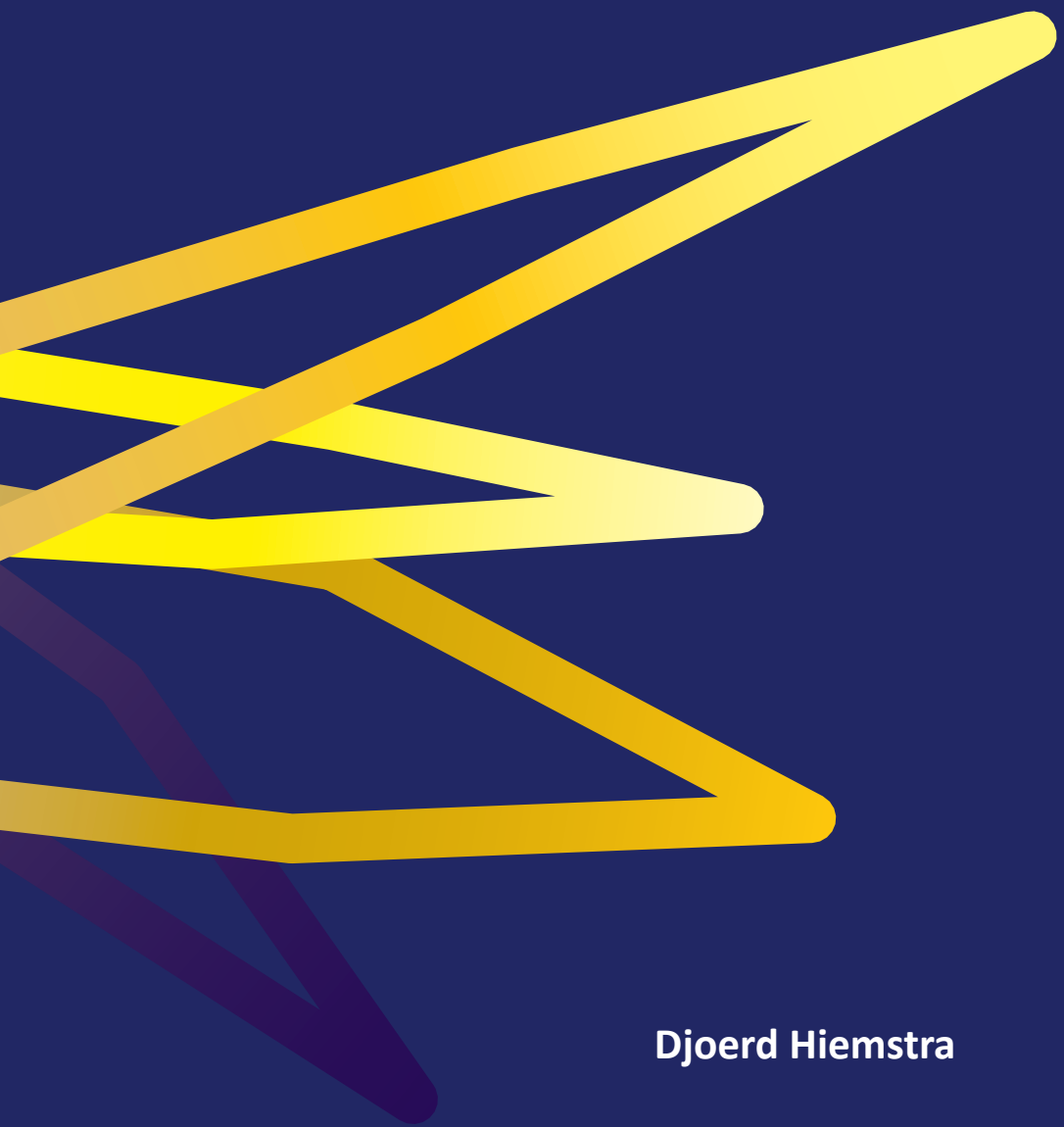
Focus on Your Strengths?

The Role of Perceived Relative Strengths versus Weaknesses in Learning Effort



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CHAPTER 1

Introduction

1 Introduction

In our present society, our success in life greatly depends on our competence - that is, the extent to which we master certain knowledge, skills, and attitudes. Therefore, strategies that may enhance individuals' learning are of great value. In this dissertation we examined a self-regulatory strategy that may bolster individuals' motivation to learn: *focusing on strengths*. Focusing on strengths entails that individuals identify their relative strengths and weaknesses and subsequently engage in learning activities that fit their strengths rather than their weaknesses. In the past decade, the notion of focusing on strengths has gained substantial resonance among practitioners in the fields of education and human resource development. However, research backing this practice is scarce. Although a vast amount of research has examined the role of self-perceived competence in motivation, not much research has specifically looked into the role of perceived strengths in motivation to learn. We do not know whether individuals who have the choice of working on multiple topics or skills are willing to put more effort into their learning when they work on their strengths rather than their weaknesses. In the present dissertation, we addressed this issue by examining the role of perceived relative strengths versus weaknesses in learning effort.

1. Motivating Individuals to Learn: Focus on Your Strengths?

How to become good at something? Across a variety of domains, including sports, music, academic, and professional competence, research shows that extended engagement in goal-directed learning activities is essential to attain high levels of competence (for reviews, see Ericsson, Krampe, & Tesch-Römer, 1993; Ericsson & Lehmann, 1996). For example, in a classic study on expertise development, Ericsson et al. (1993) examined the musical development of elite violinists. Their results showed that the more accomplished musicians had spent considerably more time in deliberate practicing. By the age of 20, the group of best musicians had spent over 10,000 hours on practicing; on average, 2,500 and 5,000 hours more than the good and the least accomplished musicians, respectively. These findings clearly illustrate the importance of effort for learning. To develop competence, individuals have to invest time and energy in goal-directed learning activities. Therefore, the key to learning is motivation, which is the psychological process whereby goal-directed efforts are instigated and sustained (Schunk, Meece, & Pintrich, 2014). To invest time and effort in learning activities, individuals have to be motivated.

Unfortunately, motivation for learning is not always abundant. Students often struggle to commit themselves to their studies, and many professionals find it hard to allocate sufficient time to their professional development (Brophy, 2013; Mahatmya, Lohman, Matjasko, & Farb, 2012; National Education Commission on Time and Learning, 2005; Rumberger & Rotermund, 2012). Moreover, in daily life, individuals' learning and development endeavors compete with other pressing demands, such as productivity targets at work, family obligations, and leisure activities. Consequently, engaging in learning activities may place considerable demands on individuals' motivation. Therefore, there is an obvious need for strategies that may help individuals to strengthen their motivation for learning.

Furthermore, a case can be made that motivation to learn may be even more important in the future than it has been in the past. Referring to developments such as globalization, the implementation of new technologies, and the flexibilization of labor relations, many scholars have outlined the highly dynamic character of our present societies (Bennett, Dawes, & Cunningham, 2012; Friedman & Phillips, 2004; Jarvis, 2004; Knapper & Cropley, 2000; Webster-Wright, 2009). In Western countries, markets, products, methods, procedures, organizations, and jobs are often subject to frequent change. Therefore, it is imperative for professionals to guard their employability and to keep their skills and knowledge up to date.

Accordingly, for many educational institutions, an important objective is to educate students to become self-regulating learners; to breed professionals who are able and driven to self-initiate, direct, and maintain their competence development throughout their career (Boekaerts, 1997; Bolhuis, 2003; Candy, 2000; Loyens, Magda, & Rikers, 2008; Zimmerman, 1990). Likewise, an important objective in human resource development (HRD) is to encourage professionals to self-regulate their professional development. Many employers aim to stimulate their employees to proactively work on their professional competence, to maintain their added value, and to keep pace with organizational change (Chalofsky, Rocco, & Morris, 2014; DeSimone, Werner, & Harris, 2002; Knowles, Holton III, & Swanson, 2014; Swanson & Holton, 2001).

In this context, the key question in the present dissertation was: How to motivate individuals to learn? How can we motivate students to put effort into their studies, and how can we motivate professionals to put effort into their professional development? Specifically, we were interested in the motivating potential of a self-regulatory strategy that has been proposed to enhance individuals' learning and professional development: *focusing on strengths*. In the past decade, a steady stream of popular publications has emerged, proposing that to stand out at school or at work individuals should focus on their strengths. Some of these titles, such as *Now, Discover Your Strengths* (Buckingham & Clifton, 2001) and *Strengths Finder* (Rath, 2007) are among the best-sellers in the management book genre. Moreover, strengths-based development methods, such as *Strengths Quest* (Clifton, Anderson, & Schreiner, 2002), *VIA Signature Strengths* (Peterson & Seligman, 2004), and *Realise2* (Linley, Willars, & Biswas-Diener, 2010), are being applied on a substantial scale in education and HRD. Typically, these methods use a self-assessment instrument to help individuals to identify their perceived relative strengths and weaknesses, and advise them to use and further develop their strengths in academia, at work, or in their personal lives. For example, the Strengths Quest method (Clifton et al., 2002) entails that students complete an online questionnaire, the outcome of which displays a personal rank order of 34 competencies ranging from their perceived relative strengths to weaknesses. Next, the participants reflect on how they may use and further develop their highest ranked competencies (i.e., their perceived relative strengths). Subsequently, they draw a personal development plan in which they specify how they intend to work on those strengths; for example, by engaging in learning and professional development activities that fit their strengths.

The reception of strengths-based development methods by practitioners clearly illustrates their appeal and practical relevance. The question is, however,

whether focusing on strengths is beneficial for learning. In psychological research, the concept of strengths was put on the empirical agenda by proponents of positive psychology. In January 2000, in a special issue of *The American Psychologist*, Seligman and Csikszentmihalyi (p. 7) posited that "*… the time has arrived for a positive psychology, our message is to remind our field that psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue. Treatment is not just fixing what is broken; it is nurturing what is best.*" Indeed, since 2000, a growing amount of research has been dedicated to the study of strengths. However, this work has predominantly focused on the role of character strengths in well-being (for reviews, see Cameron & Spreitzer, 2012; Lopez, Pedrotti, & Snyder, 2015). Within the framework of positive psychology, not much research has examined the role of strengths in motivation to learn (however, Austin, 2005; Louis 2008).

In addition to the research instigated by the agenda of positive psychology, a line of inquiry that is particularly relevant for our research question is the research on the role of self-perceived competence in motivation: obviously, focusing on strengths appeals to the commonly held notion that believing oneself to be competent is motivating. Since the late 1950s, a vast amount of research has investigated the role of competence self-perceptions in motivation (Elliot, McGregor, & Thrash, 2002; for reviews, see Baumeister, Campbell, Krueger, & Vohs, 2003; Colquitt, LePine, & Noe, 2000; Multon, Brown, & Lent, 1991; Richardson, Abraham, & Bond, 2012; Sitzmann & Ely, 2011; Vancouver, More, & Yoder, 2008). However, we cannot conclude from this body of research that focusing on strengths is positively related to motivation. On the one hand, many studies have found positive relations between self-perceived competence and motivation (see, e.g., Multon et al., 1991). On the other hand, negative relations have been observed as well (see e.g., Vancouver et al., 2008). What is more, little research has specifically examined the role of *perceived relative competence across multiple separate goals* (i.e., perceived relative strengths versus weaknesses) and motivation to learn. Despite a vast amount of research on the role of self-perceived competence in motivation, we do not know whether in multiple goal contexts, such as education and professional development, when individuals have the choice of working on different topics or skills, individuals tend to put more effort into their learning when they work on topics or skills they believe they are good at rather than not good at. The present research was aimed at addressing this issue.

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1.1. Outline of This Introduction

In this introductory chapter, we first define the concept of focusing on strengths more precisely. Next, we discuss the concept of motivation. We then consider the concepts of self-perceived competence and perceived relative strengths versus weaknesses. After defining our central concepts, we discuss the extant literature on the role of competence self-perceptions, and perceived strengths versus weaknesses, in learning effort. Finally, we set the stage for the empirical research in this dissertation. Based on our discussion of the extant literature, we outline our research model, define our research questions, and give a brief overview of the empirical studies in this dissertation.

2. Focusing on Strengths: A Self-Regulated Learning Strategy

The ultimate aim of this dissertation is to help students and professionals to bolster their learning and development endeavors. Accordingly, we examined individuals' learning from a self-regulatory perspective (Boekaerts, Pintrich, & Zeidner, 2000; Vohs & Baumeister, 2011; Zimmerman & Pons, 1986; Zimmerman & Schunk, 2011). This perspective implies that we regard individuals as active agents who are able to exercise control over their behavior, rather than passive intermediates who merely respond to external stimuli. In this section we first outline a conceptual framework of self-regulated learning. Based on this framework, we then define what we mean by focusing on strengths.

2.1. A phase model of self-regulated learning

Self-regulated learning (SRL) refers to the cognitive processes that influence individuals' learning efforts, as well as to the strategies that individuals employ to influence their learning efforts (Zimmerman & Pons, 1986). A common framework for describing self-regulated learning processes and strategies is the phase model of SRL (Zimmerman & Kitsantas, 2005). This model depicts learning as a self-regulatory process which includes three cyclical phases (see *Figure* 1): self-reflection (looking back on one's prior learning efforts), forethought (looking forward to one's subsequent learning efforts), and performance control (regulating one's present learning efforts).

2.1.1. The self-reflection phase

The self-reflection phase involves the cognitive and behavioral processes that occur in response to external and internal feedback on individuals' prior learning performances. Major self-reflection processes include *self-evaluations* (individuals' self-assessments of whether their performance was good or not), *causal attributions* (individuals' explanations of why their performance was good or not), *self-satisfaction* (individuals' positive or negative feelings regarding their performance), and *adaptive inferences* (individuals' conclusions about whether and how to alter their subsequent learning efforts). For example, in response to his (i.e., his or her) test outcomes, a student may believe that mathematics is one of his strengths, whereas English is one of his weaknesses (self-evaluation). He may think that this is due to his greater talent for math than for English (causal attribution), feel more positive about his math performance (self-satisfaction), and believe he would be better advised to go further into math than into English (adaptive inference).

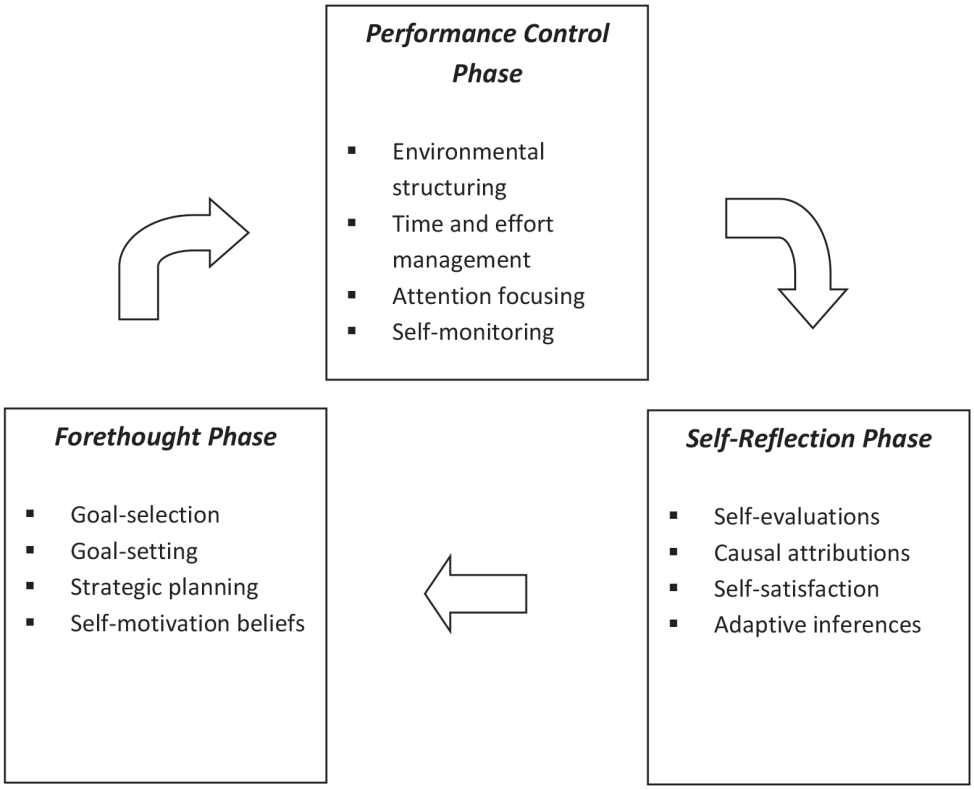


Figure 1. Phase model of self-regulated learning

2.1.2. The forethought phase

The forethought phase concerns the processes that set the stage for individuals' subsequent learning efforts. Major forethought processes include *goal-selection* (individuals' choices regarding which goals to pursue), *goal-setting* (individuals' decisions on which standards to pursue), *strategic planning* (individuals' intentions for how to pursue their goals), and *self-motivation beliefs* (individuals' competence self-perceptions, intrinsic interests, and values regarding those goals and standards). For example, a student may decide one afternoon to work on both a math and an English-language assignment (goal-selection). He may perceive math rather than English as a personal strength and believe that math is more enjoyable and more important than English (self-motivation beliefs). He may aim for no less than an A on the math assignment, while settling for a C on the English assignment (goal-setting). Accordingly, he may decide to work for three hours on math and after that for one hour on English (strategic planning).

2.1.3. The performance control phase

The performance control phase concerns the processes that regulate individuals' efforts while performing their learning activities. Performance control involves *environmental structuring* (organizing one's workplace), *time and effort management* (allocating one's time and energy), *attention focusing* (concentrating), and *self-monitoring* (observing one's progress and performance). For example, a student may choose to work in the library (environmental structuring), take a 10-minute break each hour (time and effort management), observe that he is making fast progress on the math assignment (self-monitoring), and decide to complete the math assignment sooner in order to spend some extra time on the English assignment (time and effort management).

Individuals' learning performances in the performance control phase, in turn, form the input for their subsequent reflection in the self-reflection phase, which closes the circle.

2.2. Focusing on strengths

Using the phase model of SRL, we can now define focusing on strengths more precisely. In terms of the phase model of SRL, focusing on strengths can be defined as a self-evaluation, goal-selection, and effort-management strategy which entails that individuals:

- in the self-reflection phase, based on internal and external feedback on their prior learning performances, self-assess which qualities, topics, or skills they are relatively good at (i.e., their strengths) and not good at (i.e., their weaknesses), and subsequently,
- in the forethought phase, based on self-perceptions of their relative strengths and weaknesses, select learning activities or goals to work on their strengths rather than their weaknesses, and subsequently,
- in the performance control phase, in accordance with the goal selections made in the forethought phase, perform learning activities in the area of their strengths rather than their weaknesses.

3. Motivation: Cognitions and Behavioral Effort

In this dissertation, we are interested in the motivating potential of focusing on strengths. The term 'motivation' stems from the Latin verb *movere,* which means *to move*. Accordingly, things that motivate us can be understood as things that move us. Since the early 1970s, the cognitive perspective has emerged as the dominant view in psychological research. In line with this perspective, in the present dissertation we define motivation as the psychological process whereby goal-directed activities are instigated and sustained (Schunk et al., 2014).

An implication of the cognitive perspective is that, rather than considering behavior as a direct response to external stimuli or feedback, cognitive processes are considered to influence individuals' behavior. Accordingly, cognitive models of motivation depict relations between cognitions such as perceptions, evaluations, beliefs, and attributions, on the one hand, and actual motivated behavior, which is reflected by effort and persistence, on the other hand.

A second implication of the cognitive perspective is that motivation is regarded as a multi-faceted rather than a one-dimensional concept. That is, instead of delineating an individual's motivation as a position on a single scale ranging from "not motivated" to "highly motivated", cognitive models of motivation stress that individuals can be motivated in multiple ways, and the issue is how and why individuals are motivated (Linnenbrink & Pintrich, 2002). For example, a student may be highly motivated for math, but not for English. Moreover, one student may be highly motivated for math because he enjoys doing math, whereas another student may be highly motivated for math because he believes that math is important for his future career.

Furthermore, cognitive theories of motivation typically consider motivation in relation to goals, explaining how certain qualities of individuals' goals influence their goal-directed efforts (Linnenbrink & Pintrich, 2002). For example, self-efficacy theory (Bandura, 2001) articulates how individuals' confidence in their ability to attain a goal affects their effort and persistence. Self-determination theory (Ryan & Deci, 2000) explains how motivational outcomes are affected by the locus of causality of a goal (i.e., whether the goal originates from the person's self or from external incentives), and control theory (Carver & Scheier, 1982) sets out how individuals' perceptions of discrepancies between a goal and their actual position may incite motivated behavior.

In this dissertation we focus on the role of one particular type of goal-related cognitions: namely, competence self-perceptions. This concept is discussed in the following section.

4. Competence Self-Perceptions

Psychologists have long recognized the importance of competence self-perceptions in motivation. In the late 1950s, White (1959) introduced the concept of effectance motivation, which he defined as the inherent energy representing individuals' desire for effective and competent interaction with the environment. Herewith, he defined sense of competence as individuals' subjective perceptions of their skill and ability to interact effectively with the environment (Elliot et al., 2002).

Following the early work of White, many theorists have emphasized the fundamental role of competence self-perceptions in motivation. Noteworthy, different schools of theory have postulated different terms to denote self-perceptions of competence, including self-concept, perceived competence, and self-efficacy. The definitions of these concepts overlap, although they may differ in the level of specificity of the domain of competence (Fulmer, 2014).

The term self-concept is typically used to refer to individuals' collective self-perceptions. Self-concept has been depicted as a hierarchy of self-perceptions, with a general self-concept on top and subareas of self-concepts at lower levels (Shavelson, Hubner, & Stanton, 1976). For example, an individuals' general self-concept may be formed by his or her academic self-concept, social self-concept, and physical self-concept. Academic self-concept, in turn, may be constituted by self-perceptions of specific competencies, such as math self-concept and

English self-concept. Shavelson and Bolus (1981) proposed that individuals' self-perceptions are determined by their interpretations of experiences and influenced by reinforcements and evaluations by others. In turn, these self-perceptions influence individuals' behavior, including their learning endeavors.

Perceived competence has been defined as individuals' beliefs that their abilities, skills, or capacities meet the demands of a specific domain (Boekaerts, 1991). Perceived competence is a key concept in cognitive evaluation theory (Deci & Ryan, 1985) and in the achievement goal approach (Elliot & McGregor, 2001). Cognitive evaluation theory postulates that individuals progressively develop intrinsic motivation through their evaluations of their competence. Events that satisfy individuals' need for competence enhance intrinsic motivation. The quality of individuals' motivation, in turn, determines motivational outcomes such as effort, persistence, and performance. The achievement goal approach (Elliot & McGregor, 2001) proposes that individuals' achievement goals are determined by the standards that they use to evaluate their competence. Individuals who use an interpersonal standard, rating their competence against the competence of others, endorse performance goals. In contrast, individuals who use an intrapersonal standard, rating their competence against their own (past) competence, hold mastery goals (Van Yperen, 2006). Individuals' achievement goals, in turn, affect their goal-directed behavior, including effort and achievement.

Self-efficacy, which is one of the central concepts in social cognitive theory (Bandura, 1997), is typically used in reference to a specific task. Bandura (1977) defined self-efficacy as individuals' beliefs about their capabilities to produce designated levels of performance on a task. Social cognitive theory states that individuals use various sources of information to assess their self-efficacy, including past performances, modeling, persuasion, and physiological feedback. In turn, self-efficacy beliefs are hypothesized to affect the choices that individuals make, how much effort they will expend, and how persistent they will be in the face of setbacks (Pajaris, 1996).

In the present dissertation, we use the term *competence self-perceptions* as an overarching term, which includes self-concept, perceived competence, and self-efficacy. In our empirical studies we consider competence self-perceptions at various levels of specificity: at the level of individual qualities (e.g., analytical, communicative; see Chapter 2), at the level of topics and school subjects (e.g., math, English; see Chapter 3), and at the level of specific skills and tasks (e.g., calculating or spelling; see Chapter 4). In the following section, we define

perceived strengths versus weaknesses as a distinct category of competence self-perceptions.

5. Self-Perceptions of Strengths Versus Weaknesses

An important issue in theories of self-regulation and competence motivation concerns the frame of reference that individuals use to self-assess how competent they are. In a recent review of the literature on the role of comparison processes in individuals' self-perceptions, Möller and Marsh (2013) proposed that individuals can use three types of comparisons to evaluate their competence: social comparison, temporal comparison, and dimensional comparison. First, individuals who engage in social comparisons (Festinger, 1954) use an interpersonal standard as a frame of reference to evaluate their competence. They compare their level of competence with the competence of others. For example, a student may believe that he is relatively good in math because he scores higher marks than his friends. Second, individuals who engage in temporal comparison (Albert, 1977) use a time-related intrapersonal frame of reference to evaluate their competence. That is, they compare their present level of competence with their own level of competence in the past or in the future. For example, a student may believe that he is relatively good at math because this year he is scoring better marks than last year. Third, individuals who engage in dimensional comparison use a domain-related intrapersonal frame of reference, comparing their level of competence in one domain with their competence in another domain. For example, a student may believe he is relatively good at math because he is scoring better marks for math than for English.

Building on Möller and Marsh's (2013) tri-partition of comparison processes, we can now define perceived strengths versus weaknesses more precisely. In the present research, we consider perceived strengths versus weaknesses as a specific category of competence self-perceptions. Perceiving a competence as a relative strength or weakness entails that individuals compare their competence on one domain (e.g., math) with their competence on another domain (e.g., English). Accordingly, we define perceived strengths versus weaknesses as competence self-perceptions that result from dimensional comparisons. In this dissertation, we use the term competence self-perceptions to refer to competence self-perceptions in general, which may result from social, temporal, and dimensional comparisons, and reserve the term perceived strengths versus weaknesses to

refer to competence self-perceptions that result specifically from dimensional comparisons. In the following section, we discuss the extant research on the relation between competence self-perceptions and effort.

6. The Relation Between Competence Self-Perceptions and Effort

A vast amount of research has examined the role of competence self-perceptions in motivation, including effort. In general, the extant research suggests that self-perceptions of competence are beneficial for motivation to learn. For example, in a meta-analysis of the relations between self-perceptions of competence and academic performance, Multon et al. (1991) found significant effect size estimates on various measures of effort, including time on task and number of performed items. More recently, Sitzmann and Ely (2011), in a meta-analysis of self-regulated learning in education and work-related training, reported significant meta-analytical correlations between self-perceived competence and effort. In addition, in a meta-analysis of motivation for training and development, Colquitt et al. (2000) found that self-perceived competence was significantly positively related to motivation to learn. These findings indicate that competence self-perceptions are positively related to effort. However, we cannot conclude from this body of research that individuals' learning effort will benefit from focusing on strengths. Important issues remain to be addressed.

First, interventions targeting individuals' competence self-perceptions in order to enhance learning have not proved very successful. For example, in a review of the literature on the role of self-esteem in attainment, Baumeister et al. (2003) concluded that enhancing individuals' self-evaluations does not enhance their learning. They reasoned that *"a high correlation between people's success at doing … [a task] and their self-evaluation for this task may simply result from people's awareness of their ability in this domain. If so, any attempts to improve performance by way of enhancing self-esteem would fail."* (p. 6). Indeed, enhancing competence self-perceptions in order to enhance learning has become controversial. However, the question is whether the conclusions of Baumeister et al. (2003) apply to focusing on strengths. Although focusing on strengths can be regarded as a strategy targeting competence self-perceptions, it does not strictly entail *enhancing* individuals' competence self-perceptions. Instead, focusing on strengths entails building on existing relatively high levels of self-perceived competence, by engaging in learning activities that are aimed at improving

competencies that individuals are relatively good at, rather than not good at. Therefore, we cannot simply deduce the motivational consequences of working on strengths from the extant knowledge of other self-enhancing interventions, such as self-affirmations (Forsyth, Lawrence, Burnette, & Baumeister, 2007; Sherman & Cohen, 2006) or positive feedback (Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Vallerand & Reid, 1984). Hence, research is needed to examine the motivational consequences of focusing on strengths versus weaknesses.

Second, despite a vast amount of research showing positive relations between self-perceived competence and effort, a number of studies indicate that at the within-person level negative relations can be observed (for a review, see Vancouver et al., 2008). For example, Vancouver and Kendall (2006) found that students invested less effort in their learning when preparing for tests for which they felt more competent, relative to tests for which they felt less competent. Thus, students may put less effort into their learning when they believe they are good rather than not good at something. In the light of these findings, it is conceivable that negative relations between perceived relative strengths versus weaknesses and effort exist. Therefore, in this dissertation, we examined the relations between perceived relative strengths versus weaknesses and effort, using both between-person (Chapter 2) and within-person (Chapter 3) designs, and investigated the role of variables that may moderate these relations (Chapter 4).

Third, research has typically examined the relations between competence self-perceptions in single-goal contexts, whereas perceived relative strengths emerge in multiple-goal contexts. Therefore, multiple-goal research is required to examine the relations between perceived strengths and effort. In a single goal context, focusing on strengths or weaknesses is not a relevant self-regulatory strategy. When individuals have one single goal, they cannot focus on another goal. However, applied contexts, such as school and work, are typically multiple-goal-contexts, in which individuals work on multiple goals during the same period of time. In such contexts, focusing on strengths or weaknesses is a relevant strategy. When individuals pursue multiple goals, they are likely to possess self-perceptions of relative strengths versus weaknesses in relation to their goals (Möller & Husemann, 2006), and it is likely that these self-perceptions influence their effort allocation across their goals.

To date, surprisingly little empirical information is available on the role of competence self-perceptions in multiple-goal pursuit (Sun & Frese, 2013). Although scholars have frequently called for research on self-regulation in the context of multiple goals (e.g., Barron & Harackiewicz, 2001; Boekaerts, 2009; Austin & Vancouver, 1996; Locke & Latham, 1990; Miron-Spektor & Beenen, 2015),

we do not know how individuals' competence self-perceptions concerning multiple goals are related to their effort allocation to those goals. In the present dissertation, we addressed this issue by using multiple-goal designs to examine the role of perceived relative strengths versus weaknesses in learning effort (Chapters 3 and 4).

7. Research Model and Research Questions

The purpose of our research was to clarify the relations between individuals' intrapersonal self-perceptions of relative strengths versus weaknesses and effort expenditure. Hence, our research question was: What is the relation between perceived relative strengths versus weaknesses and effort? Stated differently: Will individuals put more effort into their learning when they work on their strengths than when they work on their weaknesses?

We addressed this question in four steps (see Figure 2). First, we examined the motivating potential of perceived relative strengths versus weaknesses, by examining their effects on effort intentions. Hence, our first research question was: (1) What is the relation between perceived relative strengths versus weaknesses and effort intentions? (Chapter 2). Next, we sought an explanation for the effects of perceived relative strengths versus weaknesses on effort intentions by considering several mediation models. Hence, our second research question was: (2) How can we explain the relation between perceived relative strengths versus weaknesses and effort intentions? (Chapter 2). We then examined the relations between perceived relative strengths versus weaknesses and effort intentions and actual behavioral effort, respectively. We tested whether individuals practice more when they work on their strengths than when they work on their weaknesses. Hence, our third research question was: (3) What is the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort? (Chapter 3). Finally, we examined whether the relation between perceived relative strengths versus weaknesses and effort is affected by situational factors. Specifically, we considered the role of the learning context. Hence, our fourth research question was: (4) What is the effect of the learning context on the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort? (Chapter 4).

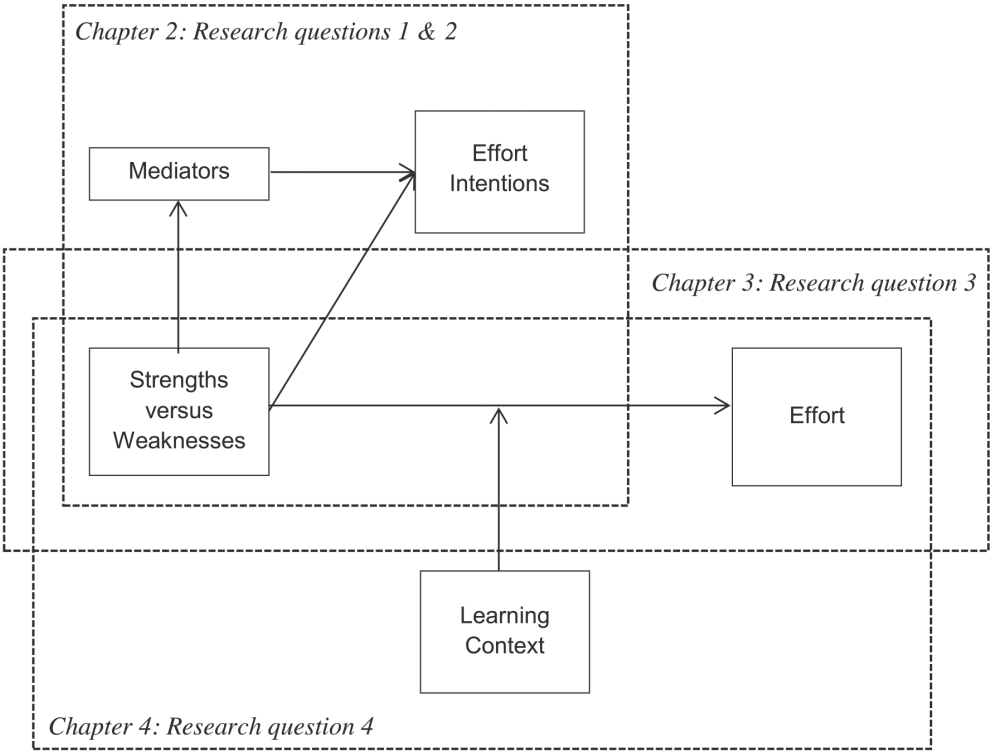


Figure 2. Research model

CHAPTER 2

The Effects of Strength-Based versus Deficit-Based Self-Regulated Learning Strategies on Students' Effort Intentions

This chapter has been published as an article:
Hiemstra, D., & Van Yperen, N. W. (2015).
The effects of strength-based versus deficit-based self-regulated learning strategies on students' effort intentions.
Motivation and Emotion, 39, 656-668. doi:10.1007/s11031-015-9488-8

Abstract

In two randomized experiments, one conducted online (n = 174) and one in the classroom (n = 267), we tested the effects of two types of self-regulated learning (SRL) strategies on students' intentions to put effort into professional development activities: *strength-based SRL strategies* (i.e., identifying perceived relative strengths and, subsequently, selecting professional development activities to further improve those strengths) versus *deficit-based SRL strategies* (i.e., identifying perceived relative shortcomings and, subsequently, selecting professional development activities to improve those shortcomings). Across both studies, analysis of variance revealed that, relative to students who used deficit-based SRL strategies, students who used strength-based SRL strategies were higher in perceived competence, intrinsic motivation, and effort intentions. Moreover, the results of multi-mediator analysis and structural equation modeling supported the hypothesis that the effect of strength-based versus deficit-based SRL strategies on students' effort intentions was sequentially mediated by perceived competence and intrinsic motivation. Implications for the application of self-regulated learning strategies in the context of professional self-development are discussed.

1. Introduction

In a knowledge-based economy it is imperative for professionals to guard their employability and to keep their skills and knowledge up to date. Accordingly, an important objective in higher professional and vocational education is to educate students to become self-regulating learners who are driven to work on their professional development throughout their career (Boekaerts, 1997; Bolhuis, 2003; Candy, 2000; Loyens et al., 2008; Zimmerman, 1990). Typically, to nurture students' self-regulated learning (SRL) capabilities, educational institutions in western countries offer their students mentoring, tutoring, and study skills classes. In these classes, students may learn to use self-regulated learning (SRL) strategies, including self-reflection and goal-selection strategies to assess their learning needs and select professional development activities to meet those needs (Hansford, Ehrich, & Tennent, 2004; Jacobi, 1991; Van den Boom, Paas, & van Merriënboer, 2007). In addition, most institutions enable their students to self-select professional development activities (i.e., activities to improve their professional competencies) by offering them a choice of elective assignments, projects, minors, and internships.

In this context, an important question is which SRL strategies optimally support students' motivation to put effort into professional development activities. In the present research, we addressed this question by examining the effects of two types of SRL strategies on students' perceived competence, intrinsic motivation, and effort intentions: *strength-based SRL strategies* (i.e., identifying perceived relative strengths and, subsequently, selecting professional development activities to further improve those strengths) versus *deficit-based SRL strategies* (i.e., identifying individual shortcomings and, subsequently, selecting professional development activities to improve those shortcomings).

Strength-based versus deficit-based SRL strategies

Self-regulated learning strategies refer to the self-controlled actions, such as self-evaluation, self-reflection, goal-selection, goal-setting, planning, and self-monitoring, that individuals take to acquire skills and knowledge and to optimize their learning (Sitzmann & Ely, 2011; Zimmerman, 1986). In higher professional and vocational education, a common practice for self-reflection and subsequent goal-selection is to review individual shortcomings and select professional development activities to improve those shortcomings. Specifically,

in competency-based education, the standards that students have to meet are explicated in a competency profile. Students are then stimulated to reflect on their present level of competency relative to those standards, and to engage in professional development activities (which may be at school or on a job) to diminish the gap (Hoogveld, Paas, & Jochems, 2005; Kenkel & Peterson, 2010; Lurie, 2012; Pintrich, 2004; Smith, 2010).

Clearly, such deficit-based SRL strategies can motivate students to put effort into professional development activities. For example, control theories (Carver & Scheier, 1981; Powers, 1973) posit that motivated behavior results from the perception of a discrepancy between the actual situation and a standard. However, a drawback of deficit-based SRL strategies is their inherent focus on students' shortcomings, that is, the performance dimensions on which students feel relatively incompetent. As emphasized by influential motivational theories, such as self-efficacy theory (Bandura, 1997), self-determination theory (Ryan & Deci, 2000), and the achievement goal approach (Elliot & Church, 1997), perceived competence is an important determinant of motivation. Therefore, an exclusive focus on deficit-based SRL strategies may not be the most effective way to motivate students to put effort into professional development activities.

To address this issue, several scholars (Kluger & Nir, 2010; Linley, Nielsen, Gillett, & Biswas-Diener, 2010; Seligman, Steen, Park, & Peterson, 2005) have proposed strength-based strategies, which entail that individuals assess their strengths, rather than their shortcomings, and select activities to further improve those strengths. Although improving shortcomings is obviously indispensable for mastering a profession, we propose that that, to educate driven self-regulating learners, strength-based SRL strategies may make a valuable *complement* to the common deficit-based SRL strategies. Because their inherent focus on the performance dimensions on which students feel relatively competent, we expect that strength-based SRL strategies may support students' willingness to put effort into their professional development activities.

However, no research to date has examined the effects of strength-based versus deficit-based SRL strategies on students' willingness to put effort into professional development activities. To fill this gap, we experimentally tested our research model, which posits that strength-based versus deficit-based SRL strategies positively affect effort intentions through subsequently perceived competence and intrinsic motivation (see Figure 1).

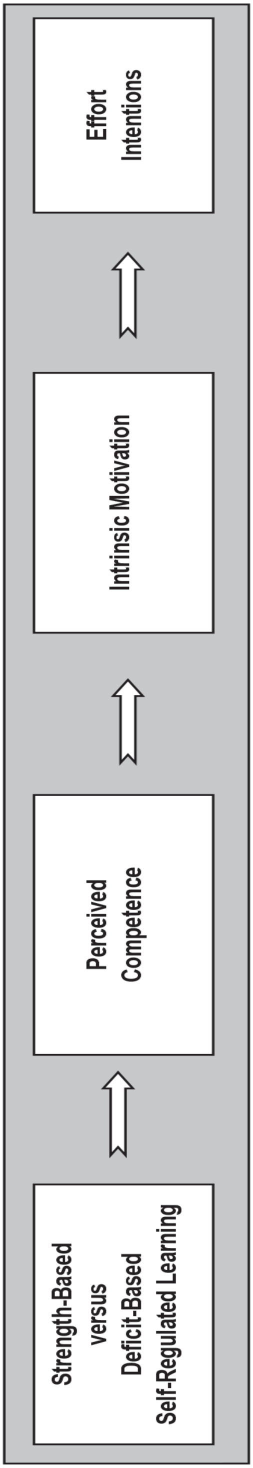


Figure 1. Research model

1.2. Toward a research model

Students who focus on improving their strengths, rather than improving their shortcomings, may feel more competent, more intrinsically motivated, and more willing to expend effort. Indeed, research indicates that working on strengths is related to various motivational concepts. For example, in a cross-sectional study, Wood, Linley, Maltby, Kashdan, and Hurling (2011) found a positive link between use of strengths and self-esteem. Similarly, Linley et al. (2010) found that using strengths was associated with goal progress and the fulfillment of psychological needs, including the need for competence. Furthermore, Proctor, Maltby, and Linley (2011) found that use of strengths was associated with higher self-esteem and more self-efficacy. In addition, evidence for causal links has been obtained in a few experimental studies that compared strength-based interventions to a control group. For example, in a randomized experiment among undergraduates, Louis (2008) tested a strength-based development course against a waiting list control group and found that students in the intervention group were higher in perceived academic control. In a similar study among high school students, Austin (2005) tested a strength-based development course against a traditional health education course and found that the strength-based development course resulted in higher academic intrinsic motivation. Finally, in a study among university students, Rechter (2010) demonstrated that, relative to a traditional feedback review, a strength-based feed-forward review resulted in higher self-efficacy and stronger effort intentions. However, although the findings of these experimental studies suggest that strength-based interventions may positively affect individuals' perceived competence, intrinsic motivation, and effort intentions, a couple of limitations should be noted. First, these studies compared broad interventions, that is, courses and reviews, which varied on multiple dimensions. Therefore, the specific causes of the reported effects cannot be determined unambiguously. Second, in these studies, strength-based interventions were not compared with deficit-based interventions. Therefore, we do not know whether strength-based interventions lead to better results than the common deficit-based interventions. Third, these experiments did not examine underlying motivational processes.

To address these limitations, in the present research, we experimentally varied the conditions on a single strength-based versus deficit-based dimension and tested the effects on both process and outcome variables. Specifically, we tested the causal effects of strength-based versus deficit-based SRL strategies

on students' effort intentions and examined the mediating effects of perceived competence and intrinsic motivation. We discuss our research model (see Figure 1) in more detail below.

1.2.1. Perceived competence

Because strength-based SRL strategies, relative to deficit-based SRL strategies, direct students' attention toward the positive rather than the negative aspects of their functioning, we reasoned that the effects of strength-based versus deficit-based SRL strategies on perceived competence may be similar to the effects of positive feedback versus negative feedback. Several theorists have posited that positive feedback rather than negative feedback is beneficial for learning effort, because it bolsters students' perceived competence or self-efficacy (Bandura 1997; Ryan & Deci, 2000). Indeed, research indicates that, relative to negative feedback, positive feedback enhances individuals' self-evaluations (e.g., Baron, 1988; Escarti & Guzman, 1999; Reeve & Deci, 1996; Vallerand & Reid, 1988; for a review, see Vallerand, 1997). For example, Reeve and Deci (1996) examined the effects of (bogus) feedback on participants' perceived competence in a puzzle-solving task. Their results showed that participants receiving negative feedback reported lower levels of perceived competence than participants receiving positive feedback. Similarly, recent research examining the effects of *knowledge of results* indicates that feedback on positive performances rather than feedback on negative performances enhances students' competency perceptions and learning (e.g., Chiviacowsky & Wulf, 2007; Badami, VaezMousavi, Wulf, & Namazizadeh, 2011; Saemi, Porter, Ghotbi-Varzaneh, Zarghami, & Maleki, 2012). For example, Saemi et al. (2012) found that providing students with feedback after relatively good trials on a motor learning task resulted in higher self-efficacy compared with providing feedback after weaker trials.

1.2.2. Intrinsic motivation

The effects of perceived competence on intrinsic motivation have been articulated in several theories. For example, both effectance motivation theory (Harter, 1992) and cognitive evaluation theory (Deci & Ryan, 1985) posit that individuals are more likely to manifest intrinsic motivation when they believe themselves to be more competent. Indeed, in an experimental study, Vallerand and Reid (1984) found that the effect of positive versus negative feedback on intrinsic motivation was mediated by perceived competence in a motor task. In another experimental study, Jussim, Soffin, Brown, Ley, and Kohlhepp (1992, Study 3)

found that positive versus negative feedback in an anagram task significantly affected intrinsic motivation through perceived competence. Similarly, Badami et al. (2011) found that positive versus negative feedback enhanced participants' intrinsic motivation through perceived competence in a golf-putting task.

1.2.3. Effort intentions

Intrinsic motivation is commonly regarded as beneficial for learning (Stipek, 2002; Guay, Ratelle, & Chanal, 2008). Research has shown that intrinsic motivation is associated with valued educational outcomes, such as challenge seeking (Boggiano, Main, & Katz, 1988; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), persistence (Hardré & Reeve, 2003; Vallerand & Bissonnette, 1992), achievement (Grolnick, Ryan, & Deci, 1991; Miserandino, 1996), and subjective well-being (Ryan & Connell, 1989; Levesque, Zuehlke, Stanek, & Ryan, 2004). Intrinsic motivation is typically examined as a process variable, linking antecedents of motivation to outcome variables, including effort intentions. For example, in a meta-analysis of 21 articles in the context of physical education, Chatzisarantis, Hagger, Biddle, Smith, and Wang (2003) found that intrinsic motivation mediated the relationship between perceived competence and intentions to engage in physical exercise. Further, in a cross-sectional study into school drop-out among high school students, Vallerand, Fortier, and Guay (1997) observed that self-determined motivation (a concept which includes intrinsic motivation) mediated the relation between perceived competence and intention to remain in school. In a similar study, Lavigne, Vallerand, and Miquelon (2007) found that self-determined motivation to study science mediated the relation between perceived competence and intention to pursue science education. Furthermore, in a cross-sectional study among teachers, Sørebø, Halvari, Gulli, and Kristiansen (2009) reported a positive link between intrinsic motivation and intention to use e-learning facilities.

1.3. Overview of the present studies

The present research adds to the extant literature on SRL strategies and motivation by examining the *causal effects* of strength-based versus deficit-based[1] SRL strategies on students' effort intentions, including the *mediating effects* of perceived competence and intrinsic motivation. We tested our research model (see Figure 1) in two randomized experiments. In Study 1, we contrasted a strength-based SRL strategy with a deficit-based SRL strategy condition, and

examined the effects on students' perceived competence, intrinsic motivation, and effort intentions on a hypothetical school project. In Study 2, we added a neutral SRL strategy condition, and assessed the effects on students' perceived competence, intrinsic motivation, and effort intentions on a professional development activity they actually intended to carry out. *Hypothesis 1* was that strength-based versus deficit-based SRL strategies positively affect perceived competence, intrinsic motivation, and effort intentions. *Hypothesis 2* was that the effect of strength-based versus deficit-based SRL strategies on effort intentions is sequentially mediated by perceived competence and intrinsic motivation.

2. Method Study 1

2.1. Participants

The participants were 174 first-year to fourth-year bachelor's students (32% men), representing different schools, including Healthcare (n = 39), Management (n = 52), Education (n = 45), and Technology (n = 38). Ages ranged from 17 to 29, with a mean of 21.75 (SD = 2.64).

2.2. Procedure

The students were recruited through an email blast, sent by their school, in which they were invited to take "a trial version of a new professional qualities test", which would include completing a questionnaire. Those who accepted the invitation could start right away by clicking on a hyperlink. Participants first completed the "professional qualities test", a 155-item inventory in which they were asked to indicate the extent to which 31 positive attributes applied to them. The test was based on the Dutch Abridged Big Five Circumplex (De Raad, Hendriks, & Hofstee, 1992). Sample items are, "I do my work in an accurate manner" (accurate), "I often talk to a lot of people" (communicative), and "I am a dependable person" (dependable). Response categories ranged from 1 (*does not apply to me at all*) to 7 (*completely applies to me*). The scores on the five items of each subscale were averaged to calculate an index for each professional quality (all Cronbach's alphas > .63). The test outcome showed a rank order of professional qualities, ranging from #1 (*applies most to me*) to #31 (*applies least to me*). After receiving the test outcome, participants were randomly assigned[2]

to a strength-based SRL strategy condition (n = 77) or a deficit-based SRL strategy condition (n = 97) in which they were instructed to select their #1 or their #31 ranked quality, respectively. Next, participants were asked to imagine that they signed up for a school project in which they could improve their #1 ranked professional quality (strength-based SRL strategy condition), or their #31 ranked professional quality (deficit-based SRL strategy condition), respectively. They then filled out the questionnaire. After completing the questionnaire, all participants were debriefed.[3]

2.3. Measures

Manipulation check. After being instructed to pick their #1 (strength-based SRL strategy condition) or their #31 (deficit-based SRL strategy condition) ranked quality, the participants were asked, "To what extent do you possess this professional quality?" Response categories ranged from 1 (*not at all*) to 9 (*completely*).

Perceived competence. Perceived competence was assessed using the Perceived Competence subscale of the Intrinsic Motivation Inventory (Ryan, 1982). The items were slightly adjusted to refer to the project the participants had signed up for: (1) "I think I will be pretty good at this project"; (2) "Relative to other students, I think I will do pretty well at this project"; (3) "I feel pretty competent at this project"; (4) "I think I will be satisfied with my performance on this project"; (5) "I am pretty skilled at this project"; (6) "This is a project that I cannot do very well" (reverse scored). Response categories ranged from 1 (*completely disagree*) to 7 (*completely agree*). Items were averaged to create an index for perceived competence.

Intrinsic motivation. Intrinsic motivation was assessed using the Intrinsic Motivation subscales of the Academic Motivation Scale (AMS; Vallerand, Pelletier, Blais, & Brière, 1992). The AMS contains three Intrinsic Motivation subscales of four items each. Following the procedure reported by others (e.g., Richer & Vallerand, 1995; Vallerand, 1997; Van Yperen & Hagedoorn, 2003), we averaged the 12 items of the three subscales into one single indicator of intrinsic motivation. The general stem of the AMS, "Why do you go to school?" was adjusted to, "Why would you do this project?" A sample item is, "For the pleasure it gives me to know more about this project." Response categories ranged from 1 (*not at all*) to 7 (*very much*). Intrinsic motivation was significantly related to perceived competence (r = .77, p < .001).

Effort intentions. Effort intentions were assessed using the following three-item scale: (1) "I intend to put effort into this project"; (2) "I am not going to do my best at this project" (reversed scored); (3) "I am determined to do this project". Response categories ranged from 1 (*completely disagree)* to 7 (*completely agree)*. Items were averaged to create an index for effort intentions. Effort intentions were significantly related to perceived competence ($r = .62$, $p < .001$) and intrinsic motivation ($r = .74$, $p < .001$).

3. Results Study 1

3.1. Manipulation check

To check the manipulation, participants were asked to indicate to what extent they possessed the professional quality they had selected to improve. The results showed a highly significant difference, $M_{\#1} = 8.04$ ($SD = 1.21$) versus $M_{\#31} = 2.47$ ($SD = 1.79$), $F(1, 161) = 528.80$, $p < .001$, $\eta^2 = .77$), allowing us to conclude that the manipulation was successful. That is, in the strength-based SRL strategy condition, participants selected a professional quality that they believed they possessed to a large degree (i.e., a perceived relative strength), whereas in the deficit-based SRL strategy condition participants selected a professional quality they believed they hardly possessed (i.e., a perceived relative shortcoming).

3.2. Tests of Hypothesis 1

The means and standard deviations of the dependent variables by condition are presented in Table 1. *Hypothesis 1* posited that strength-based versus deficit-based SRL strategies positively affect perceived competence, intrinsic motivation, and effort intentions. Hence, we conducted a multivariate analysis of variance (MANOVA), with strength-based versus deficit-based SRL strategies as independent variable and perceived competence, intrinsic motivation, and effort intentions as dependent variables. The results yielded a highly significant overall effect,[4] $F(3, 170) = 71.27$, $p < .001$, $\eta^2 = .56$. Univariate analyses of variance (ANOVAs) revealed that, relative to students in the deficit-based SRL strategy condition, students in the strength-based SRL strategy condition were higher in perceived competence, $F(1, 172) = 213.48$, $p < .001$, $\eta^2 = .55$, intrinsic motivation, $F(1, 172) = 70.70$, $p < .001$, $\eta^2 = .29$, and effort intentions, $F(1, 172) = 39.15$, $p < .001$, $\eta^2 = .19$. Thus, *Hypothesis 1* was empirically supported.

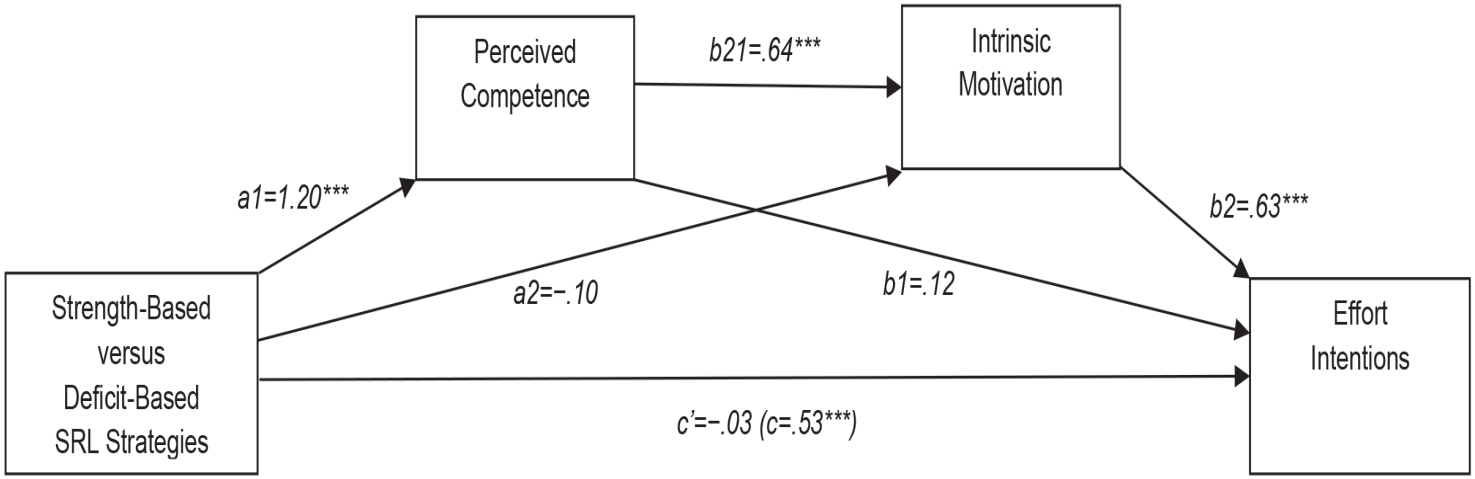
	Strength-based SRL strategies (n = 77)		Deficit-based SRL strategies (n = 97)				
	M	*SD*	*M*	*SD*	*F*	*p* <	η^2
Perceived competence (Cronbach's α = .96)	5.73	.81	3.32	1.26	213.48	.001	.55
Intrinsic motivation (Cronbach's α = .95)	5.75	.74	4.41	1.23	70.70	.001	.29
Effort intentions (Cronbach's α = .80)	5.93	.94	4.87	1.23	39.15	.001	.19

Table 1. Differences in Means between Strength-Based Self-Regulated Learning (SRL) Strategies and Deficit-Based SRL Strategies (Study 1)

3.2. Tests of Hypothesis 2

Hypothesis 2, positing that the effect of strength-based versus deficit-based SRL strategies on effort intentions was sequentially mediated by perceived competence and intrinsic motivation, was supported as well. We used Hayes' (2013) PROCESS SPSS macro (model 6) to calculate the regression weights shown in Figure 2. Model path estimates yielded a highly significant indirect path from strength-based versus deficit based SRL strategies, through perceived competence and intrinsic motivation, to effort intentions (a1 × b21 × b2); the direct path (c) was reduced to nonsignificant (c') when the mediators were controlled for. Bootstrapping analysis, based on 5,000 re-samples, showed a significant total indirect effect (a1 × b21 × b2 + a1 × b1 + a2 × b2) of point estimate .56 (95% BCA-CI [.38, .74], *SE* = .09). Examination of the specific indirect effects revealed that neither the single effect through perceived competence (a1 × b1), point estimate = .14 (95% BCA-CI [–.07, .35], *SE* = .11), nor the single effect through intrinsic motivation (a2 × b2), point estimate = –.06 (95% BCA-CI [–.16, .05], *SE* = .05), was uniquely significant. Only the indirect path through both mediators (a1 × b21 × b2) was significant, point estimate = .48 (95% BCA-CI [.33, .65], *SE* = .08), indicating that the effect of strength-based versus deficit-based SRL strategies on effort intentions was sequentially mediated by perceived competence and intrinsic motivation.

Finally, to test our research model (see Figure 1) against alternative sequences of the mediating and dependent variables, we conducted structural equation modeling (SEM). The results revealed that, relative to the alternative sequences,[5] the hypothesized sequence, *strength-based versus deficit-based SRL strategies* (S/D-SRL) → *perceived competence* (PC) → *intrinsic motivation* (IM) → *effort intentions* (EI), showed the best goodness of fit, (df = 3, x^2 = 4.09, p = .25, CFI = 1.00, RMSEA = .05, PCFI = .50).



* $p < .05$ ** $p < .01$ *** $p < .001$

Figure 2. Multiple mediation model for the effect of strength-based versus deficit-based self-regulated learning (SRL) strategies on effort intentions (Study 1).

4. Discussion Study 1

As expected, the findings of Study 1 showed that, relative to students who used deficit-based SRL strategies, students who used strength-based SRL strategies were higher in perceived competence, intrinsic motivation, and effort intentions. Note that the observed effect sizes were high compared to those typically found in feedback research (cf., Hattie & Timperley, 2007). Furthermore, the results showed that the effect of strength-based versus deficit-based SRL strategies on effort intentions was sequentially mediated by perceived competence and intrinsic motivation.

However, a limitation of Study 1 was that we asked students to imagine a hypothetical project, rather than a professional development activity that they actually intended to carry out. Furthermore, in Study 1 we contrasted the two poles of the strength-based versus deficit-based SRL strategies dimension, so we do not know yet how intermediate strategies (e.g., neutral SRL strategies) affect students' perceived competence, intrinsic motivation, and effort intentions. To address these issues, in Study 2, we asked students to think up and select a professional development activity that they actually intended to carry out. In addition, we included a neutral SRL strategy condition, in which participants aimed at improving a quality that they considered neither a strength nor a shortcoming.

5. Method Study 2

5.1. Participants

To replicate the findings of Study1 in a classroom setting, in Study 2 we invited the participants through their study skills teachers to conduct an assignment that was presented to them as "an exercise in talent development". The participants were 267 first-year bachelor's students (62% men) from different schools of a Dutch university of applied sciences, including Healthcare (n = 75), Management (n = 49), Education (n = 46), and Technology (n = 97). Ages ranged from 17 to 28 years, with a mean of 19.78 (SD = 2.38). As Study 1 and Study 2 were conducted with a one-year interval, and Study 2 only included first-year students, no students participated in both studies.

5.2. Procedure

The students were tested in groups of 5 to 25 participants. In 90-minute sessions, the participants conducted a self-reflection and goal-selection exercise, and completed a questionnaire. The exercise was based on Seligman et al. (2005) and comprised the following five steps. First, using a Q-sorting procedure, students rank ordered 34 short descriptions of professional qualities, similar to those used in Study 1, on a scale ranging from #1 (*applies most to me*) to #34 (*applies least to me*). Second, participants were randomly assigned[2] to a condition in which they were instructed to select one professional quality they wanted to work on during the following week, from their #1 to #5 ranked qualities (strength-based SRL strategy condition; $n = 75$), from their #15 to #19 ranked qualities (neutral SRL strategy condition; $n = 90$), or from their #30 to #34 ranked qualities (deficit-based SRL strategy condition; $n = 102$). Third, the participants described the professional quality they had chosen in their own words. Fourth, the participants listed as many activities as they could think of to improve themselves on this quality. Table 2 shows a number of examples of the activities that the participants thought up. Fifth, the participants selected from the activities they had listed, one activity to carry out during the following week. Next, the participants responded to the dependent variables and the manipulation check. Finally, the participants were debriefed.[3]

5.3. Measures

Manipulation check. Participants were asked to indicate the following: "I have chosen to develop a professional quality that I am …": (1) "good at"; (2) "neither good nor bad at"; (3) "not good at."

Dependent variables. The three dependent variables were assessed using the same scales as in Study 1. However, in the wording of the items, "this project" was replaced by "this activity". Intrinsic motivation was significantly related to perceived competence ($r = .56$, $p < .001$). Effort intentions were significantly related to perceived competence ($r = .37$, $p < .001$) and intrinsic motivation ($r = .73$, $p < .001$).

Professional Quality	Professional Development Activity
Creative	"To draw a sketch every time a have an good idea"
Decisive	"To take the lead in our next workgroup meeting"
Disciplined	"To make a work plan each morning"
Driven	"To attend extra-curricular lectures"
Focussed	"To make sure that we finish our project this week"
Independent	"To work alone on our project for one day, to get it back on track"
Initiative	"To recruit new clients at my job"
Leadership	"To observe others how they chair a meeting"
Optimistic	"To list the positive attributes of all of my project group members"
Responsible	"To fulfil every commitment that I make during the next week"
Sociable	"To invite others to work on our assignment together"
Unprejudiced	"To chat with class mates that I usually don't talk to"

Table 2. Examples of Professional Development Activities that Students Thought Up Themselves, Study 2

6. Results Study 2

6.1. Manipulation check

In response to the item "I have chosen to develop a professional quality that I am …": (1) "good at"; (2) "neither good nor bad at"; (3) "not good at", almost all participants (86.89%) picked the option that matched the condition they were assigned to (Cramér's V = .81; $p < .001$). We therefore concluded that the manipulation was successful. That is, the participants in the strength-based SRL strategy condition identified a professional quality they believed they were good at (i.e., a perceived relative strength), the participants in the neutral SRL strategy condition identified a professional quality they believed they were neither good nor bad at, and the participants in the deficit-based SRL strategy condition identified a professional quality they believed they were bad at (i.e., a perceived relative shortcoming).

6.2. Tests of Hypothesis 1

The means and standard deviations of the dependent variables by condition are shown in Table 3. In line with *Hypothesis 1,* multivariate analysis of variance (MANOVA) yielded a significant overall effect of SRL strategy condition on the dependent variables,[6] $F(6, 526) = 5.58$, $p < .001$, $\eta^2 = .06$. Univariate analyses of variance (ANOVAs) revealed that the strength-based versus deficit-based SRL strategy manipulation significantly affected perceived competence, $F(2, 264) = 17.55$, $p < .001$, $\eta^2 = .12$, intrinsic motivation, $F(2, 264) = 6.00$, $p < .01$, $\eta^2 = .04$, and effort intentions, $F(2, 264) = 3.60$, $p < .05$, $\eta^2 = .03$. As indicated by the different superscripts in Table 2 ($p < .05$ at the minimum), post-hoc analyses revealed that, relative to participants in the deficit-based SRL strategy condition, participants in the strength-based SRL strategy condition were significantly higher in perceived competence, intrinsic motivation, and effort intentions; this is a perfect replication of the findings of Study 1.

Furthermore, relative to participants in the deficit-based SRL strategy condition, participants in the neutral SRL strategy condition were significantly higher in perceived competence, and relative to the neutral SRL strategy condition, participants in the strength-based SRL strategy condition were significantly higher in perceived competence and intrinsic motivation.

	Strength-based SRL strategies ($n = 75$)		Neutral SRL strategies ($n = 90$)		Deficit-based SRL strategies ($n = 102$)				
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p* <	η^2
Perceived competence (Cronbach's α = .90)	5.29^{a}	.94	4.59^{b}	1.29	4.26^{c}	1.18	17.55	.001	.12
Intrinsic motivation (Cronbach's α = .95)	4.92^{a}	1.10	4.39^{b}	1.46	4.16^{b}	1.67	6.00	.01	.04
Effort intentions (Cronbach's α = .85)	5.44^{a}	1.18	5.06^{ab}	1.59	4.83^{b}	1.66	3.60	.05	.03

Table 3. Differences in Means between Strength-Based Self-Regulated Learning (SRL) Strategies, Neutral SRL Strategies, and Deficit-Based SRL Strategies (Study 2)

Note. Within each row, different superscripts indicate significant group differences at level $p < .05$

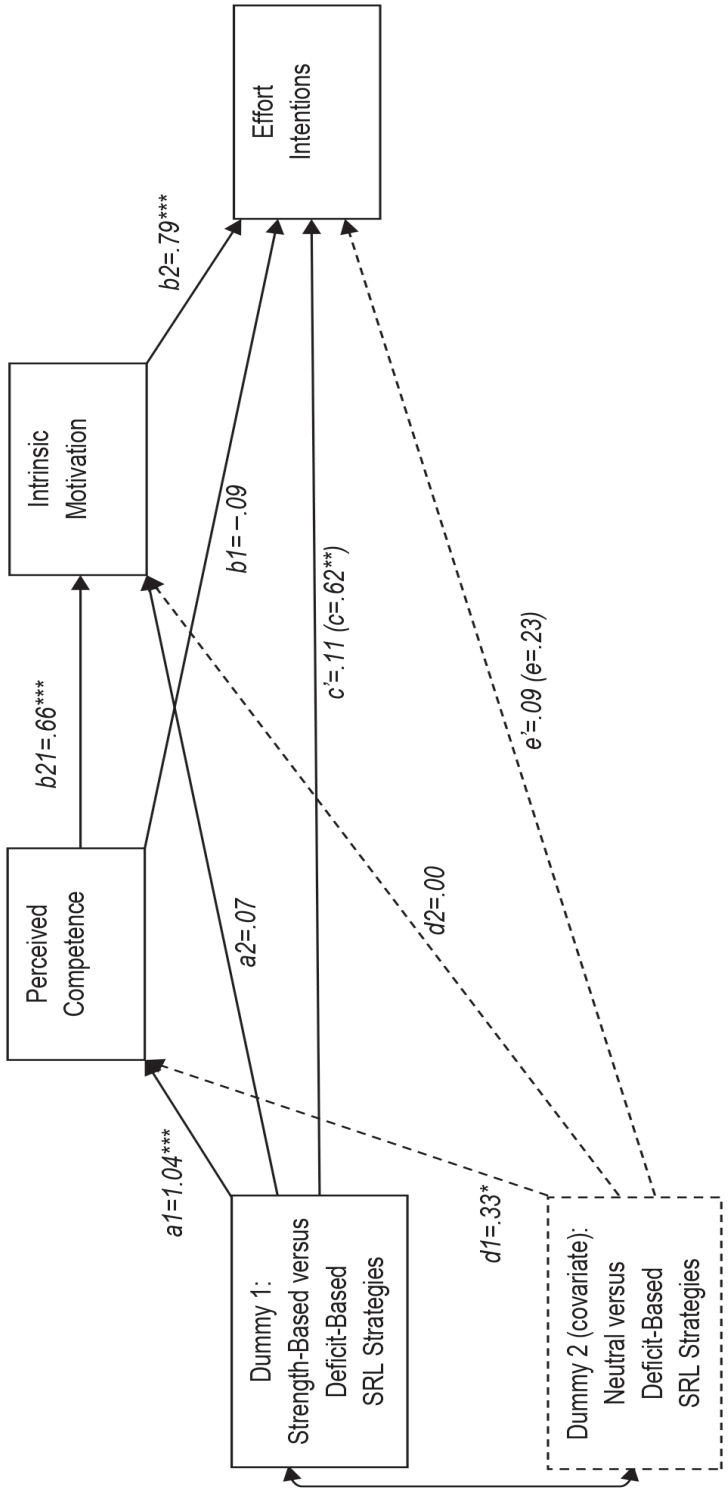
6.3. Tests of Hypothesis 2

Study 2 also yielded additional empirical support for *Hypothesis 2*. To test this hypothesis, we first recoded the independent variable into two dummy variables. The deficit-based SRL strategy condition, representing common practice, was used as the reference group. Thus, Dummy 1 was used to compare the strength-based SRL strategy condition with the deficit-based SRL strategy condition, and Dummy 2 was used to compare the neutral SRL strategy condition with the deficit-based SRL strategy condition.

In the first analysis, we treated Dummy 1 as the primary independent variable and Dummy 2 as a covariate. Figure 3 displays the path estimates obtained using Hayes' (2013) PROCESS SPSS macro (model 6). The results showed a highly significant indirect path through perceived competence and intrinsic motivation (a1 × b21 × b2). The direct path (c) was reduced to nonsignificant (c') when the mediators were controlled for. Bootstrapping analysis, based on 5,000 re-samples, yielded a significant total indirect effect (a1 × b21 × b2 + a1 × b1 + a2 × b2), point estimate .51 (95% BCA-CI [.19, .86], *SE* = .17). The indirect path through both mediators (a1 × b21 × b2) was significant, point estimate .54 (95% BCA-CI [.34, .78], *SE* = .11), whereas the single indirect paths, through perceived competence (a1 × b1), point estimate –.09 (95% BCA-CI [–.25, .06], *SE* = .08), and intrinsic motivation (a2 × b2), point estimate .06 (95% BCA-CI [–.26, . 38], *SE* = .16), were not significant.

In the second analysis, we treated Dummy 2 as the primary independent variable and Dummy 1 as a covariate. The analysis yielded a nonsignificant effect on effort intentions, which is consistent with the results of post-hoc analysis, indicating a nonsignificant difference in effort intentions between the deficit-based SRL strategy condition and the neutral SRL strategy condition.

Finally, structural equation modeling (SEM) analysis revealed an excellent goodness of fit for the hypothesized sequence, *strength-based versus deficit-based SRL strategies* (S/D-SRL) → *perceived competence* (PC) → *intrinsic motivation* (IM) → *effort intentions* (EI), $df = 5$, $x^2 = 2.08$, $p = .84$, CFI = 1.00, RMSEA = .00, PCFI = .50 , whereas the ratios of the alternative models were below threshold level.[7]



* $p < .05$ ** $p < .01$ *** $p < .001$

Figure 3. Multiple mediation model for the effect of strength-based versus deficit-based self-regulated learning (SRL) strategies on effort intentions (Study 2).

7. Discussion Study 2

In line with the findings of Study 1, the results of Study 2 show that, relative to deficit-based SRL strategies, strength-based SRL strategies lead to higher perceived competence, intrinsic motivation, and effort intentions. Furthermore, Study 2 yielded additional empirical support for the hypothesis that the effect of strength-based versus deficit-based SRL strategies on effort intentions is subsequently mediated by perceived competence and intrinsic motivation. The findings of Study 2 extend those of Study 1 by demonstrating that these effects hold under real-life conditions, that is, when students themselves think up and select a professional development activity that they actually intend to carry out, rather than imagine a hypothetical project. In addition, the findings of Study 2 show that strength-based SRL strategies lead to more optimal outcomes than neutral SRL strategies. That is, strength-based SRL strategies resulted in higher perceived competence and intrinsic motivation; the difference in effort intentions was in the expected direction, but not significant.

Notably, the effect sizes in Study 2 were smaller than in Study 1. This may be explained by two differences in methodology. First, in Study 1 the students picked *the highest* ranked versus *the lowest* ranked professional quality to work on, whereas in Study 2, the students picked *one of the five highest* ranked, versus *one of the five lowest* ranked qualities to work on. Second, in Study 1 the students selected a hypothetical project, whereas in Study 2 the students selected a concrete activity that they had thought up themselves. Both differences in methodology are likely to diminish the contrast between the strength-based and the deficit-based SRL strategy condition.

8. General discussion

On the basis of our consistent findings across two randomized experiments, we conclude that, relative to deficit-based SRL strategies, strength-based SRL strategies positively affect students' perceived competence, intrinsic motivation, and effort intentions. Moreover, in both studies, we found that perceived competence and intrinsic motivation sequentially mediated the effect of strength-based versus deficit-based SRL strategies on effort intentions.

These findings extend previous research in several ways. First, because we used a randomized experimental design, we were able to establish a causal relation between strength-based versus deficit-based SRL strategies and the outcome

variables. As we used specific, unidimensional interventions, we are confident that the observed effects can be attributed to the utilization of strength-based versus deficit-based SRL strategies, that is, the selection of a project (Study 1) or a self-thought up activity (Study 2) to improve a perceived relative strength versus shortcoming. Second, because we contrasted strength-based SRL strategies with deficit-based SRL strategies, we now know that strength-based SRL strategies lead to higher perceived competence, intrinsic motivation, and effort intentions than the common deficit-based SRL strategies. We also demonstrated that strength-based SRL strategies lead to higher perceived competence and intrinsic motivation relative to neutral SRL strategies (i.e., a condition in which students selected an activity to improve a quality that they perceived as neither a strength nor a shortcoming). Third, the results of our multi-mediator analysis and structural equation modeling provide a better understanding of *why* strength-based versus deficit-based SRL strategies differently affect students' effort intentions: namely, through perceived competence and intrinsic motivation.

More in general, our findings add to the literature on enhancing students' intrinsic motivation to learn. Several theories, such as effectance motivation theory (Harter, 1992), self-determination theory (Ryan & Deci, 2000), and self-concordance theory (Sheldon & Elliot, 1999), posit that intrinsic motivation is beneficial for learning. However, these theories do not articulate *how* students can self-select intrinsically motivating activities to improve their competencies. The present research demonstrates that students can self-select intrinsically motivating professional development activities by identifying their perceived relative strengths and aiming at further improving those strengths.

It is important to note, however, that our findings seem to contradict the position of scholars who posit that self-enhancing interventions do not improve learning (Forsyth et al., 2007; cf. Baumeister et al, 2003; Mueller & Dweck, 1998). Specifically, Forsyth et al. (2007) concluded on the basis of experimental research that self-enhancing interventions may detriment students' learning. In their study, Forsyth et al. (2007) manipulated the feedback that students received while preparing for a psychology exam. Their results indicated that students who received self-bolstering feedback performed worse relative to a control group. However, three specific differences between Forsyth et al. (2007) and our research may explain these divergent findings. First, Forsyth et al. (2007) conducted a feedback intervention which affected students' efforts while they were working toward a preset goal, whereas we conducted a goal-selection intervention that affected which activities the students selected. As explained by

Vancouver, Thompson, Tischner, and Putka (2002), self-enhancing interventions may differently affect students' learning, depending on the self-regulatory process that is affected (e.g., performance monitoring versus goal-selection). Second, Forsyth et al. (2007) affirmed students on the global level of self-esteem by sending emails with statements such as, "Hold your head and your self-esteem high". In contrast, our strength-based SRL strategy intervention affirmed students on specific professional qualities, such as "creative", "focused", or "unprejudiced". Indeed, research has shown that the effects of affirmative interventions may differ depending on the level of specificity of the message (Hattie & Timperley, 2007; Baumeister et al., 2003). Third, the study of Forsyth et al. (2007) was conducted in the context of the mandatory curriculum, whereas our research was conducted in the context of professional self-development. Clearly, when preparing for a mandatory exam, intrinsic motivation is less of a prerequisite for effort (Sansone & Smith, 2000; Lepper & Henderlong, 2000). However, in the context of professional self-development, intrinsic motivation is crucial for ensuring effort. In sum, the phase of the self-regulatory process (performance-monitoring versus goal-selection), the level of specificity (global self-esteem versus specific qualities), and the amount of autonomy (externally controlled versus self-development) may be significant moderators of the effects of self-enhancing interventions on students' efforts. As far as we are concerned, testing the moderating role of these factors should be put high on the empirical agenda.

8.1. Strengths and limitations

The consistency of the findings across both experimental studies indicates the robustness of our findings. In addition, because we tested the effects of SRL strategies under field conditions, the ecological validity and practical relevance of our studies is high, which is an important strength. In contrast, the reliance on self-report measures, albeit appropriate for studies on motivational processes, may be considered a limitation. However, the assessment of self-report effort intentions, rather than actual behavioral effort, is an obvious consequence of the methodology we used. That is, the consequence of using Seligman et al.'s (2005) procedure in a field setting is that students themselves can think up a wide range of different professional development activities. As can be seen in Table 2, these activities vary substantially in terms of time expenditure. Consequently, these activities are not comparable at the behavioral level.

Furthermore, although our findings provide empirical evidence for the causal

effects of strength-based versus deficit-based SRL strategies on perceived competence, intrinsic motivation, and effort intentions, our follow-up mediation and SEM analyses only provide suggestive evidence that the effects of these SRL strategies on effort intentions are sequentially mediated by perceived competence and intrinsic motivation. In future studies, series of experiments may be conducted to empirically establish the proposed causal chain (e.g., Spencer, Zanna, & Fong, 2005).

8.2. Practical implications

Our findings have clear implications for the use of SRL strategies in higher professional and vocational education. Many educators aim for their students to become self-regulating learners who are driven to work on their professional development. However, the question is whether deficit-based SRL strategies, which are common practice, are the most optimal way to motivate students to put effort into professional development activities. Professional self-development requires willingness to expend effort, which appears to be a function of perceived competence and intrinsic motivation. Our findings demonstrate that these outcomes are induced by strength-based rather than by deficit-based SRL strategies. Therefore, we suggest that, to stimulate students' to put effort into professional development activities, educators may teach their students to utilize strength-based SRL strategies. For example, the strength-based SRL strategy that we examined in Study 2 may be taught in mentoring, tutoring or study skills classes. For more practical suggestions, see Bouskila-Yam and Kluger, (2011), Clifton and Anderson (2002), and Linley (2008).

Finally, just to be clear, we do not suggest that strength-based SRL strategies are *a substitute* for deficit-based SRL strategies. Deficit-based SRL strategies are a sine qua non to qualify for any profession. That is, students need to work on diminishing the gap between their present level of competency and the prevailing standards for a particular profession. However, to enhance students' motivation to put effort into professional self-development activities, strength-based SRL strategies may make a valuable complement to the common deficit-based SRL strategies.

Footnotes Chapter 2

1 We conducted our studies at a university of applied sciences that practices competency-based education. In mentoring, tutoring, and study skills classes, students reflect on their shortcomings relative to the standards explicated in a competency profile. Based on this reflection, students set their goals and select their elective courses and projects for the next semester. Thus, the deficit-based SRL strategy condition reflects common practice.

2 Sample sizes are not equal across the conditions due to the unrestricted random assignment procedure used (Survey Monkey®).

3 In the debriefing, we explained the aims and expectations of our research to the students. We proposed that diminishing shortcomings is indispensable for mastering a profession, but that developing strengths might make a valuable complement to their professional development. Accordingly, we suggested that all students work on both improving their shortcomings and on further improving their strengths during their education.

4 No significant interaction effect between sex and strength-based versus deficit-based SRL strategies on the dependent variables was found, $F(3, 168) = 1.88$, $p = .36$.

5 S/D-SRL → PC → EI → IM ($df = 3$, $x^2 = 75.58$, $p = .00$, CFI = .83, RMSEA = .37, PCFI = .42)
S/D-SRL → IM → PC → EI ($df = 3$, $x^2 = 134.6$, $p = .00$, CFI = .69, RMSEA = .50, PCFI = .35)
S/D-SRL → IM → EI → PC ($df = 3$, $x^2 = 51.87$, $p = .00$, CFI = .65, RMSEA = .54, PCFI = .32)
S/D-SRL → EI → PC → IM ($df = 3$, $x^2 = 158.70$, $p = .00$, CFI = .64, RMSEA = .55, PCFI = .32)
S/D-SRL → EI → IM → PC ($df = 3$, $x^2 = 36.07$, $p = .00$, CFI = .76, RMSEA = .45, PCFI = .38)

6 No significant interaction effect between sex and strength-based versus deficit-based SRL strategies on the dependent variables was found, $F(6, 520) = .55$, $p = .77$.

7 S/D-SRL → PC → EI → IM ($df = 5$, $x^2 = 62.10$, $p = .00$, CFI = .85, RMSEA = .21, PCFI = .43)
S/D-SRL → IM → PC → EI ($df = 5$, $x^2 = 189.78$, $p = .00$, CFI = .52, RMSEA = .37, PCFI = .26)
S/D-SRL → IM → EI → PC ($df = 5$, $x^2 = 83.47$, $p = .00$, CFI = .78, RMSEA = .24, PCFI = .40)
S/D-SRL → EI → PC → IM ($df = 5$, $x^2 = 194.45$, $p = .00$, CFI = .51, RMSEA = .38, PCFI = .26)
S/D-SRL → EI → IM → PC ($df = 5$, $x^2 = 28.12$, $p = .00$, CFI = .94, RMSEA = .13, PCFI = .47)

CHAPTER 3

Self-Regulated Online Learning: The Role of Perceived Strengths and Weaknesses in Effort Expenditure

Hiemstra, D., Van Yperen, N. W., & Timmermans, M. E. (2016). *Self-Regulated Online Learning: The Role of Perceived Strengths and Weaknesses in Effort Expenditure*. Manuscript submitted for publication.

Abstract

Online learning facilities are important resources for professionals' self-regulated learning endeavours to keep their skills and knowledge up to date and maintain their employability. In a multiple-tasks context, we examined the within-person relations between perceived strengths (i.e., perceived relative strengths versus weaknesses) and individuals' willingness to engage in online learning activities. We found that individuals intended to invest more effort and time (Study 1; $n = 115$) and actually invested more behavioural effort (Study 2; $n = 58$) in learning activities on topics and skills that they perceived as their relative strengths than in learning activities on topics and skills that they perceived as their relative weaknesses. Theoretically, these findings contribute to the literature on the within-person relations between competence self-perceptions and effort in multiple-tasks contexts. Practically, these findings contribute to the implementation of self-regulated online learning for professional training and development. We suggest that focusing on improving individual strengths rather than weaknesses may be an effective motivational strategy for professionals to bolster their self-regulated online learning efforts.

1. Introduction

Self-regulating one's professional development is commonly regarded as a vital aspect of being a professional. For professionals, it is important to keep their skills and knowledge up to date, and to maintain their employability (Bennett, Dawes, & Cunningham, 2012; Jarvis, 2004; Friedman & Phillips, 2004; Knapper & Cropley, 2000; Webster-Wright, 2009). In recent decades, online learning facilities have considerably broadened opportunities for professionals to self-regulate their work-related learning endeavours. Many employers provide their employees with a choice of online learning facilities (DeRouin, Fritzsche, & Salas, 2005; Welsh, Wanberg, Brown, & Simmering, 2003). Moreover, through online educational platforms, such as Coursea (*www.coursera.org),* edX (www.edx.org), and Khan Academy (*www.khanacademy.org)*, individuals may enrol in a vast number of online courses provided by both public and commercial educational institutions. These facilities enable professionals to engage in a wide range of learning activities, whether at work or in their free time, at their own pace, and at times that suit them.

However, engaging in *self-regulated online learning activities* (i.e., online learning activities that individuals do voluntarily) clearly requires motivation (Castillo-Merino & Serradell-López, 2014; Kim, 2009; Roca & Gagné, 2008). To self-initiate and maintain online learning activities, individuals have to be willing to invest time and energy. In practice, it can be hard to give priority to such activities because of other pressing demands, such as productivity targets at work, family responsibilities, and leisure activities. Indeed, it is often challenging for professionals to find sufficient time for work-related learning efforts (e.g., National Education Commission on Time and Learning, 2005). Moreover, the dropout rates among participants in online courses are high (Ali & Leeds, 2009; Levy, 2007). An important factor in online course dropout appears to be motivation (Cho & Shen, 2013). Hence, in the present research, the main question was: under what conditions are professionals likely to put more effort into self-regulated online learning activities? We propose that a critical factor in this regard is to what extent the individual perceives the learning topic as a relative personal strength.

1.1. Focusing on Strengths versus Weaknesses

It is common practice in Human Resource Development (HRD) to advise professionals to improve their weaknesses. For example, a typical competency-based development path entails that individuals reflect on their competencies relative to standards explicated in a competency profile, and engage in learning activities to improve the competencies that do not comply with the profile (e.g., Bartram, 2005; Lado & Wilson, 1994; Lawler, 1994; Naquin & Holton, 2003). Consequently, professionals tend to focus their learning efforts on improving their perceived relative weaknesses.

Clearly, if their competencies do not comply with the prevailing standards, then improving their weaknesses is advised. However, many professionals *do* meet their job requirements and may want to work proactively on their professional development. In this context, it is questionable whether focusing on improving perceived weaknesses is the optimal strategy to stimulate professionals' self-regulated online learning endeavours. A vast amount of research indicates that competence self-perceptions (i.e., perceived competence, self-efficacy) are positively related to effort (Bandura, 1993; Hattie, Biggs, & Purdie, 1996; Multon et al., 1991; Deci & Ryan, 2000; Schunk, 1991; Sitzmann & Ely, 2011; Zimmerman, 2000). Therefore, it seems likely that individuals may put more effort into self-regulated online learning activities if they focus on further improving their perceived strengths, that is, the competencies in which they feel relatively competent. Hence, assuming that individuals' professional competence may benefit from both improving their strengths and improving their weaknesses, focusing on improving strengths may be an effective strategy to bolster professionals' self-regulated learning endeavours.

1.2. Between-Person Effects on Effort Intentions

Research indicates that working on strengths may encourage individuals to invest more effort. Specifically, in two randomized experiments, strength-based self-regulated learning strategies were shown to enhance participants' effort intentions (Hiemstra & Van Yperen, 2015) relative to deficit-based strategies. That is, individuals who identified their strengths and selected learning activities to further improve those strengths, intended to put more effort into their learning than individuals who focused on their weaknesses. Similarly, in two longitudinal field experiments, participants exposed to a strengths intervention felt more

engaged in personal growth endeavours than participants who were stimulated to work on their personal deficiencies (Meyers, Van Woerkom, De Reuver, Bakk, & Oberski, 2015). Furthermore, in a randomized experimental study, participants who received a strength-based feedforward interview, in which they discussed their strengths and set goals to build on those strengths, were higher in effort intentions than participants who received a standard feedback interview, in which the focus was on both strengths and weaknesses (Rechter, 2010, Study 2). However, a limitation of these studies is that they considered self-reported effort rather than behavioural effort. In the present research (Study 2), we addressed this limitation by examining the relations between perceived relative strengths (versus weaknesses) and behavioural effort.

1.3. Within-Person Relations with Effort

At the between-person level, ample research findings indicate that individuals who feel more competent tend to invest more effort in their learning than individuals who feel less competent (e.g., Bandura, 1993; Deci & Ryan, 2000; Hattie et al., 1996). However, at the within-person level, individuals may invest less effort on occasions when they feel more competent, relative to occasions when they feel less competent (Vancouver, et al., 2008). For example, in a study in which students' self-efficacy, effort, and performance were examined across a series of tests, the positive relation between self-efficacy and performance was reconfirmed at the between-person level, whereas the relations between self-efficacy and both effort and performance were negative at the within-person level (Vancouver & Kendall, 2006). To explain this finding, the authors reasoned that at the within-person level, higher self-efficacy may signal that less effort is needed to attain a goal (cf. Carver & Scheier, 1999). However, a negative within-person link between self-efficacy and effort is not consistently observed across situations. For example, in a study examining participants' self-efficacy and effort over a series of trials on a stock prediction task, a positive within-person relation between self-efficacy and effort was found among participants who were high in self-efficacy, whereas a negative within-person relation was found among participants who were low in self-efficacy (Beck & Schmidt, 2012). Similarly, across a series of trials on a board-hitting game, both positive and negative within-person relations between self-efficacy and effort were found, depending on the level of performance ambiguity of the task (Vancouver et al., 2008). Hence, there is consistent evidence for a positive relation between

competence self-perceptions and effort at the between-person level, but at the within-person level, both positive and negative relations have been observed. Therefore, we do not know whether, at the within-person level, individuals will put more effort into learning in the area of personal relative strengths or personal relative weaknesses. Verifying these within-person effects is important for HRD practices, because HRD practices typically involve career counselling and advice on training and development from a within-person perspective.

1.4. Single Task Versus Multiple Task Within-Person Relations

A common characteristic of the studies in which a negative within-person relation between self-efficacy and effort was found is that a *single task within-person design* was used: participants' self-efficacy and effort were examined on a single task (e.g., a stock prediction task; Beck & Schmidt, 2012) across multiple occasions. However, self-regulated online learning entails that individuals operate in a multiple-task context, in which they have the choice to engage in multiple separate learning activities, such as online courses and e-learning modules. Accordingly, in the present research, we used a *multiple-task within-person design*. That is, we examined the within-person relations between competence self-perceptions and effort, across multiple online learning activities, on a single occasion.

To our knowledge, the present studies are the first in which a multiple-task within-person design was used to examine the relationships between individuals' self-perceptions of competence in various tasks and the effort they put into those tasks (see also Sun & Frese, 2013). On the one hand, the positive link between self-perceptions of competence and effort that has been found in a vast amount of research (Bandura, 1993; Hattie et al., 1996; Multon et al., 1991; Deci & Ryan, 2000; Schunk, 1991; Sitzmann & Ely, 2011; Zimmerman, 2000) suggests that individuals are likely to put more effort into their learning when they work on their strengths than when they work on their weaknesses. Indeed, theorists have associated competence self-perceptions with more confidence, higher outcome expectations, and more ambitious goals (e.g., Atkinson, 1964; Bandura, 2001; Locke & Latham, 2002). On the other hand, the negative within-person link between self-perceptions of competence and effort that have been observed in several studies (Beck & Schmidt, 2012; Vancouver & Kendall, 2006; Vancouver et al., 2008), suggests that individuals may put more effort into their learning when they work on their weaknesses than when they work on their

strengths. Perceived weaknesses may signal that more effort is needed to attain a goal (cf. Carver & Scheier, 1999; Vancouver & Kendall, 2006). Hence, in the present research, we tested two competing hypotheses. *Hypothesis 1* states that individuals will put more effort into their strengths than into their weaknesses; *Hypothesis 2* states that individuals will put more effort into their weaknesses than into their strengths.

1.5. The Present Research

In Study 1, we used a within-person design to examine the relations between perceived strengths (i.e., perceived relative strengths versus weaknesses) and both intended effort and allocated time on six hypothetical online courses. In Study 2, we used a mixed factorial design to examine the relations between perceived strengths and behavioural effort on two e-learning modules.

2. Method Study 1

2.1. Participants

A total of 115 college students (65 men, 50 women; mean age = 21.71 years, *SD* = 4.38) from a university in the Netherlands responded to an email in which they were invited to complete a questionnaire on online learning.

2.2. Procedure

After completing the biographical questions, the participants rank ordered six topics, that is, Chemistry, Physics, Mathematics, English, French, and German, ranging from their relative strengths through to their relative weaknesses. Next, the participants were shown a screen shot of "Online Academy", an online learning website created for the purposes of the study, and read the following: "Online Academy is a popular online learning platform that is used by students and professionals in many countries. At Online Academy, you will find a large number of short videos that you can watch to improve your knowledge on a wide range of topics. You can step in at any level, from primary school level up to university level". Next the participants read that they would be given the opportunity to use "Online Academy" to further improve their knowledge on

the six topics. They then completed the perceived competence, intended effort, and allocated time items.

2.3. Measures

Perceived strengths. Participants were asked to rank order the six topics (i.e., Chemistry, Physics, Mathematics, English, French, and German) on a scale ranging from #1 (*my relative strength*) to #6 (*my relative weakness*). For each topic, the rank order score was used as an index of perceived strengths (note that a lower rank order number indicates a higher level of perceived strengths).

Perceived competence. For each of the six topics, the participants were asked: "How good are you at this topic?" Response categories ranged from 1 (*not at all good)* to 7 (*very good*).

Intended effort. For each of the six topics, the participants were asked: "If you were given the opportunity to use Online Academy to further improve your knowledge on this topic, how much effort would you put into this topic?" Response categories ranged from 1 (*very little)* to 7 (*very much*).

Allocated time. Participants were asked: "If you were given the opportunity to spend 60 hours to use Online Academy to further improve your knowledge on the following six topics, how would you allocate these 60 hours across these topics?" Participants responded by filling in the number of hours they would allocate to each of the six topics. For each topic, allocated time was subsequently calculated as the proportion of the total of 60 hours that the participants allocated to that topic.

3. Results Study 1

Table 1 displays the means and standard deviations of perceived competence, intended effort, and allocated time, at each level of perceived strengths. Visual inspection of the means shows a decreasing trend, from perceived strengths #1 (i.e., *my relative strength*) to #6 (i.e., *my relative weakness*), for each of the three dependent variables.

Rank of perceived strengths	Perceived competence (n = 115)		Intended effort (n = 115)		Allocated time (n = 115)	
	M	*SD*	*M*	*SD*	*M*	*SD*
#1	5.53[a]	1.26	4.33[a]	1.76	.24[a]	.19
#2	4.87[b]	1.37	4.35[a]	1.63	.22[a]	.16
#3	4.21[c]	1.42	4.05[b]	1.62	.18[b]	.12
#4	3.43[d]	1.49	3.50[c]	1.79	.15[bc]	.17
#5	2.58[e]	1.34	2.95[d]	1.82	.11[c]	.15
#6	1.98[f]	1.21	2.48[e]	1.70	.09[c]	.15

Table 1. Means and Standard Deviations of Perceived Competence, Intended Effort, and Allocated Time, by Rank of Perceived Strengths (i.e., Perceived Relative Strengths versus Weaknesses), Study 1

Notes:

The ranks of the perceived relative strengths versus weaknesses (i.e., Chemistry, Physics, Mathematics, English, French, and German) differ between individuals.

Within each column, different superscripts indicate significant differences at level $p < .05$.

3.1. Perceived Competence

To test whether the participants felt more competent in their perceived strengths than in their perceived weaknesses, we conducted a repeated measures multivariate analysis of variance (RM-MANOVA) with perceived strengths (i.e., #1 to #6) as the within-person factor and perceived competence as the dependent variable. As expected, the results show a significant and large effect of perceived strengths on perceived competence, $F(5, 110) = 98.86$, $p < .001$, $\eta^2 = .82$. As indicated by the different superscripts in Table 1, all pairwise comparisons were significant at the $p < .05$ level. Thus, participants' perceived competence was higher in their relative strengths than in their relative weaknesses.

3.2. Test of Hypotheses

To test whether the participants put more effort into their strengths than into their weaknesses (*Hypothesis 1*) or vice versa (*Hypothesis 2*), we conducted a RM-MANOVA with perceived strengths as the within-person factor and intended effort as the dependent variable. The results showed a significant and large effect of perceived strengths on intended effort, $F(5, 110) = 18.50$, $p < .001$, $\eta^2 = .46$. In support of Hypothesis 1, the participants allocated more effort to their perceived strengths ($M_{\#1} = 4.33$, $SD = 1.76$) than to their perceived weaknesses ($M_{\#6} = 2.48$, $SD = 1.70$). As indicated by the different superscripts in Table 1, all pairwise comparisons were significant at the $p < .05$ level, with the exception of the difference between perceived strengths #1 and #2.

Next, we tested the within-person relation between perceived strengths and allocated time. Because the proportions of time that participants allocated to the six levels of perceived strengths were inherently dependent (i.e., 1.00 in total for each participant), a RM-MANOVA could not be performed directly on the six proportions. Therefore, we conducted a paired *t*-test, testing the within-person difference in allocated time between perceived strengths #1 and #6. A bias-corrected and accelerated confidence interval (BCA-CI) of the mean difference, based on 5000 bootstrap re-samples, showed that the participants allocated significantly more time to their perceived strengths ($M_{\#1} = .24$, $SD = .19$) than to their perceived weaknesses ($M_{\#6} = .09$, $SD = .15$; 95% BCA-CI of difference [.09; .22]). Thus, again, *Hypothesis 1* was supported. The results of follow-up analyses, shown by the different superscripts in Table 1, revealed that all pairwise comparisons were significant, with the exception of the differences between perceived strengths #1 and #2, between #3 and #4, and between #4, #5, and #6.

4. Discussion Study 1

The results of Study 1 show that individuals intended to allocate more effort and time to their perceived strengths than to their perceived weaknesses. However, a limitation of Study 1 is that we assessed participants' self-reported intended effort and allocated time, rather than behavioural measures of effort. In Study 2, we addressed this limitation by using behavioural effort as the dependent variable.

5. Method Study 2

In Study 2, the participants indicated which of two types of skill they perceived as their relative strengths: spelling or calculating. We then assessed participants' behavioural effort when working, in random order, on an e-learning spelling module and an e-learning calculation module. A 2 (perceived strengths: relative strengths versus weaknesses) × 2 (order of practice: spelling first versus calculating first) mixed factorial design was used to examine whether participants invested more behavioural effort when working on their perceived strengths or their perceived weaknesses.

5.1. Participants

A total of 58 undergraduate students (33 women, 25 men; mean age = 19.84 years, *SD* = 2.85) participated in exchange for course credit.

5.2. Procedure

After signing up for the study, the participants received an email with a link to an online learning website that was constructed for the purposes of the study. The contents of the email explained that they would engage in an online learning session, which would take at least 90 minutes of their time. To create a realistic online learning condition, the participants were advised to conduct this session within two weeks after receiving the email, at a time and location that suited them best.

On starting their online learning session, the participants first completed the biographical items, the perceived strengths measure, and the perceived competence scale. Next, the participants read that they had the opportunity to work on two e-learning modules, a *spelling* and a *calculating* module, to further improve these skills. Subsequently, they were randomly assigned to either a *spelling first* condition (*n* = 26), in which they were first directed to the spelling module, and next to the calculating module, or to a *calculating first* condition (*n* = 32), in which they were directed to the two modules in reverse order.

5.3. Measures

Perceived strengths. To assess participants' perceived strengths, they were shown two sample exercises of the spelling module and two of the calculating module. Next, they were asked: "Which type of skill do you perceive as your relative strength?" Response categories were *spelling* (*n* = 28) and *calculating* (*n* = 30). The type of skill that the participants perceived as their relative strengths was coded as perceived strengths #1 (i.e., relative strengths), the other skill as perceived strengths #2 (i.e., relative weaknesses).

Perceived competence. For each type of skill (i.e., spelling and calculating), the participants completed a six-item perceived competence scale. The general stem was, respectively, "How good are you at spelling?" or "How good are you at calculating?". Sample items are, "This is something that I am good at" and "I feel competent in this". Response categories ranged from 1 (*completely disagree)* to 7 (*completely agree*). For each type of skill, the six items were averaged to create an index for perceived competence in spelling (Cronbach's alpha = .96) and in calculating (Cronbach's alpha = .97), respectively.

Behavioural effort. Within each e-learning module, the participants conducted a series of exercises. The exercises were based on "Better Spelling" (www.beterspellen.nl) and "Better Calculating" (www.beterrekenen.nl), two freely available Dutch online learning websites. After completion of each exercise within a module, the participants were presented with the correct answer and asked to indicate whether they wanted to *continue* or to *quit* practicing that module. After quitting the first module, participants were directed to the second module. After quitting the second module, the participants were debriefed. For each e-learning module, we counted the number of exercises that the participants completed. Because of the different nature of the spelling and calculating exercises, we used the standardized number of completed exercises (i.e., z scores) as the measure of behavioural effort for each module.[1]

6. Results Study 2

6.1. Perceived Competence

To assess whether participants were higher in perceived competence in the skill that they perceived as their relative strengths than in the skill that they

perceived as their relative weakness, we conducted a RM-MANOVA with perceived strengths as the within-person factor and perceived competence as the dependent variable. The results showed a strong significant effect of perceived strengths on perceived competence, $F(1, 57) = 141.76$, $p < .001$, $\eta^2 = .71$, indicating that the participants felt more competent in their relative strengths ($M_{\#1} = 5.43$, $SD = .67$) than in their relative weaknesses ($M_{\#2} = 3.46$, $SD = 1.33$).

6.2. Tests of Hypotheses

To test our hypotheses that individuals put more effort into their relative strengths (*Hypothesis 1*), or into their relative weaknesses (*Hypothesis 2*), we conducted a RM-MANOVA with perceived strengths as the within-person factor, order of practice as the between-person factor, and behavioural effort as the dependent variable. In line with the findings of Study 1, the results yielded a significant main effect of perceived strengths on behavioural effort, $F(1,56) = 5.96$, $p = .02$, $\eta^2 = .10$, indicating that the participants invested more effort in their perceived strengths ($M_{\#1} = .13$, $SD = 1.07$) than in their perceived weaknesses ($M_{\#2} = -.13$, $SD = .91$). No main effect of order of practice was found, $F(1,56) = .12$, $p = .74$, $\eta^2 = .00$. Thus, effort expenditure was similar for those who were directed first to the spelling module and those who were directed first to the calculating module. Also, no interaction effect between perceived strengths and order of practice was found, $F(1,56) = .10$, $p = .76$, $\eta^2 = .00$, which indicates that the effect of perceived strengths on effort was not influenced by order of practice.[2, 3] Therefore, we concluded that we found empirical support only for *Hypothesis 1*: Individuals tend to put more effort into their relative strengths than into their relative weaknesses.

7. Discussion Study 2

The results of Study 2 show that individuals who had the opportunity to use two e-learning modules, one to practice their spelling skills and one to practice their calculating skills, put more behavioural effort into practicing the skill that they perceived as their relative strengths than into practicing the skill that they perceived as their relative weaknesses. This finding is consistent with the result of Study 1, in which we found that individuals intended to put more effort and allocated more time to their relative strengths than to their relative weaknesses.

8. General Discussion

We examined the role of perceived relative strengths versus weaknesses in participants' effort expenditure in the context of self-regulated online learning. We found that, relative to learning activities in topics that they perceived as their weaknesses, individuals intended to allocate more effort and time, and actually allocated more behavioural effort, to learning activities in topics that they perceived as their strengths. Accordingly, we conclude that working on perceived relative strengths rather than weaknesses may bolster individuals' self-regulated online learning endeavours.

8.1. Theoretical Contributions

To the best of our knowledge, these are the first findings that show that working on relative strengths is associated with more behavioural effort than working on relative weakness. These findings are in line with previous research that has demonstrated that working on strengths rather than weaknesses enhances individuals' effort intentions (Hiemstra & Van Yperen, 2015; Meyers et al., 2015; Rechter, 2010, Study 2).

Second, our findings contribute to the theoretical discussion on the within-person relations between competency self-perceptions and effort. Although, at the between-person level, ample research has demonstrated that individuals who feel more competent tend to invest more effort in their learning than individuals who feel less competent (Bandura, 1993; Deci & Ryan, 2000; Hattie et al., 1996), at the within-person level, recent research findings indicate that individuals may invest more effort in their learning on occasions when they feel less competent than on occasions when they feel more competent (Beck & Schmidt, 2012; Vancouver & Kendall, 2006; Vancouver et al., 2008). However, in the studies that found a negative within-person relation between competence self-perceptions and effort, these relations were examined in a single-task context. That is, individuals' self-perceived competence and effort were examined on a single task, across multiple subsequent occasions. In the present research, we examined these relations in a multiple-tasks context: that is, in the context of self-regulated online learning, we examined individuals' self-perceived competence and effort across multiple separate tasks, on a single occasion. The results showed a positive within-person relation between competence self-perceptions (i.e., perceived relative strengths versus weaknesses) and effort.

Therefore, we can now be more certain that, in the context of self-regulated online learning, at the within-person level, individuals are likely to invest more effort when they work on their perceived strengths than when they work on their perceived weaknesses.

8.2. Strengths and Limitations

One of the limitations of the present research follows from our decision to examine the *within-person* relations between perceived strengths versus weaknesses and effort. Because we used a correlational within-person design, we cannot infer causal relations. However, in the light of recent research suggesting that at the within-person level both positive and negative relations exist between competence self-perceptions and effort (Beck & Schmidt, 2012; Vancouver & Kendall, 2006; Vancouver et al., 2008), our specific aim was to examine the within-person relations.

A second possible limitation is that we used effort rather than learning performance as an outcome variable. We had two main reasons for this. First, learning performance is typically attained through learning effort (Ericsson, 2009). Second, the nature of the concept of perceived strengths versus weaknesses may confound its relation with learning performance. Individuals will typically perform better on their perceived strengths than on their perceived weaknesses. Consequently, performance improvements in individuals' perceived strengths may require different amounts of effort than similar performance improvements in their perceived weaknesses. Because of this potential confound, we focused on the relation between perceived strengths versus weaknesses and effort.

A third possible limitation concerns the ecological validity of our research. We conducted our studies among university and college students, so the question is whether our findings hold in other populations such as professionals in the context of work. We see no reasons why this should not be the case; nevertheless, the generalizability of our findings should be put to the empirical test in future studies.

8.3. Practical Implications

The present findings have implications for HRD practices. Online learning facilities offer professionals a wide range of possibilities to self-regulate their professional training and development. In competency-based development

paths, individuals are typically directed to learning activities to address their deficiencies (e.g., Bartram, 2005; Lado & Wilson, 1994; Lawler, 1994; Naquin & Holton, 2003). However, this may not be the optimal strategy to stimulate individuals' self-regulated online learning endeavours. The present findings indicate that individuals are likely to put more effort into online learning activities when they work on their perceived strengths rather than their perceived weaknesses. Thus, on the premises that professionals' professional competency may benefit from both improving their strengths and improving their weaknesses, focusing on improving strengths may be an effective strategy for professionals to bolster their self-regulated online learning efforts.

Footnotes Chapter 3

1 The unstandardized mean numbers of completed exercises were: $M_{spelling}$ = 7.03 (*SD* = 5.82), $M_{calculating}$ = 5.45 (*SD* = 5.07).

2 The type of skill that the participants perceived as their relative strengths (i.e., spelling or calculating) did not influence the effect of perceived strengths on behavioural effort. A RM-MANOVA with perceived strengths (i.e., perceived strengths versus weaknesses) as the within-person factor, type of skill (i.e., spelling versus calculating) as the between-person factor, and behavioural effort as the dependent variable, yielded neither a main effect of type of skill, $F(1,56) = .17$, $p = .68$, $\eta^2 = .00$, nor an interaction effect between type of skill and perceived strengths, $F(1,56) = .00$, $p = .93$, $\eta^2 = .00$.

3 For the reader's convenience, we present the contrasts between participants' effort on their perceived strengths versus weaknesses. An alternative would be to test and present the interaction effect between the type of skill that the participants perceived as their relative strengths (i.e., spelling or calculating) and their effort on the spelling versus calculating module. This analysis yields similar results. That is, in line with *Hypothesis 1*, the results show a significant interaction effect between type of skill and e-learning module on effort, $F(1, 56) = 5.86$, $p = .02$, $\eta^2 = .10$, indicating that the participants invested more effort when working on their perceived strengths ($M_{z\text{-}spelling} = .09$, $SD = 1.02$; $M_{z\text{-}calculating} = .17$, $SD = 1.13$) than when working on their perceived weaknesses ($M_{z\text{-}spelling} = -.08$, $SD = .99$; $M_{z\text{-}calculating} = -.19$, $SD = .82$).

CHAPTER 4

Self-Directed versus Test-Directed Learning Contexts: Consequences for Students' Effort Allocation to Their Strengths and Weaknesses

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Abstract

In the present research, we conducted a series of five studies designed to examine the moderating effect of learning context (*self-directed* versus *test-directed*) on the within-person relation between perceived strengths (perceived relative *strengths* versus *weaknesses*) and allocated effort to multiple separate goals. The studies yielded consistent results, indicating that in a self-directed learning context students allocate more effort to their strengths, whereas in a test-directed learning context students allocate more effort to their weaknesses. This pattern was observed across different methodologies (scenario studies, field studies, and experimental studies), different research designs (within-person and mixed factorial designs), different participants (secondary school, college, and university students), and different measures of effort (effort intentions, self-reported effort, and behavioral effort). Theoretically, our findings contribute to the knowledge on the within-person relations between self-perceived competence and effort allocation in multiple goal pursuit. Practically, our findings guide educators in directing students' learning effort allocation to their strengths or weaknesses.

1. Introduction

To become competent professionals who stand out in a competitive job market, students may work on both their strengths and their weaknesses. By definition, students are no experts and often there is ample room for improvement, both in the competencies they believe they are relatively good at (i.e., their perceived relative *strengths*) and in those they believe they are relatively not good at (i.e., their perceived relative *weaknesses*). On the one hand, improving one's weaknesses is indispensable for mastering a profession. Students need to diminish the gap between their present level of competency and the prevailing standard for a particular profession or degree. On the other hand, further improving their strengths enables students to excel in specific competencies, which may be a valuable asset for their future careers (Hiemstra & Van Yperen, 2015a).

In achievement settings, including education, both working on strengths and working on weaknesses can be motivating. Perceiving a competency as a strength may foster students' expectations and encourage them to set their standards even higher (Atkinson, 1964; Bandura, 1997; Ryan & Deci, 2000; Weiner, 1974), whereas perceiving a competency as a weakness may signal that more effort is needed to achieve a goal, such as passing an exam (Carver & Schreier, 1981; Dunlosky & Ariel, 2011; Son & Metcalfe, 2000; Vancouver et al., 2008). However, we do not know under what conditions students tend to allocate more effort to their strengths or to their weaknesses when they have a limited amount of time and energy to work on multiple goals. We argue and demonstrate that *learning context* moderates the within-person relation between perceived strengths (i.e., perceived relative *strengths* versus *weaknesses*) and allocated effort. In a self-directed learning context, in which they feel free to pursue their own learning goals, students put more effort into their strengths than into their weaknesses. In contrast, in a test-directed learning context, in which they feel pressured to meet external standards, students put more effort into their weaknesses than into their strengths.

1.1. Perceived Relative Strengths and Weaknesses

Perceived relative strengths and weaknesses are competence self-perceptions that result from dimensional within-person comparisons (Möller & Marsh, 2013). Dimensional comparison entails that individuals use their competence

in one dimension (e.g., spelling) as a reference for judging their competence in another dimension (e.g., calculating). Although individuals' self-evaluations are typically based on social comparison information (Klein, 1997; Wheeler & Miyake, 1992; White, Langer, Yariv, & Welch, 2006; Van Yperen & Leander, 2014), research indicates that students engage in dimensional comparisons as well. For example, in a diary study among 67 university students, students reported a total of 436 dimensional comparisons (M = 6.51) over a 14-day period (Möller & Husemann, 2006). It is likely that these within-person perceptions of relative strengths versus weaknesses affect students' learning endeavors. For example, when choosing elective courses, doing homework, or preparing for tests, different school subjects make competing demands on students' limited time and energy. In such contexts, self-perceptions of strengths and weaknesses may guide students' effort allocation across these competing demands.

Although scholars have frequently called for research on self-regulation in the context of multiple goal pursuit (e.g., Barron & Harackiewicz, 2001; Boekaerts, 2009; Austin & Vancouver, 1996; Locke & Latham, 1990; Miron-Spektor & Beenen, 2015), little is known about the within-person relations between competence self-perceptions and effort allocation across multiple separate goals (Sun & Frese, 2013). In the present research we addressed this gap in the literature by examining the role of the learning context (i.e., *self-directed* versus *test-directed*) in students' effort allocation to their perceived strengths versus weaknesses on a single occasion.

1.2. Learning Context and Allocated Effort

In education, the extent to which students are afforded the opportunity to self-direct their goals may vary across time and across conditions. For example, at the beginning of a semester, teachers may encourage students to pursue their own learning goals. Accordingly, students may experience a more self-directed learning context. In contrast, at the end of the semester, approaching the test week, teachers may prime their students to meet test standards. Accordingly, students may experience a more test-directed learning context. It is likely that these different learning contexts affect students' effort allocation.

Interestingly, the extant literature has documented both positive and negative relations between each type of learning context and effort allocation (for reviews, see Guay et al., 2008; Loyens et al., 2008; Roediger, Putman, & Smith, 2011; Sheldon & Biddle, 1998). For example, in self-directed learning contexts,

students have been shown to put more effort into their learning as their goals are more self-directed (Sheldon & Elliot, 1998). On the other hand, students have been shown to waste more time when their autonomy exceeds a moderate level (Wielenga-Meijer, Taris, Wigboldus, & Kompier, 2011). Similarly, regarding test-directed contexts, research has demonstrated that students invest more effort when they are tested more frequently (Mawhinney, Bostow, Laws, Blumenfeld, & Hopkins, 1971). However, research has also demonstrated that students prefer less effortful learning tasks when they are motivated by external rather than intrinsic incentives (Pittman, Emery, & Boggiano, 1982).

A possible explanation for these inconsistent findings is that previous researchers typically used a single goal design, whereas achievement contexts are typically multiple goal contexts. At school, students take different classes and work on multiple subjects simultaneously. In multiple goal contexts, a positive effect on one goal may come at the expense of another goal. For example, if the teacher of one class decides to test students more frequently, this may enhance students' effort in that particular class, but simultaneously diminish their effort in another class in which they are not tested more frequently (cf., Mawhinney et al., 1971; Wielenga-Meijer et al., 2011). When a single goal approach is used in a multiple goal context (e.g., only considering the class in which students are tested more frequently), these adverse side effects (e.g., the negative effects on effort in another class) remain unobserved, which may lead to invalid conclusions. Therefore, in the present research, we used a multiple goal design to examine the effects of self-directed versus test-directed learning contexts on students' effort allocation.

1.3. Competence Self-Perceptions and Allocated Effort

Students who believe that they are good at a school subject may be more willing to put effort into that subject than students who believe they are less good at that subject. Indeed, research has shown that at the between-person level self-perceived competence is typically positively related to effort (e.g., Bandura & Locke, 2003; Hiemstra & Van Yperen, 2015a; Latham & Pinder, 2005; Multon et al., 1991; Sadri & Robertson, 1993). However, at the within-person level, both positive and negative relations between competence self-perceptions and effort have been observed. For example, in a study in which participants engaged in a series of trials in a stock investment simulation, a positive within-person relation between self-efficacy and allocated effort was found (Seo & Ilies, 2009). In

contrast, in a study on the relationship between students' self-efficacy and effort across a series of tests over an introductory course, a negative within-person relation was found (Vancouver & Kendall, 2006). Furthermore, in a study in which participants' self-efficacy and effort allocation were assessed across successive trials of a board-hitting game, Vancouver and Yoder (2009) found both positive and negative within-person relations between self-efficacy and allocated effort, depending on the level of task difficulty. Similarly, across a series of anagram tasks, Schmidt and DeShon (2010) observed both positive and negative within-person relations between self-efficacy and allocated effort, depending on the level of performance ambiguity of the task.

These findings indicate that at the within-person level both positive and negative within-person relations exist between competence self-perceptions and allocated effort. However, a shared characteristic of these studies is that a *temporal* within-person design was used. That is, participants' competence self-perceptions and allocated effort were assessed on a *single task* across *multiple occasions* (i.e., a series of subsequent occasions). However, as explained above, education is a multiple-goal context in which students typically work on a number of competing goals during the same period of time. To assess the within-person relation between competence self-perceptions and allocated effort to multiple separate goals, a *dimensional* within-person design is required, which entails that participants' competence self-perceptions (i.e., their perceived relative strengths versus weaknesses) and allocated effort are assessed across *multiple goals* on a *single occasion* (cf., Möller & Marsh, 2013).

To date, little empirical information is available on the dimensional within-person relations between self-perceived competence and effort allocation across multiple separate goals (Sun & Frese, 2013). In one study of effort allocation in the context of self-regulated online learning, a positive relation between perceived strengths versus weaknesses and allocated effort was found (Hiemstra & Van Yperen, 2015b). That is, students allocated more effort to topics in which they felt relatively more competent. In contrast, in a study in which participants conducted two different office tasks simultaneously, Byrd (2003) observed that the participants prioritized tasks in which they felt less self-efficacious. In the present research, we sought to demonstrate that the dimensional within-person relations between self-perceived competence and effort allocation to multiple goals may vary as a function of the learning context.

1.4. The Moderating Role of Learning Context

Students who feel free to pursue their own learning goals (a self-directed learning context) are likely to allocate their efforts in different ways across their strengths and weaknesses than students who are primed to meet test requirements (a test-directed learning context). Indeed, the existing studies on the relation between competence self-perceptions and effort allocation in multiple-goal contexts suggest that the learning context may play a moderating role. Specifically, a positive relation was observed in a study in which individuals pursued self-directed learning goals (Hiemstra & Van Yperen, 2015b), whereas a negative relation was found in a study in which goals were externally imposed on individuals (Byrd, 2003). An impressive amount of research has demonstrated that self-directed versus externally-directed goal contexts represent a major influence on motivational processes (Cerasoli, Nicklin, & Ford, 2014; deCharms, 1968; Eisenberger & Cameron, 1996; Ryan & Deci, 2000; Sansone & Harackiewicz, 2000). Therefore, in the present research, we contrasted a self-directed learning context with a test-directed learning context, to examine whether learning context moderates the dimensional within-person relations between self-perceived competence (perceived relative strengths versus weaknesses) and allocated effort. We expected that in a self-directed learning context perceived relative strengths would be positively related to allocated effort. In this context, strengths may represent a signal that more intrinsic gratification (cf., Ryan & Deci, 2000), or a higher performance level (cf., Locke & Latham, 2002), is within reach when more effort is allocated to these goals. In contrast, we expected that in a test-directed learning context perceived relative strengths would be negatively related to allocated effort. In this context, strengths may represent a signal that less effort is required on those goals to meet the external standards (cf., Carver & Schreier, 1981; Vancouver et al., 2008). Hence, we hypothesized that in a self-directed learning context students would allocate more effort to their strengths than to their weaknesses, whereas in a test-directed learning context students would allocate more effort to their weaknesses than to their strengths.

1.5. Overview of the Present Research

Across five studies, we used a variety of methods and measures to test our hypothesis. Studies 1 and 2 are vignette studies in which we examined the effects of learning context on students' self-reported effort allocation to their strengths

and weaknesses. In Study 3, we used a repeated measures design in a field setting to examine students' self-reported effort allocation to their strengths and weaknesses as a function of changes in the learning context. Finally, Studies 4 and 5 are experiments in which we examined the impact of learning context on the relation between perceived strengths versus weaknesses and behavioral effort.

2. Method Study 1

2.1. Participants

A total of 95 undergraduate psychology students (34 men, 61 women; mean age = 19.27 years, *SD* = 1.29) of a university in the Netherlands, recruited using the university's psychology experiment management system, participated in the study for course credits.

2.2. Procedure

After indicating their perceived strengths on five school subjects[1] (Math, Economy, Dutch, History, and Biology), the participants were randomly assigned to one of four conditions: one self-directed learning context or one of three variants of a test-directed learning context. In each condition they read, "Imagine you had a total of 50 hours to spend on these five school subjects: how would you allocate your time across these subjects…." In the *self-directed learning context* participants read, "…if you were free to spend this time on elective classes for extra course credit?"; in the *no fail test-directed learning context,* "…if you were preparing for exams in which you had to score a minimum of 5.5[2] on each subject?"; in the *compensate test-directed learning context,* "…if you were preparing for exams in which you had to score a minimum of 5.5[2] on average across all subjects"; and in the *excellence test-directed learning context,* "…if you were preparing for exams in which you aimed to score 8[2] or higher on as many subjects as possible."

2.3. Measures

Perceived strengths and allocated effort. Participants were asked to rank order five school subjects, Math, Economy, Dutch, History, and Biology, ranging from strength #1 (*my relative strength*) to strength #5 (*my relative weakness*) and, subsequently, to allocate 50 hours across these subjects. For each school subject, the rank order level was used as an index of perceived strengths (where a lower rank order score indicates a higher level of perceived strengths: #1 is the highest level). Allocated effort was subsequently computed as the proportion of time, from the total of 50 hours, allocated to each level of perceived strengths (i.e., #1 through #5).

3. Results Study 1

The means and standard deviations of allocated effort per rank order level of perceived strengths by learning context are shown in Table 1. First, we examined whether any evidence could be found for differences between the three variants of the test-directed learning context. A repeated measures multivariate analysis of variance (RM-MANOVA) could not be performed directly on the five proportions of allocated effort per level of perceived strengths, because of their inherent dependencies (1.00 in total). Therefore, we conducted five separate analyses of variance (ANOVAs), with test-directed learning context (*no fail* versus *compensate* versus *excellence*) as the independent variable and allocated effort at each level of perceived strengths (#1 through #5) as the dependent variables. To reduce the chances of a type II error occurring (i.e., false negative), we tested the effects at the $p < .10$ level, and considered whether the effect size was very small ($\eta^2 < .10$). No significant differences between the three variants of the test-directed learning context were found. That is, the differences between participants' strength #1, $F(2, 65) = .13$, $p = .88$, $\eta^2 = .00$, strength #2, $F(2, 65) = 1.92$, $p = .16$, $\eta^2 = .06$, strength #3, $F(2, 65) = .21$, $p = .81$, $\eta^2 = .00$, strength #4, $F(2, 65) = .35$, $p = .71$, $\eta^2 = .01$, and strength #5, $F(2, 65) = 2.24$, $p = .12$, $\eta^2 = .07$ in respect of allocated effort were all nonsignificant and had a very small effect size.

Second, because no differences were found between the three variants of the test-directed learning context, we merged the test-directed learning context conditions and tested our focal hypothesis, which posited that the self-directed versus test-directed learning context moderates the within-person relation

between perceived strengths and allocated effort. Figure 1 graphically displays the mean proportions of allocated effort for each of the five levels of perceived strengths by self-directed versus test-directed learning context. Because a RM-MANOVA could not be performed directly, because of the inherent dependencies of the five proportions, we conducted two separate paired t-tests, testing in each condition (i.e., the *self-directed* learning context and the *test-directed* learning context) the within-person differences between strength #1 and strength #5. To avoid capitalization on chance, we tested these differences at the $p < .01$ level.

Bias-corrected and accelerated (BCa) confidence intervals (CIs), based on 5000 bootstrap samples, were used to accommodate possible deviations from normality.

	Self-directed (*n* = 27)		Test-directed, aggregated (*n* = 68)		Test-directed no fail (*n* = 19)		Test-directed compensate (*n* = 25)		Test-directed excellence (*n* = 24)	
Allocated effort to perceived relative strength	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
#1	.33	.18	.14	.09	.14	.07	.15	.07	.14	.12
#2	.23	.13	.16	.07	.14	.07	.18	.04	.16	.09
#3	.16	.09	.21	.07	.20	.06	.20	.07	.21	.08
#4	.15	.11	.23	.13	.24	.09	.24	.07	.22	.10
#5	.12	.13	.25	.09	.28	.09	.23	.08	.26	.09

Table 1 Means and standard deviations of allocated effort (allocated proportions of time) per level of perceived strengths by learning context, Study 1

Note*.** Within each column, the mean proportions of allocated effort summarize to 1. The test-directed aggregated column (n*** = 68) displays the aggregated data of the test-directed no fail (***n*** = 19), the test-directed compensate (***n*** = 25), and the test-directed excellence (***n*** = 24) conditions.

The results showed that the participants in the self-directed learning context allocated significantly more effort to their strengths ($M_{\#1}$ = .33, *SD* = .18) than to their weaknesses ($M_{\#5}$ = .12, *SD* = .13), 99% BCa CI of difference [06; .36]. In contrast, participants in the test-directed learning context allocated significantly more effort to their weaknesses ($M_{\#5}$ = .25, *SD* = .09) than to their strengths ($M_{\#1}$ = .14, *SD* = .09), 99% BCa CI of difference [–.16; –.05]. Thus, we concluded that self-

directed versus test-directed learning contexts moderated the within-person relation between perceived strengths and allocated effort.

4. Method Study 2

The aim of Study 2 was to replicate the findings of Study 1 with a different group of students and a different set of school subjects, and, accordingly, to provide additional support for our hypothesis that self-directed versus test-directed learning contexts moderate the within-person relation between perceived strengths and allocated effort.

4.1. Participants

The participants were 116 college students (65 men, 51 women; mean age = 22.64 years, *SD* = 6.52) of a university of applied sciences in the Netherlands, who were recruited via an email sent by their school, and who volunteered to take part in the study.

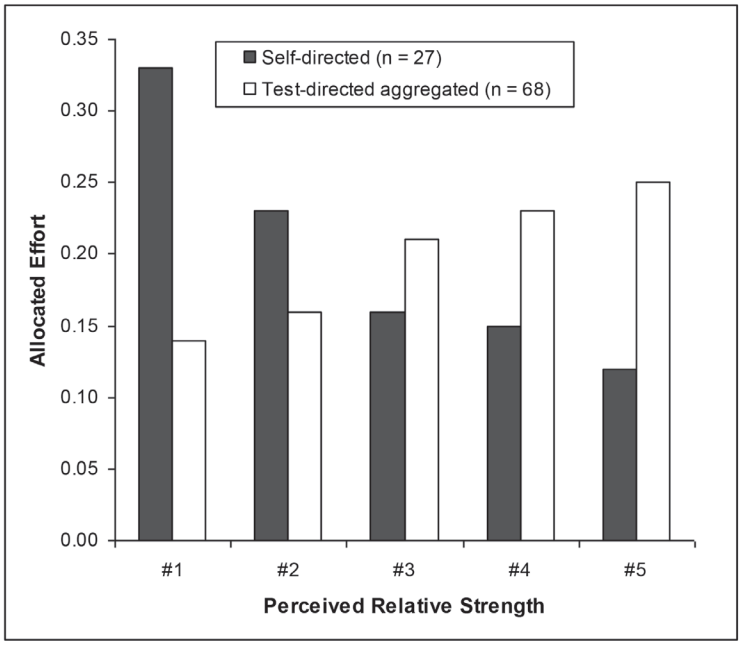

Figure 1. Allocated effort (mean proportions of allocated time) across the five levels of perceived strengths by learning context, Study 1.

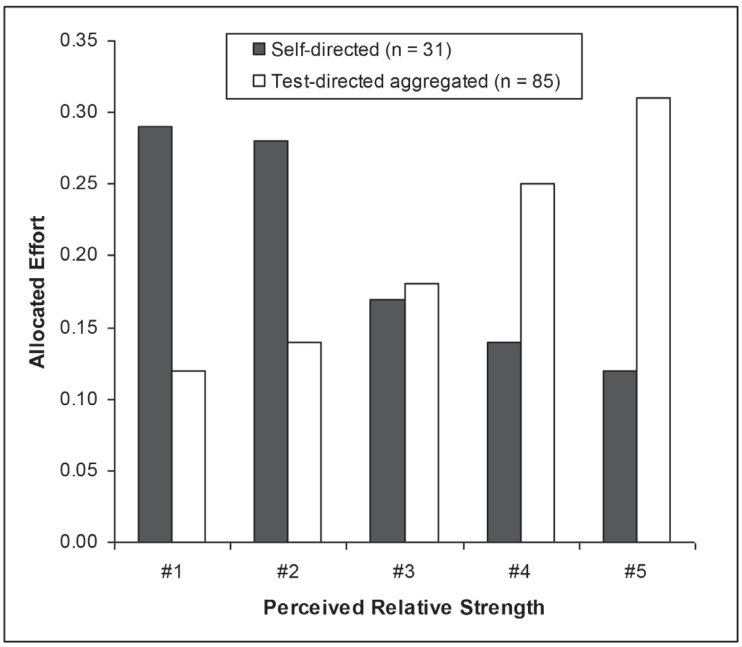

Figure 2. Allocated effort (mean proportions of allocated time) across the five levels of perceived strengths by learning context, Study 2.

4.2. Procedure and Measures

The procedure and measures were identical to those in Study 1, except for the set of school subjects, which were Math, Economy, Dutch, English, and Science (instead of Math, Economy, Dutch, History, and Biology).

5. Results Study 2

The results of Study 2 replicated the findings of Study 1. Table 2 shows the means and standard deviations of allocated effort per level of perceived strengths by learning context. Again, no differences between the three test-directed conditions were found. Five separate ANOVAs, with test-directed learning context (*no fail* versus *compensate* versus *excellence*) as the independent variable and allocated effort to each level of perceived strengths (#1 through #5) as the dependent variables, yielded no significant ($p < .10$) differences in allocated effort to strength #1, $F(2, 82) = .69$, $p = .50$, $\eta^2 = .02$, strength #2, $F(2, 82) = .73$,

p = .49, η^2 = .02, strength #3, $F(2, 82) = 1.04$, p = .36, η^2 = .03, strength #4, $F(2, 82)$ = .80 , p = .45, η^2 = .02, and strength #5, $F(2, 82) = 1.27$, p = .29, η^2 = .03.

As in Study 1, we subsequently merged the three test-directed learning context conditions (see Figure 2), and conducted two separate paired t-tests, testing in each condition (i.e., the *self-directed* learning context condition and the *test-directed* learning context condition) the within-person differences in allocated effort between strengths #1 and #5. The BCa CIs showed that the participants in the self-directed learning context allocated significantly more effort to their strengths ($M_{\#1}$ = .29, SD = .20) than to their weaknesses ($M_{\#5}$ = .12, SD = .14), 99% BCa CI of difference [.04; .31], whereas the participants in the test-directed learning context allocated more effort to their weaknesses ($M_{\#5}$ = .31, SD = .11) than to their strengths ($M_{\#1}$ = .12, SD = .08), 99% BCa CI of difference [–.23; –.15]. Thus, also in Study 2, learning context was found to moderate the within-person relation between perceived strengths and allocated effort.

	Self-directed (n = 31)		Test-directed, aggregated (n = 85)		Test-directed no fail (n = 31)		Test-directed compensate (n = 26)		Test-directed excellence (n = 28)	
Allocated effort to perceived relative strength	M	SD	M	SD	M	SD	M	SD	*M*	*SD*
#1	.29	.20	.12	.08	.11	.06	.13	.07	.12	.10
#2	.28	.17	.14	.08	.14	.06	.16	.07	.14	.10
#3	.17	.12	.18	.06	.18	.07	.20	.06	.17	.06
#4	.14	.14	.25	.12	.27	.16	.23	.09	.25	.10
#5	.12	.14	.31	.11	.31	.11	.28	.11	.33	.11

Table 2. Means and Standard Deviations of Allocated Effort (Allocated Proportions of Time) per Level of Perceived Strengths by Learning Context, Study 2

***Note*.** Within each column, the mean proportions of allocated effort summarize to 1. The test-directed aggregated column (n = 85) displays the aggregated data of the test-directed no fail (n = 31), the test-directed compensate (n = 26), and the test-directed excellence (n = 28) condition.

6. Discussion Studies 1 and 2

The results of Studies 1 and 2 indicate that, in multiple separate goal pursuit, learning context moderates the relation between perceived strengths and allocated effort. Across different groups of students and different sets of school subjects, we found that in a self-directed learning context students allocated more effort to their strengths, whereas in a test-directed learning context students allocated more effort to their weaknesses. However, a limitation of Studies 1 and 2 is that we tested the effects of learning context on students' effort allocation under imagined conditions. To provide additional and ecologically more valid support for our hypothesis, we tested it under more naturalistic conditions in Study 3.

7. Method Study 3

In Study 3, we sought to replicate the finding of Studies 1 and 2 in a secondary school setting, using a 3 × 3 factorial within-subjects design. We asked students to indicate their strongest school subject, a neutral school subject, and their weakest school subject; we then assessed their effort allocation across these subjects under three repeated measures conditions: (1) when free to follow their own interests (*self-directed learning context*); (2) at the beginning of the first semester (*intermediate learning context*); and (3) at the end of the first semester, during the first exam week (*test-directed learning context*). We reasoned that from Conditions 1 to 3, the learning context would be progressively less self-directed and more test-directed. Hence, we expected that the relation between perceived relative strengths and allocated effort would switch from positive (in Condition 1) to negative (in Condition 3).

7.1. Participants

The participants were 46 students from a secondary school in the Netherlands (5th and 6th grades; 19 male, 27 female), who were recruited through their teacher and voluntarily participated in the study. Their mean age was 16.35 years (*SD* = .60).

7.2. Procedure

First, the participants listed their school subjects, indicated which of those they perceived as their strongest, neutral, and weakest subjects, and completed the perceived competence measures. Second, in each of the following conditions, the participants completed the self-directedness and allocated effort measures.
Condition 1: Self-directed learning context. On the last day of the second week of the first semester, the participants imagined that they attended a school that allowed them to follow their own interests completely, and indicated their self-directedness and allocated effort at that imagined school.
Condition 2: Intermediate learning context. Right after this, the participants looked back at their current week at school, and indicated their self-directedness and allocated effort during that week (i.e., the second week of the first semester).
Condition 3: Test-directed learning context. Nine weeks later, on the last day of the exam week of the first semester, the participants once more looked back at their current week at school, and indicated their self-directedness and allocated effort during that week (i.e., the exam week).

7.3. Measures

Perceived strengths. After listing their school subjects for the first semester, participants were asked: "Which of these subjects do you see as…" "(a) … your strongest subject", "(b) …a neutral subject, that is, a subject in between your strongest and your weakest subject", "(c) …your weakest subject." Each participant's strongest subject was coded as strength #1, the neutral subject as strength #2, and the weakest subject as strength #3.
Perceived competence. Participants' self-perceived competence in their strongest versus weakest subjects was assessed using the following item (cf., Bandura, 2006): "Please rate, for each of the following subjects, how certain you are that you *can do* the upcoming tests", after which the participants' strongest, neutral, and weakest subjects were displayed. Response categories ranged from 0 (*cannot do at all*) to 100 (*highly certain can do*).
Self-directedness. Self-directedness was assessed by asking the participants how true the following statement was for them: "At this imagined school…" (Condition 1), or "During the past week at school…" (Conditions 2 and 3), "…I could spend my time learning in accordance with my own interests." Response categories ranged from 1 (*completely true*) to 7 (*completely not true*).

Allocated effort. Allocated effort was assessed by asking the participants: "Please apportion 100% of your time across the following school subjects", after which the three subjects that they had indicated as their strongest, neutral, and weakest subjects (i.e., strength #1, #2, and #3) were displayed. In the self-directed learning context condition (Condition 1), the general stem was: "At this imagined school, how would you allocate your time across the following subjects?" In the intermediate (Condition 2) and the test-directed (Condition 3) learning context conditions, the general stem was: "During the past week at school, how did you actually allocate your time across the following subjects?"

8. Results Study 3

8.1. Perceived Strengths

To check whether the students felt most competent in their strength #1 (their strongest subject), and least competent in their strength #3 (their weakest subject), we conducted a RM-MANOVA with perceived strengths as the within-person factor and perceived competence as the dependent variable. The results revealed a significant overall difference in perceived competence between the three levels of perceived strengths ($M_{\#1}$ = 82.52, *SD* = 20.83; $M_{\#2}$ = 64.30, *SD* = 19.97; $M_{\#3}$ = 45.85, *SD* = 21.65), $F(2, 44) = 85.23$, $p < .001$, $\eta^2 = .80$. Follow-up analyses indicated that all pairwise comparisons were significant at the $p < .001$ level. Thus, the participants perceived themselves as most competent in their strongest subject, less competent in the neutral subject, and least competent in their weakest subject.

8.2. Learning Context

To check whether the participants felt most self-directed in the self-directed learning context and least self-directed in the test-directed learning context, we conducted a RM-MANOVA with learning context (*self-directed* versus *intermediate* versus *test-directed*) as the within-person factor and self-directedness as the dependent variable. The results showed a significant decrease in self-directedness from the self-directed learning context to the test-directed learning context (M_{C1} = 4.74, *SD* = 1.32; M_{C2} = 3.72, *SD* = 1.57; M_{C3} = 3.17, *SD* = 1.76), $F(2,44) = 25.74$, $p < .001$, $\eta^2 = .54$. All pairwise comparisons were significant at the $p <$

.001 level. Therefore, we concluded that participants felt most self-directed in the self-directed learning context condition, and least self-directed in the test-directed learning context.

8.3. Tests of Hypothesis

The means and standard deviations of allocated effort per level of perceived strengths by learning context are shown in Table 3. To test whether learning context moderated the relation between perceived strengths and allocated effort, we conducted three separate paired t-tests, investigating in each learning context (i.e., *self-directed* versus *intermediate* versus *test-directed*) the within-person differences in allocated effort between strength #1 (i.e., the strongest subject) and strength #3 (i.e., the weakest subject); for the analysis approach, see Study 1. In line with the findings of Studies 1 and 2, BCa CIs showed that in the self-directed learning context, the participants allocated significantly more effort to their strongest subject ($M_{\#1}$ = .42, *SD* = .22) than to their weakest subject ($M_{\#3}$ = .26, *SD* = .18), 99% BCa CI of difference [.01; .31]. In the intermediate learning context, no significant differences were found between the strongest subject ($M_{\#1}$ = .38, *SD* = .20) and the weakest subject ($M_{\#3}$ = .31, *SD* = .19) , 99% BCa CI of difference [–.19; .06]. In the test-directed learning context, the participants allocated significantly more effort to their weakest subject ($M_{\#3}$ = .40, *SD* = .17) than to their strongest subject ($M_{\#3}$ = .25, *SD* = .13), 99% BCa CI of difference [–.24; –.07]. Thus, from the self-directed through the test-directed learning contexts, the relation between perceived strengths and allocated effort changed progressively from positive to negative.

9. Discussion Study 3

The results of Study 3 show that in a self-directed learning context, students allocated more effort to their strongest subject than to their weakest subject. In contrast, in a test-directed learning context, students allocated more effort to their weakest subject than to their strongest subject. These findings replicate the results of Studies 1 and 2 under more naturalistic conditions in a secondary school setting.

A limitation of Study 3 is that the self-directed learning condition was an imagined condition instead of an actual learning condition. Furthermore, we used

a repeated measures design, which does not allow causal inference. Moreover, we relied on self-reports rather than behavioral measures of allocated effort. To address these limitations, in Studies 4 and 5, we experimentally manipulated the learning contexts and assessed participants' actual effort allocation to their strengths and weaknesses.

	Self-directed (n = 46)		Inter-mediate (n = 46)		Test-directed (n = 46)	
Allocated effort to perceived relative strength	*M*	*SD*	*M*	*SD*	*M*	*SD*
#1	.42	.22	.31	.19	.25	.13
#2	.32	.14	.31	.17	.35	.18
#3	.26	.18	.38	.20	.40	.17

Table 3. Means and Standard Deviations of Allocated effort (Allocated Proportions of Time) per Level of Perceived Strengths by Learning Context, Study 3

10. Method Study 4

In Study 4 we used a 2 × 2 mixed factorial design, with learning context (*self-directed* versus *test-directed*) as the between-person factor and perceived strengths (*strength* versus *weakness*) as the within-person factor. The dependent variable was participants' actual effort allocated to their strengths and weaknesses.

10.1. Participants

The participants were 148 psychology undergraduates (33 men; 115 women) from a university in the Netherlands. Students were recruited via the university's psychology experiment management system, and voluntarily signed up for course credits. Their mean age was 19.43 years (*SD* = 2.68).

10.2. Procedure

Participants were randomly assigned to either a self-directed (n = 79) or a test-directed (n = 69) learning context. In the self-directed learning context, they read: "The aim of the following practice session is to further develop your skills in accordance with your own interests." In the test-directed learning context, participants read: "The aim of the following practice session is to prepare for a test, which will be administered right after this session".

In a classroom, the participants first completed a biographical questionnaire. Next, they were shown two examples of spelling and two examples of calculating exercises, after which they were asked to indicate which type of skill, spelling or calculating, they perceived as their relative strength. After this, the practice session started. Participants were given a total of 30 exercises, which they could apportion among spelling and calculating exercises as they chose. After each exercise, they were asked: "Which type of exercise do you want to do next, a spelling exercise or a calculating exercise?" They were then presented with an exercise according to their choice. After completing 30 exercises, the participants filled in the perceived competence and the self-directedness scales.

10.3. Measures

Perceived strengths. After they were shown two examples of spelling exercises and two examples of calculating exercises, participants responded to the following statement: "Which is your relative strength, spelling or calculating?" Response categories were *spelling* or *calculating*. The skill that the participants indicated as their relative strength was coded as their strength #1, the other skill was coded as their strength #2.

Perceived competence. Participants' perceived competence was assessed using a scale comprising the following items (cf. Ryan, 1982): (1) "I think I am pretty good at this"; (2) "I think I can do this pretty well"; (3) "I feel competent on this"; (4) "I think I will be satisfied with my performance"; (5) "I am pretty skilled at this"; (6) "This is something that I cannot do very well" (reverse scored). Response categories ranged from 1 (*not at all true*) to 7 (*very true*). The items were averaged to calculate a perceived competence index. The scale was used to assess participants' perceived competence in their strength #1 and strength #2. The general stem was: "How true is the following statement for your …?", after which their strength #1 and strength #2, respectively, were displayed.

Self-directedness. Participants' self-directedness was assessed using a scale with the general stem: "How true is the following statement for you? While I was practicing the exercises…." The items were (cf. Reeve, 2002): (1) "…I felt like I was doing what others wanted me to be doing" (reverse scored); (2) "…I had choices as to what I wanted to do"; (3) "…I was pursuing my own goals"; (4) "…I felt a relaxed sense of personal freedom"; (5) "…I felt free"; (6) "…I felt pressured" (reverse scored); (7) "…I felt it was my own choice what to do and whether to do anything at all"; (8) "…I had a choice which exercises to do"; (9) "…I felt I had control to decide what to do and whether to do it". Response categories ranged from 1 (*completely true*) to 6 (*completely not true*). The items were averaged to create an index for self-directedness (Cronbach's alpha = .87).

Allocated effort. Participants' allocated effort was assessed by calculating the proportion of exercises from the total of 30 exercises that the participants conducted on their strength #1 and on their strength #2.

11. Results Study 4

11.1. Self-directedness

The results of an independent samples t-test showed that the participants in the self-directed learning context ($M = 4.92$, $SD = .90$) were higher in self-directedness than the participants in the test-directed learning context ($M = 4.22$, $SD = 1.04$), 99% BCa CI of difference [.26; 1.11].

11.2. Perceived Competence

The results of a paired samples t-test revealed that the participants were higher in perceived competence in their strength #1 ($M = 5.36$, $SD = .79$) than in their strength #2 ($M = 4.15$, $SD = .99$), 99% BCa CI of difference [1.00; 1.44].

11.3. Tests of Hypothesis

To test whether learning context moderated the relation between perceived strengths and allocated effort, we conducted two separate paired t-tests, investigating in each learning context the within-person differences in effort allocated to participants' strengths #1 and strengths #2 (for the analysis approach,

see Study 1). BCa CIs showed that participants in the self-directed learning context allocated significantly more effort to strength #1 (M = .64, SD = .19) than to strength #2 (M = .36, SD = .19), 99% BCa CI of difference [.17; .39]. In contrast, participants in the test-directed learning context allocated significantly more effort to strength #2 (M = .64, SD = .18) than to strength #1 (M = .36, SD = .18), 99% BCa CI of difference [.17; .39]. Thus, in support of our hypothesis, learning context moderated the relation between perceived strengths and allocated effort.

12. Method Study 5

12.1. Participants, Procedure, and Measures

The aim of Study 5 was to replicate the findings of Study 4 with a different group of students, and, accordingly, to provide additional support for our hypothesis. A sample of 78 college students, 39 men and 39 women, from different schools of a Dutch university of applied sciences, were recruited via social media and bulletin board adverts, and volunteered to take part in the study for a €10 allowance. Ages ranged from 17 to 33, with a mean of 21.19 (SD = 3.01). The experimental procedure and the measures were identical to those of Study 4.

13. Results Study 5

13.1. Self-directedness

The results of an independent samples t-test showed that the participants in the self-directed learning context (M = 5.09, SD = .70) were higher in self-directedness than the participants in the test-directed learning context (M = 4.66, SD = .95), 95% BCa CI of difference [.05; .81].

13.2. Perceived Competence

The results of a paired t-test revealed that the participants were higher in perceived competence on their strength #1 (M = 5.49, SD = .89) than on their strength #2 (M = 4.18, SD = 1.11), 99% BCa CI of difference [1.00; 1.65].

13.3. Tests of Hypothesis

The results of Study 5, like those of Study 4, yielded clear support for our hypothesis. BCa CIs indicated that participants in the self-directed learning context allocated significantly more effort to strength #1 (M = .68, SD = .19) than to strength #2 (M = .32, SD = .19), 99% BCa CI of difference [.20; .51]. In contrast, the participants in the test-directed learning context allocated significantly more effort to strength #2 (M = .66, SD = .16) than to strength #1 (M = .34, SD = .16), 99% BCa CI of difference [.19; .46]. Thus, the findings of Study 5 are consistent with those of Studies 1 to 4, showing that self-directed versus test-directed learning context moderated the within-person relation between perceived strengths and allocated effort.

14. Discussion Studies 4 and 5

Studies 4 and 5 yielded additional support for our hypothesis. Across both studies, we found in a test-directed learning context that students allocated more actual effort to their weakness, whereas in a self-directed learning context students allocated more actual effort to their strengths. These results replicate and extend the findings of Studies 1, 2, and 3. Because we experimentally manipulated students' learning contexts and assessed behavioral measures of allocated effort in Studies 4 and 5, we may conclude that students' learning context *affects* the amount of *actual* effort that they allocate to their strengths and weaknesses.

15. General Discussion

In the current research we examined the effects of learning context on students' effort allocation to their strengths versus weaknesses. Our primary aim was to demonstrate that, in multiple goal pursuit, both positive and negative relations between perceived strengths and allocated effort exist, depending on the learning context. We examined these relations in five empirical studies. We found consistently across these studies that students in a self-directed learning context put more effort into their strengths, whereas students in a test-directed learning context put more effort into their weaknesses. These relations were

observed across scenario studies (Studies 1 and 2), a field study (Study 3), and experiments (Studies 4 and 5); across within-person (Study 3) and mixed factorial designs (Studies 1, 2, 4, and 5); across secondary school students (Study 3), college students (Studies 2 and 5), and university students (Studies 1 and 4); and across intentional measures (Studies 1 and 2), self-reported measures (Study 3), and behavioral measures (Studies 4 and 5) of allocated effort.

15.1. Theoretical Contributions

These findings help to clarify two commonly observed phenomena that have not yet been fully understood. The first is that sometimes students seem to work harder when they believe they are good at something, while other times they seem to work harder when they believe they are *not* good at something. The second is that sometimes students seem to work harder when they are afforded the freedom to pursue their own interests, while other times they seem to work harder when they are being pressured to meet test requirements. The present research clarifies these phenomena by demonstrating an interaction effect between perceived strengths (perceived relative strengths versus weaknesses) and learning context (self-directed versus test-directed) on allocated effort. That is, students in a self-directed learning context allocate more effort to their strengths and students in a test-directed learning context allocate more effort to their weaknesses.

These findings build on and extend the existing literature in several ways. First, our findings contribute to the literature on the role of competency self-perceptions in motivation. Building on Möller and Marsh (2013), we examined the concept of *perceived strengths:* that is, competence self-perceptions that result from dimensional (within-person) comparison rather than social (between-person) comparison or temporal (within-person) comparisons. Our findings extend this line of inquiry by demonstrating that dimensional comparisons have considerable behavioral consequences. In multiple separate goal pursuit, students' self-perceptions of relative strengths and weaknesses in relation to goals are significantly related to their effort allocation across those goals.

Second, our findings contribute to research on the within-person relations between competency self-perceptions and effort allocation in multiple goal pursuit. In line with Vancouver et al. (2008), we demonstrated that, at the within-person level, varying relations between self-perceived competence and allocated effort exist. However, the extant research has only demonstrated these varying

relations at the temporal within-person level: that is, when individuals conduct a series of trials on a single task. We extend this line of research by demonstrating that varying relations between self-perceived competence and effort exist at the dimensional within-person level: that is, when individuals conduct multiple tasks on a single occasion. These results are in line with the findings of Schmidt and colleagues (Schmidt & DeShon, 2007; Schmidt & Dolis, 2009; Schmidt, Dolis, & Tolli, 2009), who found varying relations at the dimensional within-person level between goal-performance discrepancies and effort.

Most notably, we demonstrated that the link between self-perceived competence and allocated effort is moderated by a factor that is particularly relevant in education, namely, the learning context. Our findings show that a self-directed learning context enhances students' efforts on their strengths, but simultaneously diminishes their efforts on their weaknesses. In contrast, a test-directed learning context enhances students' efforts on their weaknesses, but simultaneously diminishes their efforts on their strengths. Thus, in multiple separate goal pursuit, given a limited amount of effort, the positive effort effect of each learning context on one type of goals comes at the expense of the other type of goals.

15.2. Strengths and Limitations

A possible limitation of the present research is that we examined the short-term rather than the long-term effects of learning context on students' effort allocation. Our findings do not show how learning context and perceived strengths relate to learning effort in the long term. For example, Sheldon and Elliot (1998) propose that a self-directed learning context is particularly beneficial for sustained effort. Indeed, the effect of learning context on students' long-term effort is an interesting issue for future research. However, we focused on the short-term effects for two important reasons. First, examining the short-term effects suited the applied aim of our research. Both improving strengths and improving weaknesses are legitimate learning objectives. Accordingly, identifying factors that influence students' effort allocation to their strengths and weaknesses may help students and educators to attain those objectives. Second, our aim was to infer a causal relation between learning context and students' effort allocation to their strengths and weaknesses. Examining the short-term effects enabled us to experimentally manipulate the learning context, so that we could demonstrate a causal effect. Experimentally manipulating the learning context in the long-term would have raised considerable ethical concerns.

A second possible limitation is that we used effort rather than learning performance as an outcome variable. Indeed, examining the relations between learning context, perceived strengths, and learning performance is an important line of inquiry for future research. However, we reasoned that improving students' learning performance is typically mediated by effort. The next step may be to test a model with learning performance as the dependent variable, and effort as the mediator.

15.3. Practical Implications

The present research has clear practical implications. We demonstrated how students' effort allocation to their strengths and weaknesses can be directed through the learning context. A self-directed learning context stimulates students to allocate more effort to working on their strengths, which may help them to excel in specific competencies. Therefore, educators who want their students to work on their strengths may promote a self-directed learning context, encouraging students to follow their own interests. In contrast, a test-directed learning context stimulates students to allocate more effort to working on their weaknesses, which is indispensable for mastering a profession and may help them to diminish the gap between their present level of competency and the prevailing standards for a degree. Therefore, educators who want their students to work on their weaknesses may promote a test-directed learning context, encouraging students to meet external standards. However, it should be noted this may come at the expense of students' work on their strengths. Conversely, a self-directed learning context may come at the expense of students' work on their weaknesses. Both advantages and disadvantages should be considered when promoting either learning context.

Footnotes Chapter 4

1 We used secondary school subjects, reasoning that students have experience-based competence self-perceptions on these subjects. The five subjects were selected to include a range of both science and humanities subjects.

2 The grading system in the Netherlands counts from 1 (lowest) through 10 (highest). Typically, the test standards of a secondary school require students to score 5.5 to pass a single test, and an average of 5.5 on all subjects to pass the exams. High exam marks increase students' chances of admission to studies that have a *numerus fixus* (i.e., limited admittance).

CHAPTER 5

Discussion

1. Introduction

The purpose of this dissertation was to provide insight into the motivational consequences of a self-regulatory strategy that has been proposed to enhance learning: *focusing on strengths*. To this end, we examined the relations between perceived relative strengths versus weaknesses and learning effort. Over the course of nine empirical studies we addressed four research questions: (1) What is the relation between perceived relative strengths versus weaknesses and effort intentions? (2) How can we explain the relation between perceived relative strengths versus weaknesses and effort intentions? (3) What is the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort? (4) What is the effect of the learning context on the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort?

In this final chapter, we first summarize our main findings. Next, we discuss the theoretical implications of our findings. We then address several strengths and weaknesses of our research and highlight directions for future research. We conclude this chapter with a discussion of the practical implications of our research.

2. Summary of our Main Findings

In Chapter 2, we addressed our first two research questions: what is the relation between perceived relative strengths versus weaknesses and effort intentions, and how can we explain this relation? We presented the results of two randomized experiments, one conducted online (n = 174) and one in the classroom (n = 267), in which we examined the effects of perceived relative strengths versus weaknesses on students' intentions to put effort into self-regulated learning activities. In both studies, we found that students who first ranked a number of professional qualities from their perceived relative strengths to weaknesses, and subsequently selected a learning activity to further improve their strengths (i.e., applied a *strength-based self-regulated learning strategy*) felt more competent, more intrinsically motivated, and more willing to invest effort, relative to those who subsequently selected a learning activity to improve their weaknesses (i.e., applied a *deficit-based self-regulated learning strategy)*. Moreover, in both studies, the results of multi-mediator analysis and structural equation modeling showed that the

effect of perceived relative strengths versus weaknesses on effort intentions was sequentially mediated by perceived competence and intrinsic motivation, which indicates that, relative to individuals who focus on their weaknesses, individuals who focus on their strengths feel more competent; therefore, they are more intrinsically motivated, and therefore, they are more willing to invest effort.

In Chapter 3 we addressed our third research question: What is the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort? We presented the results of two empirical studies, in which we used a within-person design to examine the relations between perceived relative strengths versus weaknesses and intended and actual effort, respectively, in the context of self-regulated online learning. In Study 1 (n = 115), the participants first ranked a number of topics from their perceived relative strengths to weaknesses and subsequently indicated how they would allocate their effort and time if they were given the opportunity to follow online courses on these topics. The results showed that the participants intended to allocate more effort and time to online courses in the area of their strengths than to online courses in the area of their weaknesses. In Study 2 (n = 58) the participants first ranked a number of skills from their perceived relative strengths to weaknesses, and were subsequently given the opportunity to use different e-learning modules to practice these skills. The results showed that the participants actually invested more behavioral effort into practicing skills in the area of their strengths rather than their weaknesses.

The studies in Chapters 2 and 3 were conducted in a self-regulated rather than a test-directed learning context. That is, in both studies, the participants performed learning activities in which they could engage voluntarily, without the prospect of being tested afterward. In such a learning context, we consistently found that individuals put more effort into their strengths than into their weaknesses.

In Chapter 4, we addressed our fourth research question: What is the effect of the learning context on the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort? We presented the results of five studies designed to examine *the moderating effect of the learning context* on individuals' effort allocation to their strengths and weaknesses when working on multiple goals during a single period of time. We expected that, in contrast to a self-directed learning context, in a test-directed learning context, students put more effort into their weaknesses than into their strengths in order to meet the external standards.

Studies 1 (n = 95) and 2 (n = 116) were scenario studies in which students were asked to allocate a limited amount of time across a number of school subjects, which they had ranked from their relative perceived strengths to weaknesses. We used a mixed factorial design, with learning context as the between-person factor, perceived relative strengths versus weaknesses as the within-person factor, and allocated time as the dependent variable. In line with the results presented in Chapters 2 and 3 we found that, in a self-regulated learning context, the participants allocated more time to the their relative strengths. In contrast, in a test-directed learning context, the participants allocated more time to their perceived relative weaknesses.

Study 3 (n = 46) was a field study in which we used a two factor within-person design, with learning context and perceived relative strengths versus weaknesses as the within-person factors, and allocated time as the dependent variable, to examine students' effort allocation across their perceived strongest versus weakest school subject in the course of a semester. In line with Studies 1 and 2, the results showed that students' effort allocation changed as a function of changes in the learning context. When they felt free to follow their own interests (i.e., a self-directed learning context), students allocated more effort to their strengths. However, during the test week (i.e., a test-directed learning context), students allocated more effort to their weaknesses.

Finally, Studies 4 (n = 148) and 5 (n = 78), were laboratory studies designed to test the causal effects of the learning context on individuals' effort allocation to their strengths and weaknesses, when practicing multiple skills on a single occasion. A mixed factorial design was used, with learning context as the between-person factor, perceived relative strengths versus weaknesses as the within-person factor, and allocated effort as the dependent variable. In line with Studies 1-3, we found that participants who were told that the purpose of their practicing was to develop their skills as they saw fit (i.e., a self-directed learning context) invested more behavioral effort into practicing skills in the area of their strengths. In contrast, participants who were told that they would be tested afterwards (i.e., a test-directed learning context) invested more behavioral effort into practicing skills in the area of their weaknesses.

Thus, consistently across these five studies, we found that the learning context moderates the relation between perceived relative strengths versus weaknesses and (intended and behavioral) effort. In a self-directed learning context, perceived relative strengths versus weaknesses are positively related to effort. In contrast, in a test-directed learning context, perceived relative strengths versus weaknesses are negatively related to effort.

3. Theoretical Implications and Contributions

Our main findings are that both positive and negative relations between perceived relative strengths versus weaknesses and (intended and behavioral) effort exist, and that the relation between perceived relative strengths versus weaknesses and effort is moderated by the learning context (self-directed versus test-directed). These findings contribute to the extant literature on (1) strengths-based development, (2) competence self-perceptions in motivation, and (3) effort allocation in multiple-goal pursuit.

3.1. Strengths-based development

Despite considerable interest among practitioners, to date, not much research has examined the motivational consequences of perceived relative strengths versus weaknesses in the context of learning and development. The extant research on strengths-based development suggests that perceived relative strengths are positively related to motivational variables, such as need satisfaction (Linley et al., 2010), engagement (Meyers et al., 2015), and effort intentions (Rechter, 2010, Study 2). The present findings make several important contributions to this literature. First, in addition to the relations with subjective motivational variables that were found in previous research, our findings demonstrate that perceived relative strengths versus weaknesses are significantly related to behavioral effort. Second, our research yielded an explanation for the motivating potential of perceived relative strengths versus weaknesses. Our findings indicate that individuals who focus on their strengths feel more competent; therefore, they are more intrinsically motivated, and therefore, they are willing to invest more effort. Third, our findings suggest that the positive relations that were found in previous research are likely to be observed in self-regulated learning contexts only. We argued and demonstrated that in test-directed learning contexts, perceived relative strengths versus weaknesses are negatively related to effort.

3.2. Competence self-perceptions and motivation

Our findings also contribute to the literature on the role of competence self-perceptions in motivation. Influential motivation theories, such as cognitive evaluation theory (Deci & Ryan, 1985) and social cognitive theory (Bandura, 1997), posit that self-perceived competence is beneficial for learning. However, other theories state that self-perceived competence may be negatively related

to effort (Vancouver et al., 2008; Forsyth et al., 2007). Specifically, control theory (Carver & Scheier, 1982) posits that goal-directed effort is instigated by perceived discrepancies between the actual situation and a goal. As individuals believe themselves to be more competent, they may perceive discrepancies as easier to bridge. Therefore, higher perceived competence may signal that less effort is needed to attain a goal.

Yet, our findings indicate that in the context of learning and development, competence self-perceptions can play both a positive and a negative role in effort exertion. Which role prevails depends on the learning context. In a self-regulated learning context, the positive role prevails, which is in line with cognitive evaluation theory (Deci & Ryan, 1985) and social cognitive theory (Bandura, 1997). However, in a test-directed learning context, the negative role prevails, which is in line with control theory (Carver & Scheier, 1982). Thus, whether or not these theories correctly predict individuals' effort expenditure as a function of competence self-perceptions depends on the context. Our findings clearly demonstrate that theories that predict either positive or negative relations are incomplete. Motivation theories should account for both positive and negative relations between self-perceived competence and effort.

3.3. Multiple-goal pursuit

In addition, our findings contribute to the literature on the role of competence self-perceptions in multiple-goal pursuit. Building on the work of Möller and Marsh (2013), we defined perceived relative strengths versus weaknesses as a specific category of competence self-perceptions: competence self-perceptions that result from dimensional comparisons rather than from social comparison (Festinger, 1954) or temporal comparisons (Albert, 1977). In line with the work of Möller and Marsh (2013), our findings indicate that in the context of learning and development, individuals make dimensional within-person comparisons of their relative strengths and weaknesses. Our findings extend the work of Möller and Marsh (2013) by demonstrating that self-perceptions of relative strengths and weaknesses have considerable behavioral consequences. In multiple-goal contexts, such as education and professional development, individuals' self-perceptions of relative strengths versus weaknesses concerning their goals are significantly related to their effort allocation across their goals. In a self-directed learning context, individuals tend to put more effort into their strengths, whereas in a test-directed learning context, individuals tend to put more effort

into their weaknesses. Hence, theories of motivation in multiple-goal pursuit should assign a prominent role to the concept of perceived strengths versus weaknesses, and recognize the effect of the learning context on individuals' effort allocation.

4. Strengths and Weaknesses of the Present Research and Future Directions

Similar to individuals, our research has strengths and weaknesses. In this section, we discuss the main issues and indicate avenues for future research.

First, an important strength of our research is that we used clearly delimited unidimensional manipulations, rather than broad interventions such as strengths-based development coaching trajectories or courses (cf., Meyers et al., 2015). In all our studies, we compared conditions that were exactly identical with the exception of a single variable (i.e., working on strengths versus weaknesses). An advantage of this approach is that we can be confident that the observed differences in effort between the conditions can be attributed to the variable that we manipulated. Our approach enables us to draw clear conclusions on relations between theoretical constructs; between working on strengths versus weaknesses, on the one hand, and effort, on the other hand. However, this conceptual rigor may have a price. Based on the present research, we cannot tell yet whether in practice strengths-based development coaching or strengths-based development courses will enhance individuals' learning. Future research should address this issue by examining the effort effects of strengths-based development coaching and courses in applied settings.

A second important strength is that we found a consistent pattern across all of our studies. Specifically, in Chapter 2, Study 2 replicated Study 1; in Chapter 3, Study 2 replicated Study 1; in Chapter 4, Study 2 replicated Study 1, and Study 5 replicated Study 4. Replication of research findings is an important issue in psychological research. The results of psychological research have sometimes been shown to be difficult to replicate, which casts doubt on the reliability of psychological theory (Open Science Collaboration, 2012; Open Science Collaboration, 2015). Because we replicated many of our findings, we are confident that our results are reliable.

A third strength of our research is that we used a variety of methods to examine the role of working on strengths versus weaknesses in effort

expenditure, including randomized experiments (Chapter 2), multiple-goal designs (Chapter 3), multiple-goal repeated measures designs (Chapter 4, Study 3), and mixed factorial designs (Chapter 4, Studies, 1, 2, 4, and 5). However, a few missing links remain. In Chapter 2, we used a randomized experimental design to examine the effects of perceived relative strengths versus weaknesses on effort *intentions*. In Chapter 3, we used a *cross-sectional within-person design* to examine the relations between perceived relative strengths versus weaknesses and *behavioral* effort. Hence, the causal effect of working on strengths versus weaknesses and *behavioral* effort remains to be established. Similarly, in Chapter 4, Studies 3 and 4, we used a mixed-factorial design to examine the causal effects of the learning context on the relation between working on strengths versus weaknesses and effort. However, to establish an interaction between the causal effect of the learning context and the causal effect of working on strengths versus weaknesses on effort, both independent variables should be experimentally manipulated (e.g., by using a randomized 2 × 2 between-person design). Future research should verify the causal nature of the relation between perceived relative strengths versus weaknesses and behavioral effort, and the interaction between the effects of perceived relative strengths versus weaknesses and the learning context on effort.

Fourth, we used a variety of measures to assess individuals' effort, including effort intentions, intended allocated time, subjective effort, and number of performed exercises. However, using an even greater variety of effort measures would have made our case still stronger. Future research may use additional measures, such as invested time and physiological measures of effort, to examine the role of perceived relative strengths versus weaknesses in effort.

Fifth, a variety of students participated in our research, including secondary school students, college students, and university students. Because our findings are likely to be relevant for other learners as well, including working professionals, future research should verify the generalizability of our findings among other learners.

Finally, an important strength of our research is that we used a multiple-goal approach to examine the role of competence self-perceptions in effort. Applied contexts are typically multiple-goal contexts in which individuals work on several goals during a period of time. In multiple-goal contexts individuals' competence self-perceptions and effort allocation across multiple goals are likely to be interrelated. Putting more effort into one goal is likely to come at the expense of another goal. Hence, the applicability of knowledge from single-goal

research in real-life contexts is limited. Therefore, future research should build on and extend this multiple-goal paradigm (cf., Unsworth, Yeo, & Beck, 2014). For example, an interesting question is whether varying relations between competence self-perceptions and effort also yield over extended periods of time. In the present dissertation, we focused on the short-term consequences of working on strengths versus weaknesses on effort. However, several scholars have emphasized that competence self-perceptions are particularly beneficial for sustained effort (Sheldon & Elliot, 1999; Deci & Ryan, 1985). Therefore, future research should examine the long-term consequences of working on strengths versus weaknesses on effort in multiple-goal pursuit. The multiple-goal repeated measures design that we used in Chapter 4, Study 3, could be used in longitudinal research to examine the dynamics of the relations between perceived strengths and weaknesses and effort expenditure over extended periods of time.

5. Practical Implications

Now that we have come to the closing section of this dissertation, what can we advise educators, employers, students, and professionals, based on our research findings? As indicated in the introductory chapter of this dissertation, developing competence is an important determinant of the quality of our lives. Therefore, there is great demand for strategies that may enhance learning. Is focusing on one's individual strengths rather than weaknesses a strategy that motivates individuals to learn? Do individuals put more effort into learning activities when they work on qualities, topics, or skills in the area of their strengths rather than their weaknesses?

The answer is, it depends on the learning context. In a self-regulated learning context, when individuals feel free to engage or not to engage in learning activities, focusing on strengths rather than weaknesses may be an effective motivational strategy. In this context, individuals are likely to put more effort into their learning when they pick learning activities that match their strengths. For example, schools, colleges, and universities typically offer their students the opportunity to follow elective courses, and to engage in extracurricular activities, in addition to the standard curriculum. Similarly, employers may offer their employees a choice of professional training and development opportunities in which they may engage or not engage as they see fit. For example, many organizations have a web-based professional development portal containing

e-learning facilities for their employees. In addition, professionals may use online educational platforms such as Coursera (www.coursera.com), edX (www.edx.org), and Khan Academy (www.khanacademy.org), to work on their professional development. In such self-directed learning contexts, feeling competent is likely to be beneficial for learning effort, because it bolsters individuals' intrinsic motivation, which is crucial when there is little external pressure.

However, self-directed learning contexts, in which individuals genuinely feel free to engage or not to engage in learning activities, may not be so common. Students typically know that they will have to pass their tests to complete their studies. For many students, passing the tests is their first priority. Similarly, employees know that they have to meet job requirements. For employees, the external standards explicated in job descriptions, competency profiles, and performance reviews are an important frame of reference. In such test-directed learning contexts, individuals are unlikely to put more effort into learning activities when they work on their strengths rather than their weaknesses. For example, a math teacher may afford students the opportunity to work individually on a topic of their choice during the following semester (e.g., statistics, geometrics, etc.). In this context, if the prevailing standards for each topic are similar, and the students are predominantly focused on external standards, they are likely to invest less effort when they pick a topic that they perceive as a relative strength. Similarly, an employer may afford employees the opportunity to engage in a selection of professional development activities as they see fit. However, if those employees are predominantly focused on meeting external requirements, they are likely to invest less effort when they engage in learning activities in the area of their strengths than when they engage in learning activities in the area of their weaknesses.

Thus, paradoxically, educators who aim to stimulate their students to learn, or employers who aim to stimulate their employees to work on their professional development, may end up with disappointing results by advising them to work on their strengths rather than their weaknesses. Although working on strengths rather than weaknesses may stimulate individuals to put more effort into learning activities, our findings clearly indicate that the positive role of perceived strengths only manifest itself in self-directed learning contexts, when individuals feel free to engage or not to engage in learning activities. The positive role of perceived strengths does not emerge in test-directed learning contexts, when individuals are focused on meeting external standards. Thus, focusing on strengths is perhaps more useful as a strategy for individuals to

motivate themselves to learn, than as a strategy for those in control, such as educators or employers, to motivate others to learn.

SAMENVATTING

Focus op je Sterke Kanten?

De Relatie Tussen Ervaren Sterke versus
Zwakke Kanten en Inzet bij Leeractiviteiten

1. Inleiding

Ons succes in het leven wordt, in onze huidige samenleving, voor een belangrijk deel bepaald door onze competentie; dat wil zeggen, door de mate waarin we bepaalde kennis, vaardigheden en attitudes beheersen. Strategieën die onze competentieontwikkeling kunnen bevorderen zijn dan ook van onschatbare waarde.

In dit proefschrift hebben we een strategie onderzocht die mensen zou kunnen helpen om meer tijd en energie te steken in hun opleiding en ontwikkeling: *focussen op je sterke kanten*. Focussen op je sterke kanten houdt in dat mensen hun sterke en zwakke kanten bepalen, dus de competenties waar ze relatief goed en niet goed in zijn, en vervolgens activiteiten ondernemen om hun relatief sterke kanten verder te ontwikkelen (Hiemstra & Van Yperen, 2015).

Het idee om te focussen op sterke kanten heeft de afgelopen jaren veel weerklank gevonden in de praktijk van het onderwijs en het personeelsmanagement. Ondanks deze belangstelling vanuit de praktijk is er echter nog maar weinig onderzoek gedaan naar de relatie tussen ervaren sterke versus zwakke kanten en motivatie om te leren. We weten dus niet of mensen meer tijd en energie in hun opleiding en ontwikkeling steken als ze aan hun sterke kanten in plaats van aan hun zwakke kanten werken. Daarom hebben we in het kader van dit proefschrift onderzoek gedaan naar de relatie tussen *ervaren sterke versus zwakke kanten* en *inzet* in de context van opleiding en ontwikkeling.

In een negental empirische studies hebben we geprobeerd antwoord te vinden op de volgende onderzoeksvragen:

1. Wat is de relatie tussen ervaren sterke versus zwakke kanten en de intentie van mensen om zich in te zetten?
2. Hoe kunnen we de relatie tussen ervaren sterke versus zwakke kanten en de intentie van mensen om zich in te zetten verklaren?
3. Wat is de relatie tussen ervaren sterke versus zwakke kanten en, respectievelijk, de intentie van mensen om zich in te zetten en hun daadwerkelijke inzet?
4. Wat is het effect van de leeromgeving op de relatie tussen ervaren sterke versus zwakke kanten en, respectievelijk, de intentie van mensen om zich in te zetten en hun daadwerkelijke inzet?

Hieronder geven we een samenvatting van onze belangrijkste bevindingen.

2. Samenvatting van de Belangrijkste Bevindingen

In hoofdstuk 2 komen de eerste twee onderzoeksvragen aan bod: (1) Wat is de relatie tussen ervaren sterke versus zwakke kanten en de intentie van mensen om zich in te zetten en (2) hoe kunnen we de relatie tussen ervaren sterke versus zwakke kanten en de intentie van mensen om zich in te zetten verklaren? In dit hoofdstuk presenteren we de resultaten van twee experimentele studies, een online onderzoek (n = 174) en een onderzoek in de klas (n = 267), waarin we het effect van ervaren sterke versus zwakke kanten op inzetintenties hebben onderzocht en een mediatiemodel hebben getoetst dat dit effect verklaart. In beide studies bleek dat de deelnemers die hun sterke en zwakke kanten identificeerden en vervolgens een leeractiviteit kozen om aan één van hun sterke kanten te werken (*sterke-kanten-gerichte leerstrategie*), hoger scoorden op ervaren competentie, intrinsieke motivatie en inzetintenties, dan de deelnemers die hun sterke en zwakke kanten identificeerden en vervolgens een leeractiviteit kozen om aan één van hun zwakke kanten te werken (*deficiëntie-gerichte leerstrategie*). Verder bleek in beide studies dat het effect van ervaren sterke versus zwakke kanten op inzetintenties sequentieel werd gemedieerd door achtereenvolgens ervaren competentie en intrinsieke motivatie. Dit betekent dat, vergeleken met de deelnemers die zich richtten op hun zwakke kanten, de deelnemers die zich richtten op hun sterke kanten zich competenter voelden; daarom waren ze meer intrinsiek gemotiveerd en daarom waren ze bereid om zich meer in te zetten.

In hoofdstuk 3 gaan we in op de derde onderzoeksvraag: (3) Wat is de relatie tussen ervaren sterke versus zwakke kanten en, respectievelijk, de intentie van mensen om zich in te zetten en hun daadwerkelijke inzet? In dit hoofdstuk presenteren we de resultaten van twee empirische studies, waarin we de relatie tussen ervaren sterke versus zwakke kanten en inzet bij het verrichten van online leeractiviteiten hebben onderzocht. De resultaten van studie 1 (n = 115) laten zien dat deelnemers die worden gevraagd om een beperkt aantal uren te verdelen over een aantal online cursussen die ze zouden kunnen volgen, ervoor kiezen om meer tijd te besteden aan cursussen op het gebied van hun sterke kanten, dan aan cursussen op het gebied van hun zwakke kanten. De resultaten van studie 2 (n = 85) laten zien dat deelnemers ook daadwerkelijk meer oefeningen doen op het gebied van hun sterke kanten dan op het gebied van hun zwakke kanten, als hun de mogelijkheid wordt geboden om met behulp van een aantal e-learning-modules verschillende vaardigheden te oefenen.

Alle studies in hoofdstuk 2 en 3 zijn uitgevoerd in een zelf-gereguleerde leeromgeving. Hiermee bedoelen we dat de deelnemers vrijwillig aan de leeractiviteiten konden deelnemen, zonder het vooruitzicht dat ze na afloop zouden worden getoetst. In een dergelijke leeromgeving zien we dus een consistent patroon, namelijk dat deelnemers meer inzet tonen op het gebied van hun sterke kanten dan op het gebied van hun zwakke kanten.

In hoofdstuk 4 komt onze laatste onderzoeksvraag aan bod: (4) Wat is het effect van de leeromgeving op de relatie tussen ervaren sterke versus zwakke kanten en, respectievelijk, de intentie van mensen om zich in te zetten en hun daadwerkelijke inzet? In dit hoofdstuk presenteren we de resultaten van een vijftal empirische studies waarin we hebben gekeken naar de modererende invloed van de leeromgeving op de manier waarop mensen hun inzet over hun sterke en zwakke kanten verdelen als ze gedurende een periode aan meerdere leeractiviteiten deelnemen. Onze verwachting was dat de positieve relatie tussen ervaren sterke kanten en inzet zoals we die in hoofdstuk 2 en 3 hebben gevonden, alleen naar voren komt in een zelf-gereguleerde leeromgeving, als mensen zich vrij voelen om wel of niet aan bepaalde leeractiviteiten deel te nemen. Als mensen gericht zijn op het behalen van hun toetsen, dus in een toets-gereguleerde leeromgeving, steken ze naar verwachting juist meer tijd en energie in leeractiviteiten op het gebied van hun zwakke kanten.

Studie 1 (n = 95) en Studie 2 (n = 116) waren scenariostudies waarin we de deelnemers ad random aan een zelf-gereguleerde of een toets-gereguleerde conditie hebben toegewezen, waarna we hun in beide condities hebben gevraagd om een beperkte hoeveelheid tijd over een aantal schoolvakken te verdelen. Net als in hoofdstuk 2 en 3 laten de resultaten zien dat de deelnemers in een zelf-gereguleerde leeromgeving er voor kiezen om meer tijd te besteden aan vakken op het gebied van hun relatief sterke kanten. De deelnemers in een toets-gereguleerde leeromgeving kiezen er echter voor om meer tijd te besteden aan vakken op het gebied van hun relatief zwakke kanten.

Studie 3 (n = 46) was een praktijkstudie waarin we hebben gekeken naar de manier waarop leerlingen in de loop van een semester hun tijd over hun sterke en zwakke vakken verdelen. Ook uit deze studie blijkt dat de manier waarop mensen hun tijd over hun sterke en zwakke kanten verdelen afhankelijk is van de leeromgeving. Als leerlingen zich vrij voelen om hun tijd naar eigen inzicht te besteden, dus in een zelf-gereguleerde leeromgeving, steken ze meer tijd in hun relatief sterke vakken. Tijdens de toetsweek, dus in een toets-gereguleerde leeromgeving, steken leerlingen echter meer tijd in hun relatief zwakke vakken.

Studie 4 (n = 148) en 5 (n = 78), tot slot, waren laboratoriumstudies waarin we het causale effect van de leeromgeving op de manier waarop mensen hun inzet over hun sterke en zwakke kanten verdelen hebben onderzocht als ze gedurende één periode aan meerdere vaardigheden kunnen werken. In lijn met de bevindingen van studie 1, 2 en 3, laten de resultaten van studie 4 en 5 zien dat de leeromgeving een modererend effect heeft op de relatie tussen ervaren sterke versus zwakke kanten en inzet. De deelnemers die vooraf werd verteld dat de oefeningen waren bedoeld om naar eigen inzicht hun vaardigheden verder te ontwikkelen (zelf-gereguleerde leeromgeving) deden meer oefeningen op het gebied van hun sterke vaardigheden. De deelnemers die echter vooraf werd verteld dat ze na afloop zouden worden getoetst (toets-gereguleerde leeromgeving) deden juist meer oefeningen op het gebied van hun zwakke kanten.

Over deze vijf studies zien we dus wederom een consistent patroon, namelijk dat de relatie tussen ervaren sterke versus zwakke kanten en inzet (intenties) afhankelijk is van de leeromgeving. In een zelf-gereguleerde leeromgeving is er sprake van een positieve relatie. In een dergelijke leeromgeving tonen mensen meer inzet op het gebied van hun sterke kanten. In een toets-gereguleerde leeromgeving, daarentegen, is er sprake van een negatieve relatie. In een dergelijke leeromgeving tonen mensen meer inzet op het gebied van hun zwakke kanten.

3. Theoretische Implicaties

Onze belangrijkste bevindingen zijn dat er in leersituaties zowel positieve als negatieve relaties tussen ervaren sterke versus zwakke kanten en inzet bestaan en dat de leeromgeving een modererend effect heeft op deze relatie: in een zelf-gereguleerde leeromgeving is de relatie positief, maar in een toets-gereguleerde leeromgeving is de relatie negatief. Deze bevindingen zijn om verschillende redenen van belang. Ze dragen bij aan onze kennis op het gebied van (1) de sterke-kanten-benadering, (2) ervaren competentie en motivatie en (3) motivatie bij het werken aan meerdere doelen.

3.1. De Sterke-kanten-benadering

In de eerste plaats dragen resultaten van dit onderzoek bij aan onze kennis van de sterke-kanten-benadering. Het onderzoek dat tot nu toe op dit

gebied is gedaan laat zien dat er een positieve relatie is tussen sterke kanten en verschillende aspecten van motivatie, waaronder de mate waarin mensen voldoening van fundamentele behoeften ervaren (Linley et al., 2010), de mate waarin ze betrokkenheid ervaren (Meyers et al., 2015) en de mate waarin ze bereid zijn zich in te zetten (Rechter, 2010, Studie 2). Onze resultaten laten zien dat er niet alleen een relatie is met dit soort subjectieve motivatievariabelen, maar ook een relatie met daadwerkelijke inzet, dus met observeerbaar gedrag. Verder biedt ons onderzoek een verklaring voor de positieve relatie tussen ervaren sterke versus zwakke kanten en inzetintenties. Mensen die aan hun sterke in plaats van hun zwakke kanten werken voelen zich competenter, zijn daarom meer intrinsiek gemotiveerd en daarom bereid zich meer in te zetten. Verder laat ons onderzoek zien dat ervaren sterke kanten niet onder alle omstandigheden een motiverende werking hebben. De positieve relatie tussen ervaren sterke versus zwakke kanten en inzet doet zich alleen voor in een zelf-gereguleerde leeromgeving. In een toets-gereguleerde leeromgeving is er juist sprake van een negatieve relatie.

3.2. Ervaren Competentie en Motivatie

In de tweede plaats draagt ons onderzoek bij aan de theoretische kennis met betrekking tot de relatie tussen ervaren competentie en motivatie. Volgens invloedrijke motivatietheorieën zoals cognitieve-evaluatie-theorie (Deci & Ryan, 1985) en sociaal-cognitieve theorie (Bandura, 1997) is ervaren competentie bevorderlijk voor leren: als mensen denken dat ze ergens goed in zijn, dan zijn ze geneigd er meer tijd en energie in te steken. Een theorie als controle-theorie (Carver & Scheier, 1982) stelt daarentegen dat ervaren competentie een negatieve invloed op leren kan hebben (Vancouver et al., 2008): als je ergens beter in bent, dan hoef je er minder tijd en energie in te steken om hetzelfde resultaat te bereiken. De uitkomsten van ons onderzoek laten zien dat beide standpunten zowel gegrond als onvolledig zijn. In leersituaties kan de relatie tussen ervaren competentie en inzet zowel positief als negatief zijn, afhankelijk van de leeromgeving. De positieve relatie komt naar voren in een zelf-gereguleerde leeromgeving. De negatieve relatie komt naar voren in een toets-gereguleerde leeromgeving. Motivatietheorieën dienen dus zowel positieve als negatieve relaties tussen ervaren competentie en inzet te beschrijven en aandacht te besteden aan het effect van de context op deze relatie.

3.3. Werken aan Meerdere Doelen

In de derde plaats draagt ons onderzoek bij aan de kennis op het gebied van motivatie in situaties waarin mensen tegelijkertijd aan meerdere doelen werken. Voortbouwend op het werk van Möller en Marsh (2013), hebben we in deze dissertatie het concept *ervaren sterke kanten* geïntroduceerd. Ervaren sterke kanten hebben we gedefinieerd als een specifieke vorm van ervaren competentie; namelijk, ervaren competentie die voortkomt uit dimensionele vergelijkingen (Möller & Marsh, 2013). Hierbij vergelijken mensen hun competentie op één gebied met hun eigen competentie op een ander gebied. Dit in tegenstelling tot sociale vergelijking (Festinger, 1954), waarbij mensen hun eigen competentie vergelijken met die van anderen, of temporele vergelijking (Albert, 1977), waarbij mensen hun competentie vergelijken met hun eigen competentie in het verleden. In overeenstemming met het werk van Möller en Marsh (2013) laat ons onderzoek zien dat dimensionele vergelijking een reëel fenomeen is: mensen maken dit soort vergelijkingen en hebben een besef van hun persoonlijke sterke en zwakke kanten. Wat ons onderzoek hieraan toevoegt, is dat het laat zien dat dit besef aanzienlijke consequenties voor het gedrag van mensen heeft als zij tegelijkertijd aan meerdere doelen werken, hetgeen in het onderwijs en op het werk vaak het geval is. In dit soort situaties is er een nauwe samenhang tussen ervaren sterke versus zwakke kanten en de manier waarop mensen hun tijd over hun doelen verdelen. Deze samenhang kan zowel een positief als een negatief karakter hebben, afhankelijk van de leeromgeving. Kortom, ervaren sterke kanten en leeromgeving zijn belangrijke concepten die een plaats dienen te krijgen in theorieën die het leergedrag van mensen proberen te voorspellen in situaties waarin zij aan meerdere doelen werken.

4. Praktische Implicaties

In het begin van dit hoofdstuk gaven we aan dat er in de praktijk behoefte is aan strategieën die er toe kunnen bijdragen dat mensen gemotiveerd zijn om te werken aan hun opleiding en ontwikkeling. Wat kunnen we professionals in het onderwijs en het personeelsmanagement nu adviseren op basis van ons onderzoek? Doen studenten of medewerkers meer hun best wanneer ze aan hun sterke in plaats van hun zwakke kanten werken?

Het antwoord is: dit hangt af van de context. In een zelf-gereguleerde leeromgeving, waarin mensen een hoge mate van autonomie ervaren en zich vrij voelen om wel of niet aan opleidings- en ontwikkelingsactiviteiten deel te nemen, zullen ze meer inzet tonen als ze activiteiten kiezen op het gebied van hun sterke kanten. Onderwijsinstellingen bieden hun studenten bijvoorbeeld verdiepingsvakken en extra-curriculaire activiteiten waaruit studenten vrij kunnen kiezen. Ook grotere organisaties hebben vaak een opleidings- en ontwikkelingsaanbod, bijvoorbeeld in de vorm van e-learning-faciliteiten waar medewerkers naar eigen inzicht gebruik van kunnen maken. Daarnaast hebben mensen vele mogelijkheden om via platforms als Coursera, edX, of Khan Academy online-cursussen en -opleidingen te volgen. In een dergelijke leeromgeving, waarin de inzet van mensen sterk afhankelijk is van hun zelfsturing, bevordert ervaren competentie de inzet. Ervaren competentie versterkt namelijk de intrinsieke motivatie en intrinsieke motivatie is cruciaal als er weinig externe druk is.

Het is echter belangrijk om te bedenken dat echte zelf-gereguleerde leeromgevingen in de praktijk van het onderwijs en het personeelsmanagement waarschijnlijk niet zo vaak voorkomen. Studenten weten dat ze toetsen en examens moeten halen om hun opleiding te kunnen afronden en werknemers weten dat ze vroeger of later in de problemen komen als ze niet aan hun functie-eisen voldoen. Met andere woorden, in het onderwijs en in werksituaties zijn de externe normen van docenten of werkgevers vaak richtinggevend. In dergelijke toets-gereguleerde leeromgevingen is het maar zeer de vraag of mensen meer hun best doen als ze leeractiviteiten ondernemen op het gebied van hun sterke kanten. Ons onderzoek laat zien dat in een toets-gereguleerde leeromgeving mensen meer inzet tonen als ze werken aan hun zwakke kanten.

Onderwijzers of werkgevers die hun studenten of medewerkers willen stimuleren om meer energie in hun opleiding en ontwikkeling te steken, zouden dus wel eens bedrogen uit kunnen komen als ze dit proberen te bereiken door hun studenten of medewerkers te adviseren om op hun sterke kanten te focussen. Focussen op je sterke kanten is waarschijnlijk meer geschikt als zelf-motivatie-strategie voor mensen die zich vrij voelen om te werken aan hun opleiding en ontwikkeling, dan als strategie in handen van autoriteiten, zoals docenten en werkgevers, om anderen te motiveren om te leren.

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DANKWOORD

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ABOUT THE AUTHOR

Djoerd Hiemstra (1967) was trained as an occupational & organizational psychologist at the University of Groningen. He currently works as a policy advisor at NHL University of Applied Sciences in Leeuwarden.

Contact information
D. Hiemstra
Rengerslaan 10
8917 DD Leeuwarden
The Netherlands

Telephone: +31 (0)58 2511528
Email: d.hiemstra@nhl.nl.