high degree of CSE invest more effort and time in domains that are relevant to their self-esteem (Crocker et al., 2003). Students who make their self-esteem more dependent on their academic competence are thus expected to more strongly *enhance their effort* to achieve their performance-related goals for the purpose of strengthening their self-esteem (see Opelt & Schwinger, 2017, for global CSE). Students with a high level of CSE in the domain academic competence are likely to show a priority extrinsic approach to learning. Striving for success and avoiding failure in self-esteem-relevant domains can be at the expense of intrinsic motivation (Crocker et al., 2006). This leads to the assumption that students with a self-esteem more dependent on their academic competence tend to apply primarily *extrinsic motivation regulation strategies* (e.g., *performance avoidance self-talk*) to avoid failure and strive for success, with the focus on self-esteem protection. Accordingly, in preparation for exam situations, they tend to memorize knowledge through *surface cognitive strategies* (e.g., *rehearsal*; see Opelt & Schwinger, 2017, for global CSE).

When threats to self-esteem occur, people tend to follow their immediate impulses in order to regulate their emotions on short notice (Crocker & Park, 2004). So we assume that students with a stronger CSE regarding academic competence prefer to choose *maladaptive strategies* to regulate their emotions, which can be implemented without great effort and at the same time protect their self-esteem (e.g., by blaming others). For more complex *adaptive strategies* (e.g., cognitive problem solving), these students have less capacity since they must deal not only with the negative emotions themselves but also with the threat to their self-esteem experienced as existential.

Research has revealed negative associations between global CSE and psychological well-being (Kernis et al., 2008), as well as positive links between CSE domain academic competence and depressive symptoms (Schöne et al., 2015). Due to the awareness in learning that they have to avoid failure in order to protect their self-esteem and to the

self-esteem threat experienced when learning difficulties occur, it is assumed that students with a high CSE regarding academic competence experience more *negative affect* and less *positive affect during learning*.

Self-Control. Self-control can be defined as the “ability to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies (such as impulses) and refrain from acting on them” (Tangney et al., 2004, p. 274). It implies to break habits, resist temptations, and be self-disciplined. This includes, among others, to regulate one's thoughts with the purpose of being able to concentrate, to restrain undesirable impulses, to alter emotions, to persevere with the aim of achieving highest performance (Tangney et al., 2004), and to accomplish unpleasant but important tasks. These statements indicate that a high degree of self-control is advantageous in the context of academic learning (Bertrams & Dickhäuser, 2009a).

It can be expected that students with a high level of self-control—based on their ability to persevere, to restrain impulses, and to accomplish unpleasant tasks—show a higher and more persistent effort during learning and therefore are better able to *manage their own effort*. As a beneficial basic skill for the academic learning context (Bertrams & Dickhäuser, 2009a), self-control is assumed to be generally related to the use of a wide range of possible learning strategies, both *deep* and *surface cognitive strategies* as well as *intrinsic* and *extrinsic motivation regulation strategies*. The choice of self-regulated learning strategies in learning situations then depends on current variables such as the learning matter and the present motivation level of students with high self-control pursuing their high-performance goal (Tangney et al., 2004). Among other things, it is expected that these students are better able to organize and structure their learning matter. It can therefore be suggested that they use strategies such as the deep cognitive strategy *organization* and the extrinsic motivational regulation strategy *proximal goal setting*.

The ability of strongly self-controlled individuals to alter their emotions (Tagney et al., 2004) indicates improved emotion regulation, which has also been empirically proven (see Paschke et al., 2016). Some authors even consider emotion regulation as a specific type of self-control (Tice & Bratslavsky, 2000). Consequently, it can be assumed that students with more self-control have more *adaptive strategies* at their disposal for emotional regulation and resort less to *maladaptive strategies*.

It has been empirically found that self-control is beneficial for affective well-being, with a positive relation to positive affect and a negative relation to negative affect (Hofmann et al., 2014). A corresponding association between self-control and affective well-being is also expected during learning. Students with a high level of self-control know how to deal constructively with potential learning difficulties. This

awareness likely leads to less *negative affect during learning*, such as feeling desperate when difficulties arise, and rather to more *positive affect during learning*, such as feeling confident.

Aims and Hypotheses

Based on Boekaerts's theoretical framework model, we assume that narrow personality traits are meaningfully linked to various aspects of self-regulated learning. The central aim of our study is to examine the extent to which the selected narrow traits, mindfulness, self-control, and CSE domain academic competence, are related to the use of self-regulated learning and emotion regulation strategies as well as to affective well-being during learning. University education presupposes that students create, initiate, and evaluate their academic tasks by themselves. The skills of self-regulated learning are thus particularly relevant for university students with respect to adequate management of their own learning process (Bembenutty, 2011). Consequently, we examine a sample of university students in our study.

The relationships to be investigated in this study have not yet been explicitly explored. Concerning mindfulness, we suppose positive links with effort management, metacognitive strategies, intrinsic motivation regulation strategies, deep cognitive strategies, adaptive emotion regulation strategies, and positive affect during learning. As for CSE domain academic competence, we assume positive relations with effort management, extrinsic motivation regulation strategies, surface cognitive strategies, maladaptive emotion regulation strategies, and negative affect during learning. Regarding self-control, we expect positive connections with effort management and a wide range of further learning strategies (both intrinsic and extrinsic motivation regulation strategies, both deep and surface cognitive strategies), adaptive emotion regulation strategies, and positive affect during learning.

Method

Sample and Procedure

A total of 588 German-speaking students (408 female—such a gender rate is common in German studies with university students; age: $M = 22.95$ years, $SD = 3.92$) from 45 universities, colleges, and universities of applied sciences voluntarily participated in an online survey via SoSci Survey. Of these, approximately 86% were studying at the University of Marburg (Marburg, Germany), while the rest were distributed among locations throughout Germany and a few individual locations in Austria, Latvia, and Switzerland. About 27% of the participants were registered in psychology. The remaining students were enrolled in various other subjects (e.g., business studies, medicine, educational science). In addition, 70% were in the first five semesters of

their studies, while the remaining participants were in higher semesters. All the questionnaires were provided in the same session, which took about 45 minutes. As incentives, the students could receive extra course credits (one “test person hour” for psychology students at the University of Marburg) or take part in a lottery for a total of 25 Amazon vouchers worth €20 each. Institutional review board approval was not required for this study.

Measures

Narrow Personality Traits. *Mindfulness* was measured with the German version of the Mindful Attention Awareness Scale (Brown & Ryan, 2003; Michalak et al., 2008). The scale consists of 15 inversely scored items (e.g., “I find myself doing things without paying attention”). The applied questionnaire proved to be reliable ($\alpha = .83$; our study: $\alpha = .85$) and valid (e.g., the associations with measures for subjective well-being and symptom distress were as expected; Michalak et al., 2008).

CSE was measured with the German version of the Contingencies of Self-Worth Scales (Crocker et al., 2003; Schwinger et al., 2017), which reflects six domains of CSE (without the original domain *God's love*). This version contains 30 items in all—and five items for each of the following six domains: *academic competence* (e.g., “My self-esteem is influenced by my academic performance”), *appearance*, *family support*, *competition*, *others' approval*, and *virtue*. The six subscales showed good reliabilities ($\alpha = .79$ – $.90$), and first evidence of validity was obtained (e.g., *family support* as negative and *appearance* as positive predictors of depressive symptoms; Schwinger et al., 2017). In this study, we focus explicitly on the domain of *academic competence* ($\alpha = .84$).

Self-control was assessed with the German adaptation of the short form of the Self-Control Scale (Bertrams & Dickhäuser, 2009b; Tangney et al., 2004), which comprises 13 items (e.g., “I am good at resisting temptation”). The brief version used turned out to be reliable ($\alpha = .78$ – $.80$; our study: $\alpha = .84$) and valid (e.g., correlations with diverse external criteria such as self-regulation, life satisfaction, and dysfunctional perfectionism overall were in expected directions; Bertrams & Dickhäuser, 2009b).

All the items were responded to on a rating scale ranging from 1 (mindfulness: *very rarely/never*; self-control, CSE: *disagree*) to 5 (mindfulness: *very often*; self-control, CSE: *agree*).

Self-Regulated Learning Strategies. *Cognitive strategies*, *metacognitive strategies*, and *effort management* were measured with the corresponding subscales of the German version of the Motivated Strategies for Learning Questionnaire (Wild & Schiefele, 1994): *organization* (eight items—e.g., “I make simple charts, diagrams, or tables to help me

organize course material”), *elaboration* (eight items—e.g., “I try to relate ideas in this subject to those in other courses whenever possible”), *rehearsal* (seven items—e.g., “When I study for this class, I practice saying the material to myself over and over”), *metacognitive strategies* (11 items—e.g., “I ask myself questions to make sure I understand the material I have been studying in this class”), and *effort management* (eight items—e.g., “I work hard to do well in this class even if I don’t like what we are doing”). The applied subscales revealed satisfying to good reliabilities ($\alpha = .64-.82$; our study: $\alpha = .73-.83$), and validity information was reported to a certain extent (e.g., mainly low scale intercorrelations, mainly low correlations between scale values and amount of time required; Wild & Schiefele, 1994).

Motivational regulation strategies were assessed by a German questionnaire (Schwinger et al., 2007; see Schwinger et al., 2009, for the English translation) that distinguishes eight strategies with a total of 30 items: *enhancement of situational interest* (five items—e.g., “I make learning more pleasant for me by trying to arrange it playfully”), *enhancement of personal significance* (three items—e.g., “I look for connections between the tasks and my life as such”), *self-consequating* (four items—e.g., “I promise myself that, after work, I will do something that I like”), *proximal goal setting* (three items—e.g., “I approach work step-by-step in order to get the feeling that I proceed well”), *mastery self-talk* (four items—e.g., “I persuade myself to work intensely for the sake of learning”), *performance approach self-talk* (five items—e.g., “I call my attention to the fact of how important it is to obtain good grades”), *performance avoidance self-talk* (three items—e.g., “I imagine that my classmates make fun of my poor performance”), and *environmental control* (three items—e.g., “I make sure that distractions occur as seldom as possible”). This questionnaire proved to be reliable ($\alpha = .68-.93$; our study: $\alpha = .69-.91$) and valid (e.g., relationships to cognitive learning strategies and goal orientations in the expected way; Schwinger et al., 2007; Schwinger et al., 2009).

The participants answered all the items on a rating scale ranging from 1 (cognitive strategies, metacognitive strategies, effort management: *very rarely/never*; motivational regulation strategies: *rather rarely/never*) to 5 (*very often*).

Emotion Regulation Strategies. Emotion regulation was measured with the German questionnaire Fragebogen zur Erhebung der Emotionsregulation bei Erwachsenen (Questionnaire to Measure Emotion Regulation in Adults; Grob & Horowitz, 2014), which records six adaptive and six maladaptive emotion regulation strategies for anger, anxiety, and sadness, with two items per strategy. This results in the two higher-order factors *adaptive emotion regulation strategies* (12 items—e.g., “When I’m afraid, I think about how to solve the problem”) and *maladaptive emotion regulation strategies* (12 items—e.g., “When I’m afraid, I retire”).

Reliabilities of the higher-order factors turned out to be good across emotions ($\alpha = .88-.91$), and validity can be considered as a given (e.g., correlations with measures for well-being, optimism, and neuroticism were in expected directions; Grob & Horowitz, 2014). In this study, we focused on anxiety regulation ($\alpha = .76-.81$). The students responded to the items on a rating scale ranging from 1 (*almost never*) to 5 (*almost always*).

Affective Well-Being During Learning. Students’ *affective well-being during learning* was measured by a German adaptation of the Positive and Negative Affect Schedule (Krohne et al., 1996; Watson et al., 1988). The participants were requested to assess a total of 20 items with respect to their affect during learning for their studies on a rating scale ranging from 1 (*not at all*) to 5 (*extremely*). This questionnaire comprises two subscales: *positive affect* (10 items—e.g., “proud”) and *negative affect* (10 items—e.g., “nervous”). The questionnaire showed good reliabilities ($\alpha = .84-.86$; our study: $\alpha = .87-.88$) and was found to be valid (e.g., relationships to external criteria such as anxiety, neuroticism, and extraversion overall were as expected; Krohne et al., 1996).

Statistical Analysis

To investigate which narrow personality traits are associated to what extent with which aspects of self-regulated learning, we specified a saturated¹ path model in Mplus 7 (Muthén & Muthén, 1998–2015). We used the estimation procedure full information maximum likelihood to deal with missing data. Figure 1 shows a simplified graphic representation of the assumed relationships between the selected narrow personality traits and the self-regulated learning variables.

In our path model, all the narrow personality traits were included simultaneously as predictors of the various aspects of self-regulated learning. Intercorrelations between the individual subscales regarding learning strategies, emotion regulation strategies, and affective well-being during learning as well as between the narrow personality traits were allowed in each case.

To examine potential differences concerning the demographic variables gender and age, we calculated for our path model in Mplus additionally a multigroup model each for gender (groups: female vs. male) and for age (groups: older—i.e., ≥ 23 years vs. younger—i.e., ≤ 22 years, divided at median value). The allowed intercorrelations of the original path model were maintained.

Results

Descriptive Statistics

Means, standard deviations, internal consistencies of all scales, and intercorrelations between the narrow personality

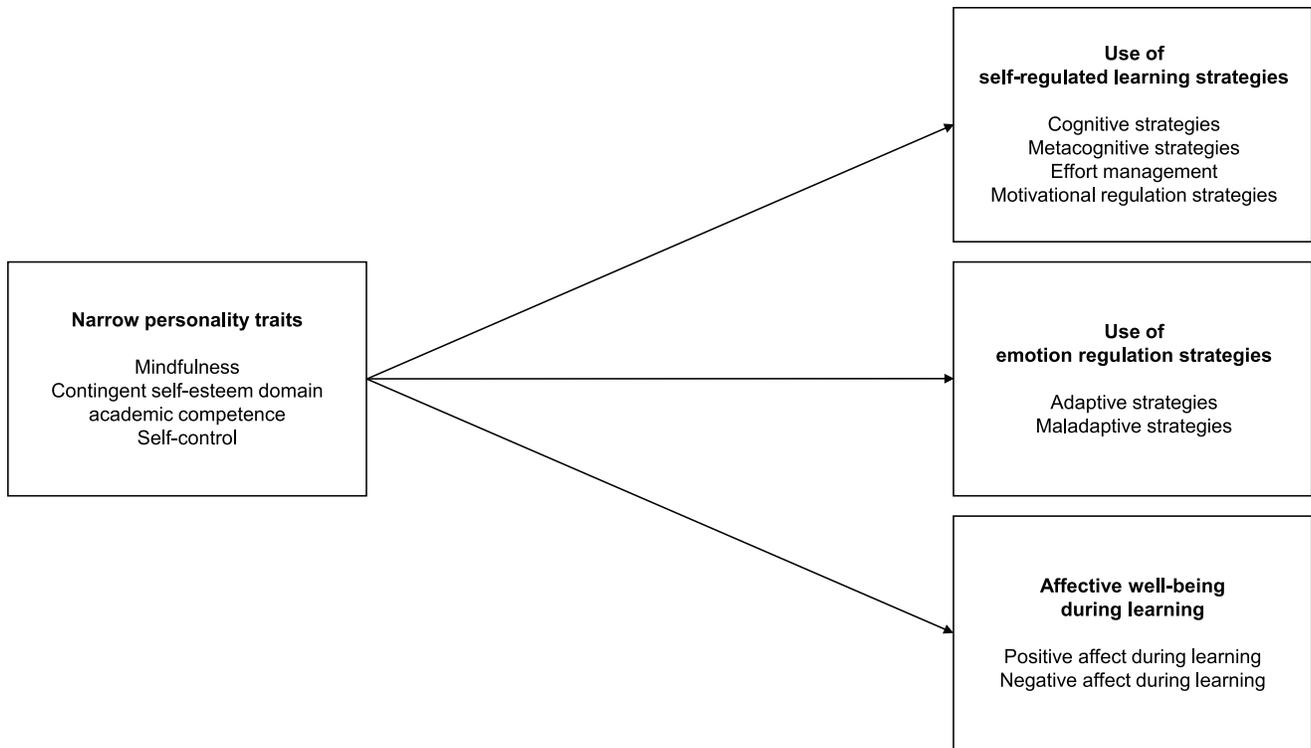


FIGURE 1. Assumed relationships between the narrow personality traits and aspects of self-regulated learning.

traits, on one hand, and between the narrow personality traits and the self-regulated learning variables, on the other, are presented in Table 1. In addition, Online Resource 1 provides a table with intercorrelations between all the self-regulated learning variables investigated.

All the scales showed at least satisfying reliabilities, with Cronbach's alphas ranging from .69 (*environmental control*) to .91 (*self-consequating*). The narrow personality traits *mindfulness* and *self-control*, and to a lesser extent *self-control* and *CSE domain academic competence*, were significantly positively correlated with each other. In contrast, *mindfulness* and *CSE domain academic competence* were significantly negatively related to each other. To varying extents, all the narrow traits were found to be significantly associated with several self-regulated learning variables.

Significant positive correlations were revealed between all the narrow personality traits and, in each case, *metacognitive strategies*, *effort management*, the extrinsic motivation regulation strategies *proximal goal setting* and *environmental control*, and *positive affect during learning*. In addition, *mindfulness* and *self-control* showed significant positive relations with *adaptive emotion regulation strategies* and were accordingly significantly negatively associated with *maladaptive emotion regulation strategies* and with *negative affect during learning*. *Self-control* and *CSE domain academic competence* were additionally significantly positively associated with the deep cognitive learning

strategies organization and elaboration, the surface cognitive learning strategy *rehearsal*, the extrinsic motivation regulation strategies *self-consequating* and *performance approach self-talk*, and the intrinsic motivation regulation strategy *mastery self-talk*. Furthermore, *mindfulness* showed significant negative correlations with the intrinsic motivation regulation strategy *mastery self-talk* and the extrinsic motivation regulation strategies *performance approach self-talk* and *performance avoidance self-talk*. Finally, *CSE domain academic competence* was significantly positively related to the extrinsic motivation regulation strategy *performance avoidance self-talk* and *maladaptive emotion regulation strategies*.

Path Analysis

Table 2 shows the results of the path analysis regarding the relations between the narrow personality traits (columns) as predictors and self-regulated learning strategies, emotion regulation strategies, as well as affective well-being during learning as outcomes (rows).

Mindfulness and *self-control* were both significantly positively associated with *adaptive emotion regulation strategies* and showed correspondingly significant negative associations with *maladaptive emotion regulation strategies* and *negative affect during learning*. Both *self-control* and *CSE domain academic competence* showed significant positive

TABLE 1
Means, Standard Deviations, Reliabilities, and Intercorrelations

Variable	<i>M</i> (<i>SD</i>)	α	(1)	(2)	(3)
Mindfulness (1)	3.39 (0.62)	.85	1		
Self-control (2)	2.98 (0.64)	.84	.34**	1	
CSE: academic competence (3)	3.63 (0.79)	.84	-.18**	.09*	1
Organization	3.61 (0.75)	.80	.04	.34**	.20**
Elaboration	3.42 (0.71)	.83	.07	.13**	.11*
Rehearsal	3.45 (0.76)	.79	.07	.29**	.20**
Metacognitive strategies	3.56 (0.54)	.73	.17**	.39**	.22**
Effort management	3.55 (0.68)	.80	.13**	.57**	.32**
Enhancement of situational interest	2.69 (0.94)	.89	-.02	.07	.03
Enhancement of personal significance	3.17 (0.98)	.87	.03	.06	.07
Self-consequating	3.81 (1.00)	.91	.05	.14**	.17**
Proximal goal setting	3.58 (0.86)	.79	.11*	.29**	.21**
Mastery self-talk	3.15 (0.89)	.78	-.12**	.26**	.36**
Performance approach self-talk	3.60 (0.98)	.90	-.11*	.15**	.54**
Performance avoidance self-talk	2.23 (1.06)	.80	-.29**	-.09	.39**
Environmental control	3.43 (0.86)	.69	.12**	.32**	.11*
Adaptive emotion regulation strategies	3.42 (0.58)	.81	.21**	.22**	-.05
Maladaptive emotion regulation strategies	2.67 (0.58)	.76	-.46**	-.24**	.26**
Positive affect during learning	3.14 (0.70)	.87	.11*	.34**	.19**
Negative affect during learning	1.97 (0.71)	.88	-.36**	-.24**	.03

Note. CSE = contingent self-esteem.
* $p < .05$. ** $p < .01$.

TABLE 2
The Narrow Personality Traits as Predictors of the Self-Regulated Learning Variables

Variable	Mindfulness				Self-control				Contingent self-esteem domain academic competence			
	β	95% CI	SE	p	β	95% CI	SE	p	β	95% CI	SE	p
Organization	-.058	-.145, .030	.045	.194	.338	.257, .419	.041	<.001	.157	.074, .239	.042	<.001
Elaboration	.049	-.044, .142	.048	.306	.111	.020, .201	.046	.016	.101	.013, .189	.045	.024
Rehearsal	-.001	-.090, .088	.045	.975	.273	.189, .357	.043	<.001	.161	.078, .245	.043	<.001
Metacognitive strategies	.079	-.005, .163	.043	.065	.341	.263, .420	.040	<.001	.198	.119, .276	.040	<.001
Effort management	-.014	-.088, .060	.038	.713	.542	.478, .606	.033	<.001	.261	.192, .331	.035	<.001
Enhancement of situational interest	-.030	-.124, .064	.048	.529	.095	.004, .187	.047	.041	.012	-.077, .101	.045	.796
Enhancement of personal significance	.027	-.068, .122	.048	.579	.065	-.028, .157	.047	.169	.079	-.011, .168	.046	.084
Self-consequating	.033	-.060, .126	.047	.487	.123	.033, .214	.046	.007	.166	.079, .253	.044	<.001
Proximal goal setting	.061	-.028, .150	.045	.178	.249	.165, .334	.043	<.001	.187	.104, .270	.042	<.001
Mastery self-talk	-.169	-.255, -.084	.044	<.001	.297	.215, .378	.041	<.001	.288	.209, .366	.040	<.001
Performance approach self-talk	-.070	-.149, .010	.041	.086	.119	.041, .196	.040	.003	.515	.449, .580	.033	<.001
Performance avoidance self-talk	-.214	-.298, -.130	.043	<.001	-.055	-.138, .028	.042	.196	.355	.279, .431	.039	<.001
Environmental control	.022	-.068, .111	.046	.636	.303	.219, .386	.043	<.001	.084	.000, .169	.043	.050
Adaptive emotion regulation strategies	.153	.063, .244	.046	.001	.169	.080, .257	.045	<.001	-.043	-.130, .043	.044	.329
Maladaptive emotion regulation strategies	-.381	-.457, -.304	.039	<.001	-.128	-.207, -.049	.040	.002	.210	.134, .286	.039	<.001
Positive affect during learning	.039	-.049, .127	.045	.384	.314	.231, .396	.042	<.001	.149	.067, .232	.042	<.001
Negative affect during learning	-.325	-.410, -.240	.043	<.001	-.127	-.213, -.041	.044	.004	-.011	-.095, .074	.043	.804

relations to the deep cognitive strategies *organization* and *elaboration*, the surface cognitive strategy *rehearsal*, *metacognitive strategies*, *effort management*, *positive affect during learning*, the intrinsic motivation regulation strategy *mastery self-talk*, and the extrinsic motivation regulation strategies *self-consequating*, *proximal goal setting*, and *performance approach self-talk*. In addition, *mindfulness* was significantly negatively related to the intrinsic motivation regulation strategy *mastery self-talk* and the extrinsic motivation regulation strategy *performance avoidance self-talk*. *Self-control* was additionally significantly positively associated with the intrinsic motivation regulation strategy *enhancement of situational interest* and the extrinsic motivation regulation strategy *environmental control*. Moreover, *CSE domain academic competence* was significantly positively related to the extrinsic motivation regulation strategy *performance avoidance self-talk* and *maladaptive emotion regulation strategies*.

Multigroup Models

The multigroup models revealed no significant differences between the respective groups (female vs. male, older vs. younger), so the results of our path analysis can be considered stable both for gender ($\chi^2_{\text{male}} = 147.851$, $df_{\text{male}} = 135$; $\chi^2_{\text{female}} = 2.019$, $df_{\text{female}} = 2$; $\chi^2_{\text{difference value}} = 145.832$, $df_{\text{difference value}} = 133$, critical value $_{df=133, \alpha=.05} = 160.915$; $\chi^2_{\text{difference value}} < \text{critical value}_{df=133, \alpha=.05}$) and for age ($\chi^2_{\text{younger}} = 146.377$, $df_{\text{younger}} = 135$; $\chi^2_{\text{older}} = 0.456$, $df_{\text{older}} = 2$; $\chi^2_{\text{difference value}} = 145.921$, $df_{\text{difference value}} = 133$, critical value $_{df=133, \alpha=.05} = 160.915$; $\chi^2_{\text{difference value}} < \text{critical value}_{df=133, \alpha=.05}$).

Discussion

Based on Boekaerts's theoretical framework model (e.g., Boekaerts, 2011; Boekaerts & Niemivirta, 2000), the aim of the present study was to examine the extent to which selected narrow personality traits of students are associated with various self-regulated learning aspects. As presumed, path analysis revealed that the selected narrow traits altogether were meaningfully related to many of the investigated self-regulated learning variables. The results for the individual narrow personality traits are discussed separately below.

Mindfulness

The findings of the path analysis partly conform to our assumptions for mindfulness. As expected, there were no significant positive relations with extrinsic motivation regulation and surface cognitive strategies. In contrast, however, path analysis did not reveal significant positive links to effort management, metacognitive strategies, intrinsic motivation regulation, and deep cognitive strategies. The missing

links according to path analysis may be explained to some extent by the fact that a part of the variance of mindfulness was bound by one of the other narrow personality traits since all the predictor variables were simultaneously included in our path model. Mindfulness and self-control correlated moderately, while the other intercorrelations of the narrow traits were either very low (self-control, CSE) or negative (mindfulness, CSE). The reported link between mindfulness and self-control is in line with previous studies (e.g., Bowlin & Baer, 2012) and is also conceptually reasonable since both concepts may reinforce each other (i.e., greater ability to overcome impulsive behavior can help one perceive things attentively and without judging, and vice versa). Correlation analysis revealed that for mindfulness—unlike for self-control and CSE—various other relationships with the self-regulated learning variables existed that were predominantly in line with our hypotheses. It is therefore likely that in path analysis the effects of mindfulness were reduced due to shared variance with self-control.

In Boekaerts's model, more mindful students did not, as assumed, tend to have a more intrinsic approach to learning that made them focus on the task in mastery mode. It revealed that mindfulness does not make the pursuit of one of Boekaerts's purposes for self-regulated learning more likely, implying that more mindful students tended mainly neither to mastery nor to coping mode. Even considering the variance skimmed off by self-control in path analysis, mindfulness showed considerably fewer positive relations to the learning strategies investigated compared with the other two narrow personality traits. A possible explanation for this finding is that mindfulness is conceptually located further away from or is more independent of the academic learning and achievement context than self-control, which can be regarded as an advantageous general basic skill for this context (see Bertrams & Dickhäuser, 2009a), and CSE domain academic competence, which directly concerns this context. Mindfulness, in contrast, may be considered more broadly as a beneficial basic attitude for psychological well-being (see Brown & Ryan, 2003), including healthy emotion regulation (see Roemer et al., 2015). This consideration is reflected in our path-analytical findings that mindfulness was particularly beneficial for emotion regulation (concerning anxiety) and affective well-being during learning; that is, it was positively associated with the emotional and affective aspects of self-regulated learning.

CSE Domain Academic Competence

Our assumptions for CSE domain academic competence are partly supported by the path-analytical findings. As hypothesized, there were significant positive associations with effort management, the surface cognitive strategy rehearsal, and primarily several extrinsic motivation regulation strategies, as well as no significant positive relations to

most intrinsic strategies. In addition to our hypotheses, further significant positive links with various other strategies also emerged: deep cognitive strategies, metacognitive strategies, and the intrinsic motivation regulation strategy mastery self-talk.

In contrast to the study on global CSE (Opelt & Schwinger, 2017), the students in this study with a self-esteem highly contingent on academic competence did not exclusively use effort management and surface or extrinsic strategies, due to their focus on self-esteem protection, but a broader spectrum of learning strategies, also including some deep or intrinsic strategies as well as even metacognitive strategies. One explanation for this multitude of relations between CSE domain academic competence and self-regulated learning strategies is that students who derived their self-esteem to a large extent from the results of their academic performance were highly engaged in maintaining or improving their performance to strengthen their self-esteem. Confronted with upcoming exams, they seemed to be driven intensively to use various learning strategies, adapted to the respective current learning contents as well as the examination requirements, to ensure self-esteem protection through academic performance as far as possible. As an example, if it was foreseeable that the mere acquisition of knowledge through surface strategies would not be enough for learning success or the avoidance of failure, these students pursued a deeper understanding of contexts through the use of appropriate deep strategies.

According to our assumptions, students with a high CSE regarding academic competence tended to choose maladaptive rather than adaptive strategies to regulate emotions (concerning anxiety). But since these students had a positive relationship to positive affect during learning, no emotion regulation strategies needed to be applied during learning. In the sense of Boekaerts's model, emotion regulation strategies are only activated as coping strategies in coping mode when negative emotions are perceived in the learning context (see Boekaerts & Niemivirta, 2000; Panadero, 2017). One possible explanation for the finding that students with a self-esteem highly contingent on academic competence tended to experience positive affect during learning, deviating from indications from previous research (e.g., Kernis et al., 2008; Schöne et al., 2015), is that these students seemed to be able to learn successfully by choosing learning strategies from a wide range of possible strategies adapted to the current learning requirements, so that their self-esteem was protected or even strengthened, which in turn was accompanied by positive affect during learning.

Referring to Boekaerts's model, it became evident that students who made their self-esteem largely dependent on their academic competence were not restricted to the coping mode. This reveals that CSE domain academic competence made the pursuit of not only Boekaerts's second purpose but also her third purpose for self-regulated learning more likely,

implying that students with a self-esteem highly contingent on academic competence tended both to coping and to (change from coping into) mastery mode. Their need for self-esteem protection, achievable through academic success, seemed to act as a strong incentive to apply learning strategies appropriate to current learning demands. These strong energies released for learning apparently made it possible for them to switch to mastery mode, if required for their learning success and thus self-esteem protection. In this context, their willingness to make an effort to pursue their goals in the academic domain that were relevant to their self-esteem (see Crocker et al., 2003) was probably beneficial.

Self-Control

Path analysis revealed results largely consistent with our hypotheses. Self-control was significantly positively connected to effort management and to several surface and deep cognitive as well as intrinsic and extrinsic motivation regulation strategies. In addition, self-control was significantly positively associated with metacognitive strategies. The perseverance component of the construct grit, which denotes that individuals are able to "sustain the time and energy necessary for accomplishing long term tasks even in the face of distractions" (Wolters & Hussain, 2015, p. 294), has proven to be a meaningful predictor of cognitive, metacognitive, motivational, and management strategies. Since self-control is conceptually similar to the grit component perseverance, it is pertinent that self-control was also positively related to several self-regulated learning strategies from these four categories, including metacognitive strategies.

Depending on their current learning context and motivation level, highly self-controlled students were thus able to use their skills for the purpose of applying appropriate self-regulated learning strategies selected from the large pool of possible strategies. Referring to Boekaerts's model, students with strong self-control were, as expected, able to start their learning process both in mastery and in coping mode. In the latter case, they were then qualified to change into mastery mode, thereby securing their engagement for learning activities, for example, by applying deep cognitive strategies adequate to the learning matter.

Thus, our study revealed that self-control was, as assumed, able to make the pursuit of all three purposes of self-regulated learning according to Boekaerts more likely, implying that highly self-controlled students tended both to mastery and to coping mode with the option to change into mastery mode.

Because being self-controlled implies being able to regulate one's thoughts, emotions, and behaviors (see Tangney et al., 2004) and is considered a basic skill for the context of academic learning (see Bertrams & Dickhäuser, 2009a), with basically positive relations to emotion regulation (see Paschke et al., 2016) and affective well-being (see Hofmann

et al., 2014), self-control may be beneficial for a wide range of self-regulated learning aspects, including students' use of diverse learning strategies as well as emotional and affective variables. The findings of the present study are consistent with this line of argument and accordingly showed positive connections of self-control with emotion regulation (concerning anxiety) and affective well-being during learning.

Summary of the Relations Between Narrow Traits and Self-Regulated Learning

Mindfulness is not to be considered irrelevant to self-regulated learning as a whole but has proven to be primarily relevant to emotional and affective self-regulated learning variables and less relevant to the use of specific learning strategies. Apart from the aspect of emotion regulation (concerning anxiety), CSE in the domain academic competence has turned out to be quite beneficial for self-regulated learning variables such as the use of various learning strategies and possibly even affective well-being during learning. Self-control emerged as a very relevant and exclusively beneficial narrow trait for a wide range of self-regulated learning aspects. These include diverse learning strategies from all four main categories as well as emotional and affective variables. In sum, the selected narrow personality traits proved to be meaningfully related to a wide range of self-regulated learning aspects. Self-control is to be regarded as the most beneficial narrow trait, while mindfulness was shown to be less relevant than self-control and CSE domain academic competence in the context examined.

Practical Implications for Promoting Self-Regulated Learning

The present investigation contributes to an understanding of the extent to which narrow personality traits are linked to aspects of self-regulated learning. Since the ability to learn in a self-regulated way is particularly important for adult learners such as university students (Bembenuddy, 2011), the findings of this study could be used in the development of training and counseling services at universities. Depending on their levels of specific narrow personality traits, students could be trained or advised with the purpose of optimizing their self-regulated learning skills.

Promoting several self-regulated learning strategies simultaneously through training in one or more narrow personality traits could be a worthwhile alternative to the often time- and cost-intensive efforts to teach a large number of individual learning strategies directly. This alternative approach to promote one or more narrow traits associated with several strategies of self-regulated learning could facilitate self-regulated learning more broadly and economically than training for individual strategies. In practice, the promotion of self-regulated learning through

trainings to improve narrow personality traits would be made feasible by implementing these short training courses at universities, possibly combined with a smartphone app that students could use in their everyday routine. Various illustrations of so-called wise interventions (Walton, 2014) show that narrow traits, for example, in the form of certain beliefs, can sometimes be changed by very brief interventions. For example, Paunesku et al. (2015) demonstrated that two 45-minute academic mind-set interventions targeting students' core beliefs about school and learning (Can I learn and grow my intelligence? Why should I learn?) led to a substantial increase in low-achieving students' grade point average.

Our analysis revealed that it would be expedient to train in self-control in order to promote a very broad spectrum of self-regulated learning strategies at the same time. Furthermore, positive impacts on affective and emotional self-regulated learning aspects may also be expected. It is empirically proven that self-control is generally trainable. A meta-analysis of self-control training effects (33 studies, 158 effect sizes) showed a small to medium effect ($g = .30$, 95% confidence interval: $[.17, .42]$, $p < .001$). Diverse training types were used (e.g., inhibitory control tasks on the PC, everyday tasks with the nondominant hand). Average age was 21.63 years, and average sample size was $n = 79$, with mostly females and student samples. Moderator analyses revealed significantly larger training effects for outcomes after effortful tasks (requiring stamina) but no significant differences concerning training type, duration, gender ratio, and lab versus real-world context. Overall, it seems that self-control can be generally trained across various contexts and domains (Friese et al., 2017). Most trainings included in the meta-analysis lasted 2 weeks, which supports our assumption that narrow traits can be influenced by short-term interventions. Indicating the same for mindfulness, a recent meta-analysis by Schurer et al. (2018) revealed a small but significant effect of brief mindfulness trainings—from single-session inductions to multisession interventions lasting up to 2 weeks—in reducing negative affectivity compared with control programs ($g = .21$, $p < .001$). However, since mindfulness has proven to be comparatively less relevant to self-regulated learning strategies, it is not recommended to train for mindfulness in this context, instead of or in addition to self-control. CSE domain academic competence should not be explicitly promoted. This narrow trait turned out to be, indeed, meaningfully positively related to a wide range of self-regulated learning strategies, but the risk of a simultaneous promotion of negative relations of a high level of CSE domain academic competence (e.g., positive associations with depressive symptoms; Schöne et al., 2015) would be problematic.

Nevertheless, the investigation of CSE domain academic competence in the context of self-regulated learning provided important insights for possible counseling services at

universities. In the sense of an aptitude-treatment interaction (see, e.g., Snow, 1991) and based on their identified relations to self-regulated learning strategies, students with high levels of CSE domain academic competence and with problems applying or, rather, choosing self-regulated learning strategies could be advised on strategy selection. Such counseling services could aim to support these students in selecting appropriate learning strategies from the pool of possible strategies adapted to their current learning demands to protect their self-esteem through more likely academic success.

Despite the promising avenues for training in narrow traits to promote self-regulated learning, one has to be cautious not to overstate the efficacy of those interventions. Given that intervention studies for mindfulness and self-control have reported small to medium effects and given our own findings that these narrow traits show small to medium associations with self-regulated learning, the efficacy of trainings for narrow traits may be limited.

Limitations and Suggestions for Future Research

Since our study is one of the few so far that examined explicitly the relationships between narrow personality traits and self-regulated learning variables, further studies should investigate to what extent our study results are replicable as well as extend the present study. We examined predominantly female university students. Multigroup models showed that our study results can be regarded as robust for gender and age. Nevertheless it is questionable whether the results are generalizable to diverse other samples. Moreover, we focused on anxiety regulation, so the results are not generalizable to other emotions. Future studies should investigate emotion regulation strategies for other emotions such as anger or sadness. The narrow personality traits examined represent a preselection based on the three purposes of self-regulated learning according to Boekaerts (2011). It has been shown that only one of the narrow traits, self-control, completely corresponded to one of the three purposes. Therefore, other narrow traits that are conceptually located closer to the academic context than, for example, mindfulness, may be examined in further studies to gain a more comprehensive understanding of the relationships between narrow personality traits and aspects of self-regulated learning.

Based on questionnaires, it is not possible to examine the quality of the self-regulated learning strategies used (Leutner & Leopold, 2006). For this reason, observation methods should additionally be applied in the future to measure the extent of the effectiveness of strategy use (Landmann et al., 2015). As an important limitation, the present study did not examine causal relationships between narrow personality traits and self-regulated learning variables. Reciprocal effects are also possible—for example, that the use of strategies such as proximal goal setting and organization leads to

a higher degree of self-control. To investigate causal relationships in the future, experimental or longitudinal study designs could be used. Further insights into the relationships between narrow personality traits and aspects of self-regulated learning could be gained in future studies by examining which combinations of selected narrow personality traits are most associated with self-regulated learning variables. In this context, it would also be important to examine the extent to which higher- and lower-performing students show different profiles of narrow personality traits. For this purpose, latent profile analyses could be carried out. This would provide further evidence for the development of training and counseling services for university students (and other adult learners)—for example, which combinations of narrow personality traits are most useful in relation to self-regulated learning.

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Notes

1. In the present study, no fit indices are given for the calculated path model. Saturated path models have no degrees of freedom, which is why they cannot be judged based on current fit indices.

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