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Student's Perspective on [DE]MOTIVATIONAL TEACHING APPROACHES in Higher Education

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Student's Perspective on (De)Motivational Teaching Approaches in Higher Education

Het Studentperspectief op (De)Motiverende Docentbenaderingen in het Hoger Onderwijs
(met een samenvatting in het Nederlands)

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Martijn Joseph Maria-Louisa Leenknecht

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te Oostburg

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"Early humans no doubt constructed bridges well before engineering courses and knowledge of the laws of physics existed; primitive healers attained cures well before medical courses and knowledge of the laws of biology existed; and achievement strivings in others were fostered well before self-instructional tapes and knowledge of the laws of motivation existed. But it is also true that the laws of physics aided the construction of the Golden Gate Bridge and the laws of biology helped eradicate smallpox. In a similar vein, theories of motivation may assist in the creation of rules to enhance human performance".

Sandra Graham & Bernard Weiner (1996)

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PREFACE

More and more emphasis is put on students as independent learners in Higher Education (HE; Bailey, 2013; Leese, 2010). The responsibility for students' learning is no longer solely vested in teachers, but students are encouraged to take up responsibility for their own learning process (Brooks & Everett, 2008). This same shift is made within my own institute (HZ University of Applied Sciences, The Netherlands). Since 2015 we adopted a student- and process-oriented educational approach (HZ University of Applied Sciences, 2015) that is built upon three pillars: (a) authentic professional tasks, (b) collaborative learning, and (c) students' self-regulation and autonomy. Central to HZ's student- and process-oriented educational approach is, as it is within all approaches that emphasize students' self-directed learning, the active role of students. It is the student who determines the success of our education. We no longer tell ourselves that we can make students learn; we recognize that it is the student (with help of significant others) who has to do the job.

The active role of students does not make teachers passive spectators. However, with the introduction of our student- and process-oriented educational approach in 2015, we did not have an immediate solution to teachers' new role. We wondered how teachers could support students in taking up the responsibility for their own learning and how teachers could become the coach to guide learning. To find answers, I started to study motivational teaching approaches and, more specifically, students' perceptions of it. When we want to support students to become autonomous learners, we should consider education from the student's perspective.

The results of my studies are presented in this dissertation. My studies have resulted in several new insights on (de)motivational teaching approaches in higher education. I hope these insights can contribute to the success of students at HZ University of Applied Sciences and, beyond that, to our knowledge base on (de)motivational teaching approaches in general.

November 15th, 2020
Martijn Leenknecht

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Chapter 1

TEACHERS' (DE)MOTIVATING TEACHING APPROACHES

We probably all have both positive and negative memories of our time at school. We enjoyed some classes more than others, and still have warm feelings for that one teacher and bad feelings about another teacher. While some teachers were able to motivate us, others were always dampening our spirits. Reflecting on those two types of teachers, we would undoubtedly have to conclude that these teachers performed similar types of activities. The motivating and demotivating teachers both gave instructions, provided feedback, and monitored our progress. However, the way *how* they taught, their interpersonal teaching approach probably differed a lot.

The effects of interpersonal teaching approaches on students' motivation are studied from different theoretical perspectives. For example, studies on student-faculty interactions revealed that teachers' respect toward students, their off-campus interactions with students, their approachability, and career guidance to students are associated with students' motivation (e.g., Komarraju et al., 2010). From the perspective of interpersonal relationships in class, teachers' proximity (i.e., whether they are cooperative or opposing) is found to be a determinant of students' pleasure, confidence, and effort (e.g., Wubbels et al., 2006). Studies taking a Self-Determination Theory (SDT) perspective showed that teachers' interpersonal supportive styles or approaches[1] are positively associated with students' motivation in physical education (e.g., Pelletier et al., 2001; Tessier et al., 2010), project-based education (e.g., Lam et al., 2009), primary and secondary education (e.g., Hornstra et al., 2018; Vansteenkiste et al., 2012), and higher education (e.g., Baeten et al., 2013). Research on (de) motivating teaching approaches from an SDT-perspective seems promising to explain teachers' influence on students' motivation (e.g., Stroet et al., 2013; Vansteenkiste et al., 2020). We will discuss (de)motivating teaching from an SDT-perspective in more detail to gain more insight into how teachers affect students' motivation.

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[1] The denotations style and approach are used interchangeably in previous research. However, we prefer to use approach, to emphasize that teachers can choose and change the support they provide from context to context. Style connotes a general and stable personality trait. See Vallerand (1997) for a closer discussion about the distinction between a global (trait) and contextual level in motivational research.

Table 1.1 *Operationalization of Need-Supportive and Need-Thwarting Teaching*

Need-supportive teaching approaches			Need-thwarting teaching approaches		
Autonomy support	Structure	Involvement	Control	Chaos	Coldness
		Definitions:			
Empowering students to experience volition and to self-endorse learning	Reinforcing students to experience effectiveness and engage in learning activities with self-confidence	Showing students that they are personally appreciated and part of the learning community	Ignoring students' perspective and forcing students to act, think, or feel in a particular way	Impeding students' self-confidence and being reluctant to offer guidance and support	Abandoning, keeping distance, and being unfriendly to students
		Corresponding behaviors:			
Offering choices	Communicating clear expectations	Showing affection and warmth	Introducing punishments or rewards	Ambiguous expectations	Being unfriendly and cold
Explaining the relevance of learning tasks	Offering guidance or support	Being available to provide support	Demanding	Reluctant to offer guidance or support	Acting indifferent
Showing respect	Communicating positive expectations	Dedicating time and effort	Nourishing feelings of shame and guilt	Wait-and-see	Keeping distance
Allowing criticism by students	Providing informational feedback		Domineering	Lackadaisical	Ignoring
	Providing optimal challenges		Using controlling language	Permissiveness	

(DE)MOTIVATING TEACHING FROM AN SDT-PERSPECTIVE

SDT is a motivational theory that assumes that all humans are active by nature (Deci & Ryan, 1985). We do what we do based on internal structures built through experiences. These internal structures are organized around three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2017). Someone has the need to feel self-endorsed in their action (autonomy), feel effectiveness (competence), and feel connected to important others (relatedness). The basic psychological needs are discussed in more detail in the paragraph "The Self and Basic Psychological Needs". The satisfaction of those basic psychological needs is found to be a strong antecedent of students' motivation, engagement, and well-being (see Vansteenkiste et al., 2020 and the paragraph "And Action! Students' Motivation" for more details). For that reason, teachers are advised to pay attention to those basic psychological needs by adopting a need-supportive teaching approach (e.g., Aelterman, 2014; Stroet et al., 2013). Need thwarting teaching approaches and need frustration should be avoided (e.g., Bartholomew et al., 2011a; Haerens et al., 2016). We will elaborate on need-supportive and need-thwarting teaching first.

NEED-SUPPORTIVE TEACHING

Teachers can support students' motivation by providing autonomy support, structure, and involvement (see Table 1.1; Skinner & Belmont, 1993; Skinner et al., 2008). Teachers can support feelings of autonomy by providing *autonomy support* (Ryan & Deci, 2017). Autonomy support can be defined as empowering students to experience volition to self-endorse learning. A teacher can do this by offering choices (e.g., Patall et al., 2010), showing respect to the students and allowing them to express criticism (e.g., Assor & Kaplan, 2001; Reeve, 2009), explaining to students why the learning tasks are relevant to them (e.g., Assor et al., 2002; Reeve, 2009), and by avoiding the use of controlling language in their communication to students (e.g., "you must," "you should"; Reeve, Jang, et al., 2004; Reeve, 2009; Vansteenkiste et al., 2004; Wijnia et al., 2014).

The teacher can support students' feelings of competence by structuring the learning context (Ryan & Deci, 2017; Skinner, 1995). With the provision of *structure*, the teacher reinforces the students to experience effectiveness and self-confidence. A teacher can provide structure to students by offering guidance and help (e.g., Jang et al., 2010), providing

informational feedback that helps students to improve (e.g., Jang et al., 2010), communicating clear expectations, and showing confidence in students' ability to meet those expectations (e.g., Belmont et al., 1988; Vansteenkiste et al., 2012).

By showing students their personal appreciation and making sure that students are part of the learning community, teachers provide interpersonal involvement and support students' feelings of relatedness (Furrer & Skinner, 2003). Providing *involvement* includes showing affection, warmth, acceptance, and showing students that they are part of the learning community (Furrer & Skinner, 2003). A teacher can show this involvement by dedicating time and effort to students and by being available for interpersonal help and support beyond educational goals (Stroet et al., 2013).

NEED-THWARTING TEACHING

Teachers' influence on students' motivation is not solely positive. With need-thwarting teaching, teachers can harm students' feelings of autonomy, competence, and relatedness and, by doing so, harm their motivation (see Table 1.1; Bartholomew et al., 2011a, 2018). A *controlling* teacher is seen as the opposite of an autonomy-supportive teacher and is associated with less (autonomous) student motivation (Haerens et al., 2016). A teacher is controlling when students' perspective is ignored, and students are made to act, think, or feel in a particular way by using pressure (Haerens et al., 2016). This pressure can be external by introducing punishments and rewards, or internal by nourishing feelings of shame and guilt (Aelterman, 2014; Haerens et al., 2016). A controlling teacher harms students' feelings of autonomy (Ryan & Deci, 2017).

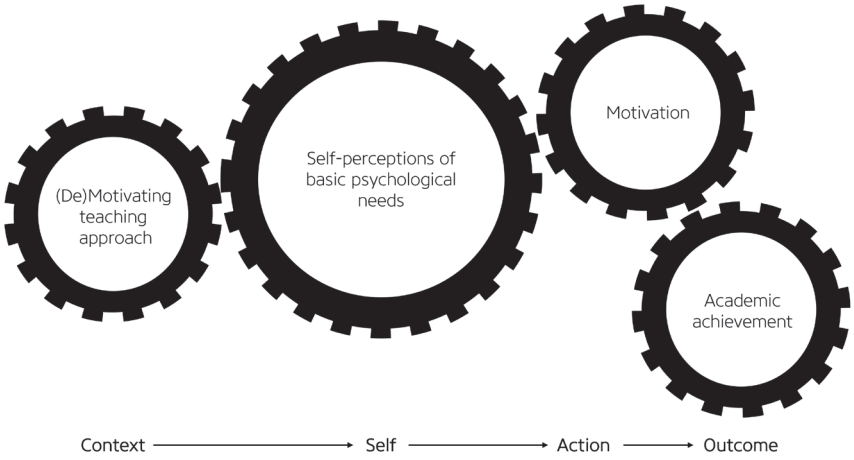
A teacher can also thwart students' motivation by being chaotic. *Chaos* is often seen as a lack of structure (Stroet et al., 2015), but it is more distinct. According to Aelterman and colleagues (2019), a chaotic teacher does not only fail to provide structure to students successfully but is also actively interfering with students' development of competence. The teacher is chaotic when unclear instructions and expectations are provided and when the teacher adopts a wait-and-see approach (Aelterman, 2014; Aelterman et al., 2019). The teacher is reluctant to provide guidance or feedback to the students (Stroet et al., 2015). When being chaotic, the teacher harms students' feelings of competence (Ryan & Deci, 2017).

Finally, teachers can harm students' motivation by interpersonal *coldness*. Aelterman (2014) describes coldness as being unfriendly, cold, and indifferent. Teachers who are acting cold are taking distance and do not show interest in their students (Aelterman, 2014) and negatively affect students' feelings of relatedness (Ryan & Deci, 2017).

(DE)MOTIVATING TEACHING AS A DIALOGIC PROCESS

A central aim of SDT is that what we do is determined by feelings of autonomy, competence, and relatedness and that those feelings are built and adjusted through experiences (i.e., each new experience contributes to our overall feelings; Deci & Ryan, 1985). In early publications, those internal structures are labeled as self-system processes (Connell & Wellborn, 1991), which are defined as "appraisals of self in relation to ongoing activity" (Connell, 1990, p. 61). Based on the work by Connell and Wellborn (1991), Skinner and Belmont (1993) presented a roadmap about how teaching approaches affect students' motivation through self-system processes. In this Self-System Model of Motivational Development (Skinner & Belmont, 1993), teaching approaches form the *context* that affects students' self-perceptions of autonomy, competence, and relatedness. Students construct those self-perceptions over time, based on interactions with the context, such as teaching approaches (Skinner et al., 2008). The self-perceptions are appraisals of the *self* and function as personal resources for motivation (Skinner et al., 2008). Positive perceptions (i.e., need satisfaction) result in more student *action* (Skinner & Belmont, 1993). Those actions and students' behavior is instigated and optimized by students' motivation (Connell & Wellborn, 1991; Ryan & Deci, 2017; Skinner et al., 2008) and results in *outcomes*, such as skills acquisition and academic achievement (Skinner & Belmont, 1993). The dynamics of the Self-System Model can be visualized as a chain of gear-wheels, which shows how teacher approaches affect students' learning (see Figure 1.1). Students' self-perceptions of autonomy, competence, and relatedness are the building blocks of their motivation, and those self-perceptions are formed during self-system processes. Whether intentional or not, teachers affect students' motivation with their teaching approach due to their role in students' self-system processes (Connell, 1990). Outcomes of the self-system processes can be very diverse, from skills acquisition to feelings of well-being, but for reasons of clarity, we only included academic achievement in the figure.

Figure 1.1 *Visualization of the Self-System Model of Motivational Development*



Note. Motivation does not represent the actual action, but is seen as a mediating factor between self and outcome that is situated in action (Connell & Wellborn, 1991).

THE SELF AND BASIC PSYCHOLOGICAL NEEDS

Students' self-system processes occur during interactions with their teachers and result in self-appraisals, which are reflected in self-perceptions about their feelings of autonomy, competence, and relatedness (Connell & Wellborn, 1991; Deci & Ryan, 2000; Skinner & Belmont, 1993). The satisfaction of these basic psychological needs has been found to facilitate students' motivation (Deci & Ryan, 2000), because motivation is about perceived control (Skinner, 1995). To experience personal control[2], that is, experiencing to be the "origin" of your behavior, you need to experience competence and autonomy (Deci & Ryan, 2000; Ryan & Deci, 2017). You need to experience that it is you that causes the effect; you have to

[2] Perceived personal control should not be confused with perceived teacher control. Perceived personal and teacher control are poles of the same control continuum. More perceived personal control, indicates less perceived teacher control and vice versa. However, low personal control not automatically means high teacher control. Point is that personal and teacher control cannot co-occur. In other contexts, teacher control can be replaced by, for example, parental, social, or governmental control.

experience that you are capable (Skinner, 1995), and you need to experience that you have volitionally chosen to cause that effect (Deci & Ryan, 2000).

The experience of being effective (Skinner, 1995) is about feeling competent and the experience of contingency. Contingency is the connection between actions and outcomes (Skinner, 1995). An action that leads to a specific outcome is contingent on that outcome, on the condition that that outcome would not occur without that action (Skinner, 1995). In other words, experiencing contingency is experiencing the effectiveness of your actions. Those effectiveness experiences are central in attribution theory (e.g., Weiner, 1980), and effectiveness beliefs are pivotal in the concept of self-efficacy (e.g., Bandura, 1997). In SDT, effectiveness experiences are labeled as perceived competence and are seen as a prerequisite for intrinsic motivation (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017).

However, feelings of effectiveness are in themselves insufficient to perceive personal control; persons will only experience effectiveness when they feel responsible for the outcome (Deci & Ryan, 2000). For example, persons can experience the effectiveness of an action that is initiated because of the anticipated reward, but this does not represent perceived control. These persons did not control the action themselves but were "forced" to perform the action to get rewarded. Thus, besides the need for competence, persons have to experience *autonomy* or self-determination of their actions to perceive personal control (Deci et al., 1981). Persons who feel autonomous do experience the option to not engage in the activity, but they choose to engage in the activity volitionally (Ryan & Deci, 2017).

In addition to competence and autonomy, relatedness is an important, albeit a more distal, influence on perceived personal control (Deci & Ryan, 2000). The need for relatedness is the feeling of being respected and significant to others (Ryan & Deci, 2017). It represents the experience of close emotional bonds and the sense of belonging to social groups (Furrer & Skinner, 2003). The experience of personal control does not seem to be dependent on the feeling of relatedness, as a person can experience personal control for individual activities as well. However, perceived personal control seems to flourish when the need for relatedness is satisfied (Deci & Ryan, 2000). Moreover, relatedness facilitates perceived personal control. It is more likely that individuals will accept activities and make it their own when they experience a genuine sense of connection with the other proposing the activity (Vansteenkiste et al., 2020).

AND ACTION! STUDENTS' MOTIVATION

We have seen that the experience of autonomy, competence, and relatedness contributes to students' perceived personal control. How this perceived personal control turns into students' action is explained by theories on human motivation, like SDT (Ryan & Deci, 2017). Students' motivation is about the motives and causes to behave in a certain way (Ryan & Connell, 1989; Ryan & Deci, 2017). Those motives and causes can be impersonal, environmental, and outside the person, or personal, based on a person's intentions or actions (Ryan & Connell, 1989). Whether or not these motives and causes are personal is represented in the construct *locus of causality*[3] (Ryan & Connell, 1989). An impersonal locus of causality is seen as amotivation (Ryan & Deci, 2017). The personal locus of causality is about control (Skinner, 1995) and can be divided into an internal and external locus of causality (Ryan & Connell, 1989). There is an internal locus of causality when the person is perceived as the "origin" of the behavior (i.e., perceived personal control), and an external locus of causality when the control of the situation is beyond personal control (e.g., perceived teacher control; Ryan & Connell, 1989).

In SDT, *intrinsic motivation* is the behavior that is instigated by personal value, joy, and pleasure, as the activity itself is intrinsically rewarding (Deci & Ryan, 2000). The reasons to act are based on an internal locus of causality (Ryan & Deci, 2017). When the locus of causality is external, persons are *extrinsically motivated* (Deci & Ryan, 2008). Anticipated rewards or punishments instigate the behavior. As soon as the motivator in the form of rewards or punishments is withdrawn, the individual will stop performing the externally regulated behavior (Deci & Ryan, 2000).

Several authors have argued that rather than the objective person (i.e., *inter*personal perspective), the subjective person is the center of the personal experiences that determines the locus of causality (i.e., *intra*personal perspective; Deci & Ryan, 1987; Ryan & Connell, 1989). The

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[3] Locus of causality should not be confused with causal attributions. Locus of causality, as defined in this dissertation, is similar to Rotter's (1966) locus of control. Student can attribute the cause of an event internally (internal causal attribution), but still not experience that they can control the event themselves (lack of internal locus of causality). See Pettersen (1987) for an elaborate discussion about the conceptual difference between causal attribution and locus of control.

experience of being the origin of one's behavior (i.e., internal locus of causality) does not depend on whether or not you actually *are* initiating the behavior. Performing behaviors because you like it or because of feelings of guilt are both initiated by yourself. However, feelings of guilt are perceived to force the behavior, and the person is "acting on", rather than experiencing to be the origin of the behavior (Ryan & Connell, 1989). In other words, from an intrapersonal perspective, the objective locus of causality is not necessarily the same as the perceived locus of causality (see Figure 1.2). The perceived internal locus of causality is the feeling that the action is initiated by oneself, and the perceived external locus of causality is the feeling that you have to do it (Deci & Ryan, 1987).

Studying the perceived locus of causality from an intrapersonal perspective resulted in the call for a more differentiated nature of the construct (Ryan & Connell, 1989). The example of guilt mentioned above did not fit within the classical dichotomy of internal and external locus of causality. Theories of internalization were used to develop a gradation in the locus of causality, as displayed in Figure 1.2. An explicit distinction was made between the objective locus of causality (from an interpersonal perspective) and the perceived locus of causality (from an intrapersonal perspective).

For intrinsic motivation, the objective locus of causality (internal) corresponds to the person's perceived locus of causality (also internal; see Figure 1.2). The same holds for external motivation: The objective external locus of causality is similar to the perceived external locus of causality (see Figure 1.2). The process of internalization results in an objective external locus of causality that is transformed into personally endorsed values (i.e., perceived internal locus of causality; Deci & Ryan, 2000). Internalization is seen as an active and inborn human process, through which an external reason or cause is adopted as a person's own (Deci & Ryan, 2000; Ryan & Connell, 1989). Some levels of internalization can be distinguished. Higher internalization levels are associated with more perceived control (Ryan & Deci, 2017; Skinner, 1995).

A person who adopts external forces but maintains those forces in the same form is introjecting the external locus of causality (Deci & Ryan, 2000; Ryan & Connell, 1989). They project the external forces on themselves and adopt those forces to impose them on themselves. The consequences of these forces (i.e., rewards or punishment) are administered by themselves (Deci & Ryan, 2000). Examples of *introjected motivation* are pride, guilt,

or shame. For example, students studying to make their parents proud are introjecting the external force, parental expectations, and adopting it as an internal force to study. The force is internalized and administered by themselves, but their motivation is not fully internalized as it is not fully assimilated with the self (Deci & Ryan, 2000). The reason to study is still outside the student. Due to this partial internalization, introjected motivation results in outcomes that are not self-determined (Deci & Ryan, 2000). As the force is internalized, introjected motivation is more stable over time than external motivation (Deci & Ryan, 2000).

Fuller internalization can be reached when the behavior becomes part of the person's identity (Deci & Ryan, 2000). This *identified motivation* is in place when the external locus of causality is assimilated into a person's values or goals (Ryan & Connell, 1989). The person recognizes the underlying value and accepts the external force as being important for themselves (Deci & Ryan, 2000). The behavior is personally valuable to them. For example, students can be involved in studying because they want to get a specific job or because they want to use the acquired knowledge and skills to develop innovative ideas. Identified motivation typically is about activities that a person "wants" (Ryan & Connell, 1989). However, the behavior is still instrumental, rather than intrinsically rewarding in itself (Deci & Ryan, 2000). The external locus of causality is not fully internalized.

Behavior is fully internalized when it is integrated with all aspects of the self, and the external force is transformed into a personal value (Deci & Ryan, 2000). For example, students who do not find intrinsic rewards in reading books but have identified reading as personally important, as it will help them to get new ideas for their drawings, experience identified motivation. When those students start enjoying the imagination that reading brings, they are integrating the behavior. Although *integrated motivation* is theoretically distinguishable from intrinsic motivation, in practice, the difference can hardly be recognized (Ryan & Deci, 2017). For that reason, we do not apply integrated motivation in the proceedings and only consider intrinsic motivation in Figure 1.2.

The distinction into types of motivation is based on the perceived locus of causality. When the perceived locus of causality is predominantly external (i.e., external and introjected motivation), the behavior is controlled, and the person feels pressured to do it (Deci & Ryan, 2000). On the other hand, one feels autonomous in one's actions (i.e., intrinsic and identified motivation) when one experiences volition and choice (Deci & Ryan, 2000).

In essence, the perceived locus of causality is different between intrinsic and identified motivation, but this does not matter much. It is the level of perceived personal control or experience of self-determination of the action that matters most (Ryan & Deci, 2017). Therefore, identified and intrinsic motivation can be grouped into autonomous motivation and external and introjected motivation into controlled motivation (see Figure 1.2).

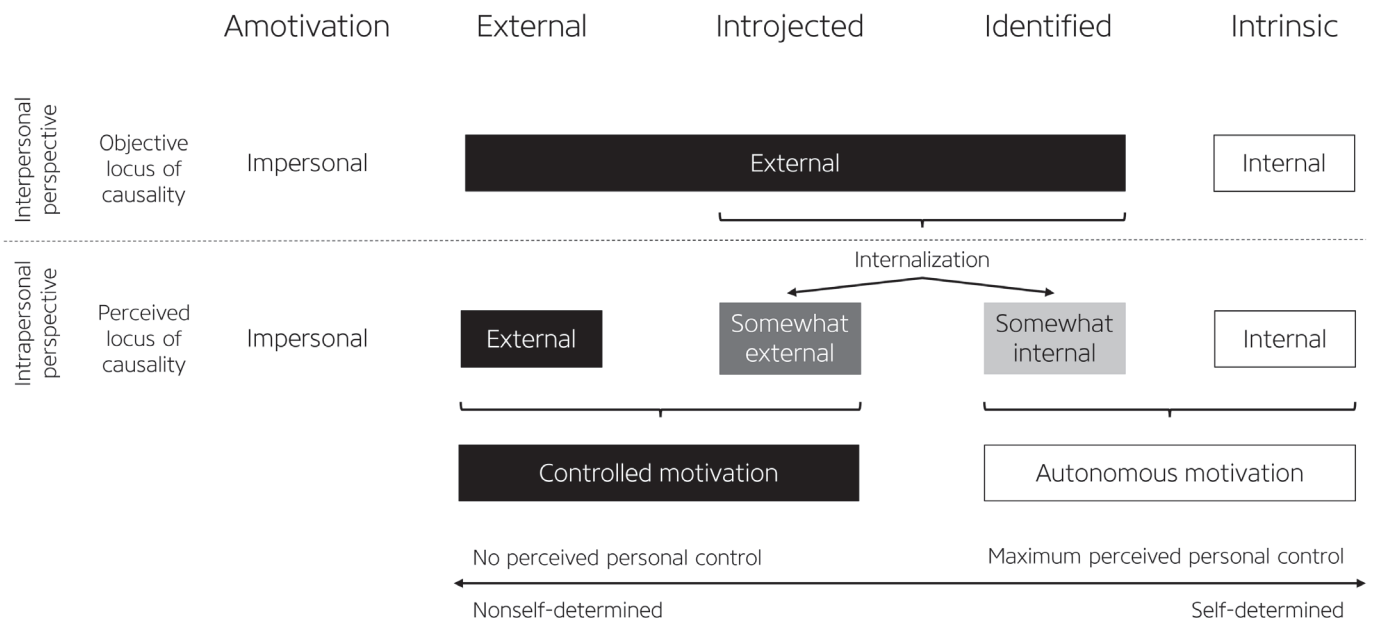
APPLYING (DE)MOTIVATING TEACHING APPROACHES

According to SDT, all three basic psychological needs should be satisfied to experience optimal motivation (Ryan & Deci, 2017): lack of satisfaction of one need results indisputably in more controlled motivation. As the (de)motivating teaching approaches are theoretically linked to the basic psychological needs (e.g., autonomy support with autonomy, chaos with competence), one would expect that a teacher should apply all three need-supportive teaching approaches to stimulate students' motivation optimally. It is assumed that the three need-supportive teaching approaches have *unique importance* in explaining the effect of motivating teaching on students' motivation (e.g., Connell & Wellborn, 1991; Ryan & Deci, 2017). However, in research on need-supportive and need-thwarting teaching, most of the time, not all (de)motivating teaching approaches are included. For example, many studies compare autonomy support with control without studying structure, involvement, chaos, and coldness (e.g., Bartholomew et al., 2011a; Deci & Ryan, 1987; Haerens et al., 2015; Jang et al., 2016).

Aelterman and colleagues (2019) developed a new questionnaire (i.e., Situations in School) to measure teachers' and students' perceptions of (de)motivating teaching approaches, but did not include involvement and coldness in their new questionnaire. They developed a circumplex model representing the interplay between autonomy support, structure, control, and chaos. They found positive associations of students' perceptions of autonomy support and structure with positive outcomes, like students' motivation, self-regulation, and students' perceptions of teacher quality. Negative associations were found with negative outcomes, like oppositional defiance and amotivation. Opposite patterns were found for control and chaos (Aelterman et al., 2019). The role of showing involvement and avoiding coldness in stimulating students' motivation remains unclear.

The discussion about the unique importance of the (de)motivating teaching approaches can be centered around three questions: (a) Are the

Figure 1.2 *The Self-Determination Taxonomy of Motivation in Relation to the Locus of Causality*



(de)motivating teaching approaches exclusively linked to the corresponding basic need?; (b) Is the process of (de)motivating teaching described in the literature dependent on the level (specific situations versus contextual) it is studied?; and (c) What is the interplay between (de)motivational teaching approaches? Each question will be discussed separately below.

LINKAGE TO CORRESPONDING BASIC NEEDS

Studies in which both perceptions of need-supportive teaching and need satisfaction are taken into account are scarce. One of the few examples is the study by Jang and colleagues (2016). They studied the longitudinal reciprocal effect of autonomy-supportive teaching in Korean high school on students' need satisfaction and engagement. They found that beginning-of-semester and mid-semester disengagement of the students predicted teachers' autonomy support at the mid-semester and end-of-semester time points. Teachers' autonomy support predicted students' need satisfaction at the successive measurement moment (Jang et al., 2016). Unfortunately, the study only measured autonomy support rather than including all three need-supportive teaching approaches, and perceptions of autonomy, competence, and relatedness satisfaction and frustration were taken together in two composite scores of need satisfaction and frustration.

The empirical support that need-supportive teaching approaches are exclusively linked to the corresponding need is not convincing. The study by Jang and colleagues (2016) suggests that there might not be an exclusive link, as autonomy support is associated with need satisfaction in general. However, as described, a composite score was used for need satisfaction, and the association between autonomy support and the separate need supports could not be revealed. Moreover, a closer inspection of the items used to measure autonomy support unveils that the questionnaire also included items about the teacher's confidence in the student's ability (an aspect of structure) and listening (an aspect of involvement; see Table 1.1). The same holds, for example, for the study by Patall, Hooper, and colleagues (2018) about perceived difficulty and disengagement in a high school science class. Their survey intends to measure teacher's autonomy support, but also includes encouragement and informational feedback (aspects of structure). It thus can be questioned whether these studies solely examined the effect of autonomy support or the effect of motivating teaching in general.

THE MEASUREMENT LEVEL OF (DE)MOTIVATING TEACHING APPROACHES

Drawing conclusions about whether all three motivating teaching approaches should be applied to support students' motivation optimally is difficult, given the fact that not all approaches are measured in previous studies (e.g., Aelterman et al., 2019; Bartholomew et al., 2011a). It is possible that although not measured, the approaches are applied by the teacher in the situations that are studied. Moreover, the measurement level of the motivating teaching approaches could account for the effect that is found. For example, the Situations in School Questionnaire developed by Aelterman and colleagues (2019) asked the respondents to reflect on specific situations that take place in school and indicate how likely a specific response would be for the teacher. The responses of the respondent were aggregated into one score for each (de)motivating teaching approach. This score did not represent a teaching approach in a specific situation, but what a teacher would generally do (i.e., at a contextual level; Vallerand, 1997). Ryan and Deci (2017) concluded that it is more likely to find an association between teaching approaches and students' motivation when reflecting at a more general level.

Although most studies on need-supportive or need-thwarting teaching are conducted at a contextual level (e.g., Haerens et al., 2015; Hospel & Galand, 2016; Lam et al., 2009), students' perceptions arise from situational experiences. Skinner and Belmont (1993) point out that students' motivation is affected by a series of interactions that result in students' perceptions of autonomy, competence, and relatedness. This notion finds resonance in studies on teacher-student relationships (e.g., Pennings & Hollenstein, 2020). In those studies, teacher-student interactions are seen as the basis for teacher-student relationships. Until now, we hardly have insight into how moment-to-moment experiences affect students' perceptions of their teacher and, consequently, their motivation to study. Patall, Steingut, and colleagues (2018) were the first, and as far we know, the only, to examine day-to-day variation in students' perceptions of the autonomy-supportive approach adopted by their teacher. In their study in a high school science class, they found that students' fluctuations in perceptions of autonomy support were predicting fluctuations in autonomous and controlled motivation. Students perceived the autonomy support provided by their teacher differently from day-to-day, resulting in day-to-day differences in their motivation to study (Patall, Steingut, et al., 2018). However, the study

by Patall, Steingut, and colleagues (2018) does not tell us whether structure and involvement are important determinants of this day-to-day fluctuation of students' motivation, as only autonomy support was taken into account.

THE INTERPLAY BETWEEN (DE)MOTIVATING TEACHING APPROACHES

The approaches of need-supportive teaching (i.e., autonomy support, structure, and involvement) can be distinguished theoretically, but the three approaches are not found in all studies. For example, in the study on the association between need-supportive teaching and motivation for home-work tasks in primary and secondary education by Katz and colleagues (2010), no distinction could be made between the dimensions of need-supportive teaching in confirmatory factor analysis. They suggested that need-supportive teaching is an integral perception that cannot be separated into dimensions (Katz et al., 2010). Further support for Katz and colleagues' (2010) conclusion are the high correlations found in studies that distinguished the dimensions of need-supportive teaching ($r > .60$; e.g., Lam et al., 2009; Sierens et al., 2009; Tolinski, 2015).

Other studies found support for an orthogonal relationship between autonomy support and structure (e.g., Vansteenkiste et al., 2012). An orthogonal relationship indicates that both approaches are independent aspects of motivating teaching, but their presence can differ in practice (Reeve, Jang, et al., 2004). Vansteenkiste and colleagues (2012) studied 7th to 12th-grade students' perceptions of their teachers' autonomy support and clear expectations (i.e., aspect of structure). They applied a person-centered approach (i.e., cluster analysis) to analyze those perceptions and found four clusters of students' perceptions: (a) low perceived autonomy support and high clear expectations, (b) high perceived autonomy support and low clear expectations, (c) both low perceived autonomy support and clear expectations, and (d) both high perceived autonomy support and clear expectations. Students in the first two clusters perceived different levels of autonomy support and clear expectations, which indicates an orthogonal relationship. However, in the two other clusters, the level of autonomy support and clear expectations did not differ. Moreover, the deviation of the scores can be questioned, as the scores in the orthogonal clusters are all within a half standard deviation from the mean, except for clear expectations in the first cluster (i.e., 0.87 *SD*).

Skinner and Belmont (1993) took the position that the dimensions of need-supportive teaching are conceptually independent, but concluded

that "it is, of course, an empirical question to determine the most common configurations in classrooms" (p. 573). We have to conclude that, almost 30 years later, we still do not have a definite conclusion about the interplay of need-supportive teaching dimensions.

OVERVIEW OF THE STUDIES

With the studies presented in this dissertation, we tried to contribute to the insights about the unique importance of the (de)motivating teaching approaches to understand *why* teaching approaches are motivating or not. Those insights into the unique importance will help teachers apply teaching approaches in their educational practice in two ways. First, insights into the linkage with the corresponding need and the interplay between the approaches will provide information about each need-supportive teaching approach's essence. When autonomy support is nourishing autonomy, competence, and relatedness, or when autonomy support goes hand in hand with structure and involvement, it might not be necessary to pay attention to all three need-supportive teaching approaches. Second, knowing the impact of an approach in day-to-day situations and insight into the different impacts over situations makes it easier to decide when which approach should be applied. An overview of the studies is presented in Table 1.2.

As need-supportive teaching is studied extensively, but predominantly in primary and secondary education (e.g., Stroet et al., 2013), **Chapter 2** describes a study concerning need-supportive teaching in higher education (N = 623), including autonomy support, structure, and involvement. We studied students' perceptions of need-supportive teaching, their motivation to study, and academic achievement. We applied both a variable and a person-oriented approach to get more insight into the interplay between the three need-supportive teaching approaches in higher education.

In **Chapter 3,** we report a study about (de)motivation teaching behaviors in specific situations, including both need-supportive and need-thwarting approaches. We asked students in higher education (three samples: N = 194; N = 391; N = 365) to reflect on a recent situation that described an interaction between themselves and their teacher. The situation descriptions were analyzed to find out whether and which need-supportive or need-thwarting teaching behaviors were described by the students. The described need-supportive and need-thwarting teaching approaches in

the situation descriptions were compared to students' perceptions of their teacher's teaching approach and their need satisfaction in the specific situation to obtain insight into the origin of students' perceptions.

In **Chapter 4,** we describe a study about students' perceptions of need-supportive teaching in a manipulated context to shed light on the unique importance of the dimensions of need-supportive teaching. We randomly assigned students of two higher educational samples (N = 111 and N = 84) to read a scenario in which one of the three dimensions of need-supportive teaching was emphasized. Students were asked how they perceived the teachers, and students' perceptions were compared across the scenarios. The study provided insight into the linkage between need-supportive teaching approaches and the corresponding needs and the interplay between autonomy support, structure, and involvement.

We describe a study on the association between students' perceptions of need-supportive teaching and the perceived student-staff relationship quality in **Chapter 5**. Students (N = 597) were asked to reflect on their teachers' need-supportive teaching approach and the quality of their relationship with all faculty and staff at their higher education institute. Moreover, students' intrinsic, identified, introjected, and external motivation was measured. Their perceptions of the need-supportive teaching approach and the relationship quality were tested as predictors of the level of self-determination in students' motivation.

In Chapters 2, 4, and 5, we studied need-supportive teaching isolated from content and didactics across various contexts (e.g., instructions, collaborative learning, skills assessments, or feedback sessions). In **Chapter 6,** we adopted the self-system processes and teaching approaches to the context of formative assessment (i.e., interference in students' learning by assessment that improves learning and teaching processes; Black & William, 2009). We studied the relation between students' perceptions about the application of formative assessment by their teacher and their autonomous and controlled motivation. We tested whether satisfaction or frustration of the basic psychological needs could function as a mediating factor in the association between the perceived application of formative assessment and students' motivation. Based on the work by Skinner (1995) and SDT, a theoretical model is proposed to study formative assessment as practice (Boud et al., 2018).

Finally, in **Chapter 7,** the insights obtained from our empirical studies are applied to extend our knowledge about need-supportive and need-thwarting teaching in higher education.

Table 1.2 *Overview of the Studies*

	Context		Self	Action	Outcome
	Institute	In class	Need-satisfaction	Motivation	Achievement
Chapter 2 Configurations of Students' Perceptions of Need-Supportive Teaching in Higher Education		✓		✓	✓
Chapter 3 (De) Motivating Teaching Approaches in Specific Situations		✓	✓		
Chapter 4 The Scenario Study		✓			
Chapter 5 Embedded Social Contexts in Higher Education	✓	✓		✓	
Chapter 6 Formative Assessment as Practice and Students' Motivation		✓	✓		

2

Chapter 2

NEED-SUPPORTIVE TEACHING IN HIGHER EDUCATION:

Configurations of Autonomy Support, Structure, and Involvement

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ABSTRACT

Need-supportive teaching is believed to increase students' motivation and achievement. This assumption was tested in a higher education sample from a Dutch university of applied sciences (N = 623). Configurations of students' perceptions of autonomy support, structure, and involvement were explored using cluster analysis to establish the relationship between these three dimensions of need-supportive teaching. Three clusters of need-supportive teaching were found: high, average, and low perceived need support. Associations with students' motivation and performance were explored using ANOVAs. The clusters were respectively associated with relatively high, average, and low student autonomous motivation and achievement.

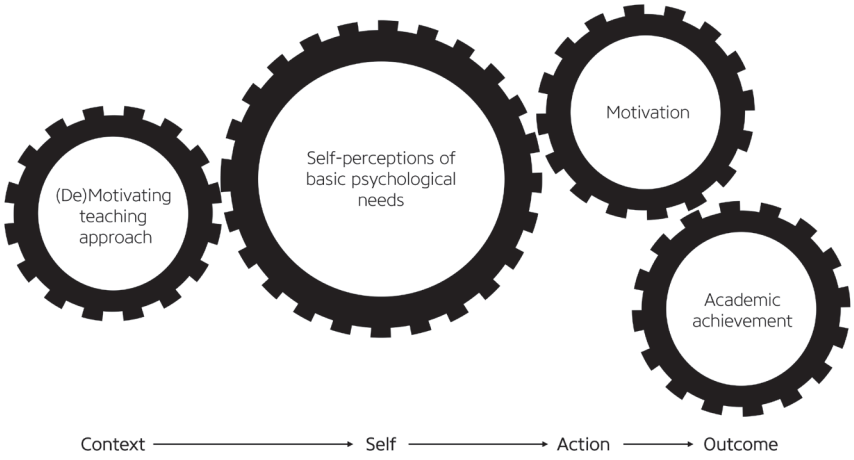
Keywords: Need-supportive teaching; Self-Determination Theory; Autonomous motivation; Achievement

NEED-SUPPORTIVE TEACHING IN HIGHER EDUCATION

Motivation to study is seen as one of the most important predictors of a successful educational career of students (Richardson et al., 2012). Students who are motivated to learn are more likely to engage in activities that will foster learning (Pintrich & Schunk, 2002), such as monitoring their learning progress and pro-actively asking for feedback. Therefore, interventions to increase students' success in higher education that focus on their motivation to study could be fruitful. A strong theoretical contribution to our understanding of motivation is Self-Determination Theory (SDT). According to Self-Determination Theory (SDT), the social context of a learning environment should support students' basic psychological needs for autonomy, competence, and relatedness to increase students' motivation and achievement (Reeve, 2002; Ryan & Deci, 2000a, 2000b). Especially, teachers are assumed to play an important role in motivating students by providing and demonstrating autonomy support, structure (i.e., support of competence), and involvement (i.e., support of relatedness; Skinner & Belmont, 1993; Stroet et al., 2013). In other words, need-supportive teaching is a powerful instrument for teachers to encourage students' motivation in order to increase students' achievement (see Figure 2.1).

The association of need-supportive teaching with students' motivation and subsequent achievement has been described and studied often (e.g., Reeve, 2002; Stroet et al., 2013). Nevertheless, studies on the association of need-supportive teaching and motivation and achievement that include all three dimensions of need-supportive teaching are relatively scarce. Moreover, there is no consensus about the interplay between the three dimensions of need-supportive teaching and their unique importance for students' motivation and achievement (Stroet et al., 2013). Studying the dimensions of need-supportive teaching with a person-oriented approach (e.g., cluster analysis) instead of a variable-oriented approach (e.g., factor analysis) could provide new insights into the interplay between the dimensions (Vansteenkiste et al., 2012). The current study, therefore, aims to investigate the role of need-supportive teaching with a person-oriented approach in a higher education setting.

Figure 2.1 *Need-Supportive Teaching: Teachers' Wheel to Promote Students' Motivation and Achievement by Supporting Students' Basic Psychological Needs*



STUDENTS' MOTIVATION TO STUDY

Within the social context of a learning environment, especially students' interactions with and perceptions of their teacher are important (Roorda et al., 2011). SDT provides a framework to understand how teacher behaviors function as nutriments or threat to students' motivation and achievement. According to SDT, teachers are more motivating when they are able to support students' basic psychological needs (Aelterman et al., 2014). SDT distinguishes three basic psychological needs: need for autonomy, competence, and relatedness (Ryan & Deci, 2000b). Once these basic needs are fulfilled, students are more likely to experience self-determination and higher well-being (Ryan & Deci, 2000b), as their classroom activity is congruent with their inner motives and needs (Reeve, Jang, et al., 2004).

According to SDT, the quality of motivation is more important than the quantity of motivation (Deci & Ryan, 2008). Looking at the quality of motivation, the main distinction that is made in SDT is between autonomous and controlled motivation (Deci & Ryan, 2000, 2008; Ryan & Deci, 2000a, 2000b; Ratelle et al., 2007; Vansteenkiste et al., 2006). Students are *autonomously motivated* when they experience volition or when their actions are self-endorsed: They are studying for reasons that are inherent to the activity, for example, pleasure or satisfaction (i.e., *intrinsic motivation*), or they identify themselves with the value of the activity, foresee personal relevance, or recognize the importance of the task (i.e.,

identified regulation). When external forces are involved, and students experience pressure in their behavior and feelings, students' actions are regulated by *controlled motivation*: They are studying because of internal pressure, such as feelings of shame or guilt (i.e., *introjected regulation*), or they are prompted by deadlines, rewards, punishments, or other external pressures (i.e., *external regulation*). According to SDT, students can experience controlled motivation and autonomous motivation at the same time (Ratelle et al., 2007; Vansteenkiste et al., 2009).

TEACHER'S MOTIVATING APPROACH: NEED-SUPPORTIVE TEACHING

As indicated above, students can become more autonomously motivated when their basic psychological needs are supported (Ryan & Deci, 2000b). The need for autonomy seems to be most important in motivating students, but when combined with feelings of relatedness and competence, conditions are most favorable to achieve identified regulation and intrinsic motivation (Koestner & Losier, 2004). In order to support students' need satisfaction, teachers can adopt different motivating approaches, which are linked to the three needs.

Students' experience of autonomy can be promoted by being autonomy supportive (Brooks & Young, 2011; McLachlan & Hagger, 2010; Reeve, Deci, & Ryan, 2004; Reeve & Jang, 2006; Reeve, Jang, et al., 2004). The need for autonomy refers to the need to experience volition. This need can be supported in several ways, such as providing choice, communicating about the value of tasks when facing uninteresting activities, and providing rationales for requested behaviors. In order to support autonomy, it is important that teachers show respect, acknowledge and accept students' expressions of negative affect, and that they do not rely on controlling language (Reeve, Deci, & Ryan, 2004; Stefanou et al., 2004; Stroet et al., 2013).

The need for competence refers to students' experience of effectiveness and can be supported by offering structure (Jang et al., 2010). Teachers who provide structure, communicate their expectations clearly, provide explicit guidelines, guidance, informational feedback, support, and encouragement. Structure is expected to support students' motivation by keeping students on task and by avoiding chaos during transitions (Jang et al., 2010; Stroet et al., 2013).

The least mentioned motivational approach is involvement (Stroet et al., 2013), which aims to promote students' feelings of relatedness (i.e., the

experience of close emotional bonds with significant others). According to Skinner and Belmont (1993), interpersonal involvement is the most important factor of teacher-student relationships. Teachers can promote involvement in order to support students' feelings of relatedness by showing affection, by expressing understanding of the students, by dedicating resources (e.g., time), and by making sure they are dependable and available to offer support (Stroet et al., 2013).

THE INTERPLAY BETWEEN NEED-SUPPORTIVE TEACHING DIMENSIONS

Whereas research first focused on autonomy support, in the last decade, more attention has been paid to the interplay between autonomy support and structure (Hospel & Galand, 2016). A recurrent topic in the discussion on need-supportive teaching is the cohesion between the three dimensions (i.e., autonomy support, structure, and involvement). Although the dimensions are theoretically distinguishable, the three dimensions of need-supportive teaching are not replicated in every study. For example, Katz and colleagues (2010) studied students' perceptions of need-supportive teaching in primary and secondary school and found only one dimension of need-supportive teaching. Because their factor analysis indicated a one-factor model, they suggest that need-supportive teaching is a more integral perception that cannot be separated into dimensions. Other studies did find distinguishable dimensions (i.e., autonomy support and structure); however, the dimensions were highly correlated (e.g., Sierens et al., 2009).

Moreover, there is no consensus about the mutual relationships between the dimensions. In the literature, the relationships between autonomy support and structure have been conceptualized in three different ways: Antagonistic, curvilinear, and orthogonal relationship (Jang et al., 2010; Reeve, Deci, & Ryan, 2004).

In an antagonistic relationship, autonomy support and structure are opposite poles of a continuum. In this view, more autonomy support indicates a decrease in structure and vice versa. Jang and colleagues (2010) argued that aspects of structure (e.g., provision of expectations or guidelines), will interfere with autonomy support (e.g., provision of choice). Another option is a curvilinear relationship (Jang et al., 2010). In this case, only with moderate structure (as opposed to low or high structure), students experience volition of their actions. However, both an antagonistic and a curvilinear relationship are not very plausible, given that the dimensions

have shown to be highly (positively) correlated in previous studies (Jang et al., 2010; Lam et al., 2009; Sierens et al., 2009; Vansteenkiste et al., 2012).

More plausible is an orthogonal relationship. Reeve, Deci, and Ryan (2004) elaborated on the orthogonal character of autonomy support and structure. In this view, autonomy support and structure are independent aspects of a teachers' motivating approach. These approaches can differ so that some teachers can score high or low on both dimensions, or high on one dimension, but low on the other (i.e., autonomy support without expressing clear expectations and vice-versa). Vansteenkiste and colleagues (2012) found support for this assumption in their study with 7th to 12th-grade students. Their analyses of students' perceptions of their teacher's motivating approaches resulted in four clusters: (a) low perceived autonomy support and high clear expectations, (b) high perceived autonomy support and low clear expectations, (c) both low perceived autonomy support and clear expectations, and (d) both high perceived autonomy support and clear expectations. The first two clusters indicate that students can perceive a teacher as supporting their autonomy while he is perceived not to communicate clear expectations and vice versa.

The above-mentioned relationships between the dimensions of need-supportive teaching are all about the relationships between autonomy support and structure. Less is known about the relationship of involvement with autonomy support and structure. As involvement has shown to be important for diverse student outcomes (i.e., self-esteem, motivation, and engagement; Chan et al., 2013; Murray, 2009; Ryan et al., 1994; Skinner & Belmont, 1993), it is interesting to take this dimension into account as well. According to Baumeister and Leary (1995), the need to belong is fundamental to human motivation. In higher education, good relationships with teachers and peers are assumed to prevent dropout (Tinto, 1998, 2012). As the dimensions seem to be correlated, it can be presumed that involvement influences (the perception of) autonomy support and structure and vice versa. Ryan and colleagues (1994) found support for this assumption, as they discovered that relationships with teachers, especially students' feelings that they can depend on their teachers for cognitive and emotional support, were associated with a greater sense of autonomy and competence.

THE ASSOCIATION BETWEEN NEED-SUPPORTIVE TEACHING AND STUDENTS' MOTIVATION

According to SDT, a positive association of need-supportive teaching with students' motivation and subsequent achievement can be expected, as higher levels of need satisfaction are associated with more autonomous motivation (Deci & Ryan, 2000; 2008; Reeve, 2002). Thus, when a teacher succeeds in supporting the psychological needs of the students, the students become more motivated to study. Reeve and Jang (2006) point out that supporting students' needs is not simple. Based on their observational study, they concluded that teachers could provide autonomy support, but not directly a sense of autonomy (Reeve & Jang, 2006). There is a mismatch between the actual support provided by teachers and the perceived support by students.

The theoretical assumption that need-supportive teaching is positively associated with autonomous motivation and achievement is studied and supported in several studies (e.g., Baeten et al., 2013; Stroet et al., 2013). A lot of these studies, however, are executed in primary and secondary education (see Stroet et al., 2013, for an overview of studies on early adolescents). Less research is done in a higher educational context. Edmunds and colleagues (2008) studied need-supportive teaching in a university exercise class and compared a supportive teaching approach with a typical teaching approach. The students in the group with the supportive teaching approach perceived in general more need support and need satisfaction. Moreover, their findings supported the assumption that psychological needs satisfaction facilitates autonomous motivation (Edmunds et al., 2008). The results from the study by Baeten and colleagues (2013) were in line with the findings of Edmunds and colleagues (2008). Although it was not the primary focus of the study, Baeten and colleagues (2013) discovered that perceived need support was a significant positive predictor of autonomous motivation in their sample of first-year student teachers. Furthermore, Black and Deci (2000) reported that university students' perceptions of their instructor's autonomy support at the beginning of the semester was a significant predictor of autonomous motivation and course performance.

The research on the association between need-supportive teaching and students' motivation has been dominated by studies using a variable-oriented approach (e.g., confirmatory factor analysis, *t*-tests, regression analysis). Using a variable-oriented approach assumes that the population is homogeneous (Von Eye & Bogat, 2006). When students' perceptions of the

three dimensions of need-supportive teaching have indeed an orthogonal relationship, population homogeneity can be questioned, and a person-oriented approach seems more suitable to study the association between need-supportive teaching and students' motivation. Moreover, a person-centered approach is more suitable to detect non-linear relationships, i.e., orthogonal relationships, than a variable-centered approach that is used to detect linear relationships (León & Liew, 2017). Vansteenkiste and colleagues (2012) have contributed to the discussion about the interplay between the dimensions by using a person-oriented approach (i.e., cluster analysis) in addition to the variable-oriented approach. They studied need-supportive teaching in secondary education and discovered four clusters of students' perceptions of need supportive teaching with different associations with motivation for each cluster. Students who perceived high autonomy support and clear expectations (Cluster 4) were significantly more autonomously motivated than students in the other clusters. Students who perceived low autonomy support and vague expectations (Cluster 3) were significantly less autonomously motivated than all other students and experienced more controlled motivation than students who perceived low autonomy support and clear expectations (Cluster 1).

AIM OF THIS STUDY

The current study investigates the interrelations between autonomy support, structure, and involvement in Dutch higher education. The Dutch higher education system consists of two types of institutes: research universities and universities of applied sciences, which offer higher vocational education. Both institutes have a bachelor's-master's degree structure. The current study is conducted at a university of applied sciences and includes only bachelor's degree students.

Studies on the association of need-supportive teaching and motivation and achievement have mainly focused on early adolescents (Stroet et al., 2013). It can be questioned whether the results from studies on early adolescents can be transferred directly to higher education as it can be assumed that higher education differs from school settings in many respects, for example, in teaching approach and classroom settings. Moreover, students at Dutch higher education often are attending university voluntarily, which requires a different conceptualization of motivation. Therefore, to optimally support students' motivation in higher education,

it is important to study teachers motivating approaches in higher education in more detail.

To obtain full understanding of need-supportive teaching and the association with motivation and achievement, studies are required that include all three dimensions of need-supportive teaching. As previous studies about need-supportive teaching have been dominated by studies about autonomy support, sometimes replenished with (aspects of) structure or involvement, but, to our knowledge, never replenished with both, we include all three dimensions in the current study.

The aim of the current study was twofold. Firstly, the interplay between the three dimensions of need-supportive teaching was explored. In order to contribute to the discussion about the orthogonal relationship between the dimensions, both variable-oriented and person-oriented approaches were used. It is expected that the three dimensions can be found in a factor analysis (i.e., variable-oriented approach; Hypothesis 1). The person-oriented approach by Vansteenkiste et al. (2012) was replicated to determine configurations of perceived need-supportive teaching. Because we are not aware of a study in which involvement was included in addition to autonomy support and structure, no specific hypotheses about the type and number of clusters to be found in the person-oriented analysis were formulated.

The second aim of the study was to examine the association of need-supportive teaching with students' motivation and achievement. It is hypothesized that clusters in which students have the highest perceptions of need-supportive teaching (i.e., autonomy support, structure, and involvement) are associated with higher autonomous motivation and lower controlled motivation (Hypothesis 2). It is further hypothesized that clusters in which students have the highest perceptions of need-supportive teaching (i.e., autonomy support, structure, and involvement) are associated with higher achievement (Hypothesis 3).

METHOD

PROCEDURE AND PARTICIPANTS

All first to fourth-year students from 24 different bachelor's degree programs of a university of applied sciences in The Netherlands, from engineering to teacher education, were invited to participate by personalized email. Students participated on a voluntary basis and provided informed consent; 16.07% of the invited students filled out the questionnaire (partially).

Participants were 623 students (37.40% male), of whom 55.06% were in their first year. The average age of the participants was 21.17 years (*SD* = 4.63).

MEASURES

Need-supportive teaching

Students' perceptions of need-supportive teaching of their lecturers were investigated with the Teacher As a Social Context Questionnaire (TASC-Q; Belmont et al., 1988). In this study, the Dutch and shortened version of the questionnaire was used that has been previously applied in higher education (Vansteenkiste et al., 2009). The TASC-Q consists of 24 items on a scale from 1 (*completely disagree*) to 5 (*completely agree*), divided over three subscales: autonomy support, structure, and involvement. Students were asked to reflect on the need-supportive teaching of their lecturers in general. As Hypothesis 1 relates to the factor structure and other psychometric properties of the scale, this will be reported in the results section.

Motivation

Students' autonomous and controlled motivation to learn was measured with a 16-item Dutch questionnaire (Vansteenkiste et al., 2009) that was based on the Academic Self-Regulation Questionnaire (SRQ-a; Ryan & Connell, 1989). This questionnaire measures students' general motivation instead of subject-specific motivation, on a scale from 1 (*completely disagree)* to 5 (*completely agree*). An example item for autonomous motivation is "I'm motivated to study because I enjoy doing it". An example item for controlled motivation is "I'm motivated to study because I'm supposed to do so". The Cronbach's alphas were good (autonomous motivation: $\alpha = .84$; controlled motivation: $\alpha = .86$).

Achievement

Student performance was expressed in their GPA, extracted from the school's administration. GPA was the average of grades (0-100) a student was rewarded with, taking into account the ECs that were associated with this grade. Each year a student can earn 60 ECs. The number of ECs awarded to a grade is determined based on the study time that needs to be invested to complete the course. Theoretically, GPA could range between 0

and 100, but in our sample, the range of GPA was between 2.36 and 86.09. Average GPA was 70.01 (*SD* = 9.43).

ANALYSES

To test Hypothesis 1, the factor structure of need-supportive teaching was analyzed with a confirmatory factor analysis, using AMOS (Version 22). The assessment of the model fit was based on multiple fit indices. The comparative fit index (CFI; Bentler, 1990) and Tucker-Lewis index (TLI; Tucker & Lewis, 1973) should have values greater than .95 (Kline, 2005), although values above .90 are acceptable (Bentler, 1990). For the root-mean-square error of approximation (RMSEA; Steiger, 1990) values of .08 or lower can be considered acceptable (Byrne, 2001).

Cluster analysis was performed (using SPSS, version 22) following the cluster analysis procedure described by Vansteenkiste et al. (2012): Scores were standardized prior to the cluster analysis, and 14 univariate and multivariate outliers were removed. A two-step procedure was used, starting with determining the number of clusters applying Ward's hierarchical clustering procedure. The two-, three-, and four-cluster solutions were selected based on the step-size criterion (Milligan & Cooper, 1985). As only in the three-cluster solution, the explained variance was at least 50% for each dimension; the three-cluster solution was considered for the second step using a *k*-means procedure. The three-cluster solution was validated, replicating the analysis with two random selected halves of the sample. The agreement between these two cluster solutions and the original clusters was good (Cohen's $\kappa = .96$), which indicates a robust cluster solution.

The association between need-supportive teaching and motivation and achievement (Hypotheses 2 and 3) was analyzed using an ANOVA with Bonferroni post-hoc tests to compare the clusters.

Table 2.1 *Items and Descriptive Statistics for the Teacher as a Social Context Questionnaire (TASC-Q)*

Item		*M*	*SD*	Skewness	Kurtosis	Factor loadings final model
Autonomy support						
1	My teachers give me a lot of freedom in how I organize my study	3.89	0.77	-1.02	1.70	.46 ***
2	My teachers listen to my ideas	3.68	0.75	-0.61	0.43	.73 ***
3	It seems like my teachers are always telling me what to do [a, b]	3.30	0.84	-0.30	-0.39	
4	My teachers don't give me much choice in how I organize my study [a, b]	3.74	0.81	-0.86	0.91	
5	My teachers don't listen to my opinion [a]	3.84	0.81	-0.63	0.33	.67 ***
6	My teachers explain how I can use the things we learn in school [b]	3.56	0.87	-0.84	0.49	
7	My teachers are always getting on my case about how I organize my study [a, b]	3.64	0.89	-0.45	-0.12	
8	My teachers don't explain why what I do in school is important to me [a]	3.54	0.96	-0.43	-0.38	.44 ***
Structure						
9	My teachers don't make clear what they expect of me in class [a]	3.49	0.90	-0.56	-0.38	.38 ***
10	If I can't solve a problem, my teachers show me different ways to try to	3.55	0.82	-0.98	0.65	.64 ***
11	Every time I do something wrong, my teachers respond differently [a]	3.22	0.83	-0.18	-0.33	.25 ***
12	My teachers don't tell me what they expect of me [a, b]	3.50	0.89	-0.53	-0.27	
13	My teachers check whether I'm ready before they start a new topic	2.52	0.93	0.34	-0.58	.50 ***
14	My teachers keep changing how they respond towards me [a, b]	3.79	0.88	-0.53	-0.17	
15	My teachers show me how to solve problems	3.52	0.81	-0.66	0.17	.67 ***
16	My teachers make sure I understand before they move on	2.72	1.00	0.13	-0.68	.61 ***
Involvement						
17	My teachers know me well	3.22	0.95	-0.28	-0.47	.75 ***
18	My teachers just don't understand me [a]	3.74	0.76	-0.45	0.18	.67 ***
19	My teachers talk with me	3.84	0.80	-1.09	1.82	.71 ***
20	I can't count on my teachers when I need them [a]	3.62	0.96	-0.64	0.05	.56 ***
21	My teachers like me	3.61	0.65	-0.19	0.35	.59 ***
22	My teachers spend time with me	3.05	0.81	0.01	-0.09	.69 ***
23	My teachers really care about me	3.33	0.85	-0.29	-0.18	.79 ***
24	I can't depend on my teachers for important things [a]	3.69	0.94	-0.73	0.27	.56 ***

Note. N = 609. The response scale ranged from 1 to 5.
[a] negatively worded items were recoded before analysis. [b] item was not included in the final model.
*** $p < .001$.

RESULTS

PRELIMINARY ANALYSES: CONFIRMATORY FACTOR ANALYSIS

The items and descriptive statistics per item of the TASC-Q are displayed in Table 2.1. The factor structure was inspected, replicating the analytic procedure reported in Johnston and Finney (2010). First, the hypothesized three-factor structure (Step 1, Table 2.2) and a one-factor structure (Step 2) were tested to determine if the one-factor structure had a better fit to the data than the three-factor structure. In support of Hypothesis 1, the results indicated that the three-factor structure had a better fit to the data than the one-factor structure, $\chi^2_{difference}$ (3) = 216.79, $p < .001$. Because the three-factor structure was not optimal, separate analyses per hypothesized factor (Steps 3-13) were conducted (see Johnston & Finney, 2010). For each factor, items with a non-significant factor loading were removed step-wise until no non-significant factor loadings remained. A negative-worded method effect was used to compensate for the misfit due to negative-worded items (see Johnston & Finney, 2010). The final factor structure consisted of 18 items, on three dimensions (see Table 2.2, Step 14: $\chi^2(125) = 421.73$, RMSEA = .06, CFI = .92, TLI = .91). This means that Hypothesis 1 was supported.

The Cronbach's alphas of the (adjusted) subscales were sufficient (autonomy support: $\alpha = .66$; structure: $\alpha = .74$) or good (involvement: $\alpha = .87$).

DESCRIPTIVE STATISTICS

Table 2.3 presents the descriptive statistics and correlations between the dimensions of need-supportive teaching, motivation, and GPA. In general, students were positive about the need support they experienced from their teachers. A within-subjects ANOVA showed significant differences between the mean perceptions on the three dimensions of need-supportive teaching, Wilks' Lambda = .69, $F(130, 906)$, $p < .01$, $\eta_p^2 = .30$. Scores on the need-supportive dimensions were significantly correlated to each other.

Overall, students experienced high autonomous motivation and lower controlled motivation. Nevertheless, students scored quite high on controlled motivation as well. Grade Point Average (GPA) was 70.01 out of 100, and GPA was significantly correlated, albeit weakly, with autonomous and controlled motivation.

Table 2.2 *Fit Indices for the Hypothesized and Modified Models*

Model		χ^2	*df*	RMSEA	CFI	TLI
General models						
(1)	Hypothesized 24-item, three-factor	1267.19	249	.08	.80	.78
(2)	24-item, one-factor	1483.98	252	.09	.76	.74
(3)	24-item, three-factor with method effect	920.79	237	.07	.87	.84
Autonomy support models						
(4)	8-item, one-factor	258.14	20	.14	.72	.61
(5)	8-item, one-factor with method effect	214.85	15	.15	.76	.56
(6)	5-item, one-factor with method effect[a]	59.231	5	.13	.90	.81
(7)	4-item, one-factor[b]	10.230	2	.08	.98	.94
Structure models						
(8)	8-item, one-factor	283.35	20	.15	.75	.65
(9)	8-item, one-factor with method effect	142.09	16	.11	.88	.79
(10)	7-item, one-factor with method effect[c]	50.341	10	.08	.95	.90
(11)	6-item, one-factor with method effect[d]	14.468	6	.05	.99	.97
Involvement models						
(12)	8-item, one-factor	178.78	20	.11	.92	.89
(13)	8-item, one-factor with method effect	80.863	17	.08	.97	.95
Rejoined modified models						
(14)	18-item, three-factor with method effect[e]	421.73	125	.06	.92	.91

Note.
[a] items 3, 4, and 7 were removed
[b] items 3, 4, 6, and 7 were removed
[c] item 14 was removed
[d] items 12 and 14 were removed
[e] items 3, 4, 6, 7, 12, and 14 were removed

CLUSTERING

The three-cluster solution accounted for 51.14% of the variance in perceived autonomy support, 63.56% in structure, and 62.94% in involvement. Table 2.4 presents the cluster solution and cluster means. The first cluster (*n* = 133, 21.84%) is characterized by relatively low need-supportive teaching. Students with average or slightly above average scores on all three dimensions of need-supportive teaching were clustered in the moderate need-supportive teaching-cluster (*n* = 283, 46.47%). In contrast to the first

cluster, students in the third cluster (*n* = 193, 31.69%) scored high on all three dimensions of need-supportive teaching (the high need-supportive teaching-cluster).

Table 2.3 *Descriptive Statistics and Correlations of Need-supportive Teaching, Motivation, and Achievement*

	Possible range	*M*	*SD*	1	2	3	4	5
1. Autonomy support (*N* = 609)	1-5	3.74	0.56	-				
2. Structure (*N* = 609)	1-5	3.43	0.56	.64**	-			
3. Involvement (*N* = 609)	1-5	3.51	0.60	.62**	.65**	-		
4. Autonomous motivation (*N* = 606)	1-5	3.83	0.58	.37**	.37**	.43**	-	
5. Controlled motivation (*N* = 606)	1-5	2.52	0.79	-.11**	-.19**	-.10*	-.08*	-
6. Grade Point Average (N = 607)	0-100	70.01	9.43	.14**	.16**	.19**	.16**	-.10*

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

ASSOCIATION WITH MOTIVATION AND ACHIEVEMENT

In support of Hypothesis 2, for autonomous motivation, $F(2, 603) = 58.88$, $p < .001$, $\eta_p^2 = .16$, the same pattern between the clusters was found as for the perceived need-supportive teaching (see Table 2.4). Students in the high need-supportive teaching cluster scored significantly higher on autonomous motivation than students in the other clusters. Students in the moderate need-supportive teaching cluster scored significantly higher than the students in the low need-supportive teaching cluster as well. For controlled motivation, a slightly different pattern was found, as only the high need-supportive teaching cluster scored significantly lower on controlled

motivation than the other clusters, $F(2, 603) = 9.66$, $p < .001$, $\eta_p^2 = .03$. No significant difference was found between the moderate and low need-supportive teaching cluster (see Table 2.4).

Table 2.4 *Univariate ANOVA's and Post-Hoc Cluster Comparisons*

	Cluster					
	Low NST (n = 133)	Moderate NST (n = 283)	High NST (n = 193)	Total (n = 609)	$F(2, 606)$	η^2
Autonomy support	3.04[a]	3.70[b]	4.27[c]	3.74	489.98**	.61
Structure	2.70[a]	3.41[b]	3.96[c]	3.43	544.14**	.64
Involvement	2.82[a]	3.45[b]	4.08[c]	3.52	440.05**	.59
Autonomous motivation	3.47[a]	3.79[b]	4.11[c]	3.83	58.88**	.16
Controlled motivation	2.68[b]	2.58[b]	2.33[a]	2.52	9.66**	.03
GPA	67.07[a]	70.01[b]	72.00[c]	70.01	11.09**	.04

Note. NST = Need-supportive teaching.
Mean-scores with different superscripts were significantly different from each other.
* $p < .05$, ** $p < .01$.

The students in the high need-supportive teaching cluster scored significantly higher on GPA than the moderate and low need-supportive teaching cluster, and the moderate need-supportive teaching cluster scored significantly higher than the low need-supportive teaching cluster, $F(2, 604) = 11.09$, $p < .001$, $\eta_p^2 = .04$ (see Table 2.4). Therefore, Hypothesis 3 was supported.

DISCUSSION

This study aimed to explore the configurations in which the three dimensions of need-supportive teaching occur in higher education. Furthermore, we examined whether students' perceptions of need-supportive teaching were associated with their motivation and achievement. The results of this study are important as they provide insight into how teachers in higher education can promote students' motivation and achievement. As studies in which all three teachers' motivating approaches (i.e., autonomy support, structure,

and involvement) were included are scarce, it remains unclear whether these teachers' approaches are equally important in motivating students.

The current study is, to our knowledge, the first attempt to find configurations of students' perceptions of need-supportive teaching that includes all three dimensions. Previous studies focused on the relationship between autonomy support and structure, while involvement was ignored. As involvement is important in motivating students as well (e.g., Ryan et al., 1994; Skinner & Belmont, 1993), it is interesting to explore the relationships between all three dimensions.

THE INTERPLAY BETWEEN THE THREE DIMENSIONS OF NEED-SUPPORTIVE TEACHING

The first aim of this study was to contribute to the discussion about the orthogonal relationship between the three dimensions of need-supportive teaching (i.e. autonomy support, structure, and involvement). Firstly, we used a variable-oriented approach and conducted a confirmatory factor analysis to test whether the dimensions could be distinguished as independent factors. Our results showed that an orthogonal relationship was supported, confirming Hypothesis 1. However, correlations between the dimensions were quite high (r=.62-.65), so there seems to be some interdependence. These high correlations are in line with previous research (e.g., Sierens et al., 2009).

Secondly, we used a person-oriented approach to find configurations of teachers' motivating approaches. Cluster analysis resulted in three clusters: high, moderate, and low need-supportive teaching. This cluster solution did not confirm an orthogonal relationship between the dimensions, as we did not find clusters with opposite scores on the dimensions. This is probably due to the fact that we asked students to reflect on need support of their teachers in general. This means that they had to reflect on their average perception of several situations and teachers at the same time. This might make it hard to differentiate between the dimensions.

The cluster solution we found was not in line with the cluster solution reported by Vansteenkiste and colleagues (2012). They reported two clusters with opposite scores for autonomy support and clear expectations. However, differences between autonomy support and clear expectations in these two clusters with opposite amounts of need support (high on autonomy support versus low on clear expectations and vice versa) were quite small: mean scores of the low perceptions were only less than a half

standard deviation lower than average. Therefore, these two clusters are probably more similar to our moderate cluster than the labeling of the clusters would suggest. It is plausible that including all aspects of structure (instead of only clear expectations) and involvement, as we did in the current study, resulted in one merged moderate cluster.

In summary, an orthogonal relationship was not confirmed by our results. In the current study, the dimensions were positively related to each other, at least regarding students' perceptions. This indicates that autonomy-supportive teachers are also perceived as being involved and providing high structure. Instead of an orthogonal relationship, the dimensions seem to be gradually related (e.g., more autonomy support resulting in more structure); the dimensions seem to overlap.

ASSOCIATION WITH STUDENTS' MOTIVATION AND ACHIEVEMENT

The second aim of this study was to examine the association of students' perceptions of need-supportive teaching with students' motivation and achievement. Both hypotheses were confirmed, as we found the same patterns for autonomous motivation and GPA and the perception of need-supportive teaching between the clusters. The cluster that showed high scores on need-supportive teaching also showed significantly higher scores on autonomous motivation and GPA than the other clusters. The moderate need-supportive teaching cluster showed significantly higher scores on autonomous motivation and GPA than the low need-supportive teaching cluster. This result is in line with previous research in secondary education (e.g., Vansteenkiste et al., 2012).

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Some critical remarks can be made about the results of the current study. First, we concluded that a gradual relationship exists between the three dimensions of need-supportive teaching, although it remains unclear whether the positive association between the dimensions means that those teachers indeed provide autonomy support, structure, and involvement in comparable amounts, or if students' perceptions are influenced by mainly one of the dimensions. For example, a student that perceives his or her teacher as being involved is probably milder about lacking autonomy support and structure. In this case, the scores of students' perceptions on the three dimensions turn out to be comparable (e.g., all about 3 out of 5), but this does not reflect the actual support that the student experiences.

It can be valuable to look into more detail which teacher behaviors affect students' perceptions of need-supportive teaching and whether perceptions of one dimension of need support affect students' perceptions of another dimension as well. This insight can be particularly interesting for the educational practice, as it tells us whether teachers can focus on one of the dimensions or if they better parcel out their attention to all three dimensions.

The found association between need-supportive teaching and motivation and achievement does not tell us anything about the direction of this association (Stroet et al., 2013). As students' perceptions of need-supportive teaching and their motivation were measured at the same time and both need-supportive teaching and motivation and GPA are general measures, it is not clear whether they reflect the same practices and whether teachers' motivating approaches influenced students' motivation or vice versa. For example, students who are autonomously motivated and perform well might have more positive perceptions of their teachers' need support than students who are less autonomously motivated and perform less well.

Although the direction of the association remains unclear, based on the fact that the different clusters of need-supportive teaching were associated with motivation and achievement, it can be concluded that need-supportive teaching is of importance in higher education as well. More research to investigate need-supportive teaching in higher education is recommended. In the current study, students' general perceptions of need-supportive teaching were studied. However, it can be expected that students' perceptions vary among teachers and situations (Vansteenkiste et al., 2012). For that reason, we assume that studying students' situation-specific perceptions provides additional insight into the relationship between the three dimensions of teachers' motivating approaches.

We strongly recommend including involvement in future research on the relationship between the three dimensions of need-supportive teaching. Studies on the relationship between autonomy support and structure have provided many interesting insights, but - as this study shows - this is just a simplification of reality. Including involvement gives a more complete but complicated view of the interplay between the dimensions.

In the current study, we studied motivating teaching approaches from an SDT-perspective. Different conceptualizations of teaching approaches are found in, for example, literature about instructional communications

(e.g., Kerssen-Griep, 2001) or interpersonal perspectives on classroom management (e.g., Wubbels et al., 2006). Comparisons of these different conceptualizations were beyond the scope of the current study but could be interesting to study into detail in future research.

In addition to these critical remarks about the results, the current study has some limitations which should be addressed in future research. First, the response rate was quite low (16.07%). This might have distorted the results, as more motivated students are more willing to participate. Second, the questionnaire used to measure students' perceptions of need-supportive teaching showed to have some items that did not fit within the assumed factor. Although an acceptable fit was attained after removing several items, we suggest developing an alternative measurement scale in future research.

CONCLUSION

This exploratory study highlights the importance of need-supportive teaching in higher education and the potential of including involvement in research on need-supportive teaching. Although confirmatory factor analysis supported the three dimensions of need-supportive teaching (i.e., autonomy support, structure, and involvement) to be independent factors, cluster analysis did not support an orthogonal relationship between the dimensions. Students' perceptions of need-supportive teaching were clustered into three groups: high, moderate, and low need-supportive teaching. Therefore, instead of an orthogonal relationship, a gradual relationship in which dimensions overlap seems to be more plausible. The positive association that was found in this study between need-supportive teaching and students' motivation and achievement underscores the importance of research to unravel the interplay between the dimensions of need-supportive teaching.

AUTHOR'S NOTE

ACKNOWLEDGMENT OF AUTHOR CONTRIBUTIONS

ML, SL, and RR designed the study, ML recruited participants and collected the data, developed the instrument, ML and LW analyzed the data, ML drafted the manuscript, all authors contributed to critical revisions of the paper, RR and SL supervised the study.


3

Chapter 3

STUDENTS' PERCEPTIONS OF TEACHER'S (DE)MOTIVATING TEACHING APPROACH

and Their Need Satisfaction in Specific Situations

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Students' perceptions of teacher's (de)motivating teaching approach and their need satisfaction in specific situations

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ABSTRACT

Teachers can support students' motivation by applying need-supportive teaching and thwart students' motivation through need-thwarting. With those approaches, teachers affect students' need satisfaction of autonomy, competence, and relatedness, which in turn affects their motivation. In the current study, these associations were tested at a situation-specific level. Students (N = 219; 381; 327) described recent positive and/or negative interactions with their teacher and reflected on their perceptions of the teaching behaviors and their need satisfaction in the specific situation. The description of one aspect of need-support in the student-teacher interaction was sufficient to let students perceive the teacher as more need-supportive on all dimensions. The same was true for need-thwarting; however, a different pattern was found for teacher chaos. Probably, chaos is less harmful and could, therefore, be considered as neutral teacher behavior. Overall, the dichotomy of need-supporting/thwarting seemed more important for students' perceptions than the actual teacher behavior.

Keywords: Need-supportive teaching; Need-thwarting teaching; Autonomy; Competence; Relatedness

Students' motivational beliefs are important for a successful school career (e.g., Plante et al., 2013) and can predict academic achievement beyond their intelligence or prior knowledge (Steinmayr et al., 2019). The social context of a learning environment, and especially teachers (Roorda et al., 2011), play a substantial role in students' motivational beliefs (Skinner et al., 2008). Teachers can let students' motivation flourish (e.g., Vansteenkiste et al., 2012) or wither (e.g., Bartholomew et al., 2018). The association between teaching approaches and students' motivation has been extensively discussed (e.g., Ryan & Deci, 2017; Stroet et al., 2013) and studied (e.g., Aelterman et al., 2019; Jang et al., 2016; Leenknecht et al., 2017). However, in those studies, need-supportive teaching approaches are studied at a contextual level, applying students' perceptions on a range of student-teacher interactions. The need-supportive teaching approach at one specific situation is not discussed, but only the teacher's need-supportive teaching over a range of situations (i.e., teacher's general approach within a context, such as a course or subject matter). Consequently, these studies identified the association between teaching approaches and students' motivation, but not *how* this association develops.

In the current study, we will focus on students' perceptions of their teachers in combination with their need satisfaction of autonomy, competence, and relatedness in specific situations to obtain insight into the origin of students' perceptions. With this insight, we learn more about the interplay among teacher behaviors and their relative importance for students' motivation.

MOTIVATING AND DEMOTIVATING TEACHING APPROACHES

With need-supportive teaching, teachers support students' positive self-perceptions of autonomy, competence, and relatedness (Skinner et al., 2008). Those self-perceptions, or basic psychological needs (Ryan & Deci, 2017), are believed to be essential for optimal students' motivation (Deci & Ryan, 2000). Without feeling autonomous, competent, and related to significant others, students will not be optimally motivated (Deci & Ryan, 2000; Ryan & Deci, 2017). Teachers can support students' motivation by providing autonomy support, structure, and involvement (i.e., need-supportive teaching; Skinner & Belmont, 1993; Skinner et al., 2008).

Teachers can support the feeling of autonomy by providing *autonomy support* (Ryan & Deci, 2017), that is, to empower students to self-endorse

learning and experience volition in their actions. A teacher can do this by offering choices (e.g., Patall et al., 2010), showing respect to the students and allowing them to express criticism (e.g., Assor & Kaplan, 2001; Reeve, 2009), explaining to students why the learning tasks are relevant to them (e.g., Assor et al., 2002; Reeve, 2009), and by avoiding the use of controlling language in their communication to students (e.g., Reeve, 2009; Reeve, Jang, et al., 2004; Vansteenkiste et al., 2004, 2005).

Structuring the learning context is seen as an essential task of teachers to stimulate motivation (Skinner, 1995), as it promotes students' feelings of competence (Ryan & Deci, 2017). With the provision of *structure*, the teacher reinforces the students to experience effectiveness and self-confidence. A teacher can provide structure to students by offering guidance and help (e.g., Jang et al., 2010), communicating clear expectations, and showing confidence in students' ability to meet those expectations (e.g., Belmont et al., 1988; Vansteenkiste et al., 2012), and providing informational feedback that helps students to improve (e.g., Jang et al., 2010).

By showing students their appreciation and making sure that students are part of the learning community, teachers provide interpersonal *involvement* and are supporting students' feelings of relatedness (Furrer & Skinner, 2003). Providing involvement includes showing affection, warmth, acceptance, and inclusion to the students beyond the educational goals (Furrer & Skinner, 2003). A teacher can show this involvement by dedicating time and effort to students and by being available for interpersonal help and support (Stroet et al., 2013).

Teachers' influence on students' motivation is not solely positive. With need-thwarting teaching, teachers can harm students' self-perceptions of autonomy, competence, and relatedness and, by doing so, harm their motivation (Bartholomew et al., 2011a, 2018). A *controlling* teacher is seen as the opposite of an autonomy-supportive teacher and is associated with less (qualitative) student motivation (Haerens et al., 2016). A teacher is controlling when students' perspective is ignored, and students are made to act, think, or feel in a particular way by using pressure. This pressure can be external by introducing punishments and rewards, or internal by nourishing feelings of shame and guilt (Aelterman, 2014; Haerens et al., 2016). A controlling teacher harms students' feelings of autonomy (Ryan & Deci, 2017).

Table 3.1 *Operationalization of Need-Supportive and Need-Thwarting Teaching*

Need-supportive teaching approaches			Need-thwarting teaching approaches		
Autonomy support	Structure	Involvement	Control	Chaos	Coldness
Definitions:					
Empowering students to experience volition and to self-endorse learning	Reinforcing students to experience effectiveness and engage in learning activities with self-confidence	Showing students that they are personally appreciated and part of the learning community	Ignoring students' perspective and forcing students to act, think, or feel in a particular way	Impeding students' self-confidence and being reluctant to offer guidance and support	Abandoning, keeping distance, and being unfriendly to students
Corresponding behaviors:					
Offering choices Promoting active involvement Fostering relevance Taking students' perspective	Offering help and guidance Step-by-step instruction Providing constructive feedback Providing optimal challenges Communicating clear (positive) expectations Setting learning goals	Showing affection and warmth Being available to provide support Dedicating time and effort	Introducing punishments or rewards Demanding Crushing protest Nourishing feelings of shame and guilt Domineering Using controlling language	Ambiguous expectations Reluctant to offer guidance or support Wait-and-see Lackadaisical Permissiveness	Being unfriendly and cold Acting indifferent Keeping distance Ignoring

A teacher can also thwart students' motivation by being chaotic. *Chaos* is sometimes seen as a lack of structure (Stroet et al., 2015), but is actually more distinct. According to Aelterman and colleagues (2019), a chaotic teacher does not only fail to provide structure to students successfully but is also actively interfering with students' feelings of competence (Ryan & Deci, 2017). Furthermore, a teacher is chaotic when unclear instructions and expectations are provided or when a teacher adopts a wait-and-see approach (Aelterman, 2014; Aelterman et al., 2019). The teacher is also reluctant to provide guidance or feedback to the students (Stroet et al., 2015).

Finally, teachers can harm students' motivation by interpersonal *coldness*. This teaching behavior is the least studied of all, and almost no theoretical conceptualizations can be found. Aelterman (2014) describes coldness as being unfriendly, cold, and indifferent. Teachers who are acting cold are taking distance and do not show interest in their students (Aelterman, 2014), and they are also negatively affecting students' feelings of relatedness (Ryan & Deci, 2017).

The need-supportive and need-thwarting teaching approaches are summed up in Table 3.1. In general, need-thwarting teaching is associated with diverse negative student outcomes, like extrinsic motivation and problem behavior (Haerens et al., 2016), while need-supportive teaching is related to positive outcomes, like higher motivation, engagement, and well-being (Stroet et al., 2013).

CURRENT STUDY: STUDENTS' PERCEPTIONS OF SPECIFIC SITUATIONS

Previous research has provided a lot of insights into the effect of need-supportive (e.g., Pelletier et al., 2001; Reeve, Deci, & Ryan, 2004; Stroet et al., 2013; Vansteenkiste et al., 2012) and need-thwarting teaching (e.g., Haerens et al., 2015; Soenens et al., 2012). Most studies are using students' perceptions as an indicator of teachers' behavior (Stroet et al., 2013). This is understandable, as it is the experience rather than the actual support that affects motivation (Furrer & Skinner, 2003). Moreover, the results of studies that conducted multilevel analyses on students' perceptions of need-supportive teaching underline the importance of students' perceptions. For example, Van den Berghe and colleagues (2015) found that most of the variance in students' perceptions of a teacher's need support was situated at the student level and not at the teacher or class level. Reeve and Cheon

(2016) came to the same conclusion in their intervention study. The majority of the variance (78%) in students' perceptions of autonomy-supportive teaching was situated at the student level, rather than the intervention level. Those studies indicate that how students perceive their teacher's teaching approach matters most.

However, this conclusion is not satisfactory when we want to intervene in class or train teachers to improve their motivating teaching approaches. We cannot change students' perceptions directly, and thus, we have to know how students' perceptions arise and why students perceive the same teacher differently to be able to intervene. Taking a closer look at previous studies, it seems that part of the explanation of how students' perceptions arise is in the design of the studies themselves. The student measures that are used in the studies by Van den Berghe and colleagues (2015) and Reeve and Cheon (2016) are contextual measures. Students are asked to reflect on their teacher's teaching approach in general (i.e., "My teacher tries to understand how I see things before suggesting a new way to do things"). Those contextual perceptions represent a collection of moment-to-moment experiences of the student with the teacher (e.g., Pennings & Hollenstein, 2020), and it remains unclear which experiences colored in the perceptions most. The study by Malmberg and colleagues (2015) showed that there is high within-student variability in motivation between learning episodes. It can be expected that those differences are also present in students' perception of their teacher's (de)motivational teaching approach. By zooming in on the perception of need-supportive teaching in a particular student-teacher interaction, we can gain a better understanding of the origin of students' perceptions of their teachers' teaching approach.

Based on Self-Determination Theory (SDT), teaching behaviors can be listed that are classified as need-supportive or need-thwarting (see Table 3.1; Ryan & Deci, 2017). Students are confronted with these teaching behaviors in class, and these combined experiences form their perception of their teachers' teaching approach. However, it remains unclear which experiences are critical for students' perceptions of their teachers in classrooms. For that reason, we asked students in the current study to describe a situation in which they interacted with their teacher that is prominent in their memory, using a critical incident technique (Flanagan, 1954). We analyzed the situation descriptions and scored whether those descriptions included need-supportive or need-thwarting teaching behaviors. By doing so, we

were able to identify which experiences were critical to students and to answer our first research question (RQ):

> *Research Question 1*: What (de)motivating teaching approaches are critical to students' experiences of positive and negative teacher-student interactions?

Previous research indicated that need-supportive teaching was associated with positive outcomes (e.g., Stroet et al., 2013) and need-thwarting teaching with negative outcomes (e.g., Haerens et al., 2016). Therefore, we expected that students describe more need-supportive behaviors in positive situations and more need-thwarting behaviors in negative situations.

After the students had described the specific situation, they were asked to fill out a questionnaire about their perceptions of their teachers' teaching approach in that situation. Consequently, we could establish the relationship between actual teaching behaviors (as described by students in the situation descriptions) and students' perceptions of it. We compared students' perceptions with the rated teaching behaviors to answer the second research question:

> *Research Question 2*: Are students' perceptions of their teacher's (de)motivating teaching approach in correspondence with the described teaching approach in the specific situation?

Previous studies found differences between students' perceptions and teachers' perceptions (Skinner et al., 2008) and students' perceptions and observational data (Reeve & Jang, 2006). However, we do not expect to find those differences at a specific level, as the concrete nature of the situation and the absence of distractors (e.g., other interactions between teacher and student) will improve alignment between the behavior as described in the situation descriptions and students' perceptions. Moreover, both are representations of students' perceptions.

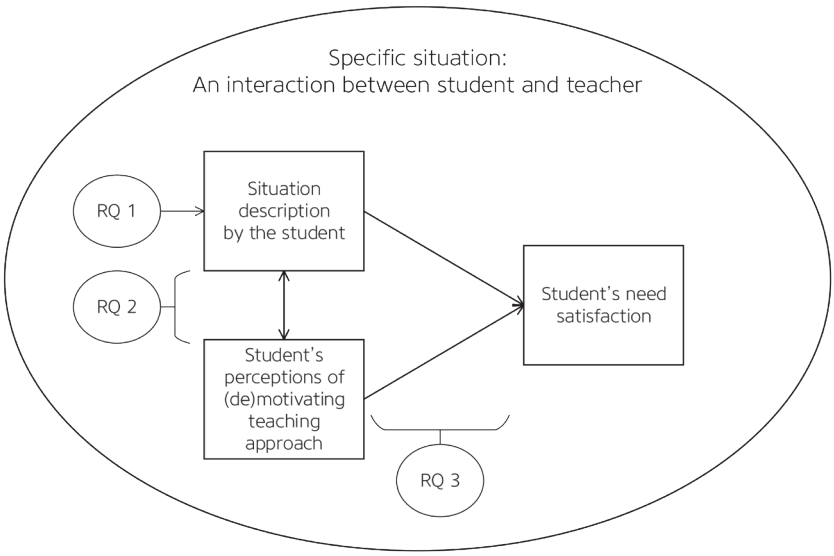
Finally, we measured students' need satisfaction of autonomy, competence, and relatedness in the described teacher-student interaction. The associations between students' need satisfaction and their perceptions of their teachers' (de)motivating teaching approach, as well as the described teaching approaches in the specific situation, were explored. This enabled us to verify the assumed association between (de)motivating teaching

approaches and need satisfaction (Ryan & Deci, 2017). Our research question was:

> *Research Question 3*: To what extent is students' need satisfaction associated with their perceptions of the (de)motivating teaching approach of their teacher and the rated teaching approach in the specific situation?

Students' needs for autonomy, competence, and relatedness are assumed to be satisfied by need-supportive teaching and not by need-thwarting teaching (Ryan & Deci, 2017). Therefore, we expected to find a positive association between students' perceptions of need-supportive teaching and need satisfaction and no association between students' perceptions of need-thwarting teaching and need satisfaction. We expected that students' perceptions of (de)motivating teaching approaches have a more powerful association with need satisfaction then the described teaching approaches in the situation descriptions. This is because students' perceptions of (de) motivating teaching approaches and their self-perceptions of autonomy, competence, and relatedness, are both internalized values. An overview of the current study and the research questions is presented in Figure 3.1.

Figure 3.1 *Overview of the Study and Research Questions*



Note. RQ = Research question.

METHOD

The study was conducted in two waves, with only slight differences in the procedures.

PARTICIPANTS

Wave 1

Participants were recruited on Amazon's crowdsourcing marketplace, "Mechanical Turk" (https://www.mturk.com). Participants of the platform are called *workers*, and they complete online tasks in return for money. All workers aged between 18 and 25 were allowed to participate in this wave. In the instruction, we explained that the study was about a teacher-student interaction, and we told the participants that, therefore, we were looking for students to participate. In total, 406 respondents provided informed consent and filled out the questionnaire completely (49.00% male, M_{age} = 23.02, SD_{age} = 2.12). Participants came from all over the world (e.g., Canada, Bangladesh, Nigeria, and Romania), but most of the participants were from The United States of America (73.40%), followed by India (17.00%) and Europe (2.96%). Participants received US$2,00 when they filled out the questionnaire adequately. We considered their entry adequate when they wrote in understandable and correct English, gave a specific situation description without vague language (e.g., not explicitly stating who they are referring to), and followed the guidelines (guiding questions) that were given. Of the 406 respondents, 393 respondents filled out the questionnaire adequately (96.80%).

Wave 2

Participants for Wave 2 were undergraduate students enrolled in an international psychology bachelor's program at a Dutch university. Within the bachelor's program, a student-centered, problem-based learning approach is used, in which active student involvement is demanded. Twice per week, the students meet in small groups, tutorial group meetings, guided by a tutor (i.e., a teacher). The students discuss a specific topic and some students of the group are assigned particular roles (e.g., chair or scribe). A session often ends with a feedback dialogue about the quality of the meeting and students' participation. Students from the first to the third year of the bachelor's program were allowed to participate. In total,

423 students provided informed consent and filled out the questionnaire completely (18.90% male, M_{age} = 20.50, SD_{age} = 2.92). The participants received research credits for participation.

PROCEDURE

Wave 1

Participants filled out a questionnaire. They were first asked to give a situation description of a self-chosen recent situation in which they interacted with their teacher. The participants were free to choose a positive or negative situation. Guiding questions (e.g., "Can you describe the situation briefly in your own words?") helped them be precise and concrete (see Measurements). After that, they filled out a questionnaire about their perceptions of the teacher's (de)motivating teaching approach in that situation.

As attentiveness of MTurk workers is an often described concern (Hauser et al., 2018), three attention checks were included in the questionnaire to check whether participants were carefully reading the statements. The attention checks were "My teacher had a headache", "My teacher went for dinner with friends the night before", and "My teacher took the bus to school". Participants did not have any information about these examples and were supposed to choose the option "not observable" for these questions. Students who correctly identified all three attention checks (N = 234, 59.54%) were included in the analyses.

Wave 2

The same questionnaire was used in Wave 1 and Wave 2, but this time respondents were asked to describe a positive *and* a negative situation, to make the situation descriptions more distinctive. Respondents were randomly asked to start with either the positive or the negative situation. In this wave, no attention checks were used.

MEASUREMENTS

Questionnaires were distributed in English in both waves. Participants of Wave 2 were allowed to answer in Dutch.

Situation Description

A critical incident technique (Flanagan, 1954) was used to guide the participants in describing the situation with their teacher. Participants were asked to describe a critical and recent situation: "Please imagine one specific situation that recently took place in which you had contact with your teacher. This can be, for example, a moment of instruction, the feedback you received, or the teacher helping you to answer your question". In Wave 2, students were asked to reflect both on a situation that made them feel happy (positive situation) and a situation that made them feel sad (negative situation). Five guiding questions were provided: "Can you describe the situation briefly in your own words?"; "When (time) did the situation take place?"; "Can you describe the moment the situation took place?"; "Where did the situation take place?"; and "What was done or said during the situation?"

Students' Perceptions of (De)Motivating Teaching in Specific Situations

A questionnaire was developed to measure students' perceptions of their teacher's (de)motivating teaching approach in specific situations. Both need-supportive and need-thwarting dimensions (e.g., Bartholomew et al., 2011b) were included in the questionnaire. The need-supportive and need-thwarting dimensions were operationalized into teacher behaviors before items were selected or formed (see Table 3.1 for operationalization) to ensure that the full scope of the dimensions is covered.

In total, 77 items were selected from existing questionnaires or newly written when dimensions were not fully covered with existing items. Items were adapted from the TASC-Q (Belmont et al., 1988), Situations at School (Aelterman et al., 2019), and the Learning Climate Questionnaire (Black & Deci, 2000), and rephrased to fit the purpose of the new questionnaire (i.e., measuring perceptions at a specific level). See Appendix A for an overview of all items.

Participants were asked to reflect on the level of accordance between the questionnaire items and the situation they described, with a Likert-scale ranging from 1 (*completely not true*) to 5 (*completely true*). In Wave 1, the option 0 (*not observable*) was included due to the attention checks.

The factor structure of the questionnaire was examined with the data from Wave 2 using Mplus (Version 8), as due to the "not observable" option, there was too much missing data on the item level in Wave 1 to conduct a factor analysis. The factor structure of the questionnaire

was inspected with a step-by-step procedure, as reported in Johnston and Finney (2010): The structure of the subscales was inspected separately first before the structure of the complete questionnaire was tested. Two items with low factor loadings were deleted based on empirical and theoretical considerations (see Table 3.2), and modification indexes were used to identify additional correlation paths between error terms. For each dimension, an acceptable or good fit was obtained (see Table 3.2). The comparative fit index (CFI; Bentler, 1990) and Tucker-Lewis index (TLI; Tucker & Lewis, 1973) indicate acceptable fit when greater than .90 (Bentler, 1990), and good fit when greater than .95 (Kline, 2005). For the root-mean-square error of approximation (RMSEA; Steiger, 1990), values of .08 or lower can be considered acceptable (Byrne, 2012). However, RMSEA is found to be not an appropriate indicator of model fit in larger models (> 10 variables) and larger samples (N > 200), and the standardized root mean square residual (SRMR) is found more appropriate (Maydeu-Olivares et al., 2018). For the SRMR, the same interpretation holds as for RMSEA: values of .08 or lower are acceptable (Byrne, 2012).

McDonald's (1970) omega was calculated as a measure of the reliability of the scale, as Cronbach's alphas are less appropriate when dimensions are correlated (see Table 3.2; Cho & Kim, 2015; Sijtsma, 2009).

Students' Need Satisfaction in Specific Situations

A specific measure of students' need satisfaction of autonomy, competence, and relatedness was selected: The Activity-Feeling States (AFS) Scale (Reeve & Sickenius, 1994). The scale has been successfully used in previous studies (e.g., Jang et al., 2012; Reeve & Tseng, 2011). Students indicated how the situation they had described made them feel ("The situation I described made me feel…") on three statements per dimension and three distractors. The AFS only includes need satisfaction scales, need frustration scales are not included. An example item for autonomy is "Free to decide for myself what to do", for structure "Capable", and relatedness "Emotionally close to the people around me". Distractors were "Stressed", "Pressured", and "Uptight".

Table 3.2 *Fit Indices for the Hypothesized and Modified Models*

Model	RMSEA	SRMR	CFI	TLI	ω
Overall					
77-item, 6 factors	.05	.06	.85	.85	
77-item, 1 factor	.07	.07	.75	.75	
77-item, 2 factor	.06	.07	.80	.80	
Autonomy support					
15-item	.09	.05	.91	.89	
15-item[a]	.08	.04	.93	.92	
15-item[ab]	.08	.04	.94	.93	.97
Structure					
18-item	.09	.05	.89	.88	
18-item[c]	.08	.05	.91	.89	
18-item[cd]	.08	.05	.92	.91	
18-item[cde]	.08	.05	.92	.91	.98
Involvement					
15-item	.09	.03	.95	.94	
15-item[f]	.08	.03	.95	.94	
15-item[fg]	.08	.03	.96	.95	.99
Control					
11-item	.08	.05	.90	.88	
10-item[h]	.08	.05	.92	.89	
10-item[hi]	.07	.04	.95	.93	.91
Chaos					
11-item	.08	.06	.90	.88	
10-item[j]	.08	.05	.93	.91	.92
Coldness					
6-item	.10	.04	.97	.95	
6-item[k]	.04	.02	.97	.99	.94
Overall					
75-item, 6 factors	.05	.06	.88	.87	

[a] correlation between error terms of item AutonomySupport_4 with AutonomySupport_11
[b] correlation between error terms of item AutonomySupport_2 with AutonomySupport_6
[c] correlation between error terms of item Structure_2 with Structure_3
[d] correlation between error terms of item Structue_1 with Structure_13
[e] correlation between error terms of item Structure_4 with Structure_16
[f] correlation between error terms of item Involvement_10 with Involvement_13
[g] correlation between error terms of item Involvement_11 with Involvement_15
[h] item Control_3 deleted
[i] correlation between error terms of item Control_7 with Control_10
[j] item Chaos_7 deleted
[k] correlation between error terms of item Coldness_3 with Coldness_5

Participants were asked to indicate to what extent the statements corresponded to their feelings in the situation they had described, on a Likert-scale from 1 (*strongly disagree*) to 7 (*strongly agree*) in Wave 1, and on a 5-point Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*) in Wave 2. Scores of Wave 1 were transformed to a 5-point scale before analyses, conducting the formula 'New score = (2/3)*old score + (1/3)', to increase intuitive interpretation and comparability between the waves. McDonald's (1970) omegas were good for autonomy (Wave 1: ω = .88; Wave 2: ω = .95), competence (Wave 1: ω = .94; Wave 2: ω = .98), and relatedness (Wave 1: ω = .93; Wave 2: ω = .89).

ANALYSIS

Each situation description obtained from the critical incident technique was rated on the six dimensions of need-supportive and need-thwarting teaching (present/absent). Situation descriptions that did *not* describe teacher behaviors (e.g., when students were not explicitly referring to a teacher), interactions between the student and teacher (e.g., a lecture without one-to-one interaction), or a specific situation in a school context (e.g., a meeting between the student and teacher in a pub), were rated "invalid". In total, 15 (6.41%), 34 (8.19%), and 74 (18.45%) situations were rated "invalid" for Wave 1, the positive situations from Wave 2, and the negative situations from Wave 2, respectively (see Table 3.3). The number of invalid situations was larger in the negative situations from Wave 2, as several respondents had indicated that they did not encounter a negative situation recently.

In total, the first and third authors have rated 452 randomly selected situation descriptions (41.85%) in three rounds using the operationalization, as presented in Table 3.1. After each round, both raters discussed disagreements, reached a consensus, and refined the operationalization. This calibration resulted in a decision tree (see Appendix B). The fourth author applied this decision tree to code the same 452 situation descriptions. After a random pilot sample (n = 67), the fourth author rated the remaining 385 situation descriptions (35.65% of the total number of situation descriptions). These ratings were compared with the agreed ratings of the first and third authors. The rated situation descriptions included 95 situation descriptions from Wave 1 (40.60%) and 145 situation descriptions (both positive and negative) from Wave 2 (34.28%). In 89.38% of the 385 rated situation descriptions, the fourth author agreed with the first and third authors'

calibrated rating on whether the situation description was valid. Agreement on the dimensions of need-supportive and need-thwarting teaching was sufficient. Interrater reliability was calculated using Krippendorff's alpha (Hayes & Krippendorff, 2007) and found acceptable to good (autonomy support: α = .84; structure: α = .76; involvement: α = .75; control: α = .66; chaos: α = .84; coldness: α = .88). The calibrated codings of the first and third authors were used for analysis, and the first author coded the remaining situation descriptions with the use of the decision tree.

Students' perceptions of need-supportive and need-thwarting teaching were compared between students who did describe a specific approach using independent samples *t*-tests in SPSS (Version 25). For example, students who described structure are the rated group, and students who did not describe that specific approach in the situation description are the not rated group. When unequal variances were encountered, Welch's correction was applied (Delacre et al., 2017). Both students' perceptions *and* the ratings from the situation descriptions were tested as predictors of students' situational need satisfaction of autonomy, competence, and relatedness in a Structural Equation Model using Mplus (Version 8). Fit indexes CFI, TLI, and RMSEA, and SRMR were used to indicate model fit (see Measurements for more details about the fit indexes).

Table 3.3 *Characteristics of the Situation Descriptions*

	Wave 1	Wave 2	
		Positive	Negative
Total situation descriptions	234	415	401
Valid situation descriptions	219	381	327
Autonomy support	21 (8.97%)	28 (7.35%)	10 (3.06%)
Structure	164 (70.09%)	310 (81.36%)	122 (37.31%)
Involvement	36 (15.38%)	88 (23.10%)	7 (2.14%)
Control	9 (3.85%)	1 (0.26%)	123 (37.61%)
Chaos	9 (3.85%)	0	108 (33.03%)
Coldness	0	0	27 (8.26%)
Without coding	1 (0.43%)	13 (3.41%)	11 (3.36%)

Note. Situation descriptions could contain multiple (de)motivational teaching approaches; for that reason, totals do not sum up to 100%.

RESULTS

RQ 1: CHARACTERISTICS OF THE SITUATION DESCRIPTIONS

The absolute number and percentages of situations in which students have described a specific teaching approach are presented in Table 3.3. In 21 situation descriptions in Wave 1 (9.59%), 56 positive situation descriptions in Wave 2 (13.24%), and 76 negative situation descriptions in Wave 2 (17.97%), more than one teaching approach was rated. All quotes presented in this paper are textually copy-pasted (without correcting students' language and punctuation errors).

Most respondents described a situation in which their teacher provided structure (see Table 3.3). The provision of structure was most present in both the descriptions of the positive and negative situations, which indicates that structure can be perceived positively and negatively. Structure in positive situations contained getting informational feedback or receiving help after a direct inquiry by the student. For example:

> "The teacher responded to my query instantly and she was very helpful in explaining the answer to me" (Respondent 209, Wave 1).

Structure in the descriptions of a negative situation was predominantly about feedback. Students described constructive feedback (e.g., Respondent 89), feedback that students perceived as unfair, and feedback that was not in line with students' self-assessment (e.g., Respondent 128) in the negative situation descriptions.

> "Teacher gave me feedback and said I could have asked more questions during chairing the discussion" (Respondent 89, Wave 2, negative situation description).

> "During the feedback she told me that she expected more input from me. I said okay. Normally they tell me to talk less so that's why I talked less" (Respondent 128, Wave 2, negative situation description).

Respondents who described a situation that was scored as autonomy supportive included teaching behaviors such as providing options, asking for student involvement in the class (see Respondent 32), asking for student input, or providing rationales and real-life cases.

> "I decided to speak against the general agreement that the class had and was encouraged by the teacher to continue" (Respondent 32, Wave 2, positive situation description).

Involvement was present in about 15% of the descriptions of Wave 1 and 23% of the positive descriptions of Wave 2. Involvement was found in situations that described teachers who showed interest in students' personal life and future aspirations or teachers that made students feel at ease. For example:

> "A specific situation I can recall was that my grandfather had passed away that morning and I still went to school in the afternoon, despite feeling very sad. My tutor was very understanding and made me feel at ease for being sad. I felt less alone and cared about more. He told me that he was in the same situation not too long ago and that he knew how it felt, so it was okay to be sad. After the conversation we went inside the classroom and chatted some more before the group session" (Respondent 46, Wave 2, positive situation description).

Control, chaos, and coldness were mainly found in the negative situation descriptions of Wave 2. In the positive situation descriptions of Wave 2, only one case of control was found. In the descriptions of Wave 1, need-thwarting teaching approaches were only mentioned occasionally. Control was reflected in situations in which the teacher acted authoritarian or made students feel ashamed about their achievement in class. For example:

> "My teacher responded to an answer of mine as if I were stupid" (Respondent 25, Wave 2, negative situation description).

Chaos was found in situations in which students did not receive help or explanation after direct inquiry. An example of a description of a situation in which the student's questions was not answered:

> "I asked a question about a problem on the board, and he acknowledged the problem I was referring to but never answered my question" (Respondent 242, Wave 1).

Situations coded as coldness were quite the opposite from involvement, as those situations were about teachers who were not interested, indifferent, or did not care about their students. Respondent 373 gave an example of a situation in which the teacher acted cold:

> "It was the first meeting of a new course, and I was appointed to chair the discussion. However, I did not feel confident enough with the topic to perform the way that is expected by tutors and peers. The tutor didn't seem to be understanding and acted very cold" (Respondent 373, Wave 2, negative situation description).

In some situation descriptions (Wave 1: 21 out of 219, 9.59%; Wave 2: 132 out of 708, 18.64%) more than one dimension of need-supportive teaching was described. For example, the combination of structure and autonomy support:

> "She was very helpful. She encouraged us to think first and try to figure it out ourselves and only when we were really stuck did she help. But never gave us the answer straight up, we always had to reach it ourselves" (Respondent 273, Wave 2, positive situation description).

In the abovementioned description of Respondent 273, the teacher is offering guidance in an autonomy-supportive manner by involving students in the process of problem-solving. However, the situation description of Respondent 328 shows that structure, in this example, providing feedback, can also be provided in a more controlling way:

> "After my teacher gave me positive feedback, she also gave me constructive criticism. She pointed out the things I was missing on my presentation and what I could have done instead. I wanted to explain myself regarding those missing points. But she suddenly snapped at me and told me not to defend myself

and let her finish what she's saying" (Respondent 328, Wave 2, negative situation description).

RQ 2: ASSOCIATIONS BETWEEN STUDENTS' PERCEPTIONS AND THE RATED (DE)MOTIVATING TEACHING

Descriptive Statistics of Students' Perceptions of (De)Motivating Teaching

Due to the option "not observable", which the students frequently used, there were a lot of missing data in Wave 1. Students were only included in further analyses when 50% or more of a construct's items were present. For control, chaos, and coldness, the remaining number of students was too low to consider these constructs for Wave 1.

The descriptive statistics are presented in Table 3.4. Autonomy support, structure, and involvement were perceived high by students from Wave 1 and in the positive situation descriptions of Wave 2. The need thwarting dimensions were perceived low in positive situations. Students perceived as much need support as need thwarting in the negative situation descriptions.

Comparison of Students' Perceptions in the Rated versus Non-Rated group

The perceptions of their teachers' (de)motivating teaching approach of the students that described a situation in which a specific teaching approach (e.g., autonomy support) was rated (the rated group) were compared to the perceptions of students who described a situation in which that teaching approach was not rated (non-rated group; see Table 3.5). Consequently, the association between the students' descriptions and the perception scores of (de)motivating teaching approach was tested.

Wave 1. Group comparisons were made only for rated autonomy support, structure, and involvement. The number of observations was too low for an appropriate comparison between rated and non-rated in control, chaos, and coldness. Listwise exclusion of missing data was applied to guarantee comparability of results between the dimensions of need-supportive teaching.

Table 3.4 *Descriptive Statistics of Students' Perceptions and Need Satisfaction*

	Wave 1			Wave 2					
				Positive			Negative		
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Need-supportive teaching									
Autonomy support	215	3.82	0.94	419	3.81	0.57	418	2.61	0.85
Structure	222	4.01	0.93	419	3.96	0.56	418	2.67	0.88
Involvement	224	3.97	1.00	419	3.94	0.66	418	2.43	0.92
Need-thwarting teaching									
Control	n/a	n/a	n/a	419	1.70	0.56	418	2.50	0.81
Chaos	n/a	n/a	n/a	419	1.74	0.54	418	2.61	0.81
Coldness	n/a	n/a	n/a	419	1.59	0.59	418	3.10	0.93
Self-perceptions									
Autonomy	234	3.74	0.93	419	3.90	0.70	418	2.41	0.90
Competence	234	4.04	0.91	419	4.21	0.62	418	2.33	0.93
Relatedness	234	3.59	1.03	419	3.60	0.74	418	2.46	0.81

Note. Range of all variables: 1-5.

Mean scores of students' perceptions for the rated versus non-rated group are presented in Table 5. No statistically significant differences were found between perceptions of (de)motivating teaching approaches between the group of students who had described a situation in which autonomy support was rated (n = 20) and the group of students who had described a situation in which autonomy support was not rated. This means that students' perceptions were not depending on whether or not the student described autonomy support in the situation description.

Students who had described a situation in which structure was rated (n = 152) scored statistically significantly higher on autonomy support, $t(52.97) = 2.35$, $p = .022$, $d = .451$, and structure, $t(50.66) = 3.37$, $p = .001$, $d = .659$, than students who did not describe teacher structure in their description of the situation (see Table 3.5). This means that students' perceptions of autonomy support and structure depended on whether or not structure was described in the situation description. The highest difference between the rated and non-rated groups, with the largest effect size, was found for students' perceptions of structure.

Table 3.5 *Mean Perception Scores of Students in the Rated versus Not-Rated Group*

	Autonomy support		Structure		Involvement		Control		Chaos		Coldness	
	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat
Wave 1												
(*N* = 197)	20	177	152	45	33	164						
Autonomy support	3.94 (0.84)	3.79 (0.96)	*3.92* (0.77)	*3.43* (1.33)	*4.11* (0.69)	*3.75* (0.98)	n/a	n/a	n/a	n/a	n/a	n/a
Structure	4.08 (0.95)	4.05 (0.90)	**4.21** (0.66)	**3.52** (1.33)	4.21 (0.62)	4.03 (0.95)	n/a	n/a	n/a	n/a	n/a	n/a
Involvement	4.27 (0.91)	3.98 (0.97)	4.11 (0.77)	3.69 (1.40)	**4.39** (0.62)	**3.93** (1.00)	n/a	n/a	n/a	n/a	n/a	n/a
Wave 2, Pos												
(*N* = 381)	28	353	310	71	88	293						
Autonomy support	4.02 (0.46)	3.81 (0.57)	3.81 (0.57)	3.91 (0.54)	**3.97** (0.59)	**3.78** (0.54)	n/a	n/a	n/a	n/a	n/a	n/a
Structure	4.05 (0.48)	3.99 (0.54)	*4.02* (0.52)	*3.85* (0.59)	4.01 (0.59)	3.99 (0.52)	n/a	n/a	n/a	n/a	n/a	n/a
Involvement	4.13 (0.59)	3.95 (0.66)	**3.89** (0.65)	**4.24** (0.63)	**4.30** (0.54)	**3.86** (0.66)	n/a	n/a	n/a	n/a	n/a	n/a
Control	1.54 (0.40)	1.67 (0.51)	1.66 (0.51)	1.63 (0.50)	1.63 (0.50)	1.67 (0.51)	n/a	n/a	n/a	n/a	n/a	n/a
Chaos	1.55 (0.44)	1.72 (0.51)	1.71 (0.51)	1.72 (0.49)	*1.60* (0.50)	*1.74* (0.50)	n/a	n/a	n/a	n/a	n/a	n/a
Coldness	1.42 (0.40)	1.55 (0.55)	1.55 (0.54)	1.50 (0.54)	*1.42* (0.51)	*1.58* (0.55)	n/a	n/a	n/a	n/a	n/a	n/a

Table 3.5 *(continued)*

	Autonomy support		Structure		Involvement		Control		Chaos		Coldness	
	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat	Rat	NRat
Wave 2, Neg												
(*N* = 327)			122	205			123	204	108	219	27	300
Autonomy support	n/a	n/a	**2.84** (0.83)	**2.38** (0.80)	n/a	n/a	**2.25** (0.84)	**2.73** (0.79)	*2.42* (0.76)	*2.61* (0.87)	**2.10** (0.59)	**2.59** (0.85)
Structure	n/a	n/a	**2.94** (0.87)	**2.40** (0.78)	n/a	n/a	**2.44** (0.86)	**2.70** (0.84)	**2.28** (0.73)	**2.76** (0.87)	**2.17** (0.68)	**2.64** (0.86)
Involvement	n/a	n/a	**2.68** (0.87)	**2.16** (0.86)	n/a	n/a	**2.04** (0.77)	**2.54** (0.92)	*2.19* (0.81)	*2.43* (0.93)	**1.77** (0.63)	**2.40** (0.90)
Control	n/a	n/a	*2.40* (0.73)	*2.63* (0.84)	n/a	n/a	**2.83** (0.81)	**2.37** (0.76)	*2.41* (0.77)	*2.61* (0.82)	2.83 (0.76)	2.52 (0.81)
Chaos	n/a	n/a	**2.36** (0.72)	**2.75** (0.81)	n/a	n/a	2.60 (0.77)	2.60 (0.82)	**2.99** (0.79)	**2.41** (0.73)	*2.95* (0.73)	*2.57* (0.80)
Coldness	n/a	n/a	**2.91** (0.88)	**3.31** (0.93)	n/a	n/a	**3.41** (0.85)	**3.00** (0.95)	*3.31* (0.93)	*3.08* (0.93)	**3.66** (0.69)	**3.11** (0.94)

Note. Rat = Rated; NRat = Not-rated; Pos = Positive situation description; Neg = Negative situation description. Standard deviations are placed in parentheses. Statistically significantly mean differences are presented in **bold** when $p < .01$, and in *italic* when $p < .05$.

When involvement was rated in the situation description (n = 33), students perceived statistically significantly more autonomy support, $t(195) = 2.01$, $p < .046$, $d = .424$, and involvement, $t(70.79) = 3.42$, $p = .001$, $d = .547$ (see Table 3.5). This means that students' perceptions of autonomy support and involvement were dependent on whether or not involvement was described in the situation description. The mean difference in perceived perceptions and the effect size was highest for students' perceptions of involvement.

Wave 2, Positive Situation Descriptions. In total, 381 valid situation descriptions were included in the analyses. No comparisons were made for control, chaos, and coldness as those were not or very rarely rated in the situation descriptions.

No statistically significant differences were found in students' perceptions of the need-supportive and need-thwarting teaching approaches when students described a situation in which autonomy support was rated by the raters (n = 28), compared to the non-rated group. This means that students' perceptions were not depending on whether or not autonomy support was described by the student in the positive situation description.

When structure was rated in the situation (n = 310), students perceived statistically significantly more structure, $t(379) = 2.52$, $p = .012$, $d = .319$, and less involvement, $t(379) = -4.11$, $p < .001$, $d = .544$, in the situation than the students who did not describe structure. This means that students' perceptions of structure and involvement were dependent on whether or not structure was described in the positive situation description. The mean difference in perceived perceptions and the effect size was highest for students' perceptions of involvement.

The students who described involvement (n = 88) in their situation description, perceived statistically significantly more autonomy support, $t(379) = 2.70$, $p = .007$, $d = .321$, and involvement, $t(379) = 5.68$, $p < .001$, $d = .728$. Those students also perceived statistically significantly less chaos, $t(379) = -2.33$, $p = .020$, $d = .282$, and coldness, $t(379) = -2.45$, $p = .015$, $d = .304$ (see Table 3.5). This means that students' perceptions of autonomy support, involvement, chaos, and coldness were dependent on whether or not involvement was described in the positive situation description. The mean difference in perceived perceptions and the effect size was highest for students' perceptions of involvement.

Wave 2, Negative Situation Descriptions. The number of situations in which autonomy support and involvement was rated was too low to make appropriate comparisons between the rated and non-rated groups.

In total, 327 students were included in the comparisons between the rated and non-rated groups for the negative situation descriptions.

Students who had described a negative situation in which structure was rated (n = 122), scored statistically significantly higher on autonomy support, $t(325) = 5.00$, $p < .001$, $d = .569$, structure, $t(325) = 5.70$, $p < .001$, $d = .642$, and involvement, $t(325) = 5.31$, $p < .001$, $d = .606$. Those students scored statistically significantly lower on control, $t(325) = -2.47$, $p = .014$, $d = .289$, chaos, $t(325) = -4.42$, $p < .001$, $d = .511$, and coldness, $t(325) = -3.85$, $p < .001$, $d = .442$ (see Table 3.5). This means that all students' perceptions of their teachers (de)motivating teaching approaches were depending on whether or not structure was rated in the situation description. The mean difference and effect size was highest for students' perceptions of structure (positive mean difference) and chaos (negative mean difference).

The group of students who described a situation in which teacher control was rated (n = 123), scored statistically significantly lower on autonomy support, $t(325) = -5.11$, $p < .001$, $d = .575$, structure, $t(325) = -2.78$, $p = .006$, $d = .316$, and involvement $t(291.56) = -5.32$, $p < .001$, $d = .593$ than students who did not describe teacher control. The students who described teacher control scored also statistically significantly higher on control, $t(325) = 5.11$, $p < .001$, $d = .580$ and coldness, $t(325) = 3.92$, $p < .001$, $d = .454$ (see Table 3.5). This means that all students' perceptions were depending on the description of control, except chaos. The mean difference and effect size was highest for students' perceptions of control (positive mean difference) and involvement (negative mean difference).

When students had described chaos in their description of the negative situation (n = 108), they perceived statistically significant lower levels of autonomy support, $t(325) = -2.02$, $p = .044$, $d = .243$, structure, $t(248.16) = -5.24$, $p < .001$, $d = .599$, involvement, $t(242.05) = -2.26$, $p = .019$, $d = .271$, and control, $t(325) = -2.09$, $p = .037$, $d = .249$, and statistically significant higher levels of chaos, $t(325) = 6.48$, $p < .001$, $d = .751$, and coldness, $t(325) = 2.08$, $p = .038$, $d = .244$, than the students who did not describe teacher chaos (see Table 3.5). This means that all students' perceptions of need-supportive and need-thwarting teaching were dependent on whether or not chaos is described in students' negative situation description. The mean difference and effect size was highest for students' perceptions of chaos (positive mean difference) and structure

(negative mean difference). Remarkably, perceptions of control were lower when chaos was rated.

Students who had described a situation in which coldness was rated (n = 27), scored statistically significantly lower on autonomy support, $t(36.45) = -2.90$, $p < .001$, $d = .663$, structure, $t(325) = -2.77$, $p = .006$, $d = .609$, and involvement, $t(36.30) = -4.80$, $p < .001$, $d = .816$, than the students who did not describe coldness. The group of students who described a situation in which coldness was rated also scored statistically significantly higher on chaos, $t(325) = 2.36$, $p = .019$, $d = .493$, and coldness, $t(35.44) = 3.84$, $p < .001$, $d = .666$, than the other students (see Table 3.5). This means that all students' perceptions were dependent on the rating of coldness in the negative situation description, except for control. The mean difference and effect size was highest for students' perceptions of coldness (positive mean difference) and involvement (negative mean difference).

RQ 3: STUDENTS' NEED SATISFACTION AND ASSOCIATION WITH PERCEIVED AND RATED (DE)MOTIVATING TEACHING

Descriptive Statistics of Students' Need Satisfaction

Students' scores on the satisfaction of autonomy, competence, and relatedness are presented in Table 3.4. Students scored relatively high on autonomy, as well as competence, and relatedness in Wave 1 and the positive situation descriptions of Wave 2, and relatively low in the negative situation descriptions of Wave 2 (see Table 3.4).

Full Structural Equation Model of Students' Perceptions and Rated (De)Motivating Teaching on Students' Need Satisfaction

The expected associations between rated and perceived need-supportive teaching, on the one hand, and students' need satisfaction of autonomy, competence, and relatedness, on the other hand, were tested in a structural equation model for each sample separately.

Wave 1. As coldness was not rated, this variable was not included in the model. The same holds for students' perceptions of control, chaos, and coldness, which were not included because of the number of missing data in those measures. The model is presented in Figure 3.2 and had a good fit (CFI = .98; TLI = .95; RMSEA = .09; SRMR = .02).

Students' satisfaction of autonomy was statistically significantly associated (R^2 = .50) with their perceptions of autonomy support

(β = .44, p < .01) and involvement (β = .28, p < .01). This means that when students perceived more autonomy support and involvement in the situation, they also experienced more autonomy. Their satisfaction of competence was statistically significantly associated (R^2 = .65) with their perception of structure (β = .50, p < .01) and involvement (β = .38, p < .01). Students' satisfaction of relatedness was statistically significantly associated (R^2 = .51) with their perceptions of involvement (β = .39, p < .01) and autonomy support (β = .27, p < .05). Students who perceived more involvement and autonomy support of their teacher in the situation also perceived higher relatedness in the situation.

Wave 2, Positive Situation Descriptions. As control, chaos, and coldness were not rated in the situation descriptions, those variables were not included in the structural equation model. The model with statistically significant paths and estimates is presented in Figure 3.3. The model fit of the model was good (CFI = .97; TLI = .84; RMSEA = .09; SRMR = .03).

Students' satisfaction of autonomy was statistically significantly positive associated (R^2 = .30) with students' perceptions of autonomy support (β = .55, p < .01) and involvement (β = .18, p < .05), and statistically significantly negatively associated with students' perceptions of structure (β = -.21, p < .01) and if autonomy support was rated in the situation description (β = -.09, p < .05). This means that when students perceived more autonomy support and involvement of their teacher in the situation, they perceived more autonomy. When they perceive more structure, or when autonomy support was rated in the situation description, they perceived less autonomy.

Students' satisfaction of competence was only statistically significantly associated with their perceptions of structure (β = .30, p < .01) and if structure was rated in the situation description (β = .18, p < .01, R^2 = .20). More perceived and rated structure were associated with more perceived competence.

Students' satisfaction of relatedness was statistically significantly positively associated (R^2 = .37) with involvement (β = .53, p < .01) and autonomy support (β = .30, p < .01), and negatively by structure (β = -.17, p < .01). This means that more perceived involvement and autonomy support and less perceived structure were associated with more perceived relatedness.

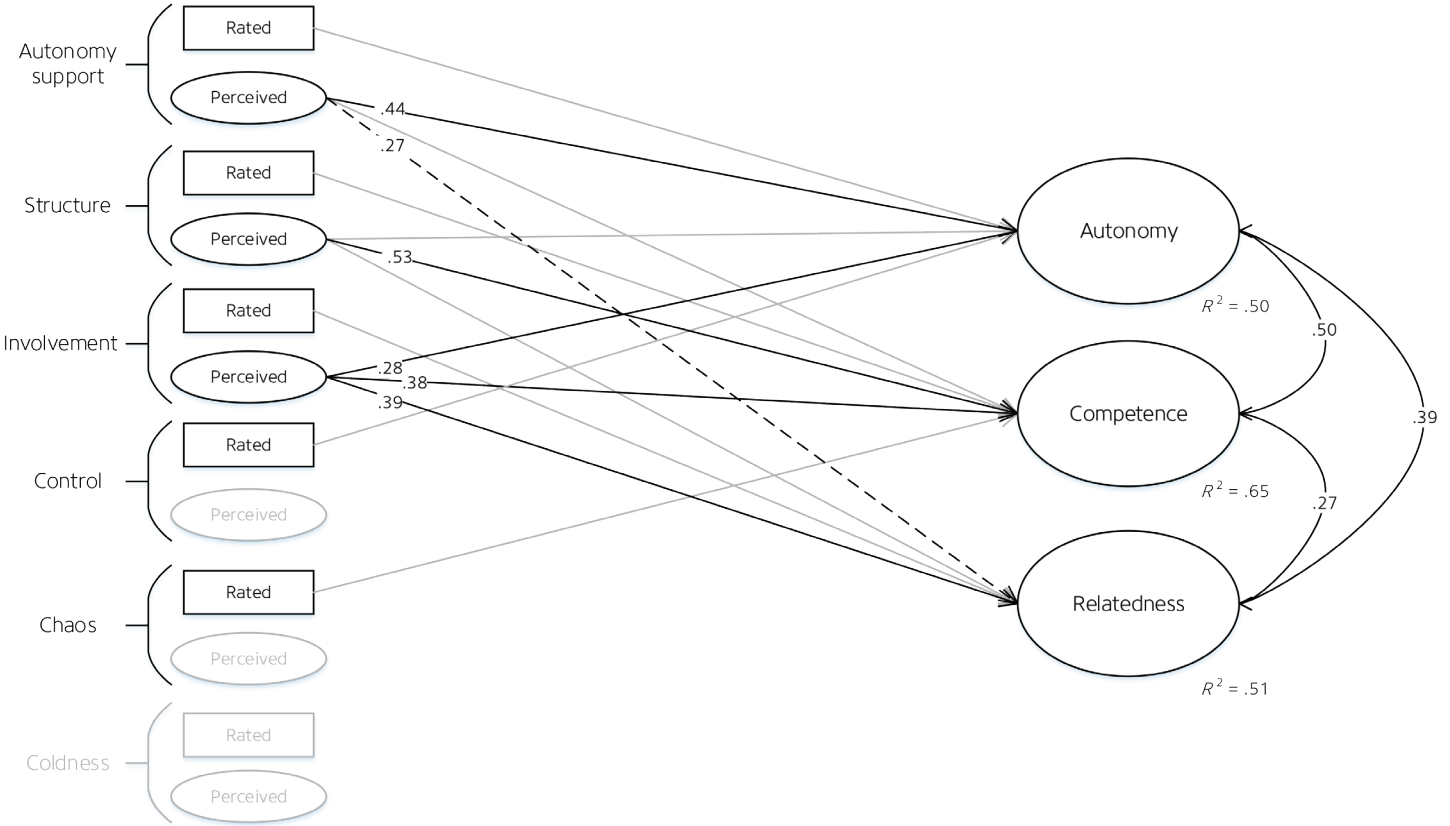
Wave 2, Negative Situation Descriptions. All variables were included in the model and the hypothesized model had a good fit for

the negative situation descriptions (CFI = .99; TLI = .97; RMSEA = .04; SRMR = .02). Statistical significant paths and estimates are presented in Figure 3.4. Students' satisfaction of autonomy was statistically significantly positively associated (R^2 = .38) with perceived autonomy support (β = .33, p < .01), and perceived chaos (β = .24, p < .01) and statistically significantly negatively associated with perceived control (β = -.31, p < .01). More perceived autonomy support and chaos, and less perceived control were associated with higher perceptions of autonomy.

Students' satisfaction of competence was statistically significantly positively associated (R^2 = .31) with perceived structure (β = .39, p <.01), and perceived chaos (β = .23, p < .01) and negatively by perceived control (β = -.21, p < .01). More perceived structure and chaos and less perceived control were associated with higher perceptions of competence. Students' satisfaction of competence was also statistically significantly negatively associated with rated structure (β = -.13, p < .01). This means that when structure was rated, students' perceptions of competence were lower.

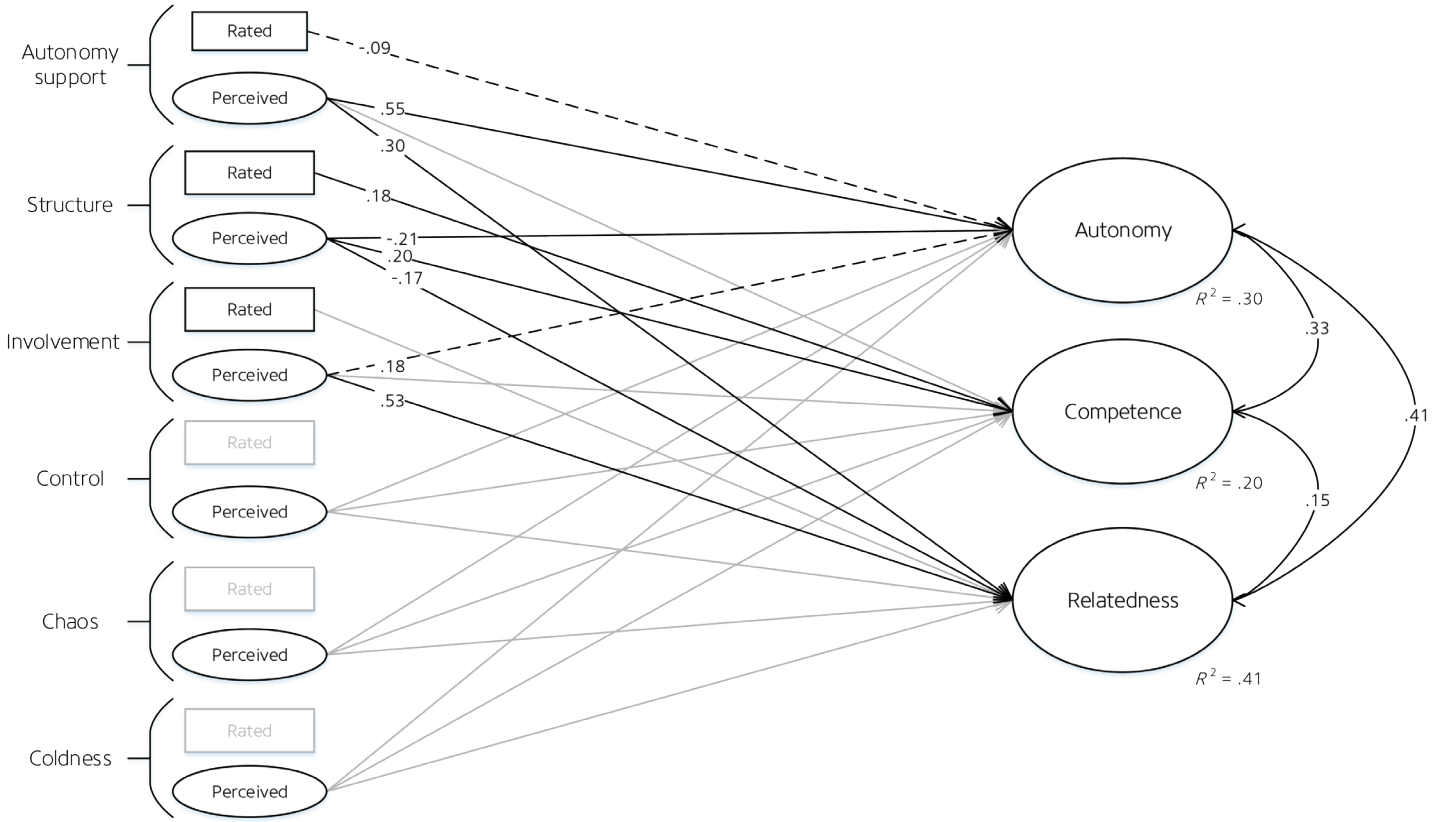
Students' satisfaction of relatedness was statistically significantly associated (R^2 = .34) with perceived autonomy (β = .25, p < .01), involvement (β = .34, p < .01), and chaos (β = .15, p < .05). This means that more perceived involvement, autonomy support, and chaos were associated with more perceived relatedness.

Figure 3.2 *Full Structural Equation Model for Wave 1*



Note. Grey variables were not included in the hypothesized model. Grey lines were hypothesized but were statistically non-significant paths; Dotted lines: $p < .05$; Black lines: $p < .01$.

Figure 3.3 *Full Structural Equation Model for Wave 2, Positive Situation Descriptions*



Note. Grey variables were not included in the hypothesized model. Grey lines were hypothesized but were statistically non-significant paths; Dotted lines: $p < .05$; Black lines: $p < .01$.

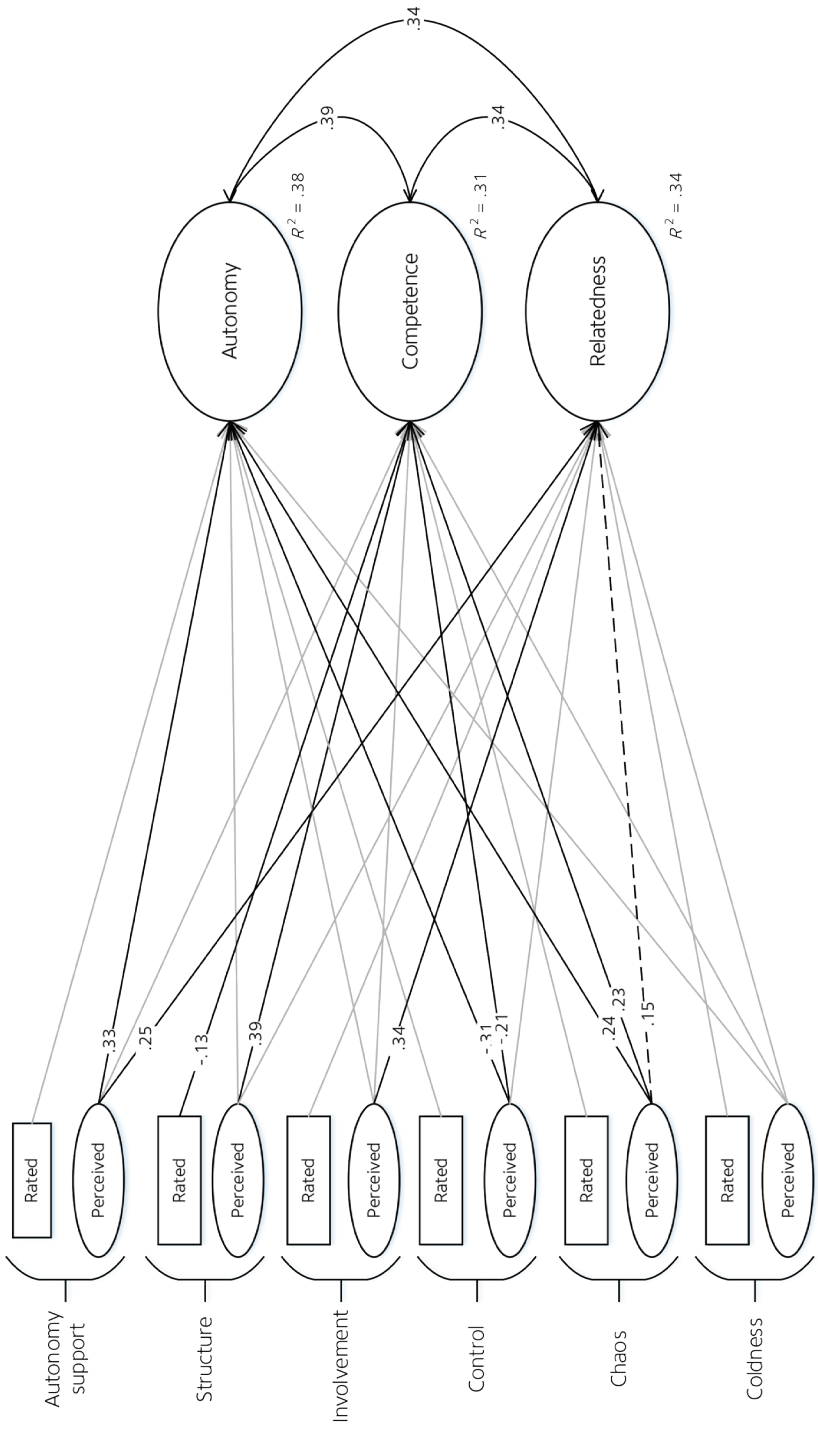


Figure 3.4 *Full Structural Equation Model for Wave 2, Negative Situation Descriptions*

Note. Grey lines were hypothesized but were statistically non-significant paths; Dotted lines: $p < .05$; Black lines: $p < .01$.

DISCUSSION

In the current study, we studied students' perceptions of their teacher's need-supportive or need-thwarting teaching in specific situations. Students' descriptions of a self-chosen situation were analyzed to establish which teacher's behavior was present in that situation. The rated need-supportive or need-thwarting teaching approaches were compared to students' perceptions of their teachers' (de)motivating teaching approach and students' satisfaction of autonomy, competence, and relatedness in that situation. This study zoomed in to a specific, situational level to provide insight into three existing blind spots in our knowledge about students' perceptions of need-supportive and need-thwarting teaching. Firstly, we examined which (de)motivating teaching approaches are critical in students' experiences of their teachers' approach. Secondly, we investigated the extent to which students' perceptions of their teachers' need-supportive or need-thwarting teaching approach correspond to the actual situation. Finally, we studied whether students' satisfaction of the need for autonomy, competence, and relatedness is exclusively satisfied by the corresponding dimensions of need-supportive teaching in specific situations or whether this association is less strict.

RQ 1: CRITICAL (DE)MOTIVATING TEACHING APPROACHES TO STUDENTS' EXPERIENCES OF CLASSROOM INTERACTIONS

When students were asked to describe a positive interaction they had with their teacher, they did not come up with need-thwarting behaviors. This indicates that need-thwarting behaviors are not associated with positive situations by the students. The results of the current study also show that students describe need-supportive behaviors when they describe a negative interaction with their teacher. Especially structuring behaviors were included in negative situations. We have seen that situations in which teachers are providing constructive feedback, and thus are providing structure, are not always perceived positively. Teacher feedback that was typically mentioned in the negative situation descriptions was feedback that students perceived as unfair or feedback that was not in line with students' self-assessment.

That students think about structuring behaviors, such as providing constructive feedback, when describing a negative interaction with their teacher, is partly in line with the conclusions of Fong and colleagues (2019). Like the current study, they found negative associations with negative

feedback in their meta-analysis on the effect of feedback on students' motivation. They found that negative teacher feedback was associated with less intrinsic motivation compared to positive teacher feedback. The equation between the study by Fong and colleagues (2019) and the current study fails when considering students' need satisfaction. We found that students' perceptions of structure were positively associated with their satisfaction of the need for competence, even in the negative situation descriptions. As students' need satisfaction is an important antecedent of students' autonomous (and intrinsic) motivation (Ryan & Deci, 2017), our results suggest that negative feedback could probably be associated with autonomous motivation. At least, our results indicate that students who perceived more structure experienced benefits from it, even when they perceived the situation negatively.

Not all teacher feedback is structure. A teacher providing feedback was only rated structure when the feedback contained information about what the student did well or what the student could improve (see the decision tree in Appendix B). In other words, when the feedback contained 'final vocabulary' such as "Well done", or "Good job!" (Leenknecht & Prins, 2018), the feedback did not provide any room for follow up action by the student and could not be considered (de)motivating. The motivational impact of final vocabulary, for example, "well done", is ambiguous, as the positive judgment could be perceived as motivating, while the lack of constructiveness could be perceived as demotivating.

Despite the association between students' perceptions of structure and their feelings of competence, negative situations in which students described more structure (as rated by the raters) were associated with fewer feelings of competence. Both rated structure and perceived structure in the negative situation descriptions were predicting students' satisfaction of the need for competence but in opposite ways. In other words, students recognize the teacher's positive intention, which is reflected in more positive perceptions of the need-supportive teaching dimensions and less negative perceptions of the need-thwarting dimensions (see the comparisons between the rated-non-rated groups for structure in negative situation descriptions). However, the situation in itself, receiving negative informational feedback, does harm students' feelings of competence as well. As the positive effect of the perceived structure is bigger than the negative effect of the rated structure, it can be concluded that students' perceptions can compensate for the impact of the objective of the situation on students' self-perceptions.

To answer our first research question, we can conclude that in general, need-thwarting teaching approaches are associated with negative situations and need-supportive teaching approaches with positive situations. Especially structuring teaching behaviors are found critical in students' experiences of positive as well as negative interactions with their teachers, as structure is present in 37.31 (negative situations) to 81.36% (positive situations) of the situation descriptions. More specifically, teacher feedback has a twofold effect on students' perceptions, as students have both positive and negative feelings about teacher feedback.

RQ 2: THE MATCH BETWEEN STUDENTS' PERCEPTIONS AND RATED APPROACHES IN THE SPECIFIC SITUATION

Two remarkable patterns occurred when comparing students' perceptions of need-supportive and need-thwarting teaching with the ratings: (a) students' perceptions of need-supportive or need-thwarting teaching depend on a more general dichotomy of need-supportive or need-thwarting, rather than the actual dimension of need-supportive or need-thwarting teaching that was present in the specific situation; and (b) chaos played a different role than the other need-thwarting teaching approaches.

The general conclusion that can be drawn based on Wave 1 and the negative situation descriptions of Wave 2 is that when structure, involvement, control, chaos, or coldness are rated, this is associated with students' perceptions of need-supportive and need-thwarting teaching broadly. Not only the rated teacher behavior but a range of teacher behaviors are perceived, and the patterns follow the positive/negative dichotomy of need-supportive or need-thwarting. In situations where structure or involvement was rated, the need-supportive dimensions were perceived more and the need-thwarting dimensions less. The opposite pattern was found for situations that described control, chaos, or coldness: lower scores on need-supportive dimensions and higher on need-thwarting dimensions. This finding is in line with high correlations ($r > .60$) that were found between the dimensions of need-supportive teaching in previous studies (e.g., Lam et al., 2009; Sierens et al., 2009). Autonomy support was an exception in this respect. More rated autonomy support did not result in more perceived autonomy support, structure, or involvement, and less perceived control, chaos, or coldness. A possible explanation could be the context of the university in Wave 2. The student-centered instructional approach applied in the bachelor's program is highly autonomy supportive

in itself, and teacher's autonomy support might not contribute much to students' perceptions of need-supportive teaching (Wijnia et al., 2014).

The students' perceptions in the positive situation descriptions of Wave 2 seemed to show a different pattern than Wave 1 and the negative situation descriptions of Wave 2. However, the situation descriptions in Wave 1 and the negative situation descriptions in Wave 2 were more balanced. In Wave 1, students were reflecting on both positive and negative situations. In the negative situation descriptions of Wave 2, it turned out that students described both situations that involved need-supportive and need-thwarting teaching. In the positive situation descriptions of Wave 2, students only described need-supportive teaching behaviors. This made it harder to compare students' perceptions between the rated and non-rated group. For this sample, almost all situation descriptions had in common that at least one dimension of need-supportive teaching was present. The situations in which, for example, no autonomy support was rated, still contained structure or involvement. This was not the case in Wave 1 and the negative situation descriptions of Wave 2, where situations in which need-supportive teaching was described, were compared with situations in which no need-supportive teaching but need-thwarting teaching was described.

This contrast between Wave 1 and the negative situation descriptions of Wave 2 on the one hand and the positive situation descriptions of Wave 2 on the other hand, underlines our conclusion that students' perceptions of need-supportive and need-thwarting teaching are based on the nature (i.e., need-supportive or need thwarting) of the teaching behavior, rather than the actual teaching behavior. The nature of the teaching behaviors is stable (positive), and so are students' perceptions in the positive situation descriptions of Wave 2. Only involvement showed some variation. Students who described a situation in which structure was rated, perceived less involvement, while students who described a situation in which involvement was rated, perceived more involvement. Moreover, when involvement was rated in the situation description, students perceived more autonomy support as well.

Altogether, it can be concluded that students' perceptions of need-supportive or need-thwarting teaching depend on a more general dichotomy of need-supportive or need-thwarting, rather than the actual dimension of need-supportive or need-thwarting teaching that was present in the specific situation. However, one dimension that plays a different role is chaos. As

theoretically expected (Haerens et al., 2016), situation descriptions in which chaos was rated were characterized by a lack of structure, which is reflected in the students' perceptions of structure and chaos in our study. But in contrast to other dimensions, only small differences (with smaller effect sizes) were found for autonomy support, involvement, and coldness between the rated and non-rated chaos groups. Moreover, an opposite pattern was found for control, compared to situations in which control or coldness was described. Students who described chaos reported lower perceptions of control, while students who described control or coldness, were reporting higher perceptions of control. In other words, when chaos was rated, students' perceptions did not convincingly follow the need-supportive or need-thwarting dichotomy. Moreover, students' perceptions of chaos did not differ whether or not control was rated and showed only a small difference whether or not coldness was rated.

In the context of our study, chaos does not seem to be as destructive as control and coldness are. Probably chaos can be described as neither need-supportive nor need-thwarting. The found associations with students' self-perceptions confirm this, where chaos is positively associated with students' feelings of autonomy, competence, and relatedness in the negative situation descriptions of Wave 2. That those associations were not found for the positive situation descriptions of Wave 2, is probably because chaos was not present in those situations, and students' perceptions of chaos were relatively low.

RQ 3: STUDENTS' SATISFACTION OF THE NEED FOR AUTONOMY, COMPETENCE, AND RELATEDNESS IN THE SPECIFIC SITUATION

When considering students' satisfaction of the need for autonomy, competence, and relatedness, students' perceptions of the corresponding need-support were the best predictor across all predictors in each sample. Students' perceptions of autonomy support were also a predictor of their feelings of relatedness in all samples. This can be explained as taking the students' perspective and attuning teaching to students' needs (i.e., aspects of autonomy support; Aelterman et al., 2019), asks for a certain level of relatedness. A teacher who can take the students' perspective and acts in a way that is in line with the students' way of thinking has to know the students well. Thus, when students perceive the teacher as being able to support autonomy, they acknowledge the relationship with the teacher.

In more positive situations (i.e., Wave 1 and positive situation descriptions of Wave 2), students' perceptions of involvement were associated with their feelings of autonomy. It is striking that this relationship did not exist when the students reflected on a negative situation. This is probably because feelings of autonomy are less present in those situations. The level of autonomy is supported in those situations by perceived chaos and hindered by perceived control of the teacher. This finding is in line with the circumplex model that was found by Aelterman and colleagues (2019) and replicated in higher education (Vermote et al., 2020), which suggests that chaos and autonomy support are closer to each other as they both represent a lack of strong teacher regulation.

Feelings of competence in negative situation descriptions (Wave 2) were associated with students' perceptions of structure, control, and chaos. The more structured and more chaotic the teacher, the more students perceive competence. As discussed above, probably chaos is perceived as less harmful than theoretically expected in a higher educational context. The guilt- and shame-inducing behaviors that characterize controlling teaching could explain the negative effect of teacher control on competence (Haerens et al., 2016). Teachers who blame students for not knowing or achieving as expected are showing control, and it seems obvious that this blaming results in lower feelings of competence. This finding is in line with previous research by González and colleagues (2018), who found that teacher control was negatively associated with pre-service teachers' competence, self-efficacy, and commitment.

Students who described a negative situation in which structure was rated felt less competent. At first sight, this result seems unexpected. However, as described above, those students described teacher feedback, which they disagreed on, or which did not match their self-assessment. It seems logical that the received teacher feedback (i.e., structure) made them feel less competent in those situations.

Altogether, students' satisfaction of autonomy, competence, and relatedness were associated with the corresponding teacher support dimensions. However, some cross-predictions were found, and need-thwarting dimensions were predicting need satisfaction.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

In the current study, students' perceptions of need-supportive and need-thwarting teaching were studied in specific situations that were selected

and described by the students. An advantage of this approach is the ecological validity of the study and the insight that is obtained in the origin of students' perceptions of their teachers' (de)motivating teaching approaches. However, this approach holds some shortcomings as well. The students had to describe the situation retrospectively. Probably this already colored their perceptions and descriptions. We cannot be sure that the students described the situation completely and unbiased. For example, possibly, students reflected on a teacher who was providing feedback without mentioning the autonomy-supportive way the teacher did this.

The assignment to students to describe both a positive and negative situation in Wave 2 revealed some interesting patterns and enlarged the insights that were obtained with this study. A potential downside of this choice in the study's procedure was that the three samples were not comparable to each other. Moreover, the current study was conducted in a higher educational context, but the participants' background in Wave 1 was diverse due to the data collection via MTurk. Replication of the study in other settings and levels is recommended to confirm the present findings' generalizability.

In the current study, we only took students' need satisfaction into account. We did this because, to our knowledge, no measurement is available to measure students' need frustration at the specific level. To get the complete overview, we recommend that in future research, both need satisfaction and need frustration are taken into consideration. Moreover, we recommend to include students' motivation as well.

In the current study, we studied isolated situations. It seems interesting to take a look at a series of situations in future research. By doing so, the development of students' contextual perceptions of the teachers' (de)motivating teaching approaches could be studied, as the moment-to-moment situations accumulate into a more general perception (e.g., Pennings & Hollestein, 2020).

THEORETICAL IMPLICATIONS

The current study has some theoretical implications. First, it shows the importance of studying students' perceptions. The students' perceptions were associated with students' satisfaction of the need for autonomy, competence, and relatedness, not the rated need-supportive and need-thwarting teaching. Moreover, although structure has been classified as

a positive teacher behavior, our study revealed that structure could be perceived negatively by the students as well.

Second, the results of our study show that students' need satisfaction is indeed associated with the corresponding teacher supports; for example, autonomy is associated with autonomy support, but some cross-predictions were also found. Teacher's corresponding need support did not exclusively predict students' self-perceptions of autonomy, competence, and relatedness. For instance, providing structure is associated with higher perceptions of autonomy support, structure, and involvement, which in turn is associated with more autonomy, competence, and relatedness. Autonomy support and involvement are not needed in this case for the students to perceive autonomy, competence, and relatedness. At least, at the specific level, supporting students' basic psychological needs is not a straightforward linear process.

A third theoretical implication is that chaos was found to be not as harmful as theoretically expected. Probably chaos should be considered as neither need-supportive nor need-thwarting. This finding is in line with the recently developed circumplex model of need-supportive and need-thwarting teaching at a contextual level (Aelterman et al., 2019; Vermote et al., 2020), in which chaos is situated alongside autonomy support, but further theory-building about the role of chaos is recommended.

Our study calls for a reconsideration of the assumed pathway from (de) motivating teaching approaches through need satisfaction (and frustration) to students' motivation. At a specific level, this assumption does not hold completely. An alternative explanation that we would like to propose is to focus on the functional aspect (i.e., controlling or informational) of the teaching approach, rather than on the corresponding basic need. The cognitive evaluation theory, one of the six mini-theories of SDT (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017), states that all rewards and constraints can have a controlling and informational aspect. The controlling aspect brings the student under external control, for example, teacher control, and causes a change in the perceived locus of causality to more extrinsic motivation (Deci et al., 1981). Due to the teacher's behaviors, such as teacher rewards, the student experiences that he is obliged to behave in a certain way. On the other hand, the informational aspect can provide the student opportunities to self-determine how to behave (Ryan & Deci, 2017). For example, feedback can provide students' information about their competence, which gives them the opportunity to self-determine where to

go next (Deci et al., 1981). The results of our study support the idea that when the controlling aspect is reduced (less control) and the informational aspect is increased (more autonomy support, structure, or involvement), students' needs for autonomy, competence, and relatedness are satisfied. It does not matter which need the teaching approach is referring to; as long as the controlling aspect is reduced and the informational aspect increased, the students' needs will be satisfied. In line with this, it makes sense that chaos was found to act differently in our study, as chaos is not pronounced controlling as well as informational. A chaotic teacher is doing anything but taking the lead (i.e., controlling aspect) and does not provide expectations and support (i.e., informational aspect).

PRACTICAL IMPLICATIONS

For teachers and teacher trainers, the results of the current study encourage them to apply need-supportive teaching approaches instead of need-thwarting approaches. It does not matter which need-supportive teaching approach is adopted. Showing your intention as a teacher is more important than adopting all need-supportive teaching behaviors correctly.

The current study underlines the fragile balance in providing feedback. Negative informational feedback is important to help students identify their points for improvement and self-regulate their learning (Hattie & Timperley, 2007). Still, negative feedback does also harm students' feelings of competence, which can restrain them from applying feedback. Our results show that students' perceptions of teacher's need-supportive behavior can compensate for the negative impact of negative informational feedback. Thus, a teacher should focus on need-supportive behaviors when providing negative feedback. Giving encouragement and help alongside negative feedback will stimulate students' motivation.

CONCLUSION

By focusing on need-supportive and need-thwarting teaching at a specific level, the current study contributed to our knowledge about students' perceptions of (de)motivating teaching behaviors. We found that providing structure is not always a positive act. Still, when students recognize a teacher's intentions, this can compensate for the negative effect of, for example, negative feedback. On the other hand, teacher's chaos was found to have a less negative impact than theoretically assumed. Probably teacher

chaos can be considered as neutral teacher behavior. Students' perceptions of the teachers need-supportive and need-thwarting behaviors were associated with their satisfaction of the need for autonomy, competence, and relatedness. The associations were not limited to the corresponding teacher behaviors, e.g., autonomy and autonomy support. Rather than the differentiated teacher behaviors, the dichotomy supportive/thwarting seemed more important for students' perceptions.

AUTHOR'S NOTE

ACKNOWLEDGMENT OF AUTHOR CONTRIBUTIONS

ML, LW, RR, and SL designed the study, ML and LW recruited participants and collected the data, ML, LW, and SL developed the instrument, ML, FvdB, EvG analyzed the data, ML drafted the manuscript, all authors contributed to critical revisions of the paper, LW, RR and SL supervised the study.

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APPENDIX A

ITEMS AND SCALES OF THE STUDENTS' PERCEPTIONS OF (DE)MOTIVATING TEACHING IN SPECIFIC SITUATIONS QUESTIONNAIRE

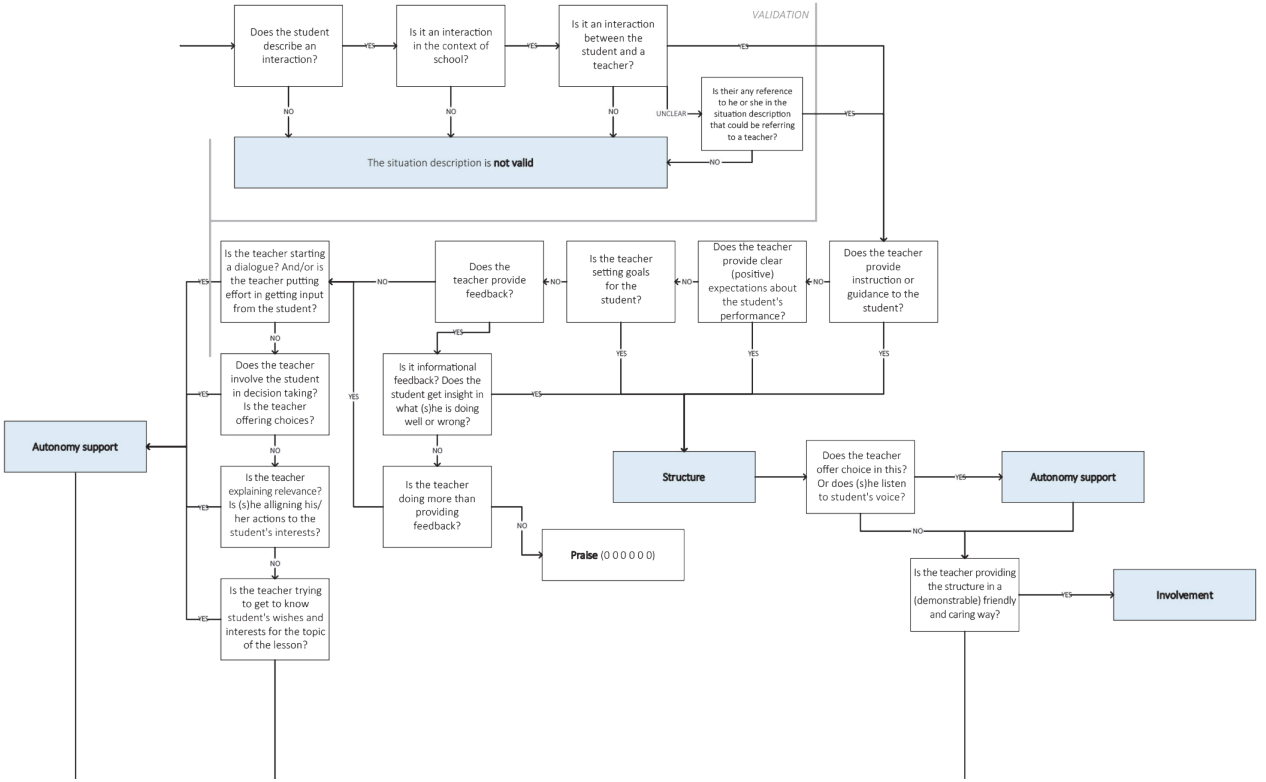
Scale	Item
Autonomy Support	
AutonomySupport_1	My teacher listened to my ideas
AutonomySupport_2	My teacher offered choices to me
AutonomySupport_3	My teacher asked me to make suggestions
AutonomySupport_4	My teacher explained to me the relevance of what we learn
AutonomySupport_5	My teacher invited me to make my own decisions
AutonomySupport_6	I felt that my teacher provided me choices and options
AutonomySupport_7	My teacher listened to how I would like to do things
AutonomySupport_8	My teacher provided a rationale for what we were supposed to do
AutonomySupport_9	My teacher offered me the opportunity to align my schoolwork with my own interest
AutonomySupport_10	My teacher gave me a lot of freedom in this situation
AutonomySupport_11	My teacher explained why what we learn is important to me
AutonomySupport_12	My teacher was interested in my opinion
AutonomySupport_13	My teacher tried to understand how I see things before suggesting a new way to do things
AutonomySupport_14	My teacher encouraged me to ask questions
AutonomySupport_15	My teacher was open for my opinion
Structure	
Structure_1	My teacher made clear what (s)he expected of me
Structure_2	My teacher showed me how to solve problems
Structure_3	My teacher showed me step-by-step how to solve problems
Structure_4	My teacher encouraged my self-confidence in this situation
Structure_5	My teacher gave me how-to guidance
Structure_6	My teacher clarified the learning goal(s) I have to obtain
Structure_7	My teacher answered my questions fully and carefully
Structure_8	My teacher made sure that I really understood the goals and what I need to do
Structure_9	My teacher provided feedback from which I could learn something
Structure_10	My teacher helped me to find a solution to the problem
Structure_11	My teacher conveyed confidence in my ability to do well in the course
Structure_12	My teacher was available for additional support when needed
Structure_13	My teacher communicated her/his expectations

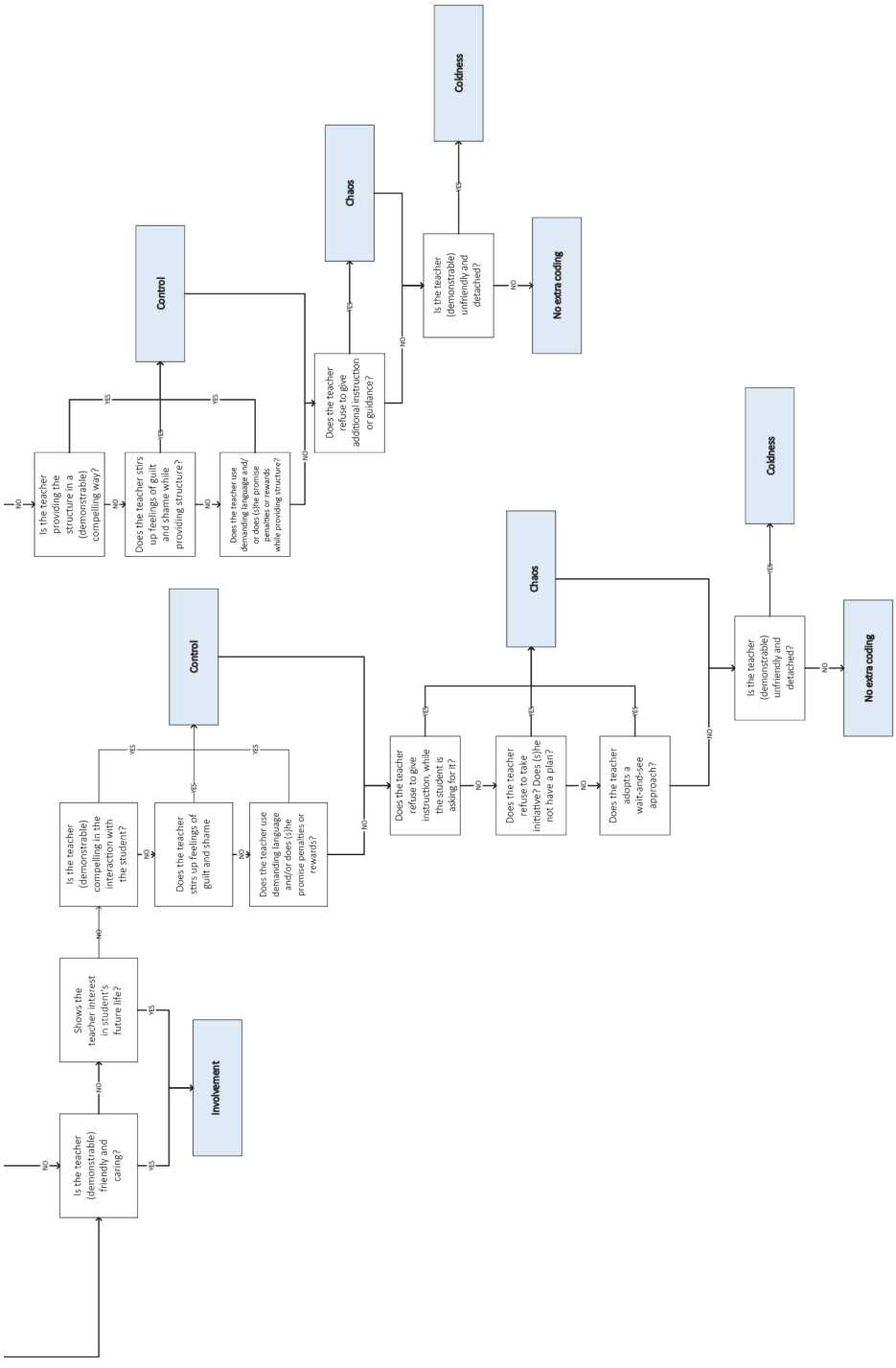
Scale	Item
Structure_14	My teacher gave me a goal to strive for
Structure_15	My teacher explained the standards and criteria that applied in this situation
Structure_16	My teacher provided positive feedback
Structure_17	My teacher showed me how I could learn from my mistakes
Structure_18	My teacher was available for questions
Involvement	
Involvement_1	My teacher spent time with me
Involvement_2	My teacher showed that (s)he likes me
Involvement_3	My teacher handled my emotions very well
Involvement_4	I was able to be open with my teacher
Involvement_5	I felt that my teacher accepts me
Involvement_6	My teacher paid attention to me
Involvement_7	I felt able to share my feelings with my teacher
Involvement_8	My teacher showed that (s)he really cares about me
Involvement_9	I felt understood by my teacher
Involvement_10	My teacher made me feel that I can always depend on her/him for important things
Involvement_11	I felt that my teacher cares about me as a person
Involvement_12	My teacher showed that (s)he enjoyed our conversation
Involvement_13	My teacher made me feel that I can always count on her/him when I need her/him
Involvement_14	I felt a lot of trust in my teacher
Involvement_15	My teacher is interested in what is going on with me
Control	
Control_1	My teacher did not allow protest
Control_2	My teacher told me that I should be ashamed of my behavior
Control_3	My teacher insisted me to work harder
Control_4	My teacher blamed me when I did not understand what (s)he was saying
Control_5	My teacher was disappointed in me
Control_6	My teacher demanded me to pay attention
Control_7	My teacher ordered me what to do
Control_8	My teacher used controlling language like 'have to', 'must'
Control_9	My teacher used rewards or punishments
Control_10	I had to do what my teacher ordered me
Control_11	My teacher blamed me for not working hard enough

Scale	Item
Chaos	
Chaos_1	My teacher did not have a plan
Chaos_2	My teacher did not take the lead
Chaos_3	My teacher neglected me
Chaos_4	My teacher was not prepared
Chaos_5	My teacher did not pay attention to me
Chaos_6	My teacher did not intervene when problems occurred
Chaos_7	My teacher adopted a wait-and-see approach
Chaos_8	My teacher ignored my question(s)
Chaos_9	My teacher did not take any initiative
Chaos_10	My teacher did not provide a clear structure for how to solve the problem
Chaos_11	My teacher did not react on what happened
Coldness	
Coldness_1	I felt that my teacher did not understand me
Coldness_2	My teacher was unfriendly
Coldness_3	I could not depend on my teacher for important things
Coldness_4	I did not feel very good about the way my teacher talked to me
Coldness_5	I could not depend on my teacher when I needed her/him
Coldness_6	My teacher was detached (from me)

APPENDIX B

DECISION TREE CODING PROCESS




Is the teacher (demonstrable) friendly and caring?
Shows the teacher interest in student's future life?
Involvement
Is the teacher (demonstrable) compelling in the interaction with the student?
Does the teacher stirs up feelings of guilt and shame
Does the teacher use demanding language and/or does (s)he promise penalties or rewards?
Control
Does the teacher refuse to give instruction, while the student is asking for it?
Does the teacher refuse to take initiative? Does (s)he not have a plan?
Does the teacher adopt a wait-and-see approach?
Chaos
Is the teacher (demonstrable) unfriendly and detached?
Coldness
No extra coding
Is the teacher providing the structure in a (demonstrable) compelling way?
Does the teacher stirs up feelings of guilt and shame while providing structure?
Does the teacher use demanding language and/or does (s)he promise penalties or rewards while providing structure?
Control
Does the teacher refuse to give additional instruction or guidance?
Chaos
Is the teacher (demonstrable) unfriendly and detached?
Coldness
No extra coding
YES
NO

4

Chapter 4

LOOKING THROUGH THE STUDENT LENS:

How Students Perceive Their Teacher's Motivating Teaching Approach

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Looking through the student lens: How students perceive their teacher's motivating teaching approach
[Manuscript submitted for publication]. University College Roosevelt, Utrecht University.

ABSTRACT

According to Self-Determination Theory, teachers can foster students' autonomous motivation by teaching in a need-supportive manner (i.e., supporting autonomy, providing structure, and showing involvement). The current study explored students' perceptions of need-supportive teaching in higher education, making use of scenarios (i.e., exemplars) of need support. This exploration provides insight into the origin of students' perceptions and the unique importance of the three approaches of need-supportive teaching. The results of two experimental studies show that students can differentiate between the three approaches of need-supportive teaching, as indicated by the statistically significant different scores that were found on need-supportive teaching approaches within each scenario. However, results showed that students based their perceptions not solely on actual teacher behaviors. We make a case for the nature of the approach and contextual preferences of students to explain how students' perceptions arise. Teachers are advised to be need-supportive rather than apply all aspects of the three need-supportive teaching approaches.

Keywords: Self-Determination Theory; Need-supportive teaching; Teaching approach

MOTIVATING TEACHING APPROACHES

A vast number of studies, taking different theoretical perspectives, have been conducted on motivating teaching approaches, as those approaches have been found to be an important predictor of student-related outcomes, such as motivation and engagement (e.g., Dincer et al., 2019; Komarraju et al., 2010; Lam et al., 2009; Van den Berghe et al., 2015; Wijsman et al., 2014; Wubbels et al., 2006). These studies result in well-meant advice for teachers. For example, Dincer and colleagues (2019) formulated four practical advises for English as a Foreign Language teachers in higher education: (a) match your teaching approach to students' proficiency levels and provide constructive feedback; (b) acknowledge students' (negative) feelings and create opportunities to engage; (c) encourage students' suggestions; and (d) create a positive atmosphere and acknowledge the social nature of language learning.

Although these several lists of teaching advice are practical and helpful, there is one question that lingers: Should a teacher implement all those teaching approaches into each lesson to be motivating? A further underlying question is: How do student perceptions arise? Are students' perceptions of teaching approaches sensitive to day-to-day variations in teaching approaches, or are those perceptions based on students' general impression of the teacher? In the current study, we used the Self-Determination Theory framework to shed light on how students' perceptions of motivating teaching approaches arise. We will first introduce the motivating teaching approaches from the SDT-perspective before we zoom in to the shortcomings in previous studies and the focus of the current study.

THE SDT-PERSPECTIVE: NEED-SUPPORTIVE TEACHING

According to SDT, teachers can promote students' motivation to learn by supporting students' basic psychological needs for autonomy, competence, and relatedness through need-supportive teaching (Ryan & Deci, 2017). In SDT, two kinds of students' motivation are determined based on the quality of the motivation. Students who experience volition or are self-endorsed in their actions are *autonomously motivated*. Intrinsic motivation is the most autonomous type of motivation (Ryan & Deci, 2017). In contrast, students have high levels of *controlled motivation* when they experience pressure in their behavior and feelings due to external or internal forces (Deci & Ryan, 2000; Ryan & Deci 2000a, 2000b; Vansteenkiste et al., 2006). Students

who are autonomously motivated to study, perform better, show more persistence, and report higher well-being (Ryan & Deci, 2017).

It is assumed that students experience more self-determination and autonomous motivation when their basic psychological needs are satisfied (i.e., need for autonomy, competence, and relatedness; Ryan & Deci, 2000b). Studies have supported the association between need support (e.g., Leenknecht et al., 2017; Stroet et al., 2013) and autonomous motivation as well as need satisfaction and autonomous motivation (e.g., Bartholomew et al., 2011; Chen et al., 2015; Vansteenkiste et al., 2020), which both results in more student engagement in learning (e.g., Dincer et al., 2019; Furrer & Skinner, 2003; Hospel & Galand, 2016; Reeve, 2012). In this regard, it is important to distinguish need support from need satisfaction. Need support is the teaching technique or instructional strategy that the teacher adopts in an attempt to let the student experience need satisfaction. However, students' need satisfaction depends on more than only need support from the teacher, for example, parental need support (Costa et al., 2019). As in many studies need-supportive teaching approaches are studied by using students' perceptions of the approaches (Stroet et al., 2013), this creates confusion between need support and need satisfaction.

Students' need for autonomy is satisfied when they experience volition. The teacher can support students' need for autonomy by being autonomy supportive (Brooks & Young, 2011; McLachlan & Hagger, 2010; Reeve, Deci, & Ryan, 2004; Reeve & Jang, 2006; Reeve, Jang et al., 2004), for example by providing rationales, explaining the relevance of learning tasks, and providing options to engage. Autonomy-supportive teachers show their respect to the students by acknowledging the negative feelings of students and avoiding controlling language (Reeve, Deci, & Ryan, 2004; Stroet et al., 2013).

Students' need for competence is satisfied when they experience effectiveness and have trust in their ability to succeed in the learning task. Teachers can support the need for competence by structuring the learning environment, for example, by communicating clear expectations (Vansteenkiste et al., 2012). Other aspects of structure are constructive feedback, encouragement, and guidance. Teachers who provide structure are keeping students on task and are avoiding chaos (Jang et al., 2010; Stroet et al., 2013).

Students' need for relatedness is satisfied when they experience close emotional bonds by belonging to social groups. The need for relatedness

can be supported by showing involvement (Stroet et al., 2013), that is, showing affection, expressing understanding, and dedicating attention and time to students (Leenknecht et al., 2017; Skinner et al., 2008). Teachers who are involved with their students offer support and let their students know they are dependable and available for them (Stroet et al., 2013).

In higher education, all three need-supportive teaching approaches have proven to be associated with students' motivation (e.g., Baeten et al., 2013; Leenknecht et al., 2017) and engagement (e.g., Dincer et al., 2019; Dupont et al., 2014). For example, Edmunds and colleagues (2008) found that students who received need-supportive teacher support experienced more need support and need satisfaction, which in turn was associated with more autonomous motivation for exercise classes at university.

STUDENTS' PERCEPTIONS AND THE UNIQUE IMPORTANCE OF THE NEED-SUPPORTIVE TEACHING APPROACHES

Most of the studies on need-supportive teaching approaches use students' perceptions to study the association with students' motivation (Stroet et al., 2013). A recurring issue that has not previously been addressed is whether students' perceptions of all three separate need-supportive teaching approaches are important to establish the relationship between need-supportive teaching and students' motivation. In most of the studies, high correlations ($r > .60$) between students' perceptions of autonomy support, structure, and involvement are reported (e.g., Lam et al., 2009; Leenknecht et al., 2017; Sierens et al., 2009; Tolinski, 2015). Moreover, studies applying a person-oriented approach found non-consistent results about the configurations of students' perceptions of need-supportive teaching approaches. Vansteenkiste and colleagues (2012) found orthogonal configurations of students' perceptions of autonomy support and clarifying expectations by the teachers (i.e., aspect of structure). They found four clusters in students' perceptions: (a) low perceived autonomy support and high clear expectations, (b) high perceived autonomy support and low clear expectations, (c) both low perceived autonomy support and clear expectations, and (d) both high perceived autonomy support and clear expectations. Students in the first two clusters perceived their teachers as autonomy supportive, but not providing structure (i.e., clear expectations) or vice versa. In contrast to these findings, including all three need-supportive teaching approaches, Leenknecht and colleagues (2017) did not replicate

this finding. They found groups based on the general perception of need-support (i.e., high, average, and low need-supportive teaching).

Indications for a general student perception of teacher's need-supportive teaching were found before. For example, Katz and colleagues (2010) could not identify the three separate approaches (i.e., autonomy support, structure, and involvement) in students' perceptions in confirmatory factor analysis. In a study by Baeten and colleagues (2013), a composite need-supportive teaching score was used as well. They found that when students perceived a teacher training learning environment as more need-supportive in general, this was associated with higher autonomous motivation of the students.

A possible explanation for the role of a general perception could be found in the functional aspect of teaching approaches (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017). According to cognitive evaluation theory, one of the six mini-theories of SDT, teacher interventions (i.e., rewards or constraints) have a controlling *or* an informational aspect (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017). When teachers assert their power, the students are brought under their control (Deci et al., 1981). Power can be asserted, for example, by promising the students a reward. By doing so, the students experience that they have no other option than performing in the way the teacher asks. The level in which a teacher asserts power is called the controlling aspect (Deci, 1975). However, a teacher can also provide support to self-regulate and self-determine actions without taking control. This is called the informational aspect (Ryan & Deci, 2017). The students receive clues from their teacher about how they could self-determine or self-regulate their learning, for example, with informational feedback that includes suggestions for future learning. Another example of the informational aspect is when the teacher explains why the activity is relevant for the students. By doing so, the students can decide whether the activity is important for them and whether they want to continue with the activity or not. All need-supportive teaching approaches are examples of approaches with an informational aspect. The fact that the approach contains an informational aspect is probably more important than the combination of autonomy support, structure, and involvement. This assumption is underlined by studies in which only autonomy support or autonomy support and structure were taken into account, and associations with students' motivation were reported (e.g., Black & Deci, 2000; Jang et al., 2016; Vansteenkiste et al., 2012). In these studies, not all three teaching

approaches were taken into account, but this did not hamper the found associations.

CURRENT STUDY

The current study is an attempt to shed light on students' perceptions of teachers' need-supportive teaching approaches. The central research question is: Should teachers adopt all three need-supportive teaching approaches (i.e., autonomy support, structure, and involvement) to be perceived by their students as need-supportive, or are students' perceptions of teachers' need-support intertwined?

This research question is examined using scenarios (i.e., exemplars) of need-supportive teaching in two studies. In each scenario, one of the three need-supportive teaching approaches (i.e., autonomy support, structure, and involvement) is emphasized, while the other approaches are kept neutral. This way, we can test whether the actual teaching approach or the more general informational aspect of the need-supportive teaching approach determines students' perceptions. As previous research is not univocal concerning this issue, no specific hypotheses were formulated. Investigating whether students' perceptions of need-supportive teaching approaches are sensitive to actual teaching behaviors in a manipulated setting allows us to conclude whether a teacher should adopt all approaches in each lesson to be (perceived as) motivating.

The first indicator that students' perceptions are determined by the teaching approach manipulated in the scenarios is when students give lower scores to the approaches that are kept neutral in the scenario. This led to the following research question (RQ):

> *Research Question 1*: Do statistically significant differences exist between students' perceptions of the need-supportive teaching approaches within one scenario?

To answer this question, each of the three scenarios is analyzed separately to investigate whether students' perceptions of autonomy support, structure, and involvement differ from each other.

If statistically significant differences occur, this does not mean that students solely base their perceptions on the teaching approach as described in the scenarios. It is possible that in all groups, the pattern of

perceptions is similar. That is, for example, when all students perceive more autonomy support than structure and involvement despite the scenario they have read. By comparing students' perceptions between the scenario groups, we can investigate whether the perceptions are coherent with the scenario that was read, that is, the need-supportive teaching approach that was emphasized. This led to the second research question:

> *Research Question 2*: Are students' perceptions of need-supportive teaching approaches coherent with the scenario they have read?

When no statistically significant differences between the scenario groups are found in the perceptions of need-supportive teaching approaches, we can conclude that the students' perceptions are not coherent with the read scenario. When students' perceptions of need-supportive teaching approaches between groups are statistically significantly different, this is an indication that students' perceptions are coherent with the scenario they read. However, we need the combination of results of the first and second research questions to conclude whether students' perceptions are coherent with the scenario. The perceptions of the approach that corresponds to the scenario should be rated highest.

DEVELOPMENT OF THE SCENARIOS

For each need-supportive teaching approach (i.e., autonomy support, structure, and involvement), a scenario was developed. The scenarios described a typical situation for the higher education institutes that participated in this study, with small classes (12-30 students) in which active student involvement is expected (and sometimes graded). In the scenarios, the first lesson of a semester was described. During this lesson, the teacher explained the central assignment of the course. In all three scenarios, a female teacher was chosen for authenticity reasons, as females are overrepresented in the students' teaching staff and to exclude gender effects in case both male and female teachers were used. In the three scenarios, either autonomy-supportive, structured, or involved teaching behaviors were emphasized while the other need-supportive teaching approaches were kept neutral (see Appendix A).

The teacher behaviors corresponding to the need-supportive teaching approaches in the scenarios were based on the observation scheme developed by Stroet and colleagues (2015). The scenarios were simultaneously developed in Dutch and English. The scenarios were rephrased based on the results of the expert and student review.

EXPERT REVIEW

Four international experts in motivational research were asked to review the scenarios. The experts provided both feedback on the scenarios in general and on the description of the need-supportive teaching approaches in particular.

STUDENT REVIEW

The scenarios were tested on 13 students from the same institute as the students in Study 2, but none of them participated in Studies 1 or 2. The students read all three scenarios and pointed out which teaching approach they recognized in each scenario, using a complete list of need-supportive teaching behaviors (extracted from the observation scheme by Stroet et al., 2015) and indicating which scenario the behavior belonged to. The student reports were compared with the intended approaches.

STUDY 1

METHOD

Participants and Procedure

Power analyses were conducted to determine the required sample size using GPower (Version 3.1). As our measurement (i.e., students' perceptions of need-supportive teaching approaches) is directly related to our intervention (i.e., manipulation of need-supportive teaching approaches), and time between the intervention and the measurement was nihil, medium to large effect size was expected (Ruiz-Primo et al., 2002). Given those expectations, the *a priori* power calculation was based on an effect size of $f = 0.25$ and $f = 0.40$, for power = 80%, and type I error rate = 5%. The required minimal sample size is 66 to 159 participants.

In total, 111 (27.03% male) undergraduate psychology students from a Dutch research university participated in this online study. All participants gave informed consent and received research credits for their participation,

in line with the university's regulations. The average age was 21.05 years old (*SD* = 2.54). Participants were predominantly first-year students (54.95%; 34.23% second-year, and 10.81% third-year students), and 75.68% had the Dutch nationality (18.92% non-Dutch with EU nationality, 5.41% non-Dutch with non-EU nationality). Students were randomly assigned to read one of the three scenarios and subsequently filled out an online questionnaire using Qualtrics software. The scenarios and questionnaire were provided in English in Study 1.

Measures

Students' perceptions of need-supportive teaching approaches were measured with a shortened version of the Teacher As a Social Context Questionnaire (TASC-Q; Belmont et al., 1988; 24 items, Likert scale 1-5; see Appendix B). This shortened version was previously developed and used by Vansteenkiste and colleagues (2009). The TASC-Q consists of three dimensions, i.e., autonomy support, structure, and involvement, which were found to be correlated in previous studies (e.g., Leenknecht et al., 2017). As Cronbach's alpha is seen as a suboptimal measurement of reliability (Gillet et al., 2017), especially for scales with complex internal structures (i.e., correlated factors; Cho & Kim, 2015; Sijtsma, 2009), McDonald's (1970) omega (ω) was calculated to get a more accurate insight into the reliability of the scale:

$$\omega = \frac{\left(\sum \lambda_j\right)^2}{\left(\left(\sum \lambda_j\right)^2 + \left(\sum \psi\right)\right)}$$

In this formula, λ_j refers to the factor loadings of item *j*, and ψ the unique variance (Trizano-Hermosilla & Alvarado, 2016).

Reliability was satisfactory for all three dimensions (autonomy support: ω = .88; structure: ω = .96; involvement: ω = .77).

Analyses

Statistical differences between students' perceptions per need-supportive teaching approach (i.e., autonomy support, structure, and involvement) were explored using paired-samples *t*-tests. Effect sizes were reported with Cohen's *d* (see Field, 2013). One-way between-group (multivariate) analyses of variance were used to compare students' perceptions of need-supportive teaching per scenario. We reported Wilks' Lambda and reported partial

eta squared to report effect sizes (see Field, 2013). Both students' average perception of need-supportive teaching, as well as perception scores per approach (i.e., autonomy support, structure, and involvement), were used.

RESULTS AND DISCUSSION

The focus of the current study was to investigate whether the three need-supportive teaching approaches (i.e., autonomy support, structure, and involvement) were perceived by students as separate or intertwined and whether students were able to differentiate in their perceptions of need-supportive teaching. We were wondering if students base their perceptions on actual teaching behaviors that they are experiencing or if the informational aspect of need-supportive teaching approaches is more prevalent in their perceptions.

Research Question 1: Within Groups

To test our first research question, we analyzed differences in students' perceptions between the three approaches of need-supportive teaching for each scenario/group separately (see Table 4.1 for mean scores and standard deviations).

Regarding the autonomy support group (Group 1), we found that autonomy support was rated highest between the three need supports, and was rated statistically significantly higher than students' perceptions of structure, $t(35) = 3.82$, $p = .001$, Cohen's $d = 0.62$ and students' perceptions of involvement, $t(35) = 5.44$, $p < .001$, Cohen's $d = 0.98$. Furthermore, students' perceptions of structure were significantly higher than their perceptions of involvement, $t(35) = 2.43$, $p = .020$, Cohen's $d = 0.40$.

In the structure group (Group 2), structure was rated significantly higher than autonomy support, $t(35) = -3.50$, $p = .001$, Cohen's $d = 0.59$, and involvement, $t(35) = 5.02$, $p < .001$, Cohen's $d = 0.94$. No statistically significant difference was found between autonomy and involvement, $t(35) = 0.95$, $p = .347$.

In the third group (involvement scenario) the perceptions of involvement were significantly higher than structure, $t(38) = -2.43$, $p = .020$, Cohen's $d = 0.52$. There were no statistically significant differences in students' perceptions between autonomy support and involvement, $t(38) = -1.69$, $p = .100$. Furthermore, there was no significant difference in Group 3 between structure and autonomy support, $t(38) = 1.12$, $p = .272$.

The statistically significant differences that were found indicated that students were able to differentiate between the approaches of need-supportive teaching. The differentiation students made in all three groups showed that students did not base their perceptions on their overall perception of need-supportiveness (i.e., the informational aspect).

Research Question 2: Between Groups

The second aim of this study was to establish whether students' perceptions were coherent with the need-supportive teaching they read about across groups. For that reason, the teacher behaviors were manipulated in three scenarios. The patterns found in students' perceptions within the scenario groups showed that the emphasized approach in the scenario was rated highest and statistically significantly higher than one or two of the other approaches within the groups (see Table 4.1 and Figure 4.1). To confirm coherence, differences between the scenario groups were explored with MANOVAs (see Table 4.1).

Students' average perceptions of need-supportive teaching were positive in all three scenarios and were not statistically significantly different between the scenarios (see Table 4.1). MANOVA with the three approaches of need-supportive teaching showed that the groups statistically significantly differed in their perceptions of autonomy support, structure, as well as involvement, Wilks' $\Lambda = .62$, $F\ (6,\ 214) = 9.46$, $p < .001$, $\eta_p^2 = .21$ (large effect). Post hoc results of these differences are reported in Table 4.1. Students' perceptions of support of a need were highest in the corresponding scenario. For example, autonomy support was perceived most prevalent in the autonomy support scenario, meaning that the scenarios were effective in their purpose. Moreover, the perceptions of the corresponding approach were statistically significantly higher than the scores of one or two of the other groups on this approach (see Table 4.1).

These results indicated that students base their perceptions of the three approaches on the actual teacher behaviors instead of a general impression. The emphasized need supports were scored highest in the corresponding groups while the groups did not differ statistically significantly in their general perception of need-supportive teaching. Patterns of students' perceptions corresponded to the read scenario. Therefore, we can conclude that students' perceptions were coherent with the actual teacher behaviors from the scenario they have read.

Table 4.1 *Comparison of Perceptions between Scenario Groups – Study 1*

	Group 1 Autonomy support (*n* = 36)		Group 2 Structure (*n* = 36)		Group 3 Involvement (*n* = 39)		ANOVA			Post hoc test
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2	
Average NST	3.50	0.33	3.56	0.33	3.41	0.30	1.88	.157		
Autonomy support	3.72	0.49	3.49	0.50	3.41	0.45	4.33	.016	.07	1>3
Structure	3.45	0.38	3.77	0.49	3.31	0.46	10.48	< .001	.16	2>1,3
Involvement	3.31	0.32	3.41	0.25	3.52	0.33	4.38	.015	.08	3>1

Note. Possible range = 1-5. NST = Need-supportive teaching.

STUDY 2

In the second study, the first study was replicated in a different sample.

METHOD

Participants

All students from the first and second year (two classes per year) of a teacher training program from a Dutch university of applied sciences were asked to participate. The preservice teachers were asked for informed consent. One participant did not provide permission to use the data and was excluded from the study. In total, 84 preservice teachers (20.24% male) gave consent and participated in this study. The average age was 18.75 years old (*SD* = 1.31). All participants were Dutch, and 57.14% of the participants were in their first year.

Procedure

In contrast to Study 1, data collection took place in the classroom with paper and pencil materials, instead of an online survey, because of practical reasons. However, the procedure was the same: Students read one of three scenarios and filled out a questionnaire. Scenarios were randomly distributed. The scenarios and questionnaire were provided in Dutch in Study 2.

Measures

Students' perceptions of teacher's need-supportive teaching were measured using the same questionnaire used in Study 1 (TASC-Q; Belmont et al., 1988). The reliability of the subscales, calculated with McDonald's (1970) omega, was satisfactory for autonomy support (ω = .84), structure (ω = .97), and involvement (ω = .98).

In Study 2, students' were also asked about their anticipated motivation and agentic engagement. As both students' motivation and agentic engagement did not relate to students' perceptions of need-supportive teaching, we concluded that it was too difficult for students to reflect on the anticipated motivation and engagement. Reflecting on how you think you will react is difficult, but reflecting on how you will respond in a fictitious situation is even harder. For that reason, we excluded motivation and agentic engagement from the study.

Analyses

The same analyses were conducted as in Study 1.

RESULTS AND DISCUSSION

In the second study, we tried to replicate the results of Study 1, where we found that students were able to differentiate in their perceptions of need-supportive teaching between the three approaches: autonomy support, structure, and involvement.

Research Question 1: Within Groups

Analyses revealed slightly different patterns (see Table 4.2 for mean scores and standard deviations). Both students' perceptions of involvement, $t(26) = -4.79$, $p < .001$, Cohen's $d = 0.89$, and autonomy support, $t(26) = 2.90$, $p = .007$, Cohen's $d = 0.62$, were significantly higher than perceptions of structure in the autonomy support group (Group 1). Perceptions of autonomy support and involvement did not differ significantly for this group, $t(26) = -1.57$, $p = .128$.

In the structure group (Group 2), perceptions of involvement, $t(27) = -6.48$, $p < .001$, Cohen's $d = 1.12$, and structure $t(27) = -3.26$, $p = .003$, Cohen's $d = 0.74$, were significantly higher than autonomy support. Involvement was rated higher than structure as well for this group, $t(27) = -2.27$, $p = .031$, Cohen's $d = 0.44$.

Perceptions of involvement were statistically significantly higher than perceptions of autonomy support, $t(28) = -9.16$, $p < .001$, Cohen's $d = 1.40$, and structure, $t(28) = -8.92$, $p < .001$, Cohen's $d = 1.66$, in the involvement group (Group 3). Perceptions of autonomy support and structure did not significantly differ in this group, $t(28) = 1.62$, $p = .117$.

In all groups, involvement was rated highest between the three needs. The patterns found in Study 2 are not entirely in line with Study 1 (see Figure 4.1 and 4.2), but simply the fact that students' perceptions were differentiated between approaches confirms the conclusions drawn in Study 1. It is not merely the informational aspect of need-supportive teaching approaches that determines students' perceptions, but students' perceptions arise from actual teaching behaviors.

Research Question 2: Between Groups

In contrast to Study 1, although students were able to differentiate between the approaches of need-supportive teaching (RQ 1), students' perceptions were not coherent with the read scenario (RQ 2). Not the emphasized need support, but involvement was rated highest by students in all three scenarios. Students perceived teachers as involved when they supported autonomy and provided structure, although the teacher involvement was not emphasized. The other way around, being involved did not result in higher ratings of autonomy support and structure. Moreover, also in Study 2, a statistically significant difference appeared in students' perceptions of autonomy support and structure in the autonomy support and structure groups.

Overall, students had (similar to Study 1) a positive perception of teachers' need-supportive teaching in the scenarios (see Table 4.2). A MANOVA revealed statistically significant differences for autonomy support, structure, as well as involvement between the scenario groups, Wilks' $\Lambda = .57$, $F(6, 158) = 8.64$, $p < .001$, $\eta_p^2 = .25$ (large effect). Furthermore, students from the involvement group (Group 3) were more positive in their average perceptions of need-supportive teaching than the other students. The difference between the involvement group and the autonomy support group (Group 1) was statistically significant (see Table 4.2).

The involvement group (Group 3) scored higher on involvement than both the autonomy-support (Group 1) and structure groups (Group 2). Furthermore, the structure group (Group 2) scored statistically significantly higher on structure than the autonomy support group (Group 1). No

between-group differences were found for perceptions of autonomy support (see Table 4.2).

Taking the between-group differences into account and having a close look at the patterns within the groups, two remarkable things can be observed in Study 2. First, the students who read the involvement scenario (Group 3) were more positive about the teachers' need support than the other students. These students' positive perceptions regarding the need-supportive teaching approaches seem to distort the results, as it erased the between-group differences. For example, the perceptions of autonomy support did not statistically significantly differ between the scenario groups. Still, students who read the autonomy support scenario (Group 1) were relative to their average perception more positive about autonomy support than the students who read the involvement scenario (Group 3). Second, within each group, involvement was rated remarkably high. In contrast to Study 1, not the emphasized approach, but involvement was scored highest in each group. Nevertheless, in the autonomy support group (Group 1) and the structure group (Group 2), the emphasized need support is scored statistically significantly higher than the third approach (i.e., structure for the autonomy support group and autonomy support for the structure group). Students who read the scenarios in which autonomy support or structure was emphasized also reported high perceptions of involvement. In contrast, students who read the involvement scenario perceived less autonomy support and structure than involvement. Probably the students in Study 2 did not observe but assumed that the teachers were highly involved as well. A possible explanation for this could be the fact that the sample in Study 2 contained all teacher trainees. Their frame of reference is not limited to how the teaching approach affects themselves, but they are also trained to reflect on the impact of teaching approaches on students. They probably assume that the teacher is involved while supporting autonomy or providing structure. In those cases, the teacher dedicates time and attention to the student and shows commitment to students' needs (i.e., aspects of involvement). Therefore, overall, these findings support the view that students' perceptions were based on actual teacher behaviors.

Table 4.2 *Comparison of Perceptions between Scenario Groups – Study 2*

	Group 1 Autonomy support (*n* = 27)		Group 2 Structure (*n* = 28)		Group 3 Involvement (*n* = 29)		ANOVA			Post hoc test
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2	
Average NST	3.49	0.37	3.63	0.32	3.76	0.34	4.46	.015	.10	3>1
Autonomy support	3.55	0.42	3.37	0.47	3.62	0.39	2.60	.080		
Structure	3.25	0.55	3.67	0.37	3.48	0.42	6.26	.003	.13	2>1
Involvement	3.68	0.41	3.83	0.36	4.19	0.44	12.16	< .001	.23	3>1,2

Note. Possible range = 1-5. NST = Need-Supportive teaching.

Figure 4.1 *Students Perceptions of Need-Supportive Teaching Between the Three Scenarios in Study 1*

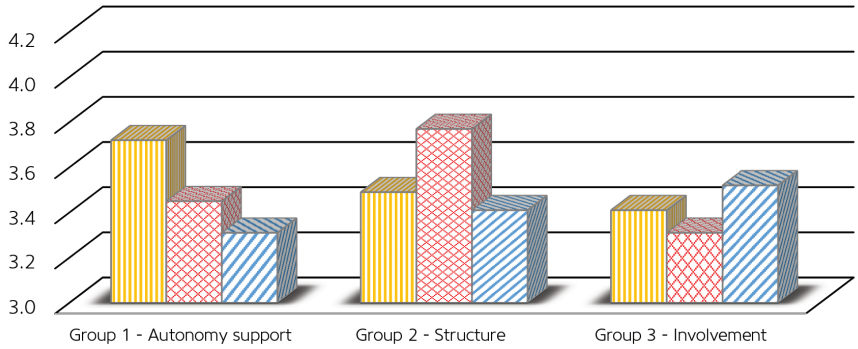
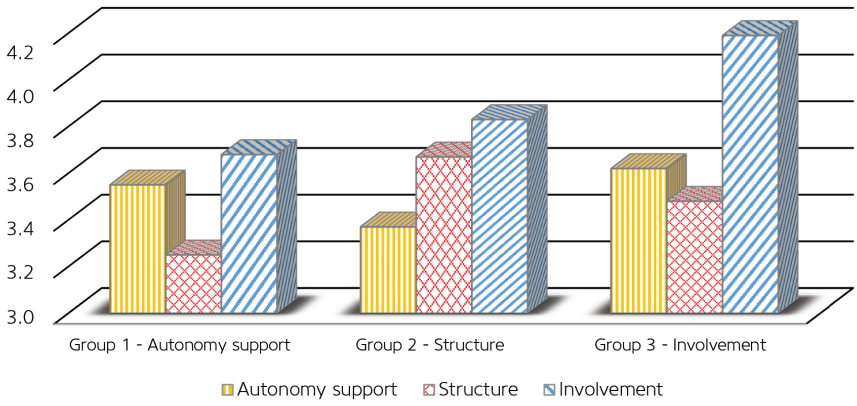


Figure 4.2 *Students Perceptions of Need-Supportive Teaching Between the Three Scenarios in Study 2*



GENERAL DISCUSSION

Our central research question was: Should teachers adopt all three need-supportive teaching approaches (i.e., autonomy support, structure, and involvement) in order to be perceived by their students as need-supportive, or are students' perceptions of teachers' need-support intertwined? Based on previous research, we presented two assumptions: (a) students' perceptions arise from the actual teaching behaviors (i.e., day-to-day variations), as indicated by orthogonal relationships found between need-supportive teaching approaches (e.g., Vansteenkiste et al., 2012); or (b) instead of actual teaching behaviors it is the informational aspect (i.e., a general perception; Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017) of the teaching approach that determines students' perceptions, which results in high correlations between students' perceptions of the need-supportive teaching approaches (e.g., Lam et al., 2009; Leenknecht et al., 2017; Sierens et al., 2009; Tolinski, 2015).

We manipulated the provided teacher support in authentic written scenarios and presented each student with one of the three teaching approaches while the others were kept neutral. By doing so, we were able to study (RQ 1) whether students' perceptions are differentiated to the separate approaches (i.e., autonomy support, structure, and involvement), and (RQ 2) whether the actual teaching approach determined students' perceptions.

RESEARCH QUESTION 1: ARE STUDENTS' PERCEPTIONS DIFFERENTIATED BETWEEN THE APPROACHES *WITHIN* THE SCENARIOS?

Overall, the students reported high perceptions of need-supportive teaching, which indicates that students believed that the teacher behaviors described in the scenario were need supportive. Studies 1 and 2 both showed that students were able to differentiate between the three approaches. Although students were overall very positive in their perceptions, students did not perceive each approach equally positive.

Students were positive about the approach emphasized in the scenario, which indicates that students' perceptions are based on actual teacher behaviors and not solely on the informational aspect of the teaching approaches. However, students' patterns of perceptions did not exclusively correspond with the described teacher behavior in the scenario. Students were relatively positive about all three approaches of teachers' need-

supportive teaching, while only one of the approaches was emphasized in the scenarios.

RESEARCH QUESTION 2: ARE STUDENTS' PERCEPTIONS COHERENT WITH THE EMPHASIZED NEED SUPPORT *BETWEEN* THE SCENARIOS?

In Study 1, students' perceptions were coherent with the emphasized need support in the scenario. This result is an indication that student perceptions arise from the actual teaching behaviors. However, in Study 2, students in all groups were particularly positive about the teacher's level of involvement. As described earlier, this is probably because while being autonomy supportive or providing structure, the teacher has a positive interaction with students. The teacher shows commitment to students' needs, which can be interpreted by the students as being involved. Our results indicate that such strong associations do not seem to exist between autonomy support and structure. This finding is in line with previous research in which an orthogonal relationship between autonomy support and structure was found (Vansteenkiste et al., 2012).

The average perceptions of need-supportive teaching did not differ between the scenarios in Study 1. In contrast, in Study 2, students in the involvement group scored statistically significantly higher than the autonomy support group on need support in general. The results of Study 2 indicate that the students in Study 2 valued involvement more than the other two approaches. When experiencing an involved teacher, those students became more positive about the teacher's need-supportive teaching in general. This effect is less present for autonomy support and structure. It suggests that confronting students with an involved teacher can affect perceptions of autonomy support and structure, as being involved somewhat seems to compensate for the lack of explicit autonomy support and structure in the involvement scenario.

The differences in students' perceptions of involvement in Study 2 cannot be explained by possible differences in conditions between both studies. These differences were small (online versus paper-and-pencil; at home versus in class), and if these differences influenced the outcomes, then the differences in the results would not have been limited to the involvement group. Within the experiments, differences between the scenarios were controlled, using random assignment to the scenarios. A possible explanation for the preference for teacher involvement of students in Study 2 can be the characteristics and organization of the university. The sample of Study 2

was from a university that identifies itself as the university "where students matter". Study programs are relatively small (30 – 100 students per cohort), and students' well-being is monitored extensively. Teachers, most of the time, have a dual role as a content expert and study coach. Both universities (in Study 1 and 2) apply a student-centered didactical approach. However, in the university involved in Study 1, education is organized in separate lessons with teachers in distinct roles (course coordinators, tutors, or study advisors), and change of courses every five weeks. The students from Study 1 probably have different expectations about teachers compared to the students in Study 2. Moreover, as indicated above, students in Study 2 were from a teaching training program, which could have influenced their frame of reference.

LIMITATIONS AND FURTHER RESEARCH

In the current study, we studied students' perceptions of teachers' motivating teaching approaches from an SDT perspective. Taking this theory as a starting point allowed us to make some grounded assumptions, which helped to simplify reality and make our research question researchable. We did not test the assumption that students' perceptions of need-supportive teaching are associated with students' motivation and the presence of basic psychological needs as antecedents of students' autonomous motivation. It could be interesting not to take those assumptions for granted in future research.

A strong point of this study is the use of scenarios. This allowed us to strictly manipulate the provision of one type of need-supportive teaching, making it possible to study how students' perceptions arise more clearly. However, the use of scenarios made it probably harder for students to reflect on the teaching approaches. Although fictional, the scenarios were authentic, as they described a typical first lesson of a semester. We think it is worthwhile to examine the possibilities to embed the scenarios more in the real context, for example by presenting the scenarios to students who are actually at the beginning of a semester, or by making use of video scenarios. We also recommend future research to test interventions of need-supportive teaching in which one of the three approaches is emphasized in practice. This will provide more insight into the unique contribution of the three approaches and the influence of contextual factors that may affect students' perceptions, such as peer relations, students' general perceptions of the teaching approach of their teacher, and students' prior achievement.

In the current study, we have chosen to distribute each student one of the scenarios at random. Providing students all three scenarios and compare their perception scores could uncover students' preferences and the impact of a general perception of need-supportive teaching. However, as we found differences between the samples (i.e., the universities), it seems that students' preferences situate at the group level (as we explained earlier), rather than on the individual level. Moreover, providing students with three scenarios in a row could distort the results due to an averaging effect (i.e., impressions of the scenarios are combined into students' perceptions) or primacy effect (i.e., the first read scenario has a pronounced influence on students' perceptions; Fang et al., 2018). Those effects can be ruled out by taking sufficient time between the scenarios and including a neutral scenario, in which none of the need-supportive teaching approaches is emphasized.

The scenarios described only need-*supportive* behaviors. The current study only tells us whether and to what extent need-supportive behaviors of one of the three approaches compensate for the lack of the other two approaches. We do not know whether need-supportive behaviors could compensate for need-*thwarting* behaviors. Previous studies have shown that need-thwarting is more damaging to students' motivation than the lack of need support (Bartholomew et al., 2011a; Haerens et al., 2016). For that reason, we recommend examining the "dark side" of need-supportive teaching in future research.

The current study took place in higher education. Although SDT has proven to be a general theory applicable in diverse contexts and cultures (Ryan & Deci, 2017), this does not automatically imply that the results of the current study are generalizable to other contexts. Further research in other contexts, like primary and secondary education, is recommended.

THEORETICAL IMPLICATIONS

Most of the studies on need-supportive teaching make use of students' perceptions (Stroet et al., 2013). It is assumed that students' perceptions are a good representation of the dynamics that take place, and it is taken for granted that we do not know how students' perceptions arise. However, our study uncovered the importance of studying students' perceptions in more detail. Our results showed that students' perceptions do not correspond one-on-one to the teaching approach that students were experiencing in the scenarios. The emphasized need support is recognizable in students'

perceptions, both in Study 1 and 2. Still, the generally positive perceptions of all three need-supportive teaching approaches indicate that besides actual behavior, the informational aspect plays a role. It seems that when a teacher adopts a teaching approach with an information aspect rather than a controlling aspect (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017), students are more positive about the teaching approaches in general.

The difference in the role of involvement between Study 1 and 2 indicates that besides the actual behavior and informational aspect, students' preferences play a role in students' perceptions as well. Day-to-day experiences accumulate into contextual preferences (e.g., Pennings & Hollenstein, 2020). Our study indicated that those contextual perceptions impact students' situational perceptions.

Where previously students' perceptions were studied as if; our study implies that students' perceptions are based on specific behavior, the nature of this behavior (need supportive or not), *and* students' preferences, which are built on a series of experiences. At least we have shown that students' perceptions of need-supportive teaching are not one on one the same as the provided teacher support. This insight could have consequences for studies on the association between need-supportive teaching and students' motivation. For example, it offers possible explanations for the fact that associations between need-supportive teaching and students' motivation are more striking at a general level (Ryan & Deci, 2017).

PRACTICAL IMPLICATIONS

For teachers in classrooms, our study indicates that they should be aware of the impact of their teaching approach. This impact can be direct but also indirect by the nature of their approach (i.e., the informational aspect) and the contextual perception of students' preferences that are built on a series of experiences. Students can recognize teacher approaches, but it seems that their perceptions of the teaching approach also depend on the nature of the approach and past experiences. Instead of a list of teaching approaches that a teacher should provide, the advice we would like to give to teachers is to make sure to apply a need-supportive teaching approach, no matter which aspect, and to build a culture in which students' are used to need-supportive teaching approaches. Make sure not to be controlling and provide students with information about how to self-determine learning (i.e., the informational aspect of a teaching approach; Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017).

CONCLUSION

Confronting students with scenarios depicting three teachers with a different motivating teaching approach resulted in different student perceptions of the three approaches of need-supportive teaching. This means that students can differentiate between the three approaches. The scenarios all resulted in positive perceptions overall, which indicates that none of the approaches was preferable. Results showed that students based their perceptions not solely on actual teacher behaviors. It seems plausible that students' perceptions are also based on the nature of the teaching approach (i.e., the informational aspect; Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017) and contextual preferences of students that are built on a series of experiences (Pennings & Hollenstein, 2020). Teachers are advised to pay attention to be need-supportive. The results of the current study seem to indicate that there is no need to apply all aspects of the three need-supportive teaching approaches in each situation.

AUTHOR'S NOTE

ACKNOWLEDGMENT OF AUTHOR CONTRIBUTIONS

All authors designed the study, ML and LW recruited participants and collected the data, ML, LW, and SL developed the instrument, ML analyzed the data, and ML drafted the manuscript, all authors contributed to critical revisions of the paper, LW, RR and SL supervised the study.

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APPENDIX A – SCENARIOS

AUTONOMY SUPPORT SCENARIO: NINA

It is the first lesson of the semester. During this lesson, the teacher, Nina, describes the central assignment for this semester.

Nina introduces the assignment by presenting a professional dilemma to the students. This professional dilemma reflects a realistic situation that students are likely to face after graduation, making the assignment relevant to students' professional development. The purpose of the assignment is to find an adequate solution for the professional dilemma while taking into account the available time and equipment. Solving the dilemma will help students to become better professionals.

One of the students wonders whether there is sufficient time to finish the assignment. Nina explains that students have to plan their work well, but that they are free to choose at what time they will work on the assignment and which approach they will take. However, they cannot choose the professional dilemma, because otherwise, they would lose too much time designing the dilemma. In addition, with a predetermined professional dilemma Nina can make sure the assignment is relevant for the students' learning processes.

One of the students calls this restriction patronizing. She understands the assignment well, but she wants to discuss her own case for this assignment. Nina listens to the student's arguments and asks her whether her case could fit within the outlined dilemma. After some reflection, the student agrees that her case does have similarities with the proposed dilemma.
After the introduction students start working on the professional dilemma.

STRUCTURE SCENARIO: EVA

It is the first lesson of the semester. During this lesson, the teacher, Eva, describes the central assignment for this semester.

Eva mentions the guidelines for the assignment in her instruction and verifies whether every student understands these guidelines by asking questions. When a guideline is not understood well, she tries to rephrase her expectations, and she tries to clarify the guideline with a concrete example. Students receive opportunities to ask questions during and after instruction.

One of the students wonders whether there is sufficient time to finish the assignment. Eva states that success is determined by students' own effort and time investment. Therefore, when students invest sufficient effort, they should be able to succeed. According to Eva, everyone can learn a great deal from this assignment.

Eva advises the students not to compete with each other but to help each other when needed by, for example, providing each other with constructive feedback. She asks the student, who had concerns about the attainability of the assignment, how she intends to tackle the assignment, and the problems she foresees. After the student has explained her intended approach, Eva shows the student alternative approaches. Finally, she provides feedback and tips to succeed in the assignment, regardless of the chosen approach.

At the end of the introduction, Eva tells her students they can ask for feedback by e-mail or during the scheduled classes. After the introduction of the assignment, the students start working on the assignment.

INVOLVEMENT SCENARIO: SOFIE

It is the first lesson of the semester. During this lesson, the teacher, Sofie, describes the central assignment for this semester.

Sofie asks the students to formulate their expectations for the semester and the assignment. They briefly discuss these expectations in a group discussion. Sofie makes sure that every student takes part and can express his or her expectations without being judged by others. By doing so, she tries to manage students' attitudes towards the assignment to ensure they can optimally learn. She tries to solve potential problems and provides additional attention to students who suffer from, for example, fear of failure.

One of the students wonders whether there is sufficient time to finish the assignment. Sofie asks the student to explain her concerns. The student points out that she is not sure about how to find the right resources for the assignment. Sofie confirms that finding resources is a difficult but important skill. Therefore, she suggests paying attention to the selection of resources during the next lesson.

Another student wonders what she should focus on first when working on the assignment. Sofie shows an understanding of the student's doubts. She explains that they will discuss this later on during the lesson. That way, all students can benefit from her instruction.

At the end of the lesson, the students start working on the assignment. One of them is insecure and asks Sofie for support. Sofie listens to the problems and reassures the student.

APPENDIX B – TASC-Q

Autonomy support	
1	The teacher gives a lot of freedom in how students organize their study
2	The teacher listens to students' ideas
3	It seems like the teacher is always telling students what to do [a]
4	The teacher doesn't give much choice in how students can organize their study [a]
5	The teacher doesn't listen to students' opinion [a]
6	The teacher explains how students' can use the things they learn in school
7	The teacher is always getting on students' case about how they organize their study [a]
8	The teacher doesn't explain why what students do in school is important to them [a]
Structure	
9	The teacher doesn't make clear what she expects of students in class [a]
10	If students can't solve a problem, the teacher shows the students different ways to try to
11	Every time the students do something wrong, the teacher responds differently [a]
12	The teacher doesn't tell students what they expect of them [a]
13	The teacher checks whether students are ready before she starts a new topic
14	The teacher keeps changing how she responds towards students [a]
15	The teacher shows students how to solve problems
16	The teacher makes sure students understand before she moves on
Involvement	
17	The teacher knows the students well
18	The teacher just doesn't understand the students [a]
19	The teacher talks with the students
20	Students can't count on the teacher when they need her [a]
21	The teacher likes the students
22	The teacher spends time with the students
23	The teacher really cares about the students
24	The students can't depend on their teacher for important things [a]

Note. The response scale ranged from 1 to 5.
[a] negatively worded items were recoded before analysis.


5

Chapter 5

BUILDING RELATIONSHIPS IN HIGHER EDUCATION

to Support Students' Motivation

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ABSTRACT

Student-teacher relationships in higher education take place in two embedded social contexts: the in-class environment and the educational institute in which the in-class environment is situated. The interplay between the two contexts and their association with students' motivation was studied in the current study. In a broad sample (N = 597), perceptions of student-staff relationship quality, need-supportive teaching in class, and autonomous and controlled motivation were measured. Perceptions of in-class teacher involvement were associated with autonomous motivation, while perceptions of in-class teacher structure were associated with controlled motivation. The association of perceptions of in-class teacher involvement and autonomy support with autonomous motivation seemed to be suppressed by perceptions of trust in benevolence. This indicates that students can get a "just tell me what to do"-attitude when trust in benevolence makes them shift from being supported to depending on support. Studying both embedded contexts in one analysis resulted in a more fine-grained insight.

Keywords: Student-staff interactions; Need-supportive teaching; Relationship quality; Motivation; Self-Determination Theory

Higher education (HE) is different from other educational contexts in several ways (Briggs et al., 2012; Christie et al., 2008). The most evident distinction is the emphasis on students as independent learners (Bailey, 2013; Leese, 2010). Students in higher education are encouraged to take up responsibility for their learning (Brooks & Everett, 2008), and to regulate their learning autonomously (Leese, 2010). This means that a strong emphasis is put on students' autonomous motivation (Ryan & Deci, 2017), that is, experiencing volition and being self-endorsed in their actions.

Students' autonomous motivation is ignited by their social context (Black & Deci, 2000; Ryan & Deci, 2017; Skinner et al., 2008). In higher education, students' social contexts are diverse, for example, class, project-group, campus, dorm, and friends. These social contexts are studied from several perspectives, for example, in studies on students' sense of belonging (e.g., Ahn & Davis, 2020). Previous studies have shown that especially student-staff relationships are important to support students in taking responsibility for their own learning (Roorda et al., 2011; Scanlon et al., 2007; Smith, 2007). For example, Middleton and colleagues (2020) conducted focus group discussions and interviews with undergraduate students in the UK. They investigated students' uptake and responses to assessment feedback. They found that student-teacher relationships were crucial in students' action-oriented behavior. Students reported that they were better able to cope with and act upon feedback when they can rely on their teachers to be available for help and support.

Concerning student-staff relationships, two embedded contexts can be distinguished: in-class and in the HE-institute. Those social contexts are not restricted to the physical location but are determined by social aspects, such as participants and social rules. Both the effects of teaching approaches in class (e.g., Dincer et al., 2019; Dupont et al., 2013; Hospel & Galand, 2016) and relationship quality with faculty and staff within the larger HE-institute context (e.g., Scanlon et al., 2007; Snijders et al., 2019; Tett et al., 2017) are studied. However, in previous research, both contexts were studied in isolation, while it seems obvious that both contexts reciprocally affect each other. Students' perceptions of the student-staff relationship quality within the HE-institute could affect their perception of the teaching approaches by their teacher in class, and vice versa, their perceptions of the teaching approach accumulate into their perception of the student-staff relationship quality. Teaching approaches in class and relationships with an institute's faculty and staff are embedded contexts (Connell & Wellborn, 1991).

We will illustrate how those contexts are embedded with an example of Linda, a Dutch first-year student at a polytechnic university. Before the start of the academic year, Linda had severe doubts between two study programs. She could not decide which program to choose from. The study advisors of the two study programs helped her out by dedicating time and discussing the pros and cons of both programs. Linda was delighted with the help she received. When the academic year started, the first lessons were very chaotic. The teachers were not able to provide clear guidelines, and it took several class meetings before the students grasped what was expected of them. The switch from secondary school to university was a culture shock to all students. Given the positive experiences Linda had with the study advisors, she gave the teachers some credit, and where some other students lost their motivation instantly, Linda kept inspired and persevered.

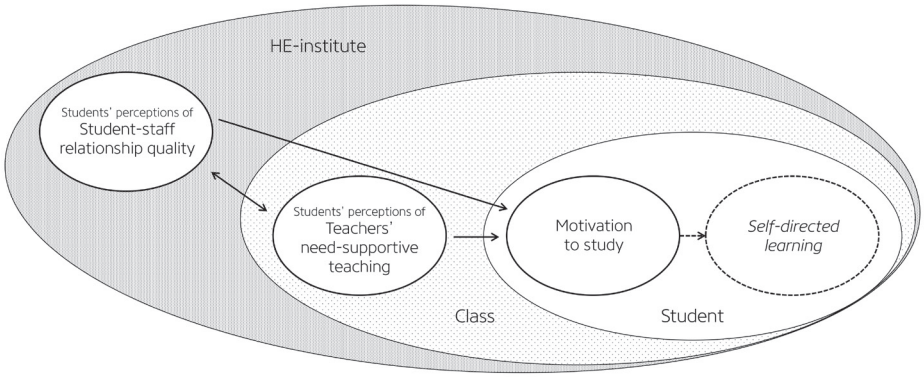
The case of Linda is only one example of how the student-staff relationship quality and teaching approaches are intertwined and strengthen or counteract the effect on students' motivation. However, how both contexts reciprocally affect each other remains a blind spot in HE-literature. In literature about teaching approaches, the question is raised what is more important, students' general perception of their teacher, or the perception about the specific teaching approaches (e.g., Katz et al., 2010). With this insight, teachers are better able to stimulate students' motivation. In the current study, the interplay between teaching approaches and relationship quality with the entire faculty and staff of an institute is explored (see Figure 5.1).

STUDENTS' SOCIAL CONTEXT IN HIGHER EDUCATION

Students' social context situates both within the class and within the educational institute. It includes contacts with peers, teachers, study-advisors, and other staff. Research from diverse theoretical perspectives has shown that teacher-student relationships are associated with motivational outcomes (Komarraju et al., 2010; Wentzel, 2009; Wubbels et al., 2006). Concerning student-teacher relationships, two embedded contexts can be distinguished (see Figure 1). Grounded in Self-Determination Theory (SDT; Ryan & Deci, 2017), the Self-System Model of Motivational Development (Connell & Wellborn, 1991; Skinner & Belmont, 1993) specifies the effect of the social context on students' motivation in three teaching approaches:

autonomy support, structure, and involvement (Skinner & Belmont, 1993; Skinner et al., 2008). Those teaching approaches are often referred to as need-supportive teaching (e.g., Hornstra et al., 2018; Stroet et al., 2013; Vansteenkiste et al., 2012). Within the broader context of the HE-institute, the student-teacher relationship is represented in the relationship quality with faculty and staff. We first explain both need-supportive teaching and relationship quality with faculty and staff in more detail. Second, we elaborate on the embedded nature of both social contexts.

Figure 5.1 *Embedded Contexts in Student-Teacher Relationships*



Note. Constructs presented in italics and dotted lines were not included in the current study.

NEED-SUPPORTIVE TEACHING

Teachers can support students' motivation by providing need-supportive teaching (Ryan & Deci, 2017; Skinner et al., 2008). By providing autonomy support, structure, and involvement, teachers support respectively students' feelings of autonomy, competence, and relatedness, i.e., the three basic psychological needs (Connell & Wellborn, 1991; Skinner & Belmont, 1993). These basic psychological needs are found to be vital for students' motivation as the satisfaction of these needs is associated with more autonomous motivation, engagement, persistence, and well-being. In contrast, the frustration of these basic needs is associated with controlled motivation, disengagement, disaffection, and problem behavior (see Vansteenkiste et al., 2020).

To support students' feelings of autonomy, a teacher can adopt an autonomy-supportive approach. That is, empowering students to

experience volition and self-endorsement in their learning, for instance, by paying attention to the relevance of learning, offering choices, and attuning instruction to students' interests and perspective, and allowing criticism by students (e.g., Aelterman et al., 2019; Jang et al., 2016). Teachers can support feelings of competence by providing structure, and hence they are reinforcing students' experiences of effectiveness (Skinner, 1995). A teacher can provide structure by showing confidence in students' abilities, providing informational feedback and help where needed, and providing clear expectations (e.g., Aelterman et al., 2019; Skinner, 1995). Students' feelings of relatedness can be supported by showing involvement (Furrer & Skinner, 2003). A teacher can show involvement by showing warmth and affection to students, dedicating time, and being available for interpersonal support (Furrer & Skinner, 2003).

Black and Deci (2000) studied the associations between students' perceptions of autonomy support and students' autonomous motivation and achievement. They found that students' perceptions at the start of the course predicted students' autonomous motivation and achievement during the course (Black & Deci, 2000). Edmunds and colleagues (2008) found that satisfaction of students' basic psychological needs facilitated their autonomous motivation in a university exercise class. Their study showed that students who received support in a need-supportive way (i.e., autonomy support, structure, and involvement) experienced more need support and need satisfaction than the students who received non-need-supportive teacher support. Baeten and colleagues (2013) came to the same conclusion in their study on the effect of the learning environment on students' motivation in teacher training. They found that the composite perception of need-supportive teaching was a significant positive predictor of autonomous motivation. The associations between need-supportive teaching and students' need satisfaction and engagement were confirmed by Dupont and colleagues (2013) for students in the last year of their university studies, and by Dincer and colleagues (2019) for English as Foreign Language students in their first year at university.

RELATIONSHIP QUALITY WITH FACULTY AND STAFF

A HE-student typically has encounters with more than one teacher and not exclusively with teachers, but also with study-advisors and other staff. In the example of Linda, study advisors helped her to make an informed choice. Those student-staff interactions accumulate into students' perceptions of

the relationship quality with faculty and staff (Snijders et al., 2018). The perceived overall strength of this student-staff relationship is represented in the relationship quality (Bowden, 2011; Snijders et al., 2018).

Based on work by Roberts and colleagues (2003), Snijders and colleagues (2018) have operationalized relationship quality in higher education into five dimensions: students' trust in staff's honesty, students' trust in staff's benevolence, students' affective commitment, students' affective conflict, and student's overall satisfaction related to the staff's performance. The perceived trust, affect, and satisfaction in faculty and staff thus determine the quality of the student-staff relationship.

Trust in staff can be divided into two aspects: trust in honesty and trust in benevolence (Roberts et al., 2003; Snijders et al., 2018). Trust in honesty reflects students' perceptions of the credibility and integrity of faculty and staff. For instance, whether students feel they can rely on the staff, believe their sincerity, and perceive staff's actions as effective and reliable (Snijders et al., 2018). Trust in benevolence refers to whether students feel that their faculty and staff care about their welfare. It includes how students perceive the staff's actions and whether they perceive those actions to be beneficial for students. Moreover, trust in benevolence also entails that students trust staff in that they will avoid negative outcomes for them (Snijders et al., 2018).

Both positive affection and its negative counterpart are determinants of relationship quality (Snijders et al., 2018). Affective commitment is represented by students' feelings of wanting to belong or be connected to their faculty and staff. Affective conflict refers to the level of conflict students experience between them and staff, such as feelings of anger and frustration, and is a negative indicator of relationship quality (Snijders et al., 2018). Satisfaction refers to the level of cumulative satisfaction students experience in their relationship with their staff.

Tett and colleagues (2017) followed a cohort of students entering a Scottish university. They found that feeling connected to their institution, staff, and peers was critical for students to cope with the transitions. Supportive relationships can only be formed when students achieve confidence and build a relationship of trust with the staff. Scanlon and colleagues (2007) underline this finding and state that trusted representatives of the university are important for the development of student identity. Tantleff-Dunn and colleagues (2002) studied conflicts between students and staff in psychology classes at a university. They concluded that conflicts

are mainly caused by a lack of students' perceptions of fairness. Paying attention to fairness, for example, of decisions and grades, could be a strategy to reduce conflicts (Tantleff-Dunn et al., 2002). Conflicts are assumed to affect interpersonal relationships in university negatively and to result in decreased student success (Zhu & Anagondahalli, 2017).

EMBEDDED CONTEXTS

Both need-supportive teaching and student-staff relationship quality refer to interactions between students and staff. However, these interactions occur in a set of social contexts (Connell & Wellborn, 1991). Where need-supportive teaching interactions take place in class, the social context of student-staff relationship quality is spread out to the HE-institute as a whole. The class context is embedded in the HE-institution context, and those embedded contexts have differentiated effects on students, as the social (e.g., participants, social rules) and historical influences (i.e., past experiences) within the contexts are diverse (Connell & Wellborn, 1991). For example, during class, it is not appropriate to talk about personal feelings that are not directly related to the topic of the lesson, however, in a one-to-one mentor conversation, teachers encourage students to talk about personal experiences. However, the activities in the different social contexts affect each other reciprocally (Connell & Wellborn, 1991). Teachers who have one-to-one mentor conversations with their students are better able to attune their instruction to students' interests and perspectives, as they know their students better.

STUDENTS' MOTIVATION

It can be assumed that both embedded contexts, in-class, and the HE-institute context as a whole, have differentiated effects on students' motivation (see Figure 5.1; Connell & Wellborn, 1991). From an SDT-perspective, students' motivation can be described on a continuum ranging from fully self-determined to non-self-determined (Deci & Ryan, 2000; Ryan & Connell, 1989; Ryan & Deci, 2017). The satisfaction of students' basic psychological needs (i.e., autonomy, competence, and relatedness) determines the quality of their motivation (Deci & Ryan, 2008; Ryan & Deci, 2017). Satisfaction of the basic needs is associated with more self-determination and results in the form of autonomous motivation, while frustration of the basic needs is associated with less self-determination

and results in the form of controlled motivation (Deci & Ryan, 2000; Vansteenkiste et al., 2006; Vansteenkiste et al., 2020).

AUTONOMOUS MOTIVATION

Students who study because they experience joy and pleasure when studying are intrinsically motivated (Deci & Ryan, 2000). The activity of studying itself is intrinsically rewarding for these students. In situations where studying is not intrinsically rewarding in itself, students can experience that they are studying for themselves, and therefore they are autonomously motivated. In those situations, studying is instrumental in obtaining important personal goals (Deci & Ryan, 2000). The student experiences a level of identification with the activity and its importance, and the student experiences identified motivation (Deci & Ryan, 2000; Ryan & Connell, 1989; Ryan & Deci, 2017). The student "wants" to become a medical doctor, for example, and recognizes that you have to study hard to become a doctor and is thus motivated to study. Students who experience identified motivation find the activity personally valuable (Deci & Ryan, 2000).

CONTROLLED MOTIVATION

In addition to those autonomous motivators, students can be more controlled in their motivation as well (Ratelle et al., 2007; Vansteenkiste et al., 2009). When they study because of internal pressure caused by external forces, e.g., feeling ashamed or guilty to others when not studying, their motivation is introjected (Deci & Ryan, 2000). In those cases, an external force, for example, a reward or punishment, is projected on the self. The students are administering the consequences of the external force to themselves and are studying because of the internal pressure (Deci & Ryan, 2000; Ryan & Connell, 1989; Ryan & Deci, 2017). When the student does not internalize the external force, they are externally motivated (Deci & Ryan, 2000). They study because of anticipated rewards or punishments, and as soon as the external force is withdrawn, they stop studying (Deci & Ryan, 2000; Ryan & Connell, 1989; Ryan & Deci, 2017). Both introjected and external motivation are forms of controlled motivation (Deci & Ryan, 2008).

CURRENT STUDY

Students in higher education are presumed to actively regulate their own learning and become independent learners (Brooks & Everett, 2008; Leese,

2010). Independent learners need to be autonomously motivated to study (Ryan & Deci, 2017). The influence of teachers and staff on students' motivation depends on the context (Connell & Wellborn, 1991). In class, teachers' need-supportive teaching approach affects students' motivation. At the same time, in the context of the HE-institute, faculty and staff interactions, as a whole, determine students' perceptions of relationship quality and their motivation (see Figure 1). In the current study, we try to map the interplay between these embedded contexts and the association with students' motivation to shed a more fine-grained light on effective approaches to stimulate students' motivation in HE.

Our first research question is: *Are students' perceptions of their teachers' need-supportive teaching associated with their perceptions of the student-staff relationship quality?* As the contexts are embedded, we expect that need-supportive teaching approaches contribute to the building of positive student-staff relationships (i.e., relationship quality). The other way around, it seems plausible that students' perceptions of student-staff relationship quality affect students' perceptions of teachers' need-supportive teaching. As Katz and colleagues (2010) argued in their study, students' perceptions are affected by a general perception students have of their teachers. For those reasons, we expect a reciprocal relation, and we expect that students' perceptions of need-supportive teaching approaches and student-staff relationship quality are associated.

For both students' perceptions of need-supportive teaching and student-staff relationship quality, the association with students' motivation is explored. Our second research question is: *Are students' perceptions of need-supportive teaching approaches as well as student-staff relationship quality associated with students' motivation?* For need-supportive teaching, many studies found associations between need-supportive teaching and students' motivation (e.g., Leenknecht et al., 2017; Stroet et al., 2013), however, for relationship quality, less evidence is available. Moreover, to our knowledge, no studies are available that compare the association between need-supportive teaching and student-staff relationship quality with students' motivation. By studying both in one analysis, we can determine whether the social context matters.

Given the reciprocal relationship that we expect between students' perceptions of need-supportive teaching approaches and their perceptions of student-staff relationship quality, it is interesting to examine whether this reciprocal relationship strengthens the association with students'

motivation. For that reason, our final research question is: *Do students' perceptions of need-supportive teaching amplify the association between students' perceptions of student-staff relationship quality and students' motivation, and vice versa?* When the association with students' motivation is strengthened, this provides additional guidelines for teachers on how to apply a motivating teaching approach, which goes beyond the advice we already got from previous research, which solely focused on in-class interactions.

METHOD

PARTICIPANTS AND PROCEDURE

In total, 597 first to fourth-year students from a university of applied sciences (60.80% female, M_{age} = 20.98, SD_{age} = 4.36) filled out all measures completely and were included in the current analysis. Data used in this study originated from a large survey at a Dutch university of applied sciences, which is reported in Leenknecht and colleagues (2017) and Snijders and colleagues (2018).

Students from all bachelor's programs of the university (Economics, Social Sciences, and Technology) were recruited by personalized e-mail. Participation was voluntary, and participants were asked for informed consent. Participants were informed that they were allowed to stop the questionnaire whenever they wanted, without the obligation to give a reason. Participants were informed that their answers were only included in analyses when they gave permission and that their responses were processed anonymously. All participants filled out the questionnaire in their own time and pace via Mailplus software.

MEASUREMENTS

Relationship Quality

Students' perceptions of the relationship quality with their faculty and staff at the university were measured with a newly developed questionnaire. More details about the reliability and validity of the questionnaire are provided in Snijders and colleagues (2018), and the factor structure was successfully replicated in other studies (see Snijders et al., 2019, 2020). The questionnaire consists of statements about how students perceive the quality of their relationship with their faculty and staff. The students

indicated to what level they agreed with the statements on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Example items and reliability scores of the scales are provided in Table 5.1. Snijders and colleagues (2018) used the data to test the internal structure of the questionnaire and to test the applicability of the concept of relationship quality in higher education.

Need-Supportive Teaching

The Dutch and shortened version of the Teacher as a Social Context Questionnaire (TASC-Q; Belmont et al., 1988; Vansteenkiste et al., 2009) was used to measure students' perceptions of their teachers' need-supportive teaching. Students answered the 24 items on a scale from 1 (*completely disagree*) to 5 (*completely agree*). Factor structure was confirmed with confirmatory factor analysis (see Leenknecht et al., 2017). As the factors have shown to be correlated in previous studies (e.g., Hornstra et al., 2018), McDonald's (1970) omega is a more accurate measure of the reliability of the scale than Cronbach's alphas (Cho & Kim, 2015; Sijtsma, 2009). Reliability scores and example items per dimension are displayed in Table 5.1.

In the study by Leenknecht and colleagues (2017), students' perceptions of need-supportive teaching in higher education were explored. Data were analyzed with a person-oriented approach to make clusters in students' perceptions. Three clusters were found: high, average, and low perceived need-supportive teaching.

Motivation

Students' motivation to learn was measured with the 16-item Dutch version of the Academic Self-Regulation Questionnaire (SRQ-a; Ryan & Connell, 1989; Vansteenkiste et al., 2009). The questionnaire consists of students' external, introjected, identified, and intrinsic motivation. Example items are displayed in Table 5.1. Students responded to the items on a scale from 1 (*completely disagree*) to 5 (*completely agree*). Reliability scores per scale are provided in Table 5.1.

The data were used in the study by Leenknecht and colleagues (2017) to study the association between the clustering of students' perceptions of need-supportive teaching and students' autonomous and controlled motivation. Moreover, associations with students' academic achievement were explored.

Table 5.1 *Example Items and Reliability Scores*

	Example item	ω
Relationship quality		
1. Trust in honesty	My university is trustworthy	.96
2. Trust in benevolence	When I confide my problems to my university, I know they will respond with understanding	.89
3. Affective commitment	I continue to deal with my university because I like being associated with them	.96
4. Affective conflict	I am frustrated with my university	.97
5. Satisfaction	I am delighted with the performance of my university	.99
Need-supportive teaching		
6. Autonomy support	My teachers give me a lot of freedom in how I organize my study	.78
7. Structure	My teachers show me how to solve problems	.81
8. Involvement	My teachers really care about me	.93
Motivation		
9. Intrinsic	I'm motivated to study because I'm highly interested in doing this	.94
10. Identified	I'm motivated to study because it is personally important to me	.77
11. Introjected	I'm motivated to study because I would feel guilty if I wouldn't do so	.90
12. External	I'm motivated to study because I'm supposed to do so	.91

ANALYSES

Correlations were calculated and structural equation modeling was applied to study the associations between students' perceptions of student-staff relationship quality, need-supportive teaching, and their motivation. The measurement model was replicated as applied in previous analyses on the same dataset (see Leenknecht et al., 2017; Snijders et al., 2018). The full structural equation model was tested using Mplus (Version 8). Assessment of the model fit was based on the comparative fit index (CFI; Bentler, 1990), Tucker-Lewis index (TLI; Tucker & Lewis, 1973), the root-mean-square error of approximation (RMSEA; Steiger, 1990), and the standardized root mean square residual (SRMR). Combination rules of Hu and Bentler (1999) were applied to determine cutoff values. Model fit was considered acceptable when: (a) CFI and TLI were above .90, and SRMR was lower than .06; or (b) when both SRMR and RMSEA were lower than .06 irrespectively the value of CFI and TLI (Hu & Bentler, 1999). The purpose of the current study and

the analyses was explorative, to obtain insight into the predictive value and the interplay between the two embedded contexts; for that reason, no model comparisons were made.

RESULTS

RESEARCH QUESTION 1: ASSOCIATIONS BETWEEN EMBEDDED CONTEXTS

The first research question was: *Are students' perceptions of their teachers' need-supportive teaching associated with their perceptions of the student-staff relationship quality?* In general, students had positive perceptions of the quality of the relationship with their faculty and staff. This is reflected in high scores on dimensions of relationship quality (M = 4.69 - 4.93 on a 7-point scale; see Table 5.2), except for affective conflict, which is a negative indicator of relationship quality, where students scored lowest (M = 3.01, SD = 1.57). Correlations between the dimensions of relationship quality were moderate and in the expected direction (r = .45 - .68; see Table 5.2). Students' perceptions of need-supportive teaching were generally high as well (M = 3.42 - 3.73 on a 5-point scale; see Table 5.2). Correlations between the dimensions were moderate (r = .64 - .66; see Table 5.2).

The strongest associations between students' perceptions of student-staff relationship quality and students' perceptions of need-supportive teaching were found between trust in benevolence, affective conflict, and satisfaction on the one hand and involvement and structure on the other hand (r = .52 - .60; see Table 5.2). Associations were lowest for trust in honesty, affective commitment, and autonomy support.

RESEARCH QUESTION 2: ASSOCIATIONS WITH STUDENTS' MOTIVATION

The second research question was: *Are students' perceptions of need-supportive teaching approaches as well as student-staff relationship quality associated with students' motivation?* Students scored highest on identified motivation (M = 4.11, SD = 0.53) and lowest on external motivation (M = 2.35, SD = 0.82). Correlations between the motivation scales were low, except for intrinsic and identified motivation and introjected and external motivation. Those correlations were moderate (r = .55 and r = .59 respectively; see Table 5.2).

To test the associations of students' perceptions of student-staff relationship quality and teachers' need-supportive teaching with their motivation, we tested two separate structural equation models. First, we

tested a model in which students' perceptions of student-staff relationship quality was a predictor of students' motivation (Model 1 in Figure 5.2; χ^2 (398) = 1063.08, p < .001). The model had an acceptable fit (CFI = .94, TFI = .92, RMSEA = .05, SRMR = .05; Hu & Bentler, 1999). Affective commitment was found to be a statistically significant positive predictor of students' intrinsic motivation (b = 0.37, p < .001), identified motivation (b = 0.55, p < .001), and introjected motivation (b = 0.19, p = .020). Affective conflict was a statistically significant negative predictor of intrinsic (b = -0.21, p < .001) and identified motivation (b = -0.30, p < .001), and a statistically significant positive predictor of introjected (b = 0.13, p = .019) and external motivation (b = 0.17, p = .003). Trust in honesty, trust in benevolence, and satisfaction were not statistically significant predictors of students' motivation.

Second, we tested a model in which students' perceptions of need-supportive teaching were a predictor of students' motivation (Model 2 in Figure 5.2; χ^2 (506) = 1471.66, p < .001). The model had an acceptable fit (RMSEA = .06, SRMR = .06), although the CFI (= .87) and TLI (= .85) are around the lower bound of what is acceptable (Hu & Bentler, 1999). Students' intrinsic (b = 0.35, p < .001) and identified motivation (b = 0.29, p = .009) were statistically significantly predicted by involvement. Structure was found to be a statistically significant negative predictor of introjected (b = -0.57, p = .003) and external motivation (b = -0.56, p = .004). Autonomy support did not statistically significantly predict students' motivation.

Table 5.2 *Descriptive Statistics and Correlations of Students' Perceptions of Relationship Quality and Need-Supportive Teaching, and Students' Motivation*

				Relationship quality					Need-supportive teaching			Motivation		
	Range	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
Relationship quality														
1. Trust in honesty	1-7	4.91	1.38	-										
2. Trust in benevolence	1-7	4.93	1.34	.68**	-									
3. Affective commitment	1-7	4.69	1.47	.59**	.64**	-								
4. Affective conflict	1-7	3.01	1.57	-.45**	-.48**	-.47**	-							
5. Satisfaction	1-7	4.78	1.43	.64**	.68**	.64**	-.63**	-						
Need-supportive teaching														
6. Autonomy support	1-5	3.73	0.60	.37**	.46**	.36**	-.50**	.44**	-					
7. Structure	1-5	3.42	0.59	.46**	.52**	.41**	-.56**	.54**	.66**	-				
8. Involvement	1-5	3.49	0.63	.44**	.60**	.47**	-.57**	.54**	.64**	.66**	-			
Motivation														
9. Intrinsic	1-5	3.55	0.75	.21**	.21**	.31**	-.25**	.22**	.29**	.30**	.36**	-		
10. Identified	1-5	4.11	0.53	.29**	.28**	.41**	-.35**	.30**	.38**	.34**	.39**	.55**	-	
11. Introjected	1-5	2.67	0.95	-.04	-.04	.04	.06	-.02	-.05	-.13**	-.03	.04	.03	-
12. External	1-5	2.35	0.82	-.08	-.09*	-.03	.13**	-.08	-.09*	-.18**	-.12**	-.18**	-.20**	.59**

N = 597; * $p < .05$; ** $p < .01$

RESEARCH QUESTION 3: THE INTERPLAY IN PREDICTING STUDENTS' MOTIVATION

The third research question was: *Do students' perceptions of need-supportive teaching amplify the association between students' perceptions of student-staff relationship quality and students' motivation, and vice versa?* We tested a combined model in which both students' perceptions of student-staff relationship quality and teachers' need-supportive teaching were included as predictors (see Model 3 in Figure 5.2; χ^2 (1061) = 2376.65, $p < .001$). By doing so, we were able to identify the interplay between the perceptions in predicting students' motivation. The combined model had an acceptable fit (RMSEA = .05, SRMR = .05, CFI = .91, TFI = .90; Hu & Bentler, 1999).

Affective conflict was no longer predicting students' motivation in the combined model. This is an indication that the association between students' perceptions of affective conflict and students' motivation is mediated by students' perceptions of teachers' need-supportive teaching (i.e., an indirect effect, MacKinnon et al., 2000). As correlations between affective conflict and involvement and structure were highest (see Table 5.2), and as students' motivation was only statistically significantly predicted by involvement and structure, these two need-supportive teaching approaches were candidate mediators. A Sobel test (Barron & Kenny, 1986) confirmed that it seems plausible that the association between affective conflict and students' motivation is mediated by involvement for intrinsic ($p < .001$) and identified ($p < .05$) motivation, and by structure for introjected ($p < .05$) and external ($p < .05$) motivation.

Trust in benevolence was found to be a statistically significant negative predictor of students' intrinsic ($b = -0.44$, $p < .001$) and identified motivation ($b = -0.50$, $p < .001$) in the combined model. At the same time, it was not a statistically significant predictor in Model 1. This indicates that trust in benevolence probably acts as a suppressor (Ludlow & Klein, 2014). The addition of trust in benevolence in a model with need support increased the coefficient of involvement from 0.35 to 0.43 for intrinsic motivation and from 0.29 to 0.31 for identified motivation. The explained variance was increased respectively, from 0.18 to 0.26 and from 0.28 to 0.47 (see Figure 5.2). Moreover, autonomy support became a statistically significant predictor of identified motivation ($b = 0.34$, $p = .044$) in the combined model, while it was not statistically significantly predicting identified motivation ($b = 0.32$, $p = .10$) in Model 2. Those patterns provide sufficient support

for the assumption that trust in benevolence acts as a suppressor for both autonomy support and involvement (Ludlow & Klein, 2014).

All other statistically significant associations found in the combined model were comparable to the associations found in Models 1 and 2 (see Figure 5.2).

DISCUSSION

The relationship that students experience with teachers and staff can vary among programs, year of study, classes, and the subject that the teacher teaches. However, in general, two social contexts can be distinguished in which student-staff relationships are developed: in-class and in the HE-institute. Those social contexts differ in their social aspects (e.g., participants and social rules) but are not restricted to the physical location (e.g., the classroom or campus). Teachers' need-supportive teaching approach represented the in-class student-teacher relationship and was found to affect students' motivation positively (e.g., Aelterman et al., 2019; Ryan & Deci, 2017). More generally, the affective quality and the socializing aspect of student-staff relationships (i.e., relationship quality) affect students' motivation (Wentzel, 2009). The current study was, to our knowledge, the first study on how those embedded contexts reciprocally affect the association with students' motivation.

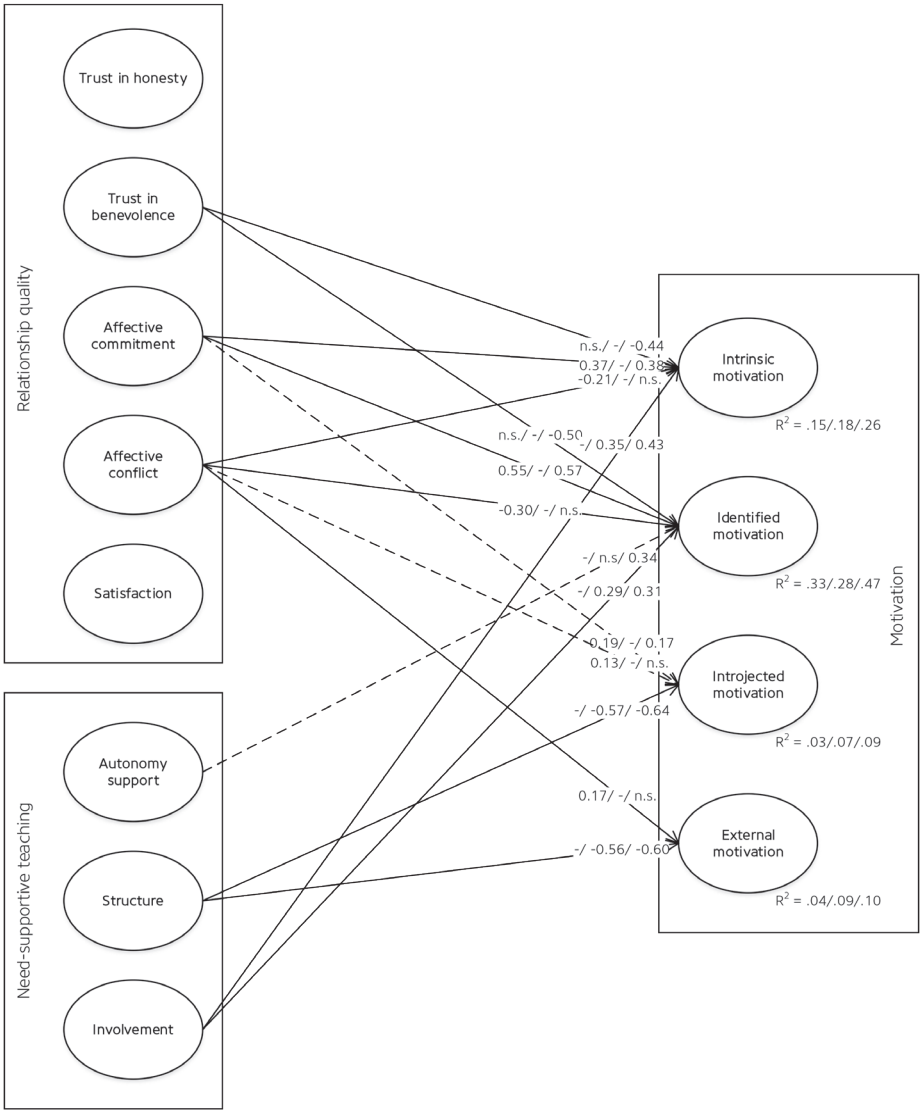
The current study was a secondary analysis of data that was available from two previous studies (see Leenknecht et al., 2017 and Snijders et al., 2018), which provided us with the opportunity to compare the association with students' motivation of the in-class teaching approach and the student-staff relationships in the context of the HE-institute. The wide range of the current sample (students from various study programs and from year 1 to 4) is a strong point of the current study, which, due to the large sample size, expands the generalizability of the results.

MAIN RESULTS

The main results of the current study can be summarized in four points. First, students' motivation is associated with perceptions of student-staff relationship quality, especially the affective component. Second, the association between students' perceptions of affective conflict and students' motivation was mediated by students' perceptions of involvement and structure. Third, Trust in benevolence acts as a suppressor for the

association of autonomy support and involvement with autonomous motivation. And finally, the study underlines that it is important to study the interplay between embedded social contexts. We will discuss our main results one by one.

Figure 5.2 *Structural Equation Model of Relationship Quality and Need-Supportive Teaching on Motivation*



Note. Standardized b's are presented for Model 1/ Model 2/ Model 3; Dotted lines: $p < .05$; Solid lines: $p < .01$; n.s. = not significant.

Associations Between Motivation and Relationship Quality

Both students' perceptions of teachers' need-supportive teaching, as well as their perceptions of student-staff relationship quality, were found to be associated with students' motivation. In the context of the HE-institute, students' perceptions of affective commitment and affective conflict were found to be significant predictors of students' motivation. The experience of affective commitment and the absence of affective conflict positively contributed to students' autonomous motivation and, albeit less stringent, to students' introjected motivation. Moreover, more perceived affective conflict was found to be associated with more external motivation. Thus, when students experience an affective bond with faculty and staff, they are more internalizing the external forces, resulting in identified and introjected motivation (Deci & Ryan, 2000). The importance of the affective quality of student-staff relationships is in line with previous research from the perspective of attachment theory (Andriopoulou & Prowse, 2020; Wentzel, 2009). For example, Andrioupoulou and Prowse (2020) describe that doctoral students have a more negative perception of the supervisory relationship quality when they report insecure attachment. However, in general, it is assumed that for students, the importance of their teachers declines with age (Wentzel, 2009) as the emphasis on independent learning grows in higher education (Bailey, 2013; Leese, 2010), dependency on teachers decreases (Hagenauer & Volet, 2014). Moreover, it is assumed that student-staff relationships in higher education are less determinative, as these relationships are between adults (not adult-child or adult-adolescent), and they built on more fragmented interactions at university (Hagenauer & Volet, 2014).

Mediation Effect for Affective Conflict

The role of affective conflict is interesting, as involvement and structure were found to act as mediators for the association between affective conflict and students' motivation. Students who experience conflicts with faculty and staff were found to experience less need-supportive teaching by their teachers and consequently were less autonomously motivated and more controlled motivated. This finding is in line with the study by Tantleff-Dunn and colleagues (2002) on conflicts. They found that the experience of conflicts was associated with the perceived fairness, which is instigated by teachers who do not explain expectations at an early stage and do not provide objective and informational grading, which are both aspects

of a structuring approach (Aelterman et al., 2019). Thus, more conflict is associated with less fairness and structure. This is in line with our results, as we found that more affective conflict was positively associated with introjected and external motivation, and students' perceptions of structure mediated this association.

Affective conflict was found to be negatively associated with involvement as well, which seems logical as involvement reflects teachers who are available to provide interpersonal support and are reinforcing emotional bonds (Furrer & Skinner, 2003), which are aspects that get neglected during conflicts. Students' perceptions of involvement seemed to function as a mediator in the association between affective conflict and intrinsic and identified motivation. This indicates that affective conflict harms students' intrinsic and identified motivation because those students experience less involvement. This finding underlines the interplay between in-class and in the HE-institute contexts on students' motivation.

Trust in Benevolence as Suppressor

Another result that underlines this interplay is that trust in benevolence acts as a suppressor (Ludlow & Klein, 2014) for the association of autonomy support and involvement with identified motivation, and involvement with intrinsic motivation. Higher perceptions of trust in benevolence were associated with higher perceptions of autonomy support and involvement. The association between need-supportive teaching and trust in benevolence is not surprising, as both constructs relate to whether students experience personal interest and care of their teachers and staff (Skinner et al., 2008; Snijders et al., 2018). However, while involvement, and to a lesser extent autonomy support, was found to be associated with autonomous motivation, trust in benevolence was found to hamper autonomous motivation in the combined model. A possible explanation is that students' feelings of trust in benevolence are associated with more reliance on teachers and staff. Students who experience trust in benevolence indicate that their teachers and staff are available for support (i.e., involvement) and show a participative and attuning approach (i.e., autonomy support), which is associated with more students' autonomous motivation. However, our results indicate that this positive association is suppressed by students' perceptions of trust in benevolence. It seems that trust in benevolence makes students *depend* on their teachers and staff to provide that support, which results in less autonomous motivation.

Interplay Between Embedded Social Contexts

The mediator and suppressor effects support our claim that it is important to study both embedded contexts together. Students' perceptions of affective conflict in the HE-institute context only affect students' motivation through students' perceptions of in-class structure and involvement. The other way around, the association between students' perceptions of teacher's autonomy support and involvement in-class and their autonomous motivation is influenced by students' trust in benevolence of the entire staff. Students' perceptions of teacher's need-supportive teaching and student-staff relationship quality are affected reciprocally, and it is this interplay that determines the association with students' motivation. This finding supports Connell and Wellborn's (1991) assumption that each embedded social context is critical in students' development of motivation.

As expected, students' perceptions of need-supportive teaching were found to be positively associated with autonomous motivation and negatively related to controlled forms of motivation (i.e., introjected and external motivation). It is interesting to see that especially involvement is associated with autonomous motivation and structure with controlled motivation. This finding violates the assumption from SDT that all three need-supports should be provided (Ryan & Deci, 2017). However, the correlations across the dimensions of need-supportive teaching are moderate, which indicates that higher involvement or structure is accompanied by higher need-support in general. The fact that involvement is found to be the most powerful predictor of the three dimensions for autonomous motivation indicates that affection, warmth, and availability for interpersonal support is most important for students to get autonomously motivated. These results are in line with, for example, research from Furrer and Skinner (2003). Structure is found to reduce controlled motivations, which indicates that students suffer the most from lack of clarity, ambiguous expectations, and evaluative feedback (i.e., chaos; Haerens et al., 2015).

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The results of the current study are promising, but some limitations apply. The found associations between students' perceptions of relationship quality, need-supportive teaching, and their motivation were modeled as if causal. However, the constructs were all measured at the same time; thus, causality cannot be demonstrated. Longitudinal designs with at least two time points at which the constructs are measured are recommended. By

doing so, the interplay among embedded contexts can be studied in more detail and with more precision.

The two embedded contexts that were studied in the current study were determined by their social aspects (e.g., participants and social rules) and not restricted to a physical location (e.g., the classroom or campus). In-class interactions do not specifically take place in a classroom, but those teacher-student interactions can also take place online. However, at the time the data were gathered, education at the university of applied sciences took predominantly place on campus. Given the recent shift to online education, it is recommended to replicate this study in an online context.

In the current study, only the bright pathway of need-supportive teaching was taken into account, and students' perceptions of the dark pathway of need-thwarting teaching (e.g., Bartholomew et al., 2011a; Haerens et al., 2015) were not measured. As indicated above, the results of the current study seem to suggest that structure can recover controlled motivations by avoiding chaos, as more structure was found to be associated with less controlled motivation. It seems worthwhile to include need-thwarting teaching (i.e., control, chaos, and coldness; Haerens et al., 2015) in further studies to get more insight into those effects on students' controlled motivation. Moreover, as affective conflict is a negative indicator of student-staff relationship quality as well, it is interesting to investigate how this relationship quality dimension relates to need-thwarting teaching approaches.

THEORETICAL IMPLICATIONS

In research on need-supportive teaching, a discussion has recently started about the importance of the three independent dimensions (e.g., Leenknecht et al., 2017) and the presence of a general perception (e.g., Katz et al., 2010). The current study contributes to this discussion in two ways. First, the results indicate that students' perceptions of need-supportive teaching are indeed associated with a more general perception of student-staff relationship quality. Based on the current study, one would advise to include other theoretical perspectives into the investigation, as it seems worthwhile to expand the discussion about the general perception beyond the scope of SDT. As we have shown, constructs from other theoretical perspectives (i.e., relationship quality) can provide additional insight into the association between student-teacher interactions and students' motivation. Second, as we found that especially involvement was associated with autonomous

motivation and structure with controlled motivation, our results indicate that differentiation between the dimensions of need-supportive teaching is beneficial and recommendable. The current study shows that providing structure can recover students' controlled motivation, while involvement can support autonomous motivation.

While autonomy is seen as the central construct in SDT (e.g., Ryan & Deci, 2017), in our study, autonomy support is of less importance. Moreover, in SDT, relatedness and involvement are seen as more distal impacts on students' motivation (Deci & Ryan, 2000), as someone can be intrinsically motivated for individual activities as well. However, our study shows that, also in the HE-context, involvement is important. A conclusion that is found in previous research for other educational contexts as well (e.g., Furrer & Skinner, 2003; Stroet et al., 2013). The importance of involvement is underlined by the finding that affective commitment and affective conflict were the most important dimensions in the association between students' motivation and their perceptions of student-staff relationship quality.

Dimensions of student-staff relationship quality are found to be beneficial for students' engagement (Snijders et al., 2019, 2020). For motivation, those beneficial associations are slightly different. Our results indicate that trust in benevolence can become a negative factor in students' motivation. Students who experience higher levels of trust in benevolence seem to become dependent on teachers' support. They become less autonomously motivated, and probably they get a "just tell me what to do"-attitude.

Research on need-supportive teaching is, in most cases, focused on in-class interactions (e.g., Stroet et al., 2013). For example, the newly developed questionnaire by Aelterman and colleagues (2019) is developed around class situations. Our study implicates that it is worthwhile to take a broader perspective and to include several embedded contexts into analyses. As Connell and Wellborn (1991) state, interactions occur in a set of social contexts, which all have differentiated effects on students' motivation. We now have determined two embedded contexts, but more social contexts can be distinguished, for example, peer groups or collaborative learning teams.

PRACTICAL IMPLICATIONS

The results of the current study have several implications for practice. Teachers can learn that both didactical interactions, as well as out-of-class

interactions, are important, as both contribute to students' perceptions of student-staff relationship quality. Thus, teachers should pay attention to both in-class and out-of-class interactions. Moreover, this finding indicates that supporting students' motivation is a team effort, as motivation is stimulated by in-class (student-teacher) as well as out-of-class interactions (student-staff). Motivating students is a team concern, and teachers are recommended to discuss need-supportive teaching in their team. An individual teacher can stimulate students' motivation, but the results of the current study indicate that staff collaboratively can achieve more.

As the affective component of student-staff relationship quality was found to be associated with students' motivation, mediated by students' perceptions of teacher involvement and structure, teachers are advised to pay attention to the emotions of their students. The emotional bond between teacher and student, and especially avoiding conflict, seems to be an important determinant of students' motivation. It seems important to not only focus on the learning objectives but also pay attention to students' well-being, for example, by actively involving students in sharing their actual mood and thoughts and recognizing and acknowledging negative affect. It is important to get to know your students, as it can magnify your effort to motivate your students in class (through need-supportive teaching).

Teachers are advised to be cautious with trust in benevolence. It is important that students can rely on their teacher for support and that teachers are consistent in their behavior. However, too much support seems to result in students who depend on their teacher and experience less autonomous motivation to study. Thus, teachers should keep in mind that the support they provide is meant to stimulate students' self-directedness. Paying attention to autonomy support could be helpful to avoid students becoming dependent on support, as with autonomy support, the teacher provides students' choices and stimulates students' input.

CONCLUSION

Students' motivation is ignited by their social context (e.g., Connell & Wellborn, 1991; Skinner & Belmont, 1993; Ryan & Deci, 2017). In higher education, two embedded social contexts can be distinguished: in-class teaching approaches and student-staff relationships in the HE-institute. Students' perceptions of both social contexts are associated with their motivation. Especially the affective component of the student-staff

relationship quality was found to be important for students' motivation, as perceived affective commitment and involvement predicted students' more autonomous forms of motivation (i.e., intrinsic and identified motivation). Structure was found to be negatively associated with controlled forms of motivation.

The embedded contexts were found to interact in their association with students' motivation. The association between students' perceptions of affective conflict and students' motivation seems to be mediated by students' perceptions of need-supportive teaching. In contrast, trust in benevolence seems to act as a suppressor for the association between students' perceptions of involvement and autonomy support and autonomous forms of motivation. This means that not only teaching approaches *or* out-of-class interactions are associated with students' motivation, but that it is the interplay of in-class and out-of-class interactions, interactions with both teachers and staff, that affect students' motivation.

AUTHOR'S NOTE

ACKNOWLEDGMENT OF AUTHOR CONTRIBUTIONS

All authors designed the study, ML and IS recruited participants and collected the data, ML and IS developed the instrument, ML analyzed the data, ML and IS drafted the manuscript, all authors contributed to critical revisions of the paper, LW, RR and SL supervised the study.


6

Chapter 6

FORMATIVE ASSESSMENT AS PRACTICE:

The Role of Students' Motivation

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ABSTRACT

Formative assessment can be seen as an integral part of teaching and learning, as formative assessment affects students' learning and vice versa. Students' motivation can theoretically be placed at the center of this reciprocal relationship, as formative assessment is assumed to affect students' need satisfaction of autonomy, competence, and relatedness, and consequently their autonomous motivation. In the current study, two assumptions were tested empirically: formative assessment contributes to students' autonomous motivation and students' need satisfaction functions as a mediator in this relationship. The results provided support for those assumptions and indicated that more perceived use of formative assessment is associated with more feelings of autonomy and competence and more autonomous motivation. The current study demonstrated the benefits of studying formative assessment as practice and provides encouragement for teachers to start applying formative assessment in their classroom. The theoretical model provides teachers with guidelines for an optimal implementation of formative assessment and provides researchers with a framework to study the phenomenon of 'formative assessment as practice' in more depth.

Keywords: Formative assessment; Motivation; Need satisfaction; Need frustration

Formative assessment approaches have expanded over the last decade in response to a traditional view of assessment (i.e., measurement tradition), in which assessment is solely about producing accurate estimations of students' learning to monitor and report on students' progress (Wiliam, 2011). However, despite increased interest, these approaches to assessment have only been minimally adopted by teachers (Boud et al., 2018). Boud and colleagues (2018) reflected on this limited adoption by teachers and made a case for an alternative view on assessment, contrasting with the measurement tradition: assessment as a cultural practice. In their *assessment as practice* view, assessment is seen as a "socially situated interpretive act" (Boud et al., 2018, p. 1109) rather than as an entity on its own. Not the product of assessment, that is, accurate estimations of students' learning, but the process of assessment is of interest when studying assessment as practice. Assessment is seen as a social activity in which a teacher, a student, and peers interact and discuss the standards, criteria, and the assessment practices (Boud et al., 2018). The current study presents and tests a model of formative assessment as practice with a central role for students' motivation.

FORMATIVE ASSESSMENT

In the measurement tradition, formative assessment is often contrasted to summative assessment. In this view, formative assessment is about low-stakes testing, whereas summative assessment concerns high-stakes testing (Wiliam, 2011). However, assessments with a summative or a formative purpose are both used to produce inferences about students' learning (Black & Wiliam, 2018). Therefore, the practice view of assessment (Boud et al., 2018) adopted the understanding of *formative* as was expressed by Black and Wiliam in 2009: Assessments become formative when the inference about a student's learning is "elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited" (Black & Wiliam, 2009, p. 9). In other words, when looking at assessments as a formative practice, the roles of the teachers, the students themselves, and their peers are recognized, and the developmental role of the assessment is highlighted. In this practice view, formative assessment is seen as a cyclical

program of high- and low-stake tasks in which students are actively involved (as assessee and/or assessor).

The cyclical nature of formative assessment is underlined by the growing number of process models of formative assessment (e.g., Ruiz-Primo & Furtak, 2007; Antoniou & James, 2014), which distinguish subsequent steps in formative assessment. Ruiz-Primo and Furtak (2007) view the interplay between a teacher and a student in formative assessment as a chain of actions in their ESRU-model: the teacher *elicits* a response (for instance, with a specific inquiry or task), the *student responds*, and the teacher *recognizes* and *uses* the student's response in further instructions. For example, a teacher uses a quiz at the beginning of a lesson to determine the focus of his/her instruction. Antoniou and James (2014) elaborated on this model and added "communication of expectancies and success criteria" as a first step. Additionally, they distinguish two ways in which teachers can make use of students' responses: provision of feedback and regulation of learning (e.g., incorporating repetition or modifying the task; Antoniou & James, 2014).

Although the cyclical models of formative assessment mention the students' role in formative assessment, students' active involvement is not fully elaborated upon in those models. Black and Wiliam (2009, 2018) do elaborate on students' active involvement in their model, as they describe three main actors in formative assessment: teachers, students, and peers. They describe five key teaching strategies of formative assessment related to the questions "Where am I/ is the student going?", "How am I/ is the student doing?", and "Where to next?" (Black & Wiliam, 2009, 2018).

FIVE KEY STRATEGIES OF FORMATIVE ASSESSMENT

The first strategy of formative assessment identified by Black and Wiliam (2009, 2018) is clarifying, sharing, and understanding learning intentions and criteria for success. In fact, this is the first step from the model of Antoniou and James (2014). This strategy can be employed to answer the question "Where is the student going?", and involves teachers, students, and peers. Examples of this strategy are a teacher discussing a rubric with students, the use of exemplars to co-construct assessment criteria, and letting students formulate personal learning goals.

To find an answer to the question "How is the student doing?", a teacher can make use of the second key strategy: arranging effective classroom discussions, activities, and learning tasks that elicit insight into students'

learning processes (Black & Wiliam, 2018). The teacher initiates activities and discussions to elicit students' responses. This strategy is similar to the E and S part of the ESRU-model (Ruiz-Primo & Furtak, 2007). These classroom practices can be done collaboratively, for example, when the teacher starts a class discussion to activate prior knowledge, or individually, for example, when the teacher uses a quiz to test students' knowledge.

The third strategy, teacher feedback, is the teachers' response to the (elicited) insight they have gained into students' learning process to help students determine "Where to go next?" (Black & Wiliam, 2018). This strategy can be found in the U phase of the ESRU-model (Ruiz-Primo & Furtak, 2007) and the last step of the model by Antoniou and James (2014). In the teacher feedback, teachers inform students how they are doing and what they have to accomplish next. Teacher feedback can vary in nature and form, such as collectively- or individually-given, written or oral, and corrective or constructive feedback (e.g., Hattie & Timperley, 2007).

Not only teachers have a role in determining how students are doing and where they are going next. The fourth and fifth teaching strategies activate students as instructional resources for one another and as owners of their learning process (Black & Wiliam, 2018). The most common way to adopt those strategies is by implementing peer- and self-assessment, respectively. A recent meta-analysis by Li and colleagues (2020) showed that students benefit from peer assessment, especially when this is accompanied by peer assessment training. Panadero and colleagues (2017) concluded after their meta-analyses on the effect of self-assessment on self-regulated learning and students' self-efficacy that "self-assessment is a necessity for productive learning" (p. 95). Activating students as an instructional resource is not represented in the ESRU-model by Ruiz-Primo and Furtak (2007) or the model by Antoniou and James (2014).

FORMATIVE ASSESSMENT AS PART OF STUDENTS' LEARNING

In the practice view on formative assessment, formative assessment is not an act on its own, but rather a part of a broader context of curriculum practices (Boud et al., 2018). Formative assessment is seen as an integral part of education, which includes both teaching practice and students' learning (Boud et al., 2018). The actions, what is said and done, by both students and teachers form the formative assessment practice. Moreover, those actions ignite future actions in formative assessment practices through students' motivation (see Figure 6.1). It is students' motivation

that nourishes their actions (Ryan & Deci, 2017), and students' motivation is affected by the formative assessment practice through the satisfaction (or frustration) of students' basic psychological needs (Skinner & Belmont, 1993; Ryan & Deci, 2017). As depicted in Figure 6.1, there is a feedback loop of formative assessment through students' motivation, which can explain why some practices are effective, and others are not.

Consider the following two examples in this respect: Dave and Mike, both statistics teachers at a university. Dave makes use of weekly formative tests. Students are obliged to take the test at home after class. They are reprimanded the next lesson when they did not take the test. After taking the test, they instantly receive feedback, and Dave uses the results of the tests to determine the learning objectives for the next lesson. Mike also makes use of weekly formative tests. At the start of each lesson, the students answer a short quiz about last week's learning objectives. Each question and the answers are discussed in a plenary discussion before the new lesson starts. Dave observes a decrease in students' engagement over the weeks, and the results on the weekly formative test decline, while students in Mike's class are highly motivated and engage positively in the class discussion. To explain the differences, we present a theoretical model, based on the work by Skinner (Skinner & Belmont, 1993; Skinner, 1995) and self-determination theory (Ryan & Deci, 2017), containing two sets of mechanisms: internal and external mechanisms (see Figure 6.1 for a schematic overview).

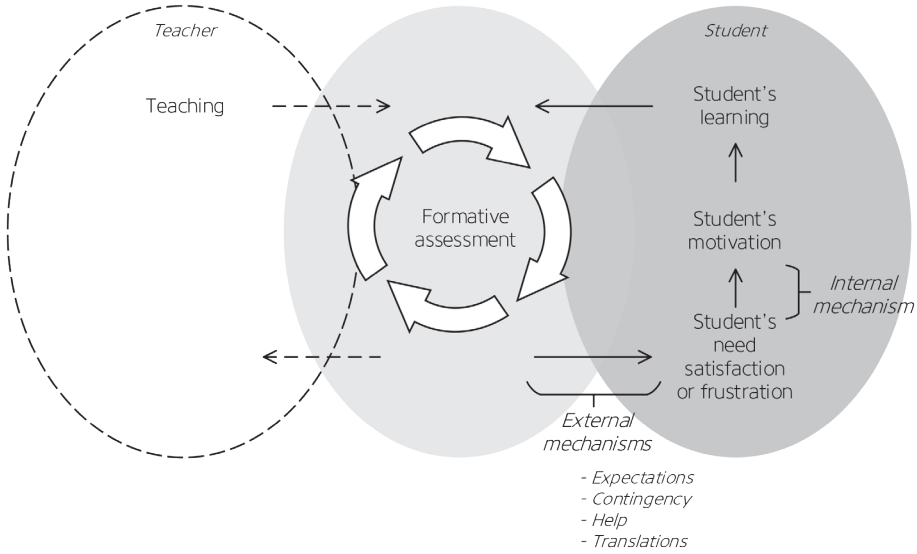
INTERNAL MECHANISMS: STUDENTS' BASIC PSYCHOLOGICAL NEEDS

Students' motivation is well-described in self-determination theory (Ryan & Deci, 2017). From the perspective of self-determination theory, motivation is determined by the level of self-endorsement for an activity (i.e., the level of perceived control; Reeve et al., 2008). When students experience pressure in their behavior and feelings due to various forces (e.g., rewards or feelings of shame; Deci & Ryan, 2000; Ryan & Deci 2000a, 2000b; Vansteenkiste et al., 2006), students experience high levels of *controlled motivation*. Students who are studying because they like the task or process they are engaged in or because they find it personally meaningful to engage in it, experience volition, are self-endorsed in their actions, and are *autonomously motivated* (Ryan & Deci, 2017). Autonomous motivation is associated with higher achievement, higher persistence, and wellbeing (e.g., Taylor et al., 2014; Ryan & Deci, 2017), while controlled motivation is

associated with maladaptive outcomes, like procrastination, burnout, and ill-being (Bartholomew et al., 2011a; Ryan & Deci, 2017).

According to self-determination theory, the level of motivation is determined by the satisfaction of a person's basic psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2017). We describe this effect of the basic needs on students' motivation as the *internal mechanisms* in our model (see Figure 6.1), as it is a process of internalization that we can describe but not observe directly (Ryan & Deci, 2017). Both the effect of need satisfaction as well as need frustration are taken into account in the current study.

Figure 6.1 *Formative Assessment as an Integral Part of Learning through Students' Need Satisfaction and Frustration and Students' Motivation*



Note. The figure shows the theoretical model. Tested models are depicted in Figures 6.2-6.5.

In general, students experience more autonomous motivation when their basic psychological needs are satisfied (i.e., need for autonomy, competence, and relatedness; Ryan & Deci, 2000b; Aelterman et al., 2014). The frustration of these needs is associated with higher levels of controlled motivation (Bartholomew et al., 2011a; Chen et al., 2015). Students' need for autonomy is satisfied when they experience volition and self-determination in their actions (Ryan & Deci, 2000b). Competence is about experiencing

effectiveness and having trust in your ability to succeed in the learning task (Skinner et al., 2008). Students' feelings of relatedness represent their experience of close emotional bonds and a sense of belonging to social groups (Furrer & Skinner, 2003). The formative assessment in itself does promote students' feelings of competence as it provides the students with insights into their progress. However, the obligatory nature of the formative test in Dave's class from our examples does harm students' feelings of autonomy.

It is assumed that all three basic psychological needs are equally important for students' autonomous motivation and that a lack of satisfaction of one of those needs will indisputably result in a lack of autonomous motivation (Ryan & Deci, 2017). For example, a student who experiences a choice, recognizes the relevance of what (s)he is doing and feels efficacious or competent to engage in an activity (i.e., feels autonomous and competent), but who does not feel connected to peers and his/her teacher (i.e., lacks the feeling of relatedness), is probably not enjoying school and is not autonomously motivated to study.

It is important to notice that the lack of satisfaction of a need is not the same as the frustration of the need. Need satisfaction and need frustration are not ends of the same continuum (Vansteenkiste & Ryan, 2013). For example, when a student does not perceive choice, his or her need for autonomy is probably not satisfied nor frustrated. Only when a student experiences to be forced to do a certain task, his or her need for autonomy will be frustrated, and (s)he will be more likely to experience controlled motivation for engaging in the task.

EXTERNAL MECHANISMS: CONTINGENCY, HELP, EXPECTATIONS, AND TRANSLATIONS

Students' feelings of autonomy, competence, and relatedness are based on a series of experiences over time, which are the results of interactions with the context (Skinner et al., 2008). Contexts that are more need-supportive are expected to support students' need for autonomy, competence, and relatedness (Ryan & Deci, 2017). Skinner's Self-System Model of Motivational Development (Skinner & Belmont, 1993) provides insights into how students' need satisfaction and frustration can be affected through the context (e.g., formative assessment). Skinner (1995) distinguished four mechanisms that follow three pathways. The first pathway is setting the right conditions. This can be done by supporting contingency (mechanism 1) and providing

help (mechanism 2). Second, teachers can provide clear expectations (mechanism 3) to stimulate students' actions (second pathway). Finally, the third pathway is helping students to interpret the practice by supporting translations (mechanism 4). We will explain the mechanisms in more detail. In our model, we describe the mechanisms as the *external mechanisms* (see Figure 1), as those mechanisms take place between context and student. Those external mechanisms explain why formative assessment practices result in need satisfaction or frustration.

To enable students to experience autonomy, competence, and relatedness, a context should be created in which students' actions result in the desired outcomes (mechanism 1: contingency), and students get the appropriate level of help to operate those actions (mechanism 2: help; Skinner, 1995). When students' means and ends are congruent with each other, we say that there is *contingency* (Skinner, 1995). In the context of formative assessment, this means that students are provided with tasks (means) that help them to reach the learning objectives (ends). By doing so, students get the opportunity to determine their actions (autonomy) and be effective (experience competence). Wylie and Lyon (2015) conclude that contingency is essential for teacher feedback to be effective. They conclude that students should be provided with time and structures for action and revision (means; Wylie & Lyon, 2015). Time and opportunity to process the given constructive teacher feedback is essential to facilitate feedback uptake (Carless & Boud, 2018). In our examples of Dave and Mike, the formative test and feedback are the means to obtain the learning objectives (ends). Students receive time and opportunity to process the feedback during the plenary discussion in Mike's class. However, Dave does not provide structures to process the feedback from the formative tests, making it more complicated for students to reach contingency between their actions and results.

In addition to contingency, a teacher can create the right conditions by providing appropriate *help* to students (Skinner, 1995). Help contains the provision of resources to obtain the learning objectives and information on how to apply those resources, like strategy explanations and meta-cognitive or self-regulatory suggestions (Skinner, 1995). Providing help to students will empower them to act autonomously and being effective (experiencing competence). Moreover, as they experience that the teacher cares about them, it contributes to students' feelings of relatedness (Furrer & Skinner, 2003). Feedback that provides information on how to proceed

(feed-forward) has proven to be effective (Hattie & Timperley, 2007). It provides help such as information about how to apply resources (e.g., applying the feedback). Wollenschläger and colleagues (2016) found in an experimental study that feed-forward feedback contributed to students' feelings of competence. Teacher classroom practice in which constructive feedback was provided, was associated with higher student perceptions of autonomy and competence in a study by Kiemer and colleagues (2015). Relating this to our examples of Dave and Mike, the statistics teachers, Mike provides a lot of how-to information in the plenary discussion about the quizzes, which could be considered as help. Dave is not explicitly providing help related to the formative tests.

The third external mechanism is expectations. Students will be stimulated to take action when *expectations* are communicated (Skinner, 1995). Those expectations tell the students what action they can take (i.e., the basis for autonomy) and give them the self-efficacy beliefs (competence) to take action (Skinner, 1995). A lot of research has been conducted in the context of formative assessment on the involvement of students in defining assessment criteria (e.g., Bloxham & West, 2007). Defining assessment criteria makes these criteria more transparent for students and helps students to understand them better (Tillema et al., 2011). Examples of means to clarify and engage students in defining criteria for success are student training (Falchikov & Goldfinch, 2000), the use of exemplars (Vu & Dall'Alba, 2007), and co-construction of rubrics (Fraile et al., 2017). These means lead to a better understanding of the assessment criteria and a sense of ownership (Falchikov & Goldfinch, 2000; Vu & Dall'Alba, 2007). Feedback can be used to communicate clear expectations as well. Feedback containing information about the learning goals, actual task performance, as well as information on how to proceed, contribute to students' feelings of competence (Wollenschläger et al., 2016). In contrast, evaluative or negative feedback can lead to negative outcomes such as negative affect and poor performance (Deci et al., 1996; Hattie & Timperley, 2007; Fong et al., 2019), as it communicates negative expectations about students' efficacy to obtain the learning objectives. In their feedback, both Dave and Mike have the opportunity to support students' self-efficacy beliefs and communicate their expectations explicitly. However, in the example, both teachers only implicitly communicate expectations with the use of formative tests or quizzes.

The fourth mechanism concerns supporting students to make appropriate *translations* (Skinner, 1995) through formative assessment. Those translations are about attribution: Why did you fail or succeed, and which role did you play in this? The formative assessment provides students with clues for those translations, for example, by a teacher's remark, "you're really good at statistics" (Skinner, 1995). The translations contribute to students' feelings of competence but also provide information about relations between teacher and students (relatedness) and who is in control (autonomy). Feedback is an evident source of information for attribution, just as classroom discussion, as it helps to identify and solve students' misconceptions during classroom discussions (Ruiz-Primo & Furtak, 2006; Black & Wiliam, 2009; Wylie & Lyon, 2015). In our examples, Mike is providing more translations than Dave in response to the outcomes of the quizzes in the plenary discussion as well as in the learning objectives for the lesson. The adjustments that Dave makes in the lesson remain invisible to students. Moreover, the instant feedback on the digital formative language test does not provide students with information about the cause of their failure, so students are not supported in their attribution of the success or failure in Dave's class.

CURRENT STUDY

While both statistics teacher Dave and Mike incorporate a weekly formative test in their lessons, the application of formative assessment by Dave is deemed less effective. In the current study, we present a theoretical model (see Figure 6.1) to explain formative assessment practices, based on the work by Skinner (Skinner & Belmont, 1993; Skinner, 1995) and self-determination theory (Ryan & Deci, 2017). Students' motivation is located in the center of our theoretical model. The relationship between formative assessment practices and students' motivation is explained by internal and external mechanisms derived from previous research (Skinner, 1995; Ryan & Deci, 2017). Two basic assumptions of our theoretical model are that formative assessment and students' motivation are associated and that students' basic psychological needs satisfaction mediates this relationship. In the current study, we test those assumptions empirically. Our research questions are:

Research Question 1: Are students' perceptions of the application of formative assessment by their teacher associated with their motivation to learn?

Research Question 2: Does satisfaction of the basic psychological needs for autonomy, competence, and relatedness mediate the association between students' perceptions of the application of formative assessment by their teacher and their motivation to learn?

Our theoretical model is applicable to higher education in general, including blended learning. Students' perceptions of the application of formative assessment in class by their teacher were used as indicators of the formative assessment practice. In class is not restricted to the physical location but is determined by time and didactics. We have used students' perceptions as the measurement of formative assessment as students' motivation is about personal internalization, which cannot easily be observed from outside the person (Ryan & Deci, 2017). Moreover, we know from previous research a discrepancy exists between teachers' intended teaching techniques or practice and students' perceptions of it (e.g., Skinner et al., 2008; Mulliner & Tucker, 2016).

First, we tested the assumption that the use of formative assessment is associated with students' autonomous motivation. Baas and colleagues (2020) found that students' who experienced more formative assessment were more autonomously motivated. Others found support for the association between autonomous motivation and specific strategies of formative assessment, such as clarifying criteria (Haerens et al., 2019) and positive teacher feedback (Fong et al., 2019). Based on these studies, we expected that when students experience the use of formative strategies by their teacher, this contributes to their autonomous motivation. No association was expected between students' perceptions of the use of formative assessment and controlled motivation. Our hypotheses were:

Hypothesis 1: Students' perceptions of the use of formative strategies by their teacher are positively associated with their autonomous motivation.

Hypothesis 2: Students' perceptions of the use of formative strategies by their teacher are not associated with their controlled motivation.

The second assumption of our theoretical model is that students' satisfaction of their need for autonomy, competence, and relatedness account for the association between students' perceptions of the use of formative assessment and their autonomous motivation. Both students' need satisfaction and need frustration were taken into account. As need frustration is assumed to be associated with controlled motivation and not with autonomous motivation (Ryan & Deci, 2017), we expected that need frustration does not function as a mediator in the association between students' perceptions of the use of formative assessment and their autonomous motivation. Haerens and colleagues (2019) found support for this assumption concerning the teaching strategy of clarifying criteria. Our hypotheses were:

Hypothesis 3: Need satisfaction functions as a mediator in the association between students' perceptions of the use of formative strategies and their autonomous motivation.

Hypothesis 4: Need frustration does not function as a mediator in the association between students' perceptions of the use of formative strategies and their autonomous motivation.

METHOD

PARTICIPANTS

Students from 14 classes were asked to participate in this study. In total, 194 first- and second-year students (M_{age} = 21.10, SD_{age} = 5.12; 57.7% female) from a Dutch University of Applied Sciences participated. All classes were characterized by activating didactics in small groups (14 – 24 students). The students participated voluntarily, and they provided informed consent.

PROCEDURE

We conducted a cross-sectional survey study on students' perceptions of classroom practices without intervening in class. All participants filled out a questionnaire about their perceptions of the use of formative strategies

during the course they were enrolled in at the time of the study. Additionally, students were asked to rate their basic need satisfaction and frustration and their levels of autonomous and controlled motivation during the course. Students filled out the questionnaire during class in a lesson at the end of the semester. The researcher briefly introduced the context of the study and gave the students the choice to participate. All students present in class during the data collection decided to participate. The questionnaire was filled out with paper and pencil, and finishing the questionnaire took students 10 to 15 minutes. The classroom practices on which students reflected varied among groups, as each group had a different teacher.

MATERIALS

Formative Assessment Scale for Students

Students' perceptions about the frequency of the application of formative strategies by their teacher were measured with the formative assessment scales from the Assessment for Learning – Data-Based Decision Making (AfL-DBDM) questionnaire developed by Kippers and colleagues (2018). In this study, the Dutch student version of the AfL-DBDM questionnaire by Wolterinck and colleagues (2020) was used. This questionnaire consists of 21 statements about the five formative strategies by Black and Wiliam (2009, 2018) and a subscale on data use for instruction (which was not included in this study). Self- and peer assessment were combined into one subscale in this questionnaire, after confirmatory factor analysis (Kippers et al., 2018). Students indicated to what extent they agreed with the statements on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). See Table 6.1 for example items and reliability coefficients. McDonald's (1970) Omega was used for calculating reliability coefficients, as a correlated factor structure was expected (Sijtsma, 2009; Cho & Kim, 2015). Abbreviated names for the constructs were used in the tables and the results section for clarity reasons. For example, the strategy "Engineering effective classroom discussions, activities, and learning tasks that elicit insight into students' learning processes" was abbreviated to "classroom discussions". However, the scope of the constructs remained unchanged.

The Basic Psychological Need Satisfaction and Frustration Scale

The Dutch version of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) was used to measure the satisfaction and frustration of students' basic psychological needs. In total, this scale consists of three subscales (one per psychological need) for satisfaction and three for frustration. The questionnaire consists of 24 items (see Table 6.1 for example items per subscale), and students were asked to indicate to what extent they agreed with the statements on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Reliability coefficients are displayed in Table 6.1.

Academic Self-Regulation Questionnaire

The Dutch translation of the task-specific Academic Self-Regulation Questionnaire (SRQ-a) was used to measure students' autonomous and controlled motivation. The scale was developed by Ryan and Connell (1989; Vansteenkiste et al., 2009). The questionnaire consists of 16 items. A 4-point Likert scale ranging from 1 (*completely disagree*) to 4 (*completely agree*) was used to measure students' motivation (see Table 6.1 for example items and reliability coefficients).

ANALYSES

Data were inspected before analyses. Firstly, five participants who did not fill out the questionnaire completely (i.e., missing value for more than one item per construct) or accurately (i.e., all the same scores across constructs) were removed from the dataset. When only one item-value was missing per scale, the average score was calculated, excluding the missing value (i.e., person mean substitution; McDonald et al., 2000). Secondly, eight univariate or multivariate outliers on the construct level were excluded from the analyses.

Table 6.1 *Reliability of the Scales and Example Items*

	Number of items	Scale	ω	Example items
AfL-DBDM				
Clarifying criteria	4	1-5	.861	During class, my teacher explains what I'm learning
Classroom discussions	6	1-5	.721	The teacher makes use of questions to get information about my prior knowledge of the topic
Teacher feedback	5	1-5	.779	The teacher makes use of information about my progress to give me feedback
Self- & peer feedback	6	1-5	.722	I assess and give feedback to peers
BPNSFS				
Autonomy satisfaction	4	1-5	.866	During this course, I felt a sense of choice and freedom in the things I did
Competence satisfaction	4	1-5	.941	During this course, I felt confident I could apply the suggested strategies
Relatedness satisfaction	4	1-5	.935	During this course, I felt connected to peers
Autonomy frustration	4	1-5	.768	During this course, I felt obliged to think and act in a certain way
Competence frustration	4	1-5	.750	During this course, I felt disappointed about the approach I choose to complete the assignment
Relatedness frustration	4	1-5	.884	During this course, I had the feeling that other students didn't respect my opinion
SRQ-a				
Autonomous motivation	8	1-4	.961	I'm motivated for this course because I enjoy doing it
Controlled motivation	8	1-4	.886	I'm motivated for this course because I would feel guilty if I didn't do it

Note. Afl-DBDM, Assessment for Learning – Data-Based Decision Making; BPNSFS, Basic Psychological Need Satisfaction and Frustration Scale; SRQ-a, Academic Self-Regulation Questionnaire.

Scores were considered outliers when they were three or more standard deviations above or below the mean score (Osborne & Overbay, 2004). Excluding the outliers did not have an impact on the results, as similar patterns in the results were found before exclusion. After data inspection, 181 respondents were included in the dataset. All scores were standardized before the analyses to prevent deviation of the results due to various Likert-scales used in the questionnaires (i.e., 4 and 5-point Likert-scale).

Students' basic psychological needs were tested as mediators, using bootstrapping with PROCESS v3.4 for SPSS 25 (Hayes, 2017). Multiple mediation models were used to test the basic psychological need satisfaction and frustration as a set of mediators and to be able to conclude which of them has the unique ability to mediate the association between formative strategies and motivation, controlling for all other mediators (Hayes, 2017). A 95% bias-corrected and accelerated (BCa) confidence interval (Efron, 1987) for indirect effects was estimated to establish the statistical significance of the indirect effects.

RESULTS

DESCRIPTIVE STATISTICS

Mean scores and correlations of students' perceptions of the use of formative strategies, students' basic psychological need satisfaction and frustration, and their autonomous and controlled motivation are displayed in Table 6.2. Students reported slightly more clarifying criteria (Strategy 1) and classroom discussion practices (Strategy 2) than teacher feedback (Strategy 3) or self- and peer assessment (Strategy 4). Correlations between students' perceptions of formative strategies were moderate.

Students reported on average that they experienced autonomous motivation as well as controlled motivation to study (see Table 6.2). Their basic psychological needs were more satisfied than frustrated. Relatedness satisfaction was reported highest (see Table 6.2). Students' autonomous and controlled motivation were not correlated (r = -.007, p = .926). At most, moderate correlations were found between autonomy satisfaction and competence satisfaction and autonomy frustration and competence frustration. Moderately negative correlations were found between the need satisfaction and frustration equivalences (see Table 6.2).

Table 6.2 *Descriptive Statistics and Correlations*

				Formative strategies				Basic psychological need						Motiv.
								Satisfaction			Frustration			
	M	*SD*	Scale	1	2	3	4	5	6	7	8	9	10	11
Formative strategies														
1. Clarifying criteria	3.55	0.73	1-5											
2. Classroom discussions	3.20	0.69	1-5	.598***										
3. Teacher feedback	2.69	0.74	1-5	.450***	.577***									
4. Self- & peer feedback	2.68	0.73	1-5	.340***	.546***	.641***								
Basic psychological need satisfaction														
5. Autonomy	3.51	0.77	1-5	.598***	.542***	.410***	.301***							
6. Competence	3.57	0.63	1-5	.437***	.378***	.367***	.323***	.574***						
7. Relatedness	3.86	0.71	1-5	.119	.034	.056	.025	.272***	.389***					
Basic psychological need frustration														
8. Autonomy	2.52	0.82	1-5	-.240**	-.226**	-.099	.050	-.448***	-.251**	-.109				
9. Competence	2.22	0.70	1-5	-.245***	-.264***	-.144	.000	-.227**	-.457***	-.129	.494***			
10. Relatedness	1.73	0.58	1-5	-.123	-.033	.042	.134	-.174*	-.182*	-.383***	.418***	.374***		
Motivation														
11. Autonomous	2.78	0.42	1-4	.430***	.397***	.361***	.258***	.637***	.502***	.225**	-.206**	-.049	-.035	
12. Controlled	2.58	0.49	1-4	.125	.158*	.075	.131	.042	-.074	.008	.217**	.246**	.218**	-.007

* $p < .05$; ** $p < .01$; *** $p < .001$
Note. N = 194; Motiv. = Motivation.

HYPOTHESES 1 AND 2: ASSOCIATION BETWEEN PERCEIVED FORMATIVE STRATEGIES AND STUDENTS' MOTIVATION

We hypothesized that students' perceptions of formative strategy use were statistically significantly associated with their autonomous motivation (Hypothesis 1), but not with controlled motivation (Hypothesis 2). Hypothesis 1 was supported: students' autonomous motivation was statistically significantly associated with their perceptions of clarifying criteria (b = .399, p < .001), classroom discussions (b = .378, p < .001), teacher feedback (b = .344 p < .001), and self- and peer assessment (b = .248, p < .001). Students' controlled motivation was only statistically significantly associated with perceptions of the use of classroom discussions (b = .159 p < .05). Perceptions of clarifying criteria, teacher feedback, and self- and peer assessment were not statistically significantly associated with controlled motivation. This means that Hypothesis 2 was supported for students' perceptions of the occurrence of clarifying criteria, teacher feedback, and self- and peer assessment, but not for classroom discussions.

HYPOTHESES 3 AND 4: MEDIATION EFFECTS

The mediating effect of need satisfaction and frustration on the association between perceptions of the use of formative assessment and motivation were tested using bootstrapping. All mediators were tested simultaneously. Significant indirect effects indicate mediation (Hayes, 2017). Specific indirect effects are displayed in Table 6.3 for autonomous motivation and Table 6.4 for controlled motivation. In Figures 6.2-6.5, the direct and total indirect effects of the perceptions of formative strategy use on autonomous motivation are displayed for each formative strategy separately. The coefficients of the associations between the perceptions of formative strategy use and the mediators (i.e., need support or frustration) and autonomous/ controlled motivation, as well as the level of statistical significance, are provided in the figures.

Autonomous Motivation

The total indirect effects of all perceptions of formative strategy use on autonomous motivation were statistically significant (see Figures 6.2-6.5 and Table 6.3), indicating that the association between formative strategy use and autonomous motivation was mediated through students' needs (as hypothesized in Hypothesis 3). Examining the specific indirect effects (see Table 3), it can be concluded that the positive effect of students'

perceptions of formative strategy use on students' autonomous motivation is mediated through autonomy satisfaction and competence satisfaction for all four strategies. The 95% bias-corrected and accelerated (BCa) confidence intervals (Efron, 1987) do not contain zero. As relatedness satisfaction was not a mediator, Hypothesis 3 was only partially supported. We hypothesized that need frustration would not function as a mediator (Hypothesis 4). According to the specific indirect effects, competence frustration was a statistically significant mediator of the positive effects of students' perceptions of clarifying criteria, classroom discussions, and teacher feedback on autonomous motivation. These results indicate that Hypothesis 4 was supported for autonomy and relatedness frustration, but not for competence frustration.

Controlled Motivation

The total indirect effects of students' perceptions of clarifying criteria, classroom discussions, teacher feedback, and self- and peer assessment on controlled motivation were not statistically significant (see Table 6.4). Moreover, no statistically significant specific indirect effects were found, meaning that no mediation effects were found. For that reason, we did not depict mediation models for controlled motivation.

Table 6.3 *Mediation of the Effect of Formative Strategies on Autonomous Motivation Through Need Satisfaction and Need Frustration*

	Clarifying criteria				Classroom discussions				Teacher feedback				Self- and peer assessment			
	Point estimate		BCa 95% CI		Point estimate		BCa 95% CI		Point estimate		BCa 95% CI		Point estimate		BCa 95% CI	
		SD	Lower	Upper		*SD*	Lower	Upper		*SD*	Lower	Upper		*SD*	Lower	Upper
	Indirect effects				Indirect effects				Indirect effects				Indirect effects			
AS	.257	.058	.155	.382	.235	.053	.142	.353	.185	.047	.103	.290	.146	.039	.079	.233
CS	.119	.041	.050	.213	.107	.038	.042	.191	.100	.036	.039	.181	.093	.038	.034	.185
RS	.002	.010	-.014	.032	.001	.007	-.008	.021	.001	.007	-.009	.024	.000	.006	-.012	.017
AF	.006	.017	-.025	.043	.006	.017	-.022	.048	.003	.009	-.009	.028	-.001	.006	-.022	.007
CF	-.047	.021	-.101	-.015	-.054	.026	-.120	-.017	-.028	.017	-.072	-.003	.000	.014	-.029	.031
RF	-.006	.011	-.038	.009	-.001	.006	-.025	.006	.002	.007	-.006	.026	.006	.013	-.013	.043
Total	.332	.061	.220	.463	.293	.057	.190	.417	.261	.055	.163	.376	.245	.051	.152	.350

Note. AS = Autonomy satisfaction; CS = Competence satisfaction; RS = Relatedness satisfaction; AF = Autonomy frustration; CF = Competence frustration; RF = Relatedness frustration.

DISCUSSION

In the current study, we investigated formative assessment as practice (Boud et al., 2018). We located formative assessment as an integral part of students' learning and tested a theoretical model that described a feedback loop between formative assessment practice and students' learning through students' motivation (see Figure 6.1). In our empirical cross-sectional study, we examined two assumptions of our theoretical model: (a) the assumption that the perceived application of formative assessment is associated with students' motivation to learn (Hypotheses 1 & 2); and (b) the assumption that students' satisfaction of their basic psychological needs for autonomy, competence, and relatedness mediate the association between students' perceptions of formative assessment use and their autonomous motivation (Hypotheses 3 & 4).

HYPOTHESES 1 AND 2: THE ASSOCIATION BETWEEN STUDENTS' PERCEPTIONS OF FORMATIVE ASSESSMENT AND THEIR MOTIVATION

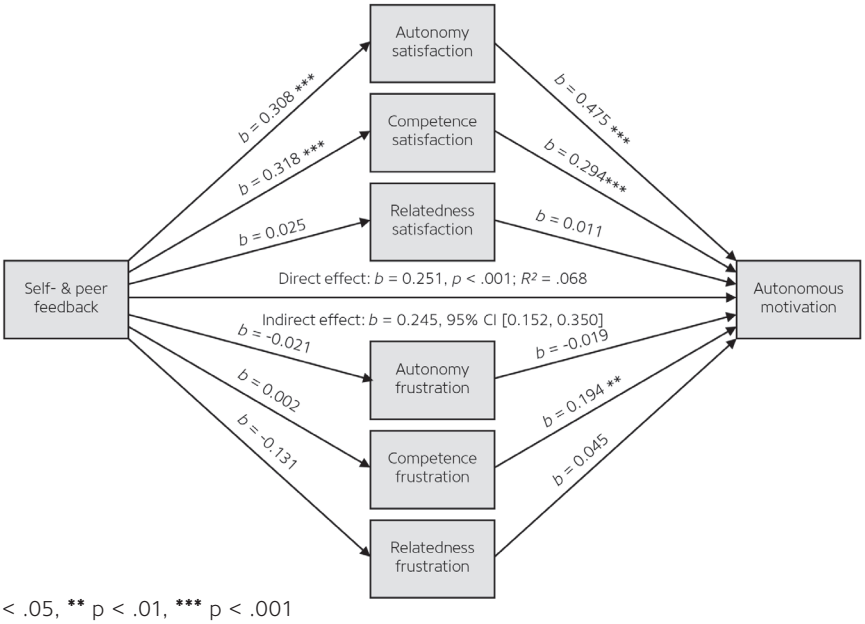
The results of the current study are in line with previous research (e.g., Haerens et al., 2019; Baas et al., 2020), and indicated that students' perceptions of the application of formative strategies by their teacher were associated with their autonomous motivation. However, the results also indicated that students' perceptions of one of the formative strategies, 'arranging effective classroom discussions, activities, and learning tasks that elicit insight into students' learning processes' (classroom discussions), was positively associated with students' controlled motivation. Thus, students who experienced more teacher use of classroom discussions reported higher autonomous and higher controlled motivation. This is in contrast to what we hypothesized (Hypothesis 2), meaning that classroom discussions do not solely result in more autonomous motivation of the students. The way classroom discussions are applied by the teacher matters. Ruiz-Primo and Furtak (2006) pointed out that the teacher plays an important role in class discussions. The teacher can control the flow of the discussion and, in this way, possibly frustrate students' need for autonomy (Stroet et al., 2013). However, how the classroom discussions were applied was not taken into account in the current study.

Table 6.4 *Mediation of the Effect of Formative Strategies on Controlled Motivation Through Need Satisfaction and Need Frustration*

	Clarifying criteria				Classroom discussions				Teacher feedback				Self- and peer assessment			
	Point estimate		BCa 95% CI		Point estimate		BCa 95% CI		Point estimate		BCa 95% CI		Point estimate		BCa 95% CI	
		SD	Lower	Upper		*SD*	Lower	Upper		*SD*	Lower	Upper		*SD*	Lower	Upper
	Indirect effects				Indirect effects				Indirect effects				Indirect effects			
AS	.052	.075	-.101	.195	.042	.065	-.087	.170	.077	.045	-.002	.179	.057	.034	-.001	.137
CS	-.055	.047	-.155	.034	-.044	.042	-.136	.032	-.043	.041	-.135	.029	-.043	.037	-.129	.020
RS	.012	.015	-.005	.062	.004	.012	-.011	.043	.005	.011	-.007	.044	.002	.011	-.011	.039
AF	-.035	.027	-.099	.010	-.034	.028	-.110	.008	-.017	.018	-.071	.003	.008	.015	-.009	.058
CF	-.033	.025	-.095	.005	-.043	.030	-.118	.002	-.017	.018	-.071	.005	.000	.011	-.022	.023
RF	-.020	.018	-.077	.001	-.005	.012	-.041	.013	.006	.014	-.010	.053	.020	.018	-.002	.076
Total	-.078	.070	-.232	.050	-.080	.060	-.211	.030	.012	.046	-.078	.103	.045	.043	-.037	.132

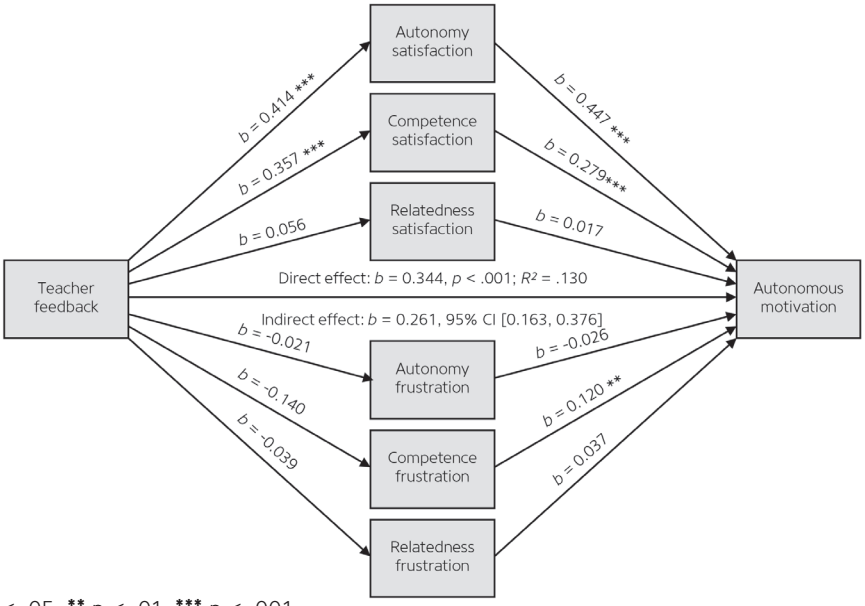
Note. AS = Autonomy satisfaction; CS = Competence satisfaction; RS = Relatedness satisfaction; AF = Autonomy frustration; CF = Competence frustration; RF = Relatedness frustration.

Figure 6.2 *Mediation Model of Criteria for Success and Autonomous Motivation*



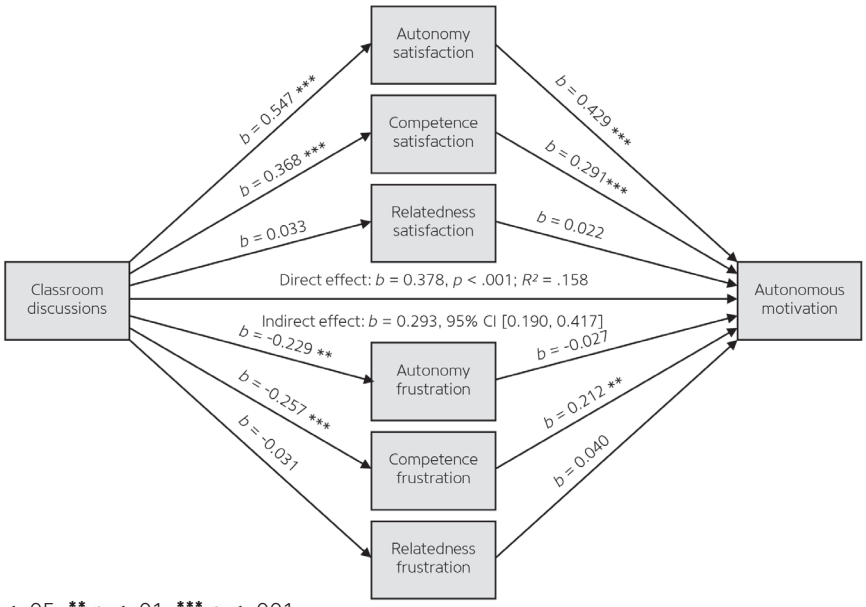
***** p < .05, ****** p < .01, ******* p < .001

Figure 6.3 *Mediation Model of Classroom Discussions and Autonomous Motivation*



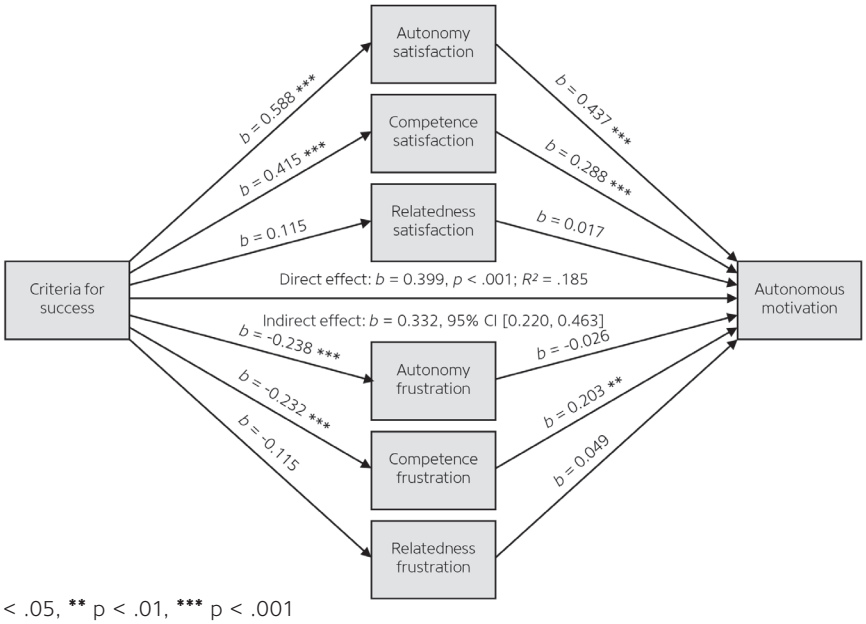
***** p < .05, ****** p < .01, ******* p < .001

Figure 6.4 *Mediation Model of Teacher Feedback and Autonomous Motivation*



***** p < .05, ****** p < .01, ******* p < .001

Figure 6.5 *Mediation Model of Self- and Peer Assessment and Autonomous Motivation*



***** p < .05, ****** p < .01, ******* p < .001

For the other strategies, students' perceptions of the use of those strategies were not associated with their controlled motivation. This result is in line with Hypothesis 2 and indicates that in general, the use of formative assessment by teachers is beneficial for students' motivation. Teachers who, as reported by students, use formative strategies, have students in their classrooms who are more autonomously motivated.

HYPOTHESES 3 AND 4: THE ROLE OF BASIC PSYCHOLOGICAL NEED SATISFACTION AND FRUSTRATION

As hypothesized, the relation between the perceived use of formative strategies and autonomous motivation was found to be mediated by students' basic psychological needs. Concerning the formative strategies of clarifying and engaging students in setting criteria for success (Strategy 1), classroom discussions (Strategy 2), teacher feedback (Strategy 3), and self- and peer assessment (Strategy 4 & 5), this hypothesized mediation effect was confirmed for autonomy satisfaction and competence satisfaction (Hypothesis 3). No mediation effect was found for relatedness satisfaction.

For autonomy and competence, our results are in line with the conclusions of the study by Haerens and colleagues (2019). However, they concluded that knowledge about the criteria contributed to students' perceptions of being in charge (autonomy), being effective (competence), *and* having strong relationships with their teacher (relatedness). The fact we did not find a mediation effect for relatedness satisfaction underlines the significance of studying students' need satisfaction with separate measures instead of a composite score as Haerens and colleagues (2019) did. Based on our results, we can come to a more fine-grained conclusion that relatedness satisfaction does not play a significant role in the association between the students' perceptions of the application of formative assessment and students' autonomous motivation.

A statistically significant mediation effect was found for competence frustration in the relation between perceived use of clarifying criteria (Strategy 1), classroom discussions (Strategy 2), and teacher feedback (Strategy 3) on the one hand and autonomous motivation on the other hand. More use of clarifying and engaging in setting criteria for success, classroom discussions, and teacher feedback was associated with less competence frustration, which in turn was associated with more autonomous motivation. This result is contrary to our hypothesis (Hypothesis 4). In line with self-determination theory, we expected that less competence frustration would

be associated with less controlled motivation and would not be associated with autonomous motivation (Ryan & Deci, 2017).

A possible explanation of those unexpected results could be transparency. As one of the objectives for the use of formative assessment is to increase transparency for students (Tillema et al., 2011), it is not surprising that three of the five strategies contribute to both competence satisfaction and frustration. Being engaged in formative assessment leads to less confusion about the task, criteria, and approach (i.e., competence frustration) as well as more confidence in one's own ability to complete the task (i.e., competence satisfaction).

The fact that both competence satisfaction and frustration were found to function as statistically significant mediators in the association between students' perceptions of the use of formative assessment strategies and autonomous motivation underlines that competence satisfaction and frustration are not opposite ends of the same continuum (Vansteenkiste & Ryan, 2013). Both explain unique variance in students' motivation. Moreover, it shows that formative assessment is mainly affecting students' feelings of competence, and thus can be considered a competence-supportive practice, similar to providing structure, which provides students' perceived control and motivation (Skinner, 1995). Structured contexts have shown to promote students' competence satisfaction and reduce their competence frustration (e.g., Stroet et al., 2013).

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The current study was a first attempt to model formative assessment as practice. Two basic assumptions of our theoretical model (see Figure 6.1) were tested and confirmed. However, the other aspects of the model (e.g., the external mechanisms) were not tested. It seems worthwhile to study in more detail how formative assessment affects students' self-perceptions of autonomy, competence, and relatedness, for example, by focusing on one of the external mechanisms (see Figure 6.1) or by adopting a more qualitative research approach.

We made use of students' perceptions about the use of formative assessment. These perceptions did not give us insight into *how* formative assessment was applied. As explained above, this could explain some unexpected relationships we found, for example, the mediating effect of competence frustration. We suggest studying the application of formative assessment in more detail. Our theoretical model can be useful in analyzing

in depth what processes are going on in the formative assessment practice, especially when focusing on students' roles.

It seems worthwhile to include the teacher's role in further research. Not only the formative assessment in itself but also the interpersonal relationship between teachers and students has been found to be important for students' autonomous motivation (e.g., Leenknecht et al., 2017; Haerens et al., 2019). Moreover, some recent studies have found that teachers' competence to apply formative assessment successfully determines the effectiveness of formative assessment (Heitink et al., 2016). We expect this is also the case for the effect of formative assessment practice on students' autonomous motivation.

The current study is a descriptive study that confirms, to a large extent, the assumptions based on our theoretical model. However, no conclusions can be drawn about the causality of relationships. Future research in which formative assessment is manipulated and applied in different conditions is necessary to establish the causality of the proposed self-system feedback loop.

IMPLICATIONS

The results of the current study showed that not one strategy of formative assessment is favorable above others. Students' perceptions of the use of all strategies were associated with higher self-perceptions (i.e., need satisfaction) of autonomy and competence and, consequently, more autonomous motivation.

Our theoretical model, which is based on the Self-System Model of Motivational Development (Skinner & Belmont, 1993), provides insight into how formative assessment influences students' learning. The theoretical model can be used to explain the effectiveness of formative assessment, and the external and internal mechanisms can be used to study formative assessment practice in depth. Even though the current study provided proof for two fundamental assumptions of the model, more fine-tuning of the model is recommended, for example, about the role of relatedness satisfaction. With the introduction of the theoretical model, we contribute to the debate and research on formative assessment as practice (Boud et al., 2018).

For teachers who are thinking about applying formative assessment in their lessons, the current study is an encouragement to start practicing. We showed the beneficial association between students' perceptions of the

application of formative assessment and students' autonomous motivation. Moreover, the current study provides teachers with a framework to apply during curriculum and course development. The external mechanisms of contingency, help, expectations, and translations can help teachers to evaluate their formative assessment as practice.

CONCLUSION

The results of the current study show that the perceived application of formative assessment strategies by teachers is associated with students' feelings of autonomy and competence. More perceived use of formative assessment is associated with more perceived autonomy and competence (both in more competence satisfaction and less frustration), and more autonomous motivation. This means that we found support for two basic assumptions of our theoretical model to explain formative assessment as practice. The application of formative assessment contributes to students' need satisfaction and, consequently, autonomous motivation. Students' motivation feeds back into the formative assessment practice, and a new feedback loop begins.

AUTHOR'S NOTE

ACKNOWLEDGMENT OF AUTHOR CONTRIBUTIONS

All authors designed the study, ML recruited participants and collected the data, ML and MK developed the instrument, ML analyzed the data, ML drafted the manuscript, all authors contributed to critical revisions of the paper, LW, RR and SL supervised the study.

7

Chapter 7

SUMMARY AND GENERAL DISCUSSION

BACKGROUND

With the studies presented in this dissertation, we examined students' perceptions of (de)motivating teaching approaches in higher education. We took a Self-Determination Theory perspective (Deci & Ryan, 2000; Ryan & Deci 2000a, 2000b, 2017) and studied autonomy support, structure, involvement, control, chaos, and coldness teaching approaches. We tried to contribute to the insights about the unique importance of the (de) motivating teaching approaches. We further sought to understand *why* teaching approaches are perceived as motivating or not.

Skinner's Self-System Model of Motivational Development (Skinner, 1995; Skinner & Belmont, 1993) was adopted to study the relationship between teaching approaches and students' motivation and achievement. The (de)motivational teaching approaches were considered important representations of the social context that affect students' self-perceptions. Self-perceptions are appraisals about the self that students construct over time, based on interactions with the context. They function as personal resources and drive actions (Skinner et al., 2008).

We took students' perceptions of the teaching approaches as our central focus of the studies, as previous research has shown that teachers' intended teaching approaches do not align with students' perceptions of it (e.g., Mulliner & Tucker, 2016; Skinner et al., 2008). Given this discrepancy between teacher practice and students' perceptions, students' perceptions of the teaching approaches can be seen as the first step in the central process of motivation: internalization (see Chapter 1). Internalization is seen as an active and inborn human process, through which an external reason or cause is adopted as a person's own (Deci & Ryan, 2000; Ryan & Connell, 1989). In the case of teaching in higher education, this process starts with the interpretation of the teaching approaches.

Insights into the origin of students' perceptions of teaching approaches and the unique importance of the approaches will help teachers apply teaching approaches effectively in their educational practice. We were searching for an answer to the question of whether teachers should implement the complete palette of need-supportive teaching approaches into each interaction to be optimally motivating.

SUMMARY OF THE MAIN FINDINGS

In the study described in **Chapter 2**, we applied the Self-System Model of Motivational Development (Skinner & Belmont, 1993) to a higher educational context. To our knowledge, we were the first to adopt the model in higher education, using students' motivation as a linking variable between teaching approaches and achievement (previous studies included students' engagement, e.g., Dincer et al., 2019; Dupont et al., 2014; Hospel & Galand, 2016). Moreover, this is one of the few studies that included students' perceptions of all three need-supportive teaching approaches, without compressing it into a composite score (cf., Baeten et al., 2013). Our results indicated that students' perceptions of all three need-supportive teaching approaches were associated with students' autonomous motivation and achievement. However, the three need-supportive approaches are closely connected as well, as illustrated by the high correlations between students' perceptions of the teaching approaches ($r \geq .62$). Furthermore, the results of the cluster analysis into three gradual groups of perceived need-support (i.e., high, moderate, and low) showed that the overall perception of the level of supportiveness of the teaching approach is more prevalent. We were not able to replicate the orthogonal relationship between the need-supportive teaching approaches, as found by Vansteenkiste and colleagues (2012). We found that when students' perceptions of autonomy support, structure, *and* involvement are included, a more gradual relationship is found, in which students' perceptions of need-supportive teaching approaches overlap.

Given the results of the study reported in Chapter 2, we wondered how specific situations affected students' perceptions of need-supportive teaching. Students' overall perceptions of their teacher's need support, as found in Chapter 2, is probably built up from moment-to-moment interactions (Pennings & Hollenstein, 2020). In three waves, we studied students' perceptions of need-supportive teaching in specific situations, and in **Chapter 3**, the results of this study are reported. In Waves 2 and 3, students were explicitly asked to describe a situation which had for them a positive or negative connotation. We found that providing structure was not exclusively perceived as a positive act by the students. For example, students described receiving teacher feedback as a negative situation when they disagreed with the feedback they received. Results indicated that when students recognized the teacher's intention, for example, by assisting or providing help, students were more likely to perceive the situation positively.

Although teacher chaos was more often reported in the negative situation descriptions, we did not find negative associations between perceived teacher chaos and need satisfaction. In general, students' need satisfaction was positively associated with perceptions of need-supportive teaching and negatively related to perceptions of need-thwarting teaching. This pattern did not hold for teacher chaos. Probably, from a student perspective, teacher chaos can be considered a neutral teacher behavior in a higher educational context.

The study in Chapter 3 further showed that the associations between students' perceptions of need-supportive teaching and students' need satisfaction in the situation descriptions were not limited to the corresponding need. For example, autonomy support was not exclusively related to autonomy, and structure not exclusively to competence. Therefore, we concluded that the dichotomy supportive/thwarting is likely to be more important than the specific need support. This dichotomy is represented in the functional aspect (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017). That is, the function that the teaching approach fulfills in students' internalization. The functional aspect of a teaching approach can be controlling *or* informational. Teachers assert power *or* they provide clues for students to self-determine learning. They hamper students' internalization *or* they support it. Rather than the specific teaching approach, it could be that the functional aspect of the teaching approach determines students' perceptions more. The distinction between controlling or informational could also explain the deviating patterns found for teacher chaos. When a teacher ends up in a chaotic teaching approach, this teacher is not asserting power, nor providing information to students about how to self-regulate or engage in self-determined learning. Thus, this teaching approach is perceived neutral, as it does not contain a functional aspect.

This functional aspect of need-supportive teaching was further explored in the study described in **Chapter 4**: The Scenario Studies. In two studies, we asked students to read a scenario describing a teacher introducing the central assignment for the course. We designed three scenarios, each describing a teacher with a different need-supportive teaching approach. In each scenario, one of the need-supportive teaching approaches (i.e., autonomy support, structure, or involvement) was emphasized, while the other two approaches were kept neutral. In both samples, students' perceptions of all three need-supportive teaching approaches were positive, but different patterns between the scenarios were found. This finding

indicates that students can differentiate between the three approaches, but it also supports the notion that the functional aspect of the teaching approaches matters. Students' perceptions seem to be based on the actual teaching behavior described in the scenario, as well as the functional aspect of the teaching approach.

Moreover, the students in Study 2 had a preference for involvement and perceived all teachers as being involved. In general, students' perceptions were highest in the involvement group. This indicates that the contextual preferences of students (e.g., being used to and/or preference for teacher involvement) affect their perceptions as well. In other words, it seems that students' perceptions are also based on their general perception of need-supportiveness. Thus, based on the results of both studies described in Chapter 4, it seems plausible that students' perceptions are based on the actual teacher behavior, the nature of the teaching approach (i.e., the informational aspect), and a general perception of need-supportiveness within their institute.

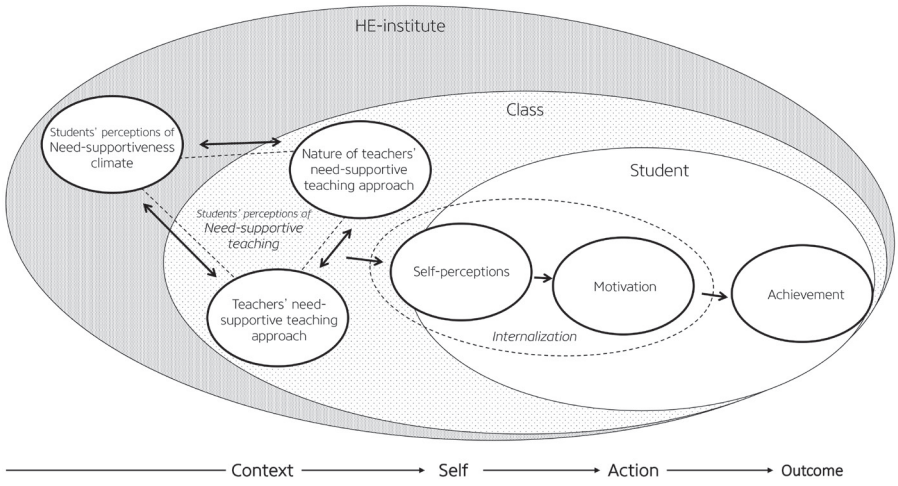
The general perception of need-supportiveness within the institute was further explored in **Chapter 5**. In this chapter, we described a study that zooms in on the social context within higher education. We distinguished two embedded social contexts: in-class and within the higher educational institute. As described in Chapter 2, the effect of the social context on students' motivation in-class can be explained by motivating teaching approaches. The social context at the institute level can be studied by focusing on the relationship quality between students and faculty/staff (Snijders et al., 2018). Relationship quality represents the perceived overall strength of the student-staff relationships and contains an affective, trust, and satisfaction component (see Chapter 5). We found that students' perceptions of both social contexts were associated with students' motivation. Both in-class teacher structure and involvement were found to be associated with students' motivation, as well as the affective component of the student-staff relationship quality. We observed interactions between the embedded social contexts. We found that the association between students' perceptions of affective conflict and students' motivation was mediated by students' perceptions of need-supportive teaching (i.e., autonomy support, structure, and involvement). Moreover, trust in benevolence seemed to act as a suppressor for the association between students' perceptions of involvement and autonomy support and autonomous motivation. The results of the study presented in Chapter 5

provided empirical evidence for multiple layers in students' perceptions of motivating teaching approaches. Students' general perception of need-supportiveness within the institute (e.g., the closeness of the student-staff relations) that could only be presumed in the study described in Chapter 4, was found determining students' motivation in Chapter 5.

We applied the insights obtained from Chapters 2-5 to the context of formative assessment in **Chapter 6**. We proposed a theoretical model to study formative assessment as practice (Boud et al., 2018). Two assumptions of the theoretical model were tested empirically: whether the perceived use of formative assessment in class was associated with students' need satisfaction and whether need satisfaction was associated with students' motivation. The results showed that both assumptions were confirmed. More perceived use of formative assessment was associated with more perceived autonomy and competence (for the latter, illustrated by more competence satisfaction and less frustration), and more autonomous motivation. Students' need satisfaction functioned as a mediator in the association between the perceived use of formative assessment and students' motivation. The study showed once more that the Self-System Model by Skinner and Belmont (1993) is applicable to higher education to explain the association between the social context and students' actions.

The main findings of our studies are represented in the model presented in Figure 7.1.

Figure 7.1 *Overall Model: The Composition of Students' Perceptions of Need-Supportive Teaching and the Relationship with Students' Internalization*



GENERAL DISCUSSION

The studies presented in this dissertation all focused on students' perceptions of their teachers' need-supportive teaching approaches. With the studies, we confirmed that students' perceptions of need-supportive teaching are important antecedents of students' motivation in higher education. As we described, higher education differs from other educational settings in many ways, but the most prevalent difference is the expected independence of learners in higher education (Bailey, 2013; Briggs et al., 2012; Brooks & Everett, 2008; Christie et al., 2008; Leese, 2010). We have seen that, even in institutes with a student-centered didactical approach (e.g., Chapter 4), a teacher's teaching approach is associated with students' motivation. Thus, even when we expect students to engage in self-directed learning, the teacher's role remains important. As in other educational contexts, also in higher education it is important for teachers to teach in a need-supportive way.

Our studies do not only underline the importance of need-supportive teaching in higher education, but they also underscore the importance of studying students' perceptions of it. Without examining students' perceptions, we would not have untangled associations and found patterns in the linkage between the social context (i.e., teaching approaches) and students' motivation. For example, the results of Chapter 3 would have been less satisfying when focusing on actual teaching behaviors, as the associations we found were especially situated between students' *perceptions* and need satisfaction, less between the scored behaviors and need satisfaction. Students' perceptions are the linking pin between the social context and students' self-appraisals (Connell & Wellborn, 1991; Deci & Ryan, 2000; Skinner & Belmont, 1993). As Mouratidis and colleagues (2011) concluded in their study on need-supportive teaching in physical education: "context effects could be accounted for by [students'] perceptions of need support" (p. 362). By studying students' perceptions, we contributed to the knowledge about how students internalize influences from the social context, that is, more specifically, teaching approaches, into perceptions about themselves and their perceived personal control (Ryan & Connell, 1989; Skinner, 1995). In this regard, we will discuss in more detail: (a) the origin of students' perceptions, (b) the importance of teachers' involvement, and (c) insights on teacher feedback.

ORIGIN OF STUDENTS' PERCEPTIONS

We found that students' perceptions of need-supportive teaching do not correspond one-to-one to the actual need support provided by the teacher, but they are built on (a) actual teacher behaviors, (b) the nature of the teaching approach, and (c) a general perception of need-supportiveness within the institute (i.e., the climate of need-supportiveness; see Figure 7.1).

Actual Teacher Behaviors

Several previous studies provided indications that students' perceptions are not based on the actual teaching approach students experienced. For example, a multilevel analysis in the study by Van den Berghe and colleagues (2015) on teachers' need-supportive teaching revealed that most of the variance in students' perceptions of need-supportive teaching was situated at the student level and not at the teacher or class level. Reeve and Cheon (2016) found the same in their intervention study on autonomy-supportive teaching. They found that 78% of the variance in students' perceptions was situated at the student level. Those results are in line with studies that report differences between students' perceptions and teachers' perceptions of need-supportive teaching (Skinner et al., 2008), and students' perceptions and observational data (Reeve & Jang, 2006). However, our results show that the actual teacher support explains at least a portion of the variance in students' perceptions. We found that students were able to differentiate between need-supportive teaching approaches (Chapter 4).

In the Scenario Studies (Chapter 4), we found that students' perceptions of the need-supportive teaching approaches depended on the scenario students read. Especially in Study 1, students' perceptions were in line with the scenario they received. For example, students who had read the autonomy-supportive teaching scenario perceived more autonomy support than students in other scenario groups. These patterns were replicated in Study 2, but perceptions of involvement were high in all three groups in this sample. We concluded that the different backgrounds of the participants caused the differences between Study 1 and 2. The students in Study 2 were teaching trainees, who were used to a personal approach of their teachers. It seems that these contextual experiences were translated into a general perception of need-supportiveness within the institute. Nevertheless, also in Study 2, statistically significant differences were found between the scenario

groups, which could be traced back to the scenarios. In other words, the scenario that was read mattered for students' perceptions.

More support that students' perceptions are built on actual teaching behaviors was provided in the study on situation-specific need-supportive teaching (Chapter 3). In Wave 1, students described a recent interaction with their teacher, independently from whether the situation caused positive or negative feelings. Those students who described a situation in which the teacher showed a structuring approach perceived statistically significantly more structure than students who did not describe teacher structure. Students who described an involved teaching approach showed a similar pattern. However, those patterns were not found when students were asked to describe an interaction that made them feel happy or sad. Probably this is understandable, as by asking to describe situations that caused an emotional reaction (positive or negative), we incorporated personal variance into the study, as reported by Van den Berghe and colleagues (2015) and Reeve and Cheon (2016). It is obvious that the same situation can be perceived differently from person to person. A situation that is perceived negatively by one student, can be interpreted as neutral by another student. Thus, asking for a situation that was perceived positively or negatively could have brought personal values to the foreground.

The Nature of the Teaching Approach

Throughout our studies, we had to conclude that besides the actual teacher behaviors, the nature of the teaching approach mattered for students' perceptions. We first came to this realization after we found high correlations between students' perceptions of the need-supportive teaching approaches and found gradual clusters of students' perceptions (i.e., high, moderate, low) in our first study (Chapter 2). Moreover, we found broad patterns of perceptions in the study on specific need-supportive teaching (Chapter 3). Our assumption was further confirmed in the scenario studies (Chapter 4), in which we found high perceptions of all three need-supportive teaching approaches, while only one approach was emphasized in the scenarios.

The high correlations between students' perceptions of need-supportive teaching that we found in our first study (Chapter 2) are in line with previous research. Lam and colleagues (2009) studied the relation between teachers' and students' motivation and the mediating role of teacher support in secondary education. They found a high correlation (r = .60) between students' perceptions of cognitive (i.e., the combination of

autonomy support and structure) and affective support (i.e., involvement). Also in secondary education, Sierens and colleagues (2009) found an even higher correlation between students' perceptions of their teacher's autonomy support and structure (r = .67). The correlations reported in our study (r = .62-.65) are in line with those studies.

In several studies, the separate need-supportive teaching approaches are not distinguished in students' perceptions. For example, Baeten and colleagues (2013) used a composite score of autonomy support, structure, and involvement in their study in higher education in Belgium. Katz and colleagues (2010) studied primary and secondary school students' motivation for homework in Israel. They reported that they could not distinguish between the need-supportive teaching approaches in students' perceptions in confirmatory factor analysis. They suggested that students' perceptions of need-supportive teaching cannot be separated into dimensions and instead form an integral perception (Katz et al., 2010). We did not find support for this suggestion in our higher education sample (Chapter 2), as we were able to distinguish the three need-supportive teaching approaches in students' perceptions of their teachers' teaching approach. However, the gradual clusters (i.e., high, moderate, low) that we found in the person-oriented analyses support the suggestion that students' perceptions are highly interrelated.

The cluster solution (Chapter 2) and the patterns of students' perceptions found in the study on situation-specific perceptions (Chapter 3) suggest that not the actual teaching behavior, but the nature of the teaching approach is more important. This nature of the teaching approach is described as the functional aspect of the teaching approach (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017): A controlling *or* informational aspect. This distinction in students' perceptions of informational and controlling teaching approaches finds resonance in research in secondary education (Fryer & Oga-Baldwin, 2019) and higher education (Fryer & Bovee, 2020), as students' perceptions of good teaching (i.e., a combination of autonomy support and structure) versus controlling teaching. Moreover, the functional aspect of teaching approaches can be recognized in the newly proposed circumplex model of (de)motivational teaching (Aelterman et al., 2019). In this circumplex model, perceptions of need-supportive teaching are defined on two axes: (a) Need thwarting vs. need support and (b) high directiveness vs. low directiveness (Aelterman et al., 2019; Vermote et al., 2020). The need thwarting vs. need support axis denotes the level of perceived

supportiveness of the teaching approach. In contrast, the high vs. low directiveness axis denotes the level of perceived teacher control (Aelterman et al., 2019). In Interpersonal Theory (Pennings & Hollenstein, 2020; Wijsman et al., 2014; Wubbels et al., 2006), similar dimensions are distinguished, but they are labeled differently. The dimensions of communion, affiliation, or proximity are used to indicate need thwarting vs. need support; and agency, control, or influence for high vs. low directiveness (Wiggins, 2003; Wubbels et al., 2012).

The circumplex model with two axes was not entirely confirmed by our studies, as we did not find support for the coexistence of both dimensions. In our vision, and in line with the original theory (Deci, 1975; Deci et al., 1981), a teaching approach has a controlling aspect *or* an informational aspect, not both. This point of view is confirmed by the patterns of perceptions found in the study on situation-specific perceptions of (de)motivational teaching approaches (Chapter 3). Although we did find that the provision of structure was perceived negatively, we did also find statistically significantly lower perceptions of control in those cases. This finding suggests that the controlling aspect was low even when the need-supportive approach was perceived negatively. When the two functional aspects coexist, as is presumed in the circumplex model by Aelterman and colleagues (2019), we would have found both high perceptions of structure and control. We found that students' perceptions of the need-supportive teaching approaches were opposite to perceptions of control and coldness for all cases.

The associations we found for teacher's chaos (see Chapter 3) provide support for the importance of the functional aspects (and is in line with the circumplex model; Aelterman et al., 2019). Teachers who end up in a chaotic approach are not perceived as controlling nor as need-supportive. We found that when teacher control is low, the need-thwarting approach (i.e., chaos) is less harmful to students' need satisfaction.

Need-Supportiveness Climate

In addition to actual teaching behaviors and the functional aspect of the teaching approach, we found support for the role of students' general perception of need-supportiveness within the institute. In the Scenario Study (Chapter 4), differences between Studies 1 and 2 could be attributed to differences in the students' contextual experiences. The students from Study 2 were teaching trainees from a university of applied sciences where personal contact between student and teacher is highly valued. Moreover,

these students were participating in small year groups with a small number of different teachers. The students from Study 1 were used to a program in which they have a different teacher every five weeks. We assumed that these differences could explain the appreciation of teacher involvement of the students in Study 2.

The interplay between students' perceptions of need-supportive teaching and more general perceptions about the higher educational institute's need-supportiveness culture was further explored in Chapter 5. In this chapter, two embedded social contexts were distinguished: in-class and in the institute. We found that students' perceptions of structure and involvement were negatively associated with the experience of affective conflict with faculty and staff. This finding was in line with previous research that described that students who experienced conflicts perceived less fairness (Tantleff-Dunn et al., 2002) and pointed out the importance of the teacher's interpersonal support (Furrer & Skinner, 2003). Higher perceptions of trust in benevolence (the belief that faculty and staff care about your welfare; Snijders et al., 2018) were found to be associated with higher perceptions of autonomy support and involvement. This indicates that students who experience the staff at their institute as taking a personal interest in their students, they also experience those characteristics in their teacher's teaching approach. Pennings and Hollenstein (2020) describe those reciprocal associations between moment-to-moment interactions (micro-level) and cultural influences (macro-level) as feedback loops. Perceptions of the need-supportiveness culture are built on moment-to-moment interactions but also loop back into those moment-to-moment interactions as they affect the students' and teachers' emotional state and preferences (e.g., students who are used to timely teacher feedback will develop an appreciation for timely feedback).

THE IMPORTANCE OF TEACHERS' INVOLVEMENT

In all our studies, we included perception scores of all three need-supportive teaching approaches. In previous studies, most attention was paid to autonomy support and structure (e.g., Black & Deci, 2000; Jang et al., 2016; Vansteenkiste et al., 2012). The results of our studies indicate that it is worthwhile to include teacher involvement in the research on need-supportive teaching, as especially involvement seems to play a leading role. In the scenario studies (Chapter 4), it was involvement that was perceived highest in Study 2, and that caused differences between both

studies. No matter what approach the students were shown in Study 2, they perceived high involvement in the scenarios. Even in Study 1, involvement scores were relatively high. In the study on students' perceptions of (de) motivational teaching approaches in specific situations (Chapter 3), we found that students' perceptions of involvement were associated with students' need satisfaction. In Wave 1, involvement was associated with all three needs. In Wave 2, involvement was associated with the need for autonomy and relatedness in the positive situation descriptions and with the need for relatedness in the negative situation descriptions. Furthermore, students' perceptions of involvement showed to be positively associated with autonomous motivation in the study about embedded social contexts, while none of the students' perceptions of other need-supportive teaching approaches were (Chapter 5). In this study, students' perceptions of structure were negatively associated with their controlled motivation. Students' perceptions of involvement were found to be negatively related to perceptions of affective conflict and positively with perceptions of trust in benevolence.

These findings are in line with previous studies in which associations between teacher involvement and student outcomes were found, such as motivation, self-esteem, and engagement (Chan et al., 2013; Murray, 2009; Ryan et al., 1994; Skinner & Belmont, 1993; Skinner et al., 2008). Sometimes it is assumed that strong teacher-student relationships, built on the provision of teacher involvement, are not important in higher education, as the importance of guiding adults is supposed to decline by age (Wentzel, 2009). Moreover, at the age of students in higher education, teachers and students have more equal relationships with each other (e.g., both adults). Also, interactions become more fragmented in traditional higher educational institutes where lectures are dominant in curricula (Hagenauer & Volet, 2014). However, our results indicate that teacher involvement and the affective component of student-teacher relationships are essential in higher education (see also Chapter 5).

INSIGHTS ON TEACHER FEEDBACK

Teacher feedback is found to be an important aspect of teachers' structuring approach (see Chapters 3 and 6). However, in Chapter 3, we concluded that not all teacher feedback can be considered as "providing structure" and that not all teacher feedback is perceived positively by students. Teacher feedback that did not contain clues regarding follow-up actions could not

be considered as informational. Comments like “Well done” or “You did a great job” do not leave room for improvement and can be labeled as “final vocabulary”, as learning stops after a student receives those feedback comments (Leenknecht & Prins, 2018). The positive valence of these comments could nourish positive feelings, but the lack of recommendations for future learning could hamper motivation.

Many students described teacher feedback in their situation descriptions of a recent interaction with their teacher, indicating that teacher feedback is a prominent teaching approach (see Chapter 3). The results of our study on formative assessment and student motivation (Chapter 6) underlines this conclusion, as students generally experienced the use of teacher feedback by their teacher. However, it has to be noted that students recognized the use of other formative assessment strategies as well (e.g., classroom discussions, peer, and self-assessment). Students do not always refer to teacher feedback positively. In the negative situation descriptions (see Chapter 3), teacher feedback was mentioned, especially feedback that was not in line with students’ self-assessment and feedback that students perceived as unfair.

Although constructive feedback is perceived negatively by several students (Chapter 3), we found support for the positive effects of teacher feedback. In our study on formative assessment (Chapter 6), we showed that the perception of the use of a formative strategy (including teacher feedback) was associated with both competence satisfaction and frustration, albeit with reverse effects. Students who perceived a formative strategy during class reported higher levels of perceived competence satisfaction and lower competence frustration. The use of teacher feedback (and other formative assessment strategies) both contributed to students’ feelings of competence and was able to compensate for competence frustration. In Chapter 3, we concluded that a possible negative effect of teacher feedback is compensated by the recognition of the teacher’s intention by the students. Students’ perceptions of structure were associated with competence satisfaction, even though the situation was perceived negatively. Again, this is an indication that both actual teaching behaviors (i.e., the negative perceived teacher feedback) and students’ contextual perceptions of the need-supportiveness culture (see Chapter 5) are important indicators for the association between need-supportive teaching and students’ motivation. Our findings underline the importance of working on a feedback-friendly culture (London & Smither 2002) to assist students in managing their

experience of feedback dialogues (as an aspect of feedback literacy; Carless & Boud, 2018) and in building up their feedback resilience (To, 2016).

STUDYING (DE)MOTIVATIONAL TEACHING APPROACHES: SUGGESTIONS FOR FUTURE RESEARCH

Our research has shown that Skinner's Self-System Model is a powerful framework to study the influence of social contexts in higher education. Not only for studying engagement (e.g., Dincer et al., 2019; Dupont et al., 2014; Hospel & Galand, 2016) but also for studying motivation. Future research applying the Self-System Model is recommended. Especially, we recommend future research investigating the linkage between the social context and students' self-perceptions. As proposed in our theoretical model for formative assessment as practice (Chapter 6), the mechanisms, as described by Skinner (1995), could help unravel this linkage.

While the effect of the controlling aspect of a teacher's teaching approach on students' self-perceptions is quite straightforward, this is more indistinct for the informational aspect. When you experience that someone is controlling the situation, this hampers your perceptions of control (i.e., internal locus of causality). The effect of the informational aspect can be attributed to students' perceptions of autonomy and competence, according to SDT (Deci & Ryan, 2000; Ryan, 1982; Ryan & Deci, 2017). However, our studies on need support advocate not to exclude relatedness and involvement (see the paragraph "The Importance of Teacher's Involvement"). The work by Ellen Skinner (1995) provides more insight into the mechanisms that are taking place in this respect. According to Skinner, it is all about perceived personal control (i.e., internal locus of causality; see Chapter 1). A teacher can impact students' perceived personal control (i.e., self-perceptions) with four mechanisms: by setting the right conditions (with providing 1] *contingency* and 2] *help*), by stimulating actions (by providing 3] *expectations*), and by assisting students in interpreting the learning progress (by providing 4] *translations*; see Chapter 6 for an elaboration on these mechanisms). More research on those mechanisms is recommended. In our opinion, studying these mechanisms will help to unravel the black box of the linkage between teaching approaches and students' motivation. We agree with Skinner (1995) that perceived personal control is the key, rather than need support or need satisfaction. We have found that in addition to the unique importance of the basic psychological needs, it is the more

general functional aspect that seems to be an important explanation of how the social context ignites students' motivation.

Besides future research on the functional aspect and the mechanisms by Skinner (1995), we recommend paying attention to the multiple determinants of students' perceptions of (de)motivational teaching approaches. We found indications for three determinants: actual teaching behavior, the functional aspect of the teaching approach, and the general perception of need-supportiveness within the institute. However, we do not know the relative importance of these determinants. Knowing their relative importance is essential, as we want to know whether the influence lies at the individual teacher, the faculty and staff, or a combination of both.

It seems plausible that teachers' teaching approach in class and the need-supportiveness climate are reciprocally influenced. Dynamic System approaches (Hollenstein, 2007) could help study those nested structures, as it provides the language to interpret the relations. Dynamic System approaches study phenomena as hierarchically nested in time and focuses on reciprocal influences between those timescales. Dynamic System approaches were successfully applied to Interpersonal Theory before (Pennings & Hollenstein, 2020) to study classroom interactions and student-teacher relationships in more detail.

APPLYING (DE)MOTIVATIONAL TEACHING APPROACHES: PRACTICAL IMPLICATIONS

The main practical implication of our research is to apply a need-supportive teaching approach when you want to motivate your students and to stimulate their academic achievements in higher education. Our results indicate that for students' perceptions, it does not matter whether teachers apply the complete palette of need-supportive teaching approaches (i.e., autonomy support, structure, and involvement) each time they interact with them or just one of them. The nature of the teaching approach is important. Finally, besides their teaching approach, it is the culture within the study program or institute that matters as well, such as perceptions of relationship quality.

Our studies indicate that the lists of teaching approaches (see Chapter 1) should not be interpreted as a blueprint that should be applied letter by letter. The lists are just tools that a teacher can use to support students' motivation. Taking the students' perspective (i.e., autonomy support), providing constructive feedback (i.e., structure), or showing that

students can depend on you for personal support (i.e., involvement), are all perceived as need-supportive. They all have an informational aspect that provide students with clues about how to self-determine learning. All these approaches can support students' autonomous motivation.

Besides fostering the informational aspect, teachers are advised to handle the controlling aspect with care. Teaching invites by definition for teacher control. However, a lack of perceived personal control hampers students' motivation and achievement. It is a balancing act to make students perceive control over their learning. Teachers are advised to avoid controlling language, be careful with rewards, marks, and "final vocabulary" (e.g., well done), and avoid inducing feelings of guilt and shame.

Each teacher's teaching approach will impact the overall need-supportiveness climate, which in turn supports or hampers the effectiveness of the teaching approaches in class. It thus is recommended to pay attention to need-supportive teaching within the teaching team (i.e., faculty and staff). Need-supportive teaching is both a teacher and a team activity. How teachers collectively interact with their students seems to affect students' perceptions of the individual teacher. Teachers are advised to build a need-supportive climate in cooperation.

The research presented in this dissertation focused on teaching approaches. Still, it seems evident that the curriculum's design affects students' perceptions of the social context, and consequently, their motivation and achievement. Strict assessment programs and focus on summative assessments could hamper the need-supportiveness of the environment within the study program or institute, as it leaves only little room for personal differentiation and focus on personal growth (i.e., autonomy and competence). Formative assessment (Chapter 6) could offer a solution.

To conclude, teachers are recommended to avoid controlling teaching approaches and to adopt informational teaching approaches. Moreover, need-supportive teaching seems to be a team effort, and teachers are recommended to work collectively on a need-supportive climate. It seems important to take need-supportive teaching in mind while developing curricula. The curriculum design forms the building blocks for actual teaching and the need-supportive climate within the study program or institute.

CONCLUSIONS

With our studies, we have demonstrated the applicability of Skinner's Self-System Model to the context of higher education. We have shown that the social context, as perceived by students, is associated with their self-perceptions of basic psychological needs (Chapter 6) and their autonomous motivation (Chapter 5), and consequently with their academic achievement (Chapter 2). Students' perceptions of their teacher's teaching approach form a first step in the chain that activates or counteracts academic achievement. Students seem to base their perceptions on the actual teaching behaviors, the nature of the teaching approach, and their general perceptions of the need-supportiveness climate within the educational program or institute. This finding indicates that teachers can focus on the informational nature of the teaching approach to be motivating, but asks for attention for motivational teaching at the individual as well as team level.

Summary in Dutch

NEDERLANDSE SAMENVATTING

Binnen het hoger onderwijs wordt een accent gelegd op de student als onafhankelijke lerende (Bailey, 2013; Leese, 2010). Studenten worden aangemoedigd om zelf hun leerproces te reguleren en verantwoordelijkheid te nemen voor het leren (Brooks & Everett, 2008). Immers, docenten kunnen niet afdwingen dat de student leert, dat is aan de student zelf, die met de juiste inspanning het leerresultaat kan bereiken. Er wordt dus een groot beroep gedaan op de intrinsieke motivatie van de student om te studeren. Dit vraagt om een docent die de studenten op een juiste manier weet te motiveren.

Het motiveren van studenten door docenten wordt vanuit verschillende theoretische invalshoeken bestudeerd (e.g., Komarraju et al., 2010; Wubbels et al., 2006). Voor dit proefschrift zijn we uitgegaan van de zelfdeterminatietheorie (Self-Determination Theory; Deci, 1975; Deci & Ryan, 1985; Ryan & Deci, 2017). De zelfdeterminatietheorie is een motivatietheorie die ervan uitgaat dat ieder individu een natuurlijke drive heeft die wordt aangestuurd door interne structuren die opgebouwd zijn uit ervaringen (Deci & Ryan, 1985). Die interne structuren zijn georganiseerd rond drie psychologische basisbehoeften: de behoefte aan autonomie, competentie, en relatie (Ryan & Deci, 2017). Of aan onze psychologische basisbehoeften wordt voldaan, hangt af van de ervaringen die we opdoen. Op basis van ervaringen bepalen we in hoeverre we het gevoel hebben zelf aan het stuur te staan (autonomie), we onszelf capabel voelen (competentie), en of we ons gesteund en verbonden voelen door anderen (relatie). Iedere ervaring is een potentiële inbreuk, of juist een mogelijke versterking van deze basisbehoeften.

Wanneer we het gevoel hebben dat aan onze basisbehoeften wordt voldaan, dan zorgt dit ervoor dat we controle over de situatie ervaren en leidt dit tot autonome motivatie (Ryan & Deci, 2017). Ons gedrag in zo een situatie wordt ingegeven, omdat we het leuk vinden, of omdat we het belang inzien van de activiteit. Aan de andere kant, wanneer niet aan onze basisbehoeften worden voldaan, dan ervaren we juist een gebrek aan persoonlijke controle over de situatie en worden onze acties enkel gedreven door externe factoren. Alles wat we in dit soort situaties doen, doen we vanuit een gecontroleerde motivatie (Ryan & Deci, 2017). We doen de dingen uit angst voor schaamte- of schuldgevoelens, of door de verwachte straf of beloning. We weten uit onderzoek dat studenten die autonoom gemotiveerd zijn, beter presteren, meer doorzetten, en een beter welzijn ervaren (e.g., Vansteenkiste et al., 2020).

(DE)MOTIVERENDE DOCENTBENADERINGEN

Als docent kan je de motivatie van studenten zowel positief als negatief beïnvloeden. Docentbenaderingen die de psychologische basisbehoeften van studenten stimuleren, worden behoefte-ondersteunende benaderingen genoemd, terwijl docentbenaderingen die de basisbehoeften belemmeren, behoefte-ondermijnende benaderingen worden genoemd (zie Tabel N.1).

Docenten kunnen het gevoel van autonomie versterken, door *autonomie ondersteuning* te bieden (Ryan & Deci, 2017). Hiermee geven ze studenten de handvatten om de eigen wilskracht in te zetten en zelfsturing toe te passen. Een docent kan autonomie ondersteunen door keuzes te bieden (e.g., Patall et al., 2010), respect te tonen naar de studenten en kritiek toe te staan (e.g., Assor & Kaplan, 2001; Reeve, 2009) en door controlerend taalgebruik te vermijden (bijvoorbeeld “Je moet…”, of “Ik wil dat je dit doet…”; e.g., Reeve et al., 2004; Reeve, 2009; Vansteenkiste et al., 2004; Wijnia et al., 2014).

Een docent kan *structuur* aanbieden om het gevoel van competentie te stimuleren bij studenten (Ryan & Deci, 2017; Skinner, 1995). Door het bieden van richtlijnen en hulp, informatieve feedback en duidelijke verwachtingen (e.g., Jang et al., 2010; Vansteenkiste et al., 2012), kan de docent ervoor zorgen dat de student ervaart effectief te zijn en zelfvertrouwen opbouwt.

Door persoonlijke waardering te tonen en te zorgen dat iedere student betrokken wordt bij de groep, kan een docent het gevoel van relatie stimuleren (Furrer & Skinner, 2003). De docent biedt *betrokkenheid*

door affectie en warmte te tonen, door tijd en energie te besteden aan de student en persoonlijke hulp te bieden die verder gaat dan de leerdoelen (Stroet et al., 2013).

De behoefte-ondermijnende docentbenaderingen zijn vaak niet bewust gekozen, maar ontstaan uit overtuigingen of gewoonte (Reeve, 2009). Zo kunnen docenten heel controlerend worden, omdat zij de overtuiging hebben dat studenten orde en dwang nodig hebben of dat een docent die controle neemt, wordt ervaren als betere docent (Reeve, 2009). Een docent die *controle* toepast, negeert het perspectief van de student, voedt schuld- of schaamtegevoelens en gebruikt straffen en beloningen (Aelterman, 2014; Haerens et al., 2016). Een controlerende docent beperkt het gevoel van autonomie van de student (Ryan & Deci, 2017).

Een docent die alles op zijn beloop laat en geen duidelijk plan heeft, draagt hiermee niet bij aan het gevoel van competentie van de student, maar belemmert dit gevoel juist (Aelterman et al., 2019). Een docent veroorzaakt *chaos* als er geen of onvoldoende instructie, hulp, en feedback wordt geboden (Stroet et al., 2015) en wanneer een afwachtende houding wordt aangenomen (Aelterman, 2014).

Tot slot kan een docent het gevoel van relatie negatief beïnvloeden, door zich *koel* te gedragen (Ryan & Deci, 2017). Een docent die koel is, reageert onvriendelijk en afstandelijk en toont geen interesse in de student (Aelterman, 2014). De docent is onverschillig.

Uit onderzoek weten we dat de behoefte-ondersteunende docentbenaderingen een positieve invloed hebben op de autonome motivatie van de student en behoefte-ondermijnende docentbenaderingen invloed hebben op de gecontroleerde motivatie (e.g., Aelterman et al., 2019). Onduidelijk blijft echter wat de specifieke invloed is van de afzonderlijke docentbenaderingen. Bovendien weten we niet precies *waarom* deze docentbenaderingen motiverend zijn of juist niet. Deze vragen stonden centraal in dit proefschrift. Daarbij namen we studentpercepties als centrale uitgangspunt, omdat we weten dat studentpercepties soms afwijken van docentintenties (e.g., Mulliner & Tucker, 2016; Skinner et al., 2008). Daarnaast is het juist de internalisatie van externe gebeurtenissen door

studenten die de basis vormt van studentmotivatie, omdat de psychologische basisbehoeften nu eenmaal worden opgebouwd op basis van ervaringen (Ryan & Deci, 2017).

Tabel N.1 *Beschrijving van Behoefte-ondersteunende en Behoefte-ondermijnde Docentbenaderingen*

Behoefte-ondersteunende docentbenaderingen			Behoefte-ondermijnende docentbenaderingen		
Autonomie ondersteuning	Structuur	Betrokkenheid	Controle	Chaos	Koel
Definities:					
Studenten handvatten bieden om de eigen wilskracht in te zetten en zelfsturing toe te passen	Zorgen dat de studenten ervaren effectief te zijn en zelfvertrouwen opbouwen	Studenten laten zien dat ze persoonlijk gewaardeerd worden en onderdeel vormen van de groep	Het perspectief van studenten negeren en hen dwingen te denken of zich te gedragen op een bepaalde manier	Weigeren om hulp te bieden en studenten aan hun lot overlaten	Onvriendelijk en afstandelijk zijn en geen interesse tonen in de studenten
Bijbehorende gedragingen:					
Keuzes bieden	Duidelijke verwachtingen communiceren	Warmte en affectie tonen	Werken met straffen en belonen	Ambigue verwachtingen scheppen	Onvriendelijk en koel communiceren
Relevantie van de taak uitleggen	Hulp en ondersteuning bieden	Beschikbaar zijn voor hulp	Veeleisend zijn	Hulp weigeren	Onverschillig zijn
Respect tonen	Informatieve feedback geven	Tijd en energie investeren	Inspelen op gevoelens van schaamte en schuld	Afwachtende houding aannemen	Afstand bewaren
Kritiek van de student toestaan	Gepaste uitdaging bieden		Controlerende taal gebruiken	Lusteloosheid	Student negeren
				Toegeeflijk	

OVERZICHT VAN DE STUDIES

In de studie die wordt beschreven in **Hoofdstuk 2** hebben we aangetoond dat de motiverende docentbenaderingen ook hun kracht kennen in het hoger onderwijs. We vonden een samenhang tussen studentpercepties van alle drie de docentbenaderingen en de motivatie en prestatie van studenten. Met behulp van een clusteranalyse vonden we dat de studentpercepties kunnen worden gegroepeerd in drie groepen: hoog, gemiddeld, laag. Als een student een hoge mate van autonomie ondersteuning ondervond, dan was deze student doorgaans ook positief over de mate van structuur en verbondenheid. Het lijkt er dus op dat een algemeen beeld van de mate van behoefte-ondersteuning belangrijker is dan de afzonderlijke docentbenaderingen.

Gegeven deze bevinding hebben we ons afgevraagd of er meer differentiatie is in studentpercepties wanneer wordt gekeken naar specifieke situaties. Daarom hebben we in **Hoofdstuk 3** studenten bevraagd over specifieke situaties. In drie fases en twee steekproeven hebben we studenten gevraagd een recente specifieke interactie tussen henzelf en een docent te beschrijven. In de eerste steekproef en fase 1 mochten studenten zelf kiezen of dit een positieve of negatieve situatie was. In een onafhankelijke tweede steekproef hebben we in fase 2 en 3 de studenten gevraagd om specifiek respectievelijk een positieve en negatieve situatiebeschrijving te geven. Na het beschrijven van de situatie hebben we de studenten gevraagd om een vragenlijst in te vullen over de docentbenadering in de zelfbeschreven situatie. We vonden dat structuur niet altijd positief wordt ervaren door studenten. Wanneer ze bijvoorbeeld negatieve feedback kregen die niet aansloot bij hun eigen verwachtingen, dan ervaarden de studenten dit als een negatieve situatie. Echter, doordat de studenten wel de positieve intentie van de docent herkenden, belemmerde de negatieve situatie vaak niet de psychologische basisbehoeften van de studenten. Docentchaos werd veelal beschreven als een negatieve situatie, toch vonden we geen samenhang met frustratie van de basisbehoeften. We konden dus concluderen dat chaos een meer neutrale docentbenadering is dan we op basis van de theorie zouden verwachten.

Uit de resultaten van de studie beschreven in Hoofdstuk 3, bleek verder dat de behoefte-ondersteuning niet alleen samenhing met de bijbehorende basisbehoefte. Bijvoorbeeld, autonomie ondersteuning hing niet enkel samen met het gevoel van autonomie, en structuur niet

enkel met het gevoel van competentie. Wel zagen we dat de behoefte-ondersteunende docentbenaderingen meer samenhingen met voldoening van de psychologische basisbehoeften en behoefte-ondermijnende docentbenaderingen meer met frustratie van de basisbehoeften. We concludeerden daarom dat de dichotomie van ondersteunend/ondermijnend belangrijker is dan de specifieke docentbenaderingen. Dit hangt samen met wat ze binnen de zelfdeterminatietheorie het functionele aspect van de docentbenadering noemen (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017). Het functionele aspect is óf informerend, óf controlerend. Een benadering kan de motivatie van de student belemmeren of stimuleren, niet allebei.
Het functionele aspect hebben we verder onderzocht in de studie die we beschreven in **Hoofdstuk 4**: de scenariostudie. In twee deelstudies hebben we studenten een scenario voorgelegd, waarin een docent de centrale opdracht van een nieuwe onderwijseenheid (cursus) introduceerde. Er waren drie scenario's, waarbij de docent steeds één van de behoefte-ondersteunende docentbenaderingen hanteerde en de andere benaderingen neutraal beschreven waren. We vergeleken de studentpercepties binnen en tussen groepen, en vonden dat studenten in staat zijn om te differentiëren: de beschreven docentbenadering (bijv. autonomie ondersteunend) werd ook vaker gerapporteerd door de studenten. Toch zagen we ook dat ze in het algemeen heel positief waren over de docentbenaderingen van de docent in het scenario. Vooral in Studie 2 bleek ook de contextuele voorkeur van de student een rol te spelen. De studenten in Studie 2 waren gewend aan een betrokken docent en zij ervaarden dan ook alle docenten uit de drie scenario's als betrokken docenten. Kortom, de studie met de scenario's lijkt erop te wijzen dat studenten hun percepties van de docent baseren op het waargenomen gedrag van de docent, het functionele aspect van dit gedrag én de contextuele ervaringen.

De invloed van de context op de studentpercepties van de docentbenaderingen hebben we verder onderzocht in **Hoofdstuk 5**. In dit hoofdstuk beschrijven we een studie naar de sociale contexten binnen het hoger onderwijs. Daarbij hebben we twee geneste contexten onderscheiden: binnen het instituut en binnen de klas. Op het niveau van het instituut hebben we de student-docentrelatie onderzocht aan de hand van het concept relatiekwaliteit (Snijders et al., 2018). We vonden dat zowel studentpercepties van de relatiekwaliteit met alle medewerkers van de hoger onderwijsinstelling, als de behoefte-ondersteunende docentbenaderingen samenhingen met de motivatie van studenten. Daarbij leken de percepties

binnen de twee geneste contexten ook met elkaar te interacteren. De relatie tussen de studentpercepties van de mate van conflict en de motivatie van studenten werd gemedieerd door de studentpercepties van behoefte-ondersteunende docentbenaderingen in de klas. Ook vonden we dat het vertrouwen in de welwillendheid van de medewerkers van de hoger onderwijsinstelling de relatie tussen studentpercepties van autonomie ondersteuning en betrokkenheid in de klas en studentmotivatie onderdrukte. Het lijkt er dus op dat ervaren autonomie ondersteuning en betrokkenheid kan leiden tot een "zeg-maar-wat-ik-moet-doen-mentaliteit" bij de studenten, waardoor de positieve samenhang met motivatie teniet wordt gedaan.

De inzichten opgedaan in Hoofdstukken 2 tot en met 5 hebben we toegepast op de context van formatief toetsen in **Hoofdstuk 6**. In dit hoofdstuk presenteren we een theoretisch model om formatief toetsen te bestuderen als praktijk (Boud et al., 2018). Twee assumpties van dit theoretische model hebben we empirisch getest. We vonden dat de waargenomen inzet van formatieve strategieën in de les samenhing met de ervaren voldoening van de basisbehoeften en dat deze ervaren voldoening van de basisbehoeften ook samenhing met de autonome motivatie van studenten.

ALGEMENE DISCUSSIE

De studies gepresenteerd in dit proefschrift onderschrijven het belang van behoefte-ondersteunende docentbenaderingen in het hoger onderwijs. Bovendien onderschrijven de studies het belang van het bestuderen van studentpercepties. We vonden dat studentpercepties voortkomen uit: (a) het docentgedrag; (b) het functionele aspect van de docentbenadering; en (c) de context waarin de docentbenadering zich afspeelt.

HET DOCENTGEDRAG

Uit enkele eerdere studies rees de vraag of studentpercepties wel volledig gebaseerd zijn op het actuele docentgedrag of dat andere factoren ook een rol spelen. Zo vonden Van den Berghe en collega's (2015) dat de meeste variantie in studentpercepties gesitueerd was op studentniveau en niet op docent- of klasniveau. Toch kunnen wij concluderen dat het docentgedrag wel deels bepalend is voor de studentpercepties. Zo vonden we in Hoofdstuk 4 dat studenten konden differentiëren in hun percepties. De behoefte-

ondersteunende docentbenadering die in het scenario naar voren kwam, scoorde ook het hoogst in de perceptiemeting (met name in Studie 1). Dat docentgedrag deels bepalend is voor studentpercepties, werd onderstreept in onze studie naar situatie-specifieke docentbenaderingen (Hoofdstuk 3). In fase 1 vonden we dat studentpercepties van structuur en betrokkenheid hoger waren in de situaties waarin daadwerkelijk deze docentbenaderingen waren beschreven.

HET FUNCTIONELE ASPECT VAN DE DOCENTBENADERING

Gedurende het onderzoek hebben we moeten concluderen dat docentgedrag niet de enige determinant van studentpercepties vormt, maar dat ook het functionele aspect van de docentbenadering belangrijk is. Het belang van het functionele aspect boven de specifieke benadering, bleek uit de graduele clusterindeling die we vonden in Hoofdstuk 2, de brede patronen van percepties die we vonden in Hoofdstuk 3, en de hoge perceptiescores die we vonden voor alle drie de behoefte-ondersteunende docentbenaderingen in alle drie de scenario's in Hoofdstuk 4.

De hoge samenhang tussen de docentbenaderingen was al vastgesteld in eerder onderzoek (e.g., Lam et al., 2009; Sierens et al., 2009). Baeten en collega's (2013) gebruikten zelfs een samengestelde score voor studentpercepties, omdat zij niet in staat waren om de percepties per docentbenadering te onderscheiden. Hetzelfde deden Katz en collega's (2010). Zij stelden zelfs dat de studentpercepties überhaupt niet per docentbenadering te onderscheiden zijn. Deze conclusie konden we weerleggen, omdat in factoranalyses steevast drie factoren naar voren kwamen (zie bijvoorbeeld Hoofdstuk 2).

We kunnen de stellingname van Katz en collega's (2010) dat een meer algemene perceptie van docentbenaderingen wellicht belangrijk is wel bevestigen. Onze onderzoeken onderschrijven het belang van het functionele aspect van de docentbenadering (Deci, 1975; Deci et al., 1981; Ryan & Deci, 2017). Een docentbenadering is óf informeren (en daarmee motiverend), óf controleren (en daarmee demotiverend). Deze tweedeling komt naar voren in verschillende eerdere onderzoeken. Zo werd in eerder onderzoek het onderscheid gemaakt in 'goed lesgeven' en 'controlerend lesgeven' (Fryer & Bovee, 2020; Fryer & Oga-Baldwin, 2019). Ook worden docentbenaderingen vaak ingedeeld op twee dimensies: behoefte-ondersteunend versus behoefte-ondermijnend en hoog directief versus laag directief (Aelterman et al., 2019; Vermote et al., 2020). De eerste

dimensie beschrijft de mate van informatie en de tweede dimensie de mate van controle. Deze twee dimensies zijn ook terug te zien in onderzoeken vanuit andere theoretische invalshoeken, zoals de interpersoonlijke theorie (Pennings & Hollenstein, 2020; Wijsman et al., 2014; Wubbels et al., 2006).

De onderzoeken waarin twee dimensies worden onderscheiden, gaan ervan uit dat een docentbenadering dus zowel informerend als controlerend kan zijn. Dit is niet in lijn met de originele theorie (Deci, 1975; Deci et al., 1981) en we vonden geen onderbouwing voor deze aanname. De patronen van studentpercepties die wij vonden, lieten geen percepties zien waarin behoefte-ondersteunende docentbenaderingen, zoals structuur, samengingen met een controlerende docentbenadering. Wel vonden we een docentbenadering die niet informerend en niet controlerend bleek: chaos.

DE CONTEXT VAN DE DOCENTBENADERING

Naast docentgedrag en het functionele aspect van docentbenaderingen, bleek in onze onderzoeken dat ook de context een rol speelde. In de scenariostudie (Hoofdstuk 4) bleken verschillen tussen de twee studies te verklaren door verschillen in context. In de studie die beschreven is in Hoofdstuk 5 hebben we de interactie tussen de context van het instituut en de context van de klas nader onderzocht. Ook hier vonden we interacties tussen studentpercepties op de verschillende niveaus. Pennings en Hollenstein (2020) onderschrijven de wederzijdse samenhang tussen klassenniveau (micro) en instituutsniveau (macro). De studentperceptie van de docentbenaderingen binnen het instituut zijn opgebouwd uit de verzamelde ervaringen van docentbenaderingen in de klas, maar omgekeerd kleurt de studentperceptie van docentbenaderingen op instituutsniveau de studentperceptie van docentbenaderingen in de klas. Zo is er een wederzijdse beïnvloeding (Pennings & Hollenstein, 2020).

IMPLICATIES

De onderzoeken die we hebben uitgevoerd hebben zowel theoretische als praktische implicaties.

THEORETISCHE IMPLICATIES: SUGGESTIES VOOR VERVOLGONDERZOEK

In de verklaring van onze resultaten hebben we nadruk gelegd op het functionele aspect van de docentbenaderingen. Dit concept is ontstaan in het begin van de theorievorming (Deci, 1975; Deci et al., 1981), maar wordt

sindsdien alleen nog in historische overzichten benoemd (bijv., Ryan & Deci, 2017). Onze resultaten en interpretaties laten zien dat het waardevol kan zijn om meer onderzoek te doen naar het belang van het functionele aspect. Daarbij kunnen de mechanismen die Skinner (1995) beschrijft wellicht behulpzaam zijn (zie Hoofdstuk 6).

Het effect van een controlerende docentbenadering behoeft weinig toelichting, toch is het effect van een informerende docentbenadering minder voor de hand liggend. We raden dan ook aan om met name meer onderzoek te doen naar informerende docentbenaderingen en wanneer deze effectief zijn. Daarbij zien wij dat betrokkenheid net zo belangrijk is als autonomie ondersteuning en structuur. Het is dus belangrijk om alle drie de docentbenaderingen mee te nemen in vervolgonderzoek.

Naast dit vervolgonderzoek naar het functionele aspect van docentbenaderingen, raden wij aan om de determinanten van studentpercepties nader te onderzoeken. Wij konden drie determinanten onderscheiden: docentgedrag, het functionele aspect, en de context. We verwachten dat vooral een focus op de interactie tussen verschillende contexten interessante inzichten kan opleveren (zie ook Pennings & Hollenstein, 2020).

PRAKTISCHE IMPLICATIES: SUGGESTIES VOOR TOEPASSING

Ons onderzoek onderschrijft het belang van behoefte-ondersteunende docentbenaderingen, ook in het hoger onderwijs. Docenten die studenten willen motiveren om zelf verantwoordelijkheid te nemen voor het leren, kunnen het beste autonomie ondersteuning, structuur, en betrokkenheid toepassen in hun docentbenadering. Het gebruik van controle, op welke manier dan ook, wordt afgeraden, omdat dit leidt tot meer gecontroleerde en minder duurzame vormen van motivatie.

Om de motivatie van studenten te stimuleren, is het niet nodig om iedere les of ieder moment alle docentbenaderingen in te zetten. Belangrijker dan de specifieke docentbenaderingen is het functionele aspect. Zolang een student ervaart dat de docent hem/haar handvatten geeft om zelf de regie te nemen, dan stimuleert de docent hiermee de autonome motivatie van de student. Kortom, een docent hoeft bijvoorbeeld niet iedere les keuzes te bieden, maar het is wel belangrijk dat de docent iedere les put uit het palette van behoefte-ondersteunende docentbenaderingen (zie Tabel N.1).

Hoewel ons onderzoek zich richtte op docentbenaderingen, durven we ook te concluderen dat niet alleen het docentgedrag van een individuele

docent belangrijk is (zie Hoofdstuk 5 en 6). Motiverend lesgeven is ook een kwestie van goed curriculum- en onderwijsontwerp en teamwork. Ook in het ontwerp van het onderwijs moet rekening worden gehouden met behoefte ondersteuning. Geen dwingende instructies, maar flexibiliteit en differentiatiemogelijkheden. Een student motiveren om zelf regie te nemen over het eigen leerproces, bestaat ook uit heldere en constructieve instructie en feedback. Bovendien hebben we gezien dat ook de context van het instituut de studentpercepties beïnvloeden. Daarom is het van belang dat alle medewerkers van de hoger onderwijsinstelling werken vanuit een behoefte-ondersteunende mentaliteit. Alleen samen wordt het maximale effect bereikt.

CONCLUSIES

Kortom, we hebben aangetoond dat het motiveren van studenten in het hoger onderwijs van belang is en dat behoefte-ondersteunende docentbenaderingen hierbij van belang zijn. We vonden dat studentpercepties van deze docentbenaderingen antecedenten vormen van motivatie en prestatie en dat deze studentpercepties worden opgebouwd aan de hand van actueel docentgedrag, het functionele aspect van de docentbenadering in het algemeen en de context waarbinnen de docentbenadering wordt toegepast.

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ABOUT THE AUTHOR

CURRICULUM VITAE

Martijn Leenknecht was born on July 24, 1986, in Oostburg, The Netherlands. After completing his secondary education (VWO) at Reynaertcollege in Hulst in 2004, he started studying Educational Sciences at Utrecht University. He received his Bachelor's Degree in July 2007, with minors in Developmental Psychopathology and Communication Studies. A year later, he received his Master's Degree. Later in 2008, he started the Research Master's program Developmental Psychopathology in Education and Child Studies at Leiden University in the track Educational Sciences and Learning. He completed the Research Master's program and received his second Master's Degree in February 2011.

After graduation, he started working at HZ University of Applied Sciences as a policy advisor. He was responsible for setting institute-wide policy about study choice support and assessment. He also contributed to the institute's educational concept and the educational concept of the Associate Degree Academy, which was co-founded by HZ University of Applied Sciences and Avans University of Applied Sciences in 2016. Since 2017, he is trainer and assessor (at Rotterdam University of Applied Sciences) of the Senior Qualification Examination program. Throughout the years, he has given lectures and masterclasses for diverse audiences (see list of publications).

In 2013 he founded the national network "Platform Leren van toetsen", together with colleagues from Rotterdam University of Applied Sciences. The platform promotes the implementation of assessment for learning in Dutch higher education by supporting research and disseminating research output. It is nowadays a hotspot of information and inspiration for teachers

in higher education (see www.lerenvantoetsen.nl), and the number of participants is still growing.

Martijn started in 2015 as a PhD-candidate at Roosevelt Center for Excellence in Education (RCEE), Utrecht University, studying students' perceptions of (de)motivational teaching approaches in higher education. The results of this research are presented in this dissertation. Since 2016 he is combining his work as a policy advisor at HZ University of Applied Sciences and coordinator of Platform Leren van toetsen with working as a researcher at the Research Group "Excellence in Primary Education" at HZ University of Applied Sciences.

PUBLICATIONS AND PRESENTATIONS

PUBLICATIONS

Scientific Publications (Peer Reviewed)

Leenknecht, M. J. M., Snijders, I., Wijnia, L., Rikers, R. M. J. P., & Loyens, S. M. M. (2020). Building relationships in higher education to support students' motivation. *Teaching in Higher Education*. Advance online publication. https://doi.org/10.1080/13562517.2020.1839748

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Leenknecht, M. J. M., Wijnia, L., Rikers, R. M. J. P., & Loyens, S. M. M. (2020). *Looking through the student lens: The interplay between the dimensions of a need-supportive teaching approach* [Manuscript submitted for publication]. University College Roosevelt, Utrecht University.

Leenknecht, M. J. M., Wijnia, L., Van der Boon, F. A., Van Geffen, E. C., Rikers, R. M. J. P., & Loyens, S. M. M. (2020). *Students' perceptions of teacher's (de)motivating teaching approach and their need satisfaction in specific situations* [Manuscript submitted for publication]. University College Roosevelt, Utrecht University.

Kruiper, S. M. A., Leenknecht, M. J. M., & Slof, B. (2020). *Using scaffolding strategies to improve formative assessment practice in higher education* [Manuscript submitted for publication]. Utrecht University.

Practical Publications (Peer Reviewed)

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Leenknecht, M. J. M. (2016, February). *Acceptatie bij peer assessment: Waarom studenten soms moeite hebben met een beoordeling door een medestudent* [Acceptance during peer assessment: Why students sometimes have wories about the appraisal of a peer]. Platform Leren van toetsen. https://lerenvantoetsen.nl/acceptatie-bij-peer-assessment-waarom-studenten-soms-moeite-hebben-met-een-beoordeling-door-een-medestudent/

Leenknecht, M. J. M. (2016, January). *De kracht van beoordelingscriteria (deels) ontkracht?* [The power of assessment criteria taken to the edge?]. Platform Leren van toetsen. https://lerenvantoetsen.nl/de-kracht-van-beoordelingscriteria-deels-ontkracht/

Leenknecht, M. J. M. (2015, February). *Leren van toetsen? Betrek studenten bij het toetsproces!* [Learning from assessment? Involve students with the process of assessment!]. Platform Leren van toetsen. https://lerenvantoetsen.nl/leren-van-toetsen-betrek-studenten-bij-het-toetsproces/

PRESENTATIONS

Scientific Presentations (Peer Reviewed)

Broerse, S., & Leenknecht, M. J. M. (2021, January 12-13) *Developing students' feedback literacy in higher education: Effect of a training program and goal orientation on students' feedback seeking behaviour in workplace learning* [paper presentation]. International Symposium on Feedback Literacy: From Education to Professional Practice, Surrey, England (online).

Leenknecht, M. J. M., Fryer, L. K., Wijnia, L., Rikers, R. M. J. P., & Loyens, S. M. M. (2020, September 3-6). *A hierarchy model of need-supportive teaching* [Paper presentation]. International Conference on Motivation, Dresden, Germany (conference cancelled).

Leenknecht, M. J. M., & Carless, D. (2020, June 22-25). *Strategies for feedback seeking in higher education: A narrative review* [Paper presentation]. Joined EARLI SIG 1 and SIG 4 Conference, Cadiz, Spain (conference cancelled).

Leenknecht, M. J. M., Wijnia, L., Rikers, R. M. J. P., & Loyens, S. M. M. (2019, May 21-24). *Teacher's (de)motivating teaching style is like a tree, students' perceptions like a shadow* [Poster presentation]. Self-Determination Theory Conference, Egmond aan Zee, The Netherlands.

Snijders, I. & Leenknecht, M. J. M. (2019, May 21-24). *"Hey teachers! Don't leave your students alone": A new perspective on relationship quality and students' motivation to learn* [Poster presentation]. Self-Determination Theory Conference, Egmond aan Zee, The Netherlands.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2018, August 15-17). Students' task-specific perceptions of teacher's (de)motivating teaching style. In N. Aelterman (Chair), *Theoretical and methodological advancements in examining teachers' motivating and demotivating styles* [Symposium]. International Conference on Motivation, Aarhus, Denmark.

Hompus, P. B. M., Leenknecht, M. J. M., & Van der Schaaf, M. F. (2018, June 13-15). Studenten die zelf op zoek gaan naar feedback: Het effect van doelen en leerstrategie op feedback-zoekend gedrag [Students who are seeking for feedback: The effect of goals and learning strategies on feedback seeking behavior]. In D. Sluijsmans (Chair), *Op een andere manier kijken naar feedback: de student centraal* [Symposium]. Onderwijs Research Dagen, Nijmegen, The Netherlands.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2018, April 13-17). Putting students in charge: The association between formative strategies in class and students' motivation. In D. Joosten-Ten Brinke (Chair), *Toward the integration of formative assessment and self-regulated learning* [Symposium]. Annual meeting of American Educational Research Association, New York, NY.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2017, August 29 – September 2). *Can students differentiate between dimensions of need-supportive teaching? An experimental study* [Paper presentation]. European Association for Research on Learning and Instruction Conference, Tampere, Finland.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2017, August 27-28). *Need satisfaction in higher education: Providing structure* [Roundtable session]. Junior Researchers Conference of the European Association for Research on Learning and Instruction, Tampere, Finland.

Leenknecht, M. J. M. (2017, June 28-30). Discussie: Studenten activeren in een feedbackcultuur [Discussion: Activating students in a feedback culture]. In S. E. Kooij (Chair), *Leren van toetsen: Studenten activeren met toetsen en feedback* [Symposium]. Onderwijs Research Dagen, Antwerpen, Belgium.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2016, August 24-27). *Configurations of autonomy support, structure, and involvement in higher education* [Paper presentation]. International Conference on Motivation, Thessaloniki, Greece.

Leenknecht, M. J. M., Wijnia, L., Loyens, S. M. M., & Rikers, R. M. J. P. (2016, August 21-23). *Promoting students' motivation in higher education: When do students perceive teachers as being need-supportive?* [Paper presentation]. Summer School of the International Conference on Motivation, Thessaloniki, Greece.

Roskam-Pelgrim, E., Kooij, S., & Leenknecht, M. (2014, November 25-28). *Learning from assessment: Measuring feedback effectiveness* [Roundtable session] EAPRIL Conference, Nicosia, Cyprus.

Leenknecht, M. J. M., & Prins, F. J. (2011, August 30 - September 3). *Formative peer assessment in primary school: The effects of involving pupils in setting assessment criteria on their appraisal and feedback style* [Paper presentation]. European Association for Research on Learning and Instruction Conference, Exeter, England.

Leenknecht, M. J. M., & Prins, F. J. (2011, June 8-10). *Formative peer assessment in primary school: The effects of involving pupils in setting assessment criteria on their appraisal and feedback style* [Paper presentation]. Onderwijs Research Dagen, Maastricht, The Netherlands.

Practical presentations

Leenknecht, M. J. M. (2021, February). *In actie! Studenten motiveren om het leren zelf te reguleren* [In action! Stimulating students' motivation to self-regulate their learning] [Workshop]. Versterk-je-onderwijs-week. Utrecht University, Utrecht, The Netherlands.

Leenknecht, M. J. M. (2020, August). *Meet the expert: Need supportive teaching during a pandemic & formative assessments* [Q&A-session]. Get Ready for Flexible Teaching Weeks, University College Roosevelt, Middelburg, The Netherlands.

Leenknecht, M. J. M. (2019, October). *Feedback seeking* [Workshop]. High Impact Learning that Lasts Congress, Utrecht, The Netherlands.

Leenknecht, M. J. M. (2019, September). *Supporting students' motivation to learn: A delicate matter* [Workshop]. Pedagogical Innovation Seminar Series, Centre for the Enhancement of Teaching and Learning, University of Hong Kong, Hong Kong.

Leenknecht, M. J. M. (2019, May). Promoting students' learning with (formative) assessment [Lecture]. In R. Bouwer, & M. Lesterhuis (Course Coordinators), *Innovative assessment research and implications for practice*. Interuniversitair Centrum voor Onderwijswetenschappen, Utrecht, The Netherlands.

Gulikers, J. T. M., & Leenknecht, M. J. M. (2019, January). *Toolkit formatief toetsen: Ontwerp je eigen team heidag* [Toolkit formative assessment: Develop a professionalization program your own team] [Workshop]. Conferentie Formatief Evalueren in de Lerarenopleiding, Zwolle, The Netherlands.

Leenknecht, M. J. M., & Luteijn, F. (2018, October). *Feedbackcultuur in kaart brengen* [Mapping feedback culture] [Workshop]. Cito Kennisplatform Hoger Onderwijs, Arnhem, The Netherlands.

Leenknecht, M. J. M. (2018, March). *Motiverende leerkrachtstijlen* [Motivating teaching styles] [Workshop]. Basisschool De Twijn, Terneuzen, The Netherlands.

Leenknecht, M. J. M. (2018, January). *Motiverende leerkrachtstijlen* [Motivating teaching styles] [Workshop] Studiedag Albero Scholengroep, Vlissingen, The Netherlands.

Leenknecht, M. J. M. (2017, October). *Motivation and assessment: How assessment can foster and harm students' motivation* [Lecture]. Erasmus University, Rotterdam, The Netherlands.

Leenknecht, M. J. M. (2017, October). *Motivatie van studenten, en hoe je die als docent kunt beïnvloeden* [Students' motivation, and how a teacher can support it] [Workshop]. Zeeuwse Onderwijsdag, Middelburg, The Netherlands.

Leenknecht, M. J. M. (2017, October). *Motiverende leerkrachtstijlen* [Motivating teaching styles] [Workshop]. Studiedag OnzeWijs scholengroep, Middelburg, The Netherlands.

Leenknecht, M. J. M. (2017, October). *De leerwaarde van toetsen: Op weg naar een feedbackcultuur* [Assessment for learning: Our way to a feedback culture] [Lecture]. Cito Kennisplatform Hoger Onderwijs, Arnhem, The Netherlands.

Leenknecht, M. J. M. (2017, September). *Motiverende leerkrachtstijlen: Behoefte-ondersteunend lesgeven* [Motivating teaching styles: Need-supportive teaching] [Lecture]. Pabo, HZ University of Applied Sciences, Vlissingen, The Netherlands.

Leenknecht, M. J. M. (2017, June). *Feedback geven? Overtreed de regels!* [Providing feedback? Break the rules!] [Workshop]. Facta Seminar Toetsen en Examineren in het Voortgezet Onderwijs, Amersfoort, The Netherlands.

Leenknecht, M. J. M., & Kooij, S. E. (2017, April). *Kwaliteit van toetsen? Van toetscultuur naar feedbackcultuur!* [Quality of assessment? From testing culture to feedback culture!] [Workshop]. Congres Vereniging Hogescholen, Amersfoort, The Netherlands.

Leenknecht, M. J. M. (2016, October). *Feedback geven? Overtreed de regels!* [Providing feedback? Break the rules!] [Workshop]. Facta Seminar Toetsen en Examineren in het Hoger Onderwijs, Amersfoort, The Netherlands.

Leenknecht, M. J. M., & Kooij, S. E. (2016, March). *Feedback en gepersonaliseerd leren: Hoe pakken we het aan?* [Feedback and personalized learning: How to establish?] [Interactive lecture]. SBO Congres Toetsen en Examineren in het Hoger Onderwijs, Utrecht, The Netherlands.

Leenknecht, M. J. M. (2014, May). *Assessment for learning* [Masterclass]. Verenigde Scholen J.A. Alberdingk Thijm, Hilversum, The Netherlands.

HONORS AND AWARDS

Nominee of the Dutch Prijs voor Examens 2017 [Prize for Exams 2017] for Platform Leren van toetsen.

Nominee of the Dutch Prijs voor Examens 2019 [Prize for Exams 2019] for Toolkit Formatief toetsen [Toolkit Formative assessment].

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VAN JAIPUR TOT HONGKONG
en weer terug

Jaipoer. Jabalpoer. Djamsjedpoer. Kattak... Vele malen zat ik achter mijn laptop en tuurde ik over de rand van het scherm, naar deze rode bolletjes op mijn oude schoolkaart. Vanachter mijn laptop, zittend aan de keukentafel, zaten deze bolletjes in India precies op ooghoogte. Diep verzonken in gedachten keek ik naar ze, zonder dat ik zag wat een wonderlijke namen ze hebben. Deze Indiase steden markeren de vele uurtjes die ik voor deze landkaart heb gezeten om alle woorden en zinnen in dit boek in een logische en zinnige volgorde op papier te zetten. Nadenkend, zinnen construerend, bouwend aan dit proefschrift.

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Jaipoer. Jabalpoer. Djamsjedpoer. Kattak... Vele malen zat ik achter mijn laptop en tuurde ik over de rand van het scherm, diep in gedachten over een van mijn onderzoeken. Tot ik ineens toch registreerde welke wonderlijke plaatsnamen er worden gevormd met de letters die voor me op de landkaart stonden en mijn gedachten afdwaalden naar fantasiebeelden van Indiase dorpjes. Gelukkig kon ik mij vaker wel focussen dan niet. En iedereen die daaraan heeft bijgedragen, wil ik bedanken: collega's, vrienden

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[DE]MOTIVATIONAL TEACHING APPROACHES

Students in higher education are not just passive spectators. Nowadays, we recognize that their own motivation to be, stay, or become an active participant is crucial for lifelong learning. It is up to higher education to support students' motivation; making students the captain of their own starship can really set them off to great heights.

Unfortunately, teachers are not always sure how to get this done. Does that sound familiar to you? This dissertation can help you out. We explore various ways to support your students' motivation. Starting from the self-determination theory, we look at the matter from the student's perspective. This gives you insight into which teaching approaches are effective - and why.

Motivating students is not just about *what* you do; *how you do it* might matter even more. This book teaches you how you can light your student's fire!

ABOUT THE AUTHOR

Martijn Leenknecht works as educational researcher and policy advisor at HZ University of Applied Sciences. His broad interest in higher educational teaching and learning is part of the reason he started his PhD at Roosevelt Center for Excellence in Education (Utrecht University). His role in the foundation and coordination of the Dutch national network "Platform Leren van toetsen" ('Learning from Assessment') illustrates his commitment to translating research into practice.