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Chapter 3
Teacher and Teaching Behaviour and Student Motivational Outcomes: Critical Reflections on the Knowledge Base and on Future Research

Marie-Christine Opdenakker

Abstract In this chapter, (a selection of) current conceptualizations, theories, measurements, and instruments of (quality of) teacher and teaching behaviour from a variety of perspectives, namely educational and teacher effectiveness research, learning environments research and research on motivational teaching are discussed. Furthermore, attention is paid to topics such as the dimensionality of teacher and teaching behaviour, and of teaching skills, as well as the existence of teaching styles and stages in teaching skill development. In addition, context, antecedents, informant as well as (in)stability issues concerning teacher and teaching behaviour are addressed. Relevant empirical findings concerning the already mentioned issues as well as empirical findings with regard to teacher and teaching effectiveness in relation to student motivational outcomes are reviewed and discussed. Attention is paid to unique and joint effects of teacher and teaching behaviour dimensions and relative sizes of effects. In addition, differential effectiveness of teacher and teaching behaviour in relation to student background characteristics such as gender, social-economic status, cognitive ability, race and ethnicity, and prior engagement is discussed. The chapter ends with conclusions, reflections, implications and suggestions for future research directions and practice related to effective teacher and teaching behaviour based on the findings discussed before.

Keywords Teacher behaviour · Motivation · Instruments · Differential effects · Stability

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1   Introduction

How can students be motivated and stay motivated and what influences can teachers have on their students' motivation and learning? These questions have been triggering teachers, teacher trainers and researchers for many decades. After all, it is a well-known fact that learning takes more easily place when students are motivated (Stipek, 1988) and this is also recognized in models of learning (e.g., Illeris, 2009). Interest in the effects that teachers and, in particular, their behaviour may have on students can be found in various domains of educational research such as educational and teacher effectiveness research, learning environments research and research in the domains of educational, developmental and motivational psychology. In all these domains, conceptualizations of teacher behaviour exist as well as ideas on what constitutes a good, successful, or effective teacher. This led to the construction (and refinement) of instruments to measure relevant aspects of teacher behaviour and to the formulation of several theories. Because the domains already mentioned have different backgrounds and frameworks, and operated in the past rather independently from each other, it is interesting and important to compare their conceptualizations, measurements and instruments of teacher and teaching behaviour[1] and their findings in relation to student motivational outcomes. This operation includes looking for convergence and divergence on these topics across these domains and also addressing the dimensionality of teacher quality and effectiveness, the existence of teaching styles and stages in teaching skill development, and exploring context, informant and stability issues concerning teacher and teaching behaviour). It can enlarge our knowledge on and insights in the way in which teachers may and can have an impact on their students' motivation and how teachers' behaviour and its effect on student motivational outcomes can be optimally investigated. In this chapter, these topics will be critically addressed and substantiated with empirical findings, and findings from the mentioned domains regarding teacher and teaching effectiveness in relation to student motivational outcomes will be discussed.

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[1] In this chapter the terms teacher and teaching behaviour are used. In fact, teacher behaviour is a broader concept than teaching behaviour and it can include teaching behaviour. Nevertheless, it was opted to mention teaching behaviour in addition to teacher behaviour because it depends on the theoretical framework which concept is used in publications (and I wanted to stay as close as possible to the concepts used by authors in publications) and because it is informative to know if or that teaching behaviours of teachers are addressed in theoretical frameworks, conceptualizations and other relevant topics discussed in this chapter.

2   Conceptualizations of Teacher and Teaching Behaviour from a Variety of Perspectives

It is striking how many different terms are used in the literature to refer to classroom processes or practices and behaviour of teachers who appear to be good, successful, or effective in their teaching (Leon et al., 2017). For example, terms like teaching quality (Allen et al., 2011; Fauth et al., 2014; Leon et al., 2017), quality of teaching (Hattie, 2009; Teddlie et al., 2006), instructional quality (Klieme et al., 2009; Lipowsky et al., 2009; Rjosk et al., 2014), quality of instruction (Creemers, 1994; Opdenakker, 2020), teaching effectiveness (Hamre et al., 2013; Marsh & Roche, 1997; Seidel & Shavelson, 2007;), effective teaching (Campbell et al., 2004; Creemers, 1994; Muijs & Reynolds, 2011), teacher effectiveness (Campbell et al., 2004; Doyle, 1977; Kyriakides et al., 2020; Muijs et al., 2014) and classroom quality (McLean & Connor, 2015) are used. In addition, in some studies reference is made to effective teaching styles (Campbell et al., 2004; Opdenakker & Van Damme, 2006; Wentzel, 2002), instructional style (Jang et al., 2010), quality of teacher-student interactions (Hafen et al., 2015; Hamre & Pianta, 2010), and effective classroom management (Arens et al., 2015). Furthermore, some of these terms have a broader and others a narrower meaning, and sometimes it depends on who is using the term. A good example is quality of teaching (see e.g., Teddlie et al., 2006), which is often used with a narrower meaning than teacher effectiveness (Campbell et al., 2004; Muijs et al., 2014; Teddlie et al., 2006). For example, teacher effectiveness is defined by Campbell et al. (2004) as 'the power to realize socially valued objectives agreed for teachers' work, especially, but not exclusively, the work concerned with enabling students to learn' (Campbell et al., 2004, p. 4). It refers to the impact of classroom factors such as teaching methods, teaching expectations, classroom organization and the use of classroom resources (p. 3). This is a broader definition than the definition of quality of teaching by Teddlie et al. (2006). They define quality of teaching by referring to indicators such as clarity of instruction, (demonstrating) instructional skills, promoting active learning and developing metacognitive skills in students, and (having an adequate) planning of single lessons. However, broader definitions of teaching are found as well. For example, Sykes and Wilson (2015) refer to two domains namely instruction and professional role responsibilities in their framework for competent teaching, a framework that was based on an interpretive synthesis of main and contemporary currents in the research on teaching and learning. The first domain (instruction) refers to preparing and planning for high-quality instruction, attending to relational aspects of instruction, establishing and maintaining the social and academic culture, interactive teaching, and engaging in instructional improvement. The second domain of teaching (professional role responsibilities) refers to collaborating with other professionals, working with families and communities, fulfilling ethical responsibilities, and meeting legal responsibilities. In addition, Campbell et al. (2004) mention that teacher effectiveness is (often) conceptualized too narrowly in the literature and that attention should be paid to differential teacher effectiveness which takes into account that teachers may

be more effective with some categories of students, some subjects and some teaching contexts than with others.

Moreover, a number of models and theories on effective teaching (e.g., the comprehensive model of educational effectiveness of Creemers, 1994; the dynamic model of educational effectiveness of Creemers & Kyriakides, 2008; Kyriakides et al., 2020), instruction(al) quality (e.g., the three dimensions model of instructional quality of Klieme et al., 2009), and (need-)supportive teaching (e.g., the self-system process model of motivational development of Connell & Wellborn, 1991; the self-determination theory of Ryan & Deci, 2017; the teaching through interactions framework cf. Hafen et al., 2015; Hamre et al., 2013)[2] have been developed. Some of these theories focus mainly on how to achieve student learning outcomes, while others focus on more general/broader outcomes (e.g., well-functioning, development) or on non-cognitive outcomes such as motivation or motivated student behaviour in the classroom, or on a diversity of outcomes (cognitive as well as on non-cognitive outcomes). In addition, depending on the research domain, theorizing got more/less attention in the past. For example, in the domain of learning environments research, the focus has always been strongly on developing instruments, while theorizing got less attention. An exception is the theoretical work of Wubbels and colleagues on interpersonal behaviour of teachers. In the next paragraph, (teacher/teaching behaviour) factors often mentioned in the above-mentioned research domains and visible in famous, influential (current) theories/models stemming from these domains and included in a listing of findings of a state-of-the-art on teacher effectiveness research (Muijs et al., 2014) will be discussed. (For an overview of the selected theories/models/state-of-the-art, see Table 3.1).

Table 3.1 reveals that the theories/models and list in the state-of-the-art on teacher effectiveness refer to a different number of relevant factors/dimensions/domains, although three of them refer to three overarching factors. However, looking into more detail into these factors and their content, it is striking that there is much in common even though the different theories/models stem from a variety of research domains and their knowledge bases are mostly separately constructed. Another observation is that, depending on the research domain, some factors are more elaborated, which often results in more separate dimensions. In the following, the research domains with corresponding theories/models will be discussed paying attention to convergences and divergences.

Teacher effectiveness research and accompanying frameworks/theories refer, first, to the importance of structured teaching (including aspects of direct instruction) (Creemers, 1994; Klieme et al., 2009; Kyriakides et al., 2020; Muijs et al., 2014; Opdenakker, 2020; Opdenakker & Minnaert, 2011; Opdenakker & Van Damme, 2006; Teddlie et al., 2006; van de Grift, 2007). Structured teaching entails the delivery of explicit and clear instruction as well as structuring the lessons (clearly stating goals, making the structure of the lesson explicit, paying attention to main ideas of the lesson) and also entails elements of direct instruction such as giving an orientation on the learning content, offering explicit strategy instruction and

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[2] Hamre et al. (2013) also use the term teacher effectiveness.

Table 3.1 Overview of factors, dimensions, and outcomes in a selection of theories/models of teacher effectiveness, instructional quality and effective teaching and mentioned in a state-of-the-art review of teacher effectiveness

	Theory/model					
Author(s)	Creemers (1994) (selection – teacher behaviour)	Kyriakides et al. (2020)	Klieme et al. (2009)	Muijs et al. (2014)	Hafen et al. (2015)	Connell and Wellborn (1991)/Ryan and Deci (2017)
Name of theory/model/framework	Comprehensive model of educational effectiveness	Dynamic model of educational effectiveness	Model of instructional quality[a]	State-of-the-art on teacher effectiveness research	Teaching through interactions framework	Self-system process model of motivational development/self-determination theory
Domains/factors/dimensions	Management/orderly and quiet atmosphere High expectations Homework Clear goal setting (restricted set, emphasis on basic skills, on cognitive learning and transfer) Structuring the content Clarity of presentation Questioning Immediate exercises Evaluation Feedback Corrective instruction	Orientation modelling Structuring Questioning Application Assessment Management of time Classroom as a learning environment For each factor 5 dimensions: Frequency, focus, stage, quality & differentiation	Cognitive activation & deep content Classroom management (including clarity and structure) Supportive climate[b]	Classroom management (related to opportunity to learn and time on task) Instruction and interaction: Structuring Classroom climate (social, businesslike, and supportive for learning) Teacher expectations Attention needed for self-regulated learning	Emotional support – *Positive climate* – *Negative climate[c]* – *Teacher sensitivity* – *Regard for student Perspectives[d]* Classroom organization – *Behaviour management* – *Productivity* – *Instructional learning Formats[e]* Instructional support – *Content understanding* – *Analysis and inquiry* – *Quality of feedback* – *Instructional dialogue*	Structure Autonomy support Teacher involvement

Table 3.1 (continued)

Author(s)	Theory/model					
	Creemers (1994) (selection – teacher behaviour)	Kyriakides et al. (2020)	Klieme et al. (2009)	Muijs et al. (2014)	Hafen et al. (2015)	Connell and Wellborn (1991)/Ryan and Deci (2017)
Outcomes	Achievement (Motivation)	Achievement (Subject motivation) (Thinking style)	Student learning (i.e., knowledge & understanding) Motivation (emotions & affects)	Cognitive & non-cognitive (e.g., self-concept, wellbeing, motivation & engagement)	Social and emotional skills Engagement Regulation of behaviour Regulation of attention Cognition & learning Higher-order thinking/Metacognition	Satisfaction of the need to feel related, competent & autonomous Motivation Engagement Learning & achievement

[a] This model is also known under the names of 'Generic dimensions of teaching quality' and 'German framework of three basic dimensions'

[b] This refers to supportive teacher-student relationships, positive and constructive teacher feedback, a positive approach to student errors and misconceptions, individual learner support, caring teacher behaviour (Klieme et al., 2009, p. 141). Reference is made to the fulfillment of students' basic psychological needs as mentioned in the self-determination theory

[c] This factor belongs to classroom organization in the framework for secondary education

[d] Within the developmental and motivational literature, this dimension belongs to the construct of autonomy support (e.g., Anderman & Midgley, 1998; Skinner & Belmont, 1993; Hamre & Pianta, 2010)

[e] This factor belongs to instructional support in the framework for secondary education

guided practice etc. There is overlap with the concept of clarity of instruction often mentioned in learning environments research[3] (den Brok et al., 2006), although clarity of instruction is often more narrowly conceptualized.

In addition, teacher effectiveness research also mentions the importance of good classroom management (Klieme et al., 2009; Kyriakides et al., 2020; Muijs et al., 2014; Opdenakker, 2020; Opdenakker & Minnaert, 2011; Teddlie et al., 2006; van de Grift, 2007), and teacher behaviour that stimulates a positive relational and learning climate in the classroom (Klieme et al., 2009; Kyriakides et al., 2020; Muijs et al., 2014; Opdenakker, 2020; Teddlie et al., 2006). A positive relational climate is characterized by good and frequent teacher-student interactions and good relationships characterized by mutual respect, trust and interest in each other. A good learning climate refers to a class climate that is supportive and conducive to learning (van de Grift, 2007). In some teaching effectiveness studies the importance of the teacher as a helpful person is stressed (Opdenakker & Minnaert, 2011; Teddlie et al., 2006). The mentioned concepts also show resemblance with factors referred to as important in learning environments research, namely of classroom management (see e.g., Back et al., 2016; den Brok et al., 2006; Fraser, 2012) and teachers' interpersonal behaviour referring to proximity/communion (see e.g., den Brok et al., 2004, 2006; Wubbels, 2019; Wubbels & Brekelmans, 2005). Also, the importance of teachers' role in creating a positive psychosocial climate in the classroom and the importance of teacher involvement (Fraser, 2012) is emphasized in learning environments research.

Moreover, teacher effectiveness research points to the importance of making expectations about learning (and corresponding evaluation) explicit, and of having high and realistic student expectations as a teacher (Hattie, 2009; Muijs et al., 2014; van de Grift, 2007). The importance of providing positive and constructive feedback to students is stressed as well (Hattie, 2009; Klieme et al., 2009; Kyriakides et al., 2020; Muijs et al., 2014). Slavin (2021) points out the relevance of intentionally/ (purposeful) teaching. Furthermore, teacher behaviour in line with constructivist concepts of learning (that stimulates active student involvement in their own learning and the development of metacognitive skills) is, rather recently, receiving attention as effectiveness enhancing teacher behaviour as well (Klieme et al., 2009; Kyriakides et al., 2020; Muijs et al., 2014; Opdenakker, 2020; Teddlie et al., 2006). Lastly, teacher effectiveness research refers to the importance of offering adaptive education/instruction and differentiation opportunities (Creemers & Kyriakides, 2008; Kyriakides et al., 2020).

Theories and literature on educational, developmental and motivation psychology refer to the same kind of factors referring to providing structure, stimulation of self-regulated learning/student participation, climate, and classroom management.

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[3] The instruments that were constructed within the learning environments research tradition to make the characteristics of the learning environments visible and to get an impression of the quality of the psychosocial climate the teachers had created in their classrooms, deliver a good illustration of this emphasis. For an overview and description of de most famous instruments, see Fraser (2012, 2019).

See for example the Teaching through interactions framework (TTI) (and research based on this framework). In this framework (see Hafen et al., 2015), which combines developmental theory with classroom practices, reference is made to three overarching factors namely emotional support (which refers to the climate in classes, teacher sensitivity and teacher's regard for student perspectives), classroom organization (which refers to, among others, behaviour management and productivity in relation to time), and instructional support (which is indicated by, among others, teachers' approaches to help students with subject matter comprehension, facilitation of higher-level thinking skill use and metacognition, quality of teachers' feedback and encouragement of students' participation, and purposeful use of dialogue-structured, cumulative questioning and discussion to facilitate students' understanding of the subject matter). The resemblance of the first factor with the already mentioned climate factor and teacher involvement in other frameworks, the second factor with classroom management, and the third factor with providing structure and the stimulation of self-regulation and participation is clear.

Related factors are visible in theories/models focusing on supporting students' motivation and engagement such as the self-determination theory (SDT; Ryan & Deci, 2000, 2002, 2017) and the self-system process model of motivational development (Connell & Wellborn, 1991), a model grounded in self-determination theory. In this model/theory it is stressed that every person requires the fulfillment of three fundamental innate psychological needs in order to function well, to flourish, to be and to stay motivated, and to experience psychological growth and well-being (Ryan & Deci, 2000). These needs are the need to feel competent, to feel autonomous and to feel related. Three (need-supportive) factors are mentioned that can satisfy these needs, namely structure, autonomy support and teacher involvement.

Structure refers to the creation of a supportive well-structured environment and includes offering optimal challenges, instrumental help and support, and positive and rich efficacy supportive feedback to students. It also includes adjusting teaching strategies to the level of the student (Ryan & Deci, 2020). In addition, it refers to the amount of information that is available in the context about how to effectively achieve desired outcomes (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Structure can be provided by clearly communicating expectations and goals towards students and by responding contingently, consistently, and predictably to them. It entails the provision of clear and consistent guidelines and rules in the classroom. Structure is considered to play an important role in the fulfillment of the need to feel competent (Ryan & Deci, 2020) and is important to promote motivation and engaged behaviour (Ryan & Deci, 2002). Providing structure may not be confused with controlling teacher behaviour which pressures students to think, feel or behave in a certain way or which pressures to achieve. The 'opposite' of structure is chaos, uncertainty, and inconsistency.[4]

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[4] Recently, SDT researchers have begun to see and study these need-supportive and their need-thwarting "opposites" as separate dimensions (Opdenakker, 2021; Reeve et al., 2014). Furthermore, it is recognized that little support for the needs will lead to experiences of low/deprived need satisfaction, while a more direct thwarting of individuals' needs lead to need frustration experiences (Ryan & Deci, 2017).

Autonomy support refers to supporting students to take ownership and initiative of their schoolwork (Ryan & Deci, 2020). It can be promoted and supported by providing students meaningful choices and tasks and by allowing them latitude in their learning activities, by making connections between school activities and students' interests and by offering students a rationale for tasks and learning activities that must be done. It also entails attempts to understand, acknowledge, respect, and where possible, be responsive to the perspective of students, to give them a voice and to use informational language (Ryan & Deci, 2017). For fostering autonomy, the absence of controls and pressures and, also, of external rewards is important. Autonomy support is seen as promoting not only the satisfaction of the need to feel autonomous but contributes also to the satisfaction of the need to feel related and when it occurs along with structure, the satisfaction of competence is promoted as well. In addition, in respecting autonomy and advocating for its support, which entails, as mentioned before, respecting and attempting to appreciate the perspective of each student as well as his/her unique challenges, the importance of differences between students is acknowledged as well (Ryan & Deci, 2020). The 'opposite' of being autonomy supported is being coerced and feeling controlled (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Controlling teachers are more oriented to pressure students with regard to their thinking, feeling or behaving and are not responsive to student perspectives.

The third factor, teacher involvement, is of particular importance to fulfill students' need of relatedness and refers to creating a caring, supporting and respectful environment (Ryan & Deci, 2020). It entails expressing warmth and affection towards students, enjoying interactions with them, taking time for them, and being attuned and dedicate resources to them. Involvement refers to the quality of the interpersonal relationship with teachers and peers. The 'opposite' of involvement is rejection or neglect.

The structure factor resembles structure and classroom management factors in other frameworks, while the teacher involvement factor is familiar with (relational) climate and emotional support[5] factors in other frameworks. The autonomy support factor has connections with factors referring to the stimulation of students' self-regulation and to teacher actions in line with constructive ideas of learning mentioned in other frameworks.

In general, it can be concluded that all these frameworks and theories mentioned and discussed in the preceding pages include combinations of factors/dimensions that were associated with different research domains in the earlier days. For example, a strong focus on instruction and instructional context is characteristic for educational research, while social dynamics of and within the class has always got much attention in developmental and learning environments research (Hamre & Pianta, 2010). Classroom management and organization has always been a factor that was highly focused on in research on teaching and teacher training, learning

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[5] This familiarity between teacher involvement of the SDT and emotional support of the TTI is also recognized in Virtanen et al. (2018).

environments research (Hamre & Pianta, 2010), and educational psychology (Emmer & Strough, 2001). Overlooking the dimensions of the discussed frameworks and theories, they all have a rather broad and holistic approach to and vision on (the quality of) teacher behaviour. However, it is also clear that there are some differences regarding the degree to which the dimensions are elaborated. For example, it is obvious that instruction is quite elaborated within the models and frameworks related to teacher effectiveness research, while teachers' role in creating a positive psychosocial classroom climate and offering emotional support is less well elaborated, in particular, in the oldest ones. In other frameworks e.g., the TTI or Need-supportive teaching framework, these dimensions are more equally elaborated.

3   Measurements and Instruments of Teacher and Teaching Behaviour

In each of the mentioned domains of research, instruments for the (reliable and valid) measurement of teacher/teaching behaviour were developed in line with theoretical perspectives, models, and knowledge bases. A comparison of these instruments reveals that they differ regarding the type of informants (teachers – self-report, student perspectives, observers, consultants/administrators), the kind of data collection method used (questionnaires, observation instruments, vignettes, etc.), and the intended educational level (preprimary, primary, secondary education). In the early developing phases of the instruments, the choices made in this respect were the logical consequence of the research traditions in the domains concerned and were often conceived as generic instruments. Later, additions were made to some of the existing instruments. For example, observation variants were added to questionnaires tapping student perceptions (or vise versa), different forms were made to map not only the current perception of teacher's classroom behaviour/classroom environment, but also the ideal (i.e., preferred teacher behaviour/classroom environment) or the expected teacher behaviour/classroom environment. Sometimes, adaptations for other educational levels than the original were made as well. One of the most known and wide-spread used instruments are the *CLASS* [Classroom Assessment Scoring System] instrument (Pianta & Hamre, 2009; Pianta et al., 2012) stemming from the domain of developmental and educational psychology), the *WIHIC* [What Is Happening In this Class] from the domain of learning environments research[6] (Fraser et al., 1996), the *ICALT* [International Comparative Analysis of Learning and Teaching] (van de Grift, 2007), the *ISTOF* [International System for Teacher Observation and Feedback] instrument (Muijs et al., 2018; Opdenakker & Minnaert, 2011; Teddlie et al., 2006), both stemming from educational and teacher

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[6] Another famous instrument is the CES (Moos & Trickett, 1974). Due to word constraints and because the CES is older than the WIHIC, this instrument was not included in this review.

effectiveness research, and the *TASC* [Teacher As a Social Context] (Belmont et al., 1992), which is based on elaborations of the self-determination theory/self-system processes model of motivational development (Ryan & Deci, 2017, 2020; Connell & Wellborn, 1991).

A comparison of these instruments reveals that, in line with the findings about the theoretical/knowledge base foundations of these instruments, the instruments share overlapping concepts and characteristics that are recognized as effective teaching behaviour in teacher effectiveness research (see Table 3.2). For a description and discussion of these instruments, see the Appendix.

4 Dimensionality, Stability and Best Informants of Teacher and Teaching Behaviour

4.1 Dimensionality of Teacher and Teaching Behaviour

An important question is how the mentioned dimensions/factors/domains of the instruments described in the preceding section and the appendix should be considered. Do they refer to a one-dimensional, multidimensional or multifaced conceptualization of teaching and teacher behaviour? What evidence does validation research deliver about the theoretical conceptualizations?

In general, all the dimensions/factors/domains distinguished in the instruments are, from a theoretical point of view, considered as unique contributors to teaching and a lot of validation studies found evidence for the multidimensionality of teacher behaviour.[7] For example, a variety of studies (e.g., Allen et al., 2013; Hafen et al., 2015; Hamre et al., 2013; Virtanen et al., 2018) found evidence for the three-domain latent structure of the CLASS/CLASS-S instrument. In each of the studies, a three-factor solution (in confirmatory factor analysis) had a better fit compared to one- or two-factor solutions. The studies referred to a variety of classroom settings (ranging from preschool to high school) and to teaching in a variety of countries. Comparable findings providing evidence for the multidimensionality of teacher behaviour/teaching were found with regard to the WIHIC (e.g., Aldridge & Fraser, 2000; Dorman, 2003), the TASC (e.g., Opdenakker, 2014; Sierens et al., 2009[8]; Vansteenkiste et al., 2012[9]) and dimensions related to need-supportive teaching (Jang et al., 2010[10]), the

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[7] However, there are also a few exceptions related to the CLASS as well as the ISTOF instrument. For a discussion of the first, see Virtanen et al. (2018), and for the second, see Muijs et al. (2018).

[8] In this study, only autonomy support and structure were included. Confirmatory factor analysis indicated a significantly better fit for the two-factor model compared to the one-factor model.

[9] In this study, a short version with an adaptation of the dimension 'structure' was used.

[10] Jang et al. (2010) distinguished, in an observation instrument, between autonomy support and structure and found evidence based on confirmatory factor analysis that a two-factor model had a significant better fit than a one-factor model. However, they also explored how both dimensions relate to each other (antagonistic, curvilinear, independent) and found that both relate in al linear way.

Table 3.2 Overview of a selection of instruments tapping teacher behaviour with corresponding factors/dimensions of teacher behaviour

Name	CLASS (classroom assessment scoring system)	WIHIC (what is happening in this class?)[a]	ICALT (international comparative analysis of learning and teaching)	ISTOF (international system of teacher observation and feedback) –observation	ISTOF - questionnaire[b]	TASC (teacher as a social context)
Factors/ dimensions/ domains/ components (and subdimensions)	Emotional support – Positive climate – Negative climate[c] – Teacher sensitivity – Regard for adolescent perspectives[d]	Student cohesiveness Cooperation Equity Teacher support[e] Task orientation[f]	Learning climate (safe and stimulating)	Classroom climate	(see helpful)	Teacher involvement
	Classroom organization – Behaviour management – Productivity – Instructional learning formats[e]		Classroom management (efficient)	Classroom management	Manager/organizer of classroom activities	Structure
	Instructional support – Content understanding – Analysis and inquiry – Quality of feedback – Instructional dialogue	Teacher support[g] Investigation	Clarity of instruction (clear instruction) Teaching learning strategies	Clarity of instruction Instructional skills	Helpful and good instructor	
		Involvement	Activating teaching	Promoting active learning and developing metacognitive skills (see also instructional skills)	Teacher as promotor of active learning and differentiation	Autonomy support

		Differentiation/ adaptive teaching (adaptation of teaching)	Differentiation and inclusion Assessment and evaluation	(see differentiation)

[a] The original version of this instrument also included the dimension autonomy/independence (see Fraser et al., 1996)

[b] ISTOF questionnaire (see Opdenakker & Minnaert, 2011)

[c] This factor belongs to classroom organization in the instrument for secondary education (CLASS-S; Pianta et al., 2012)

[d] Within the developmental and motivational literature, this dimension belongs to the construct of autonomy support (e.g., Anderman & Midgley, 1998; Skinner & Belmont, 1993; Hamre & Pianta, 2010)

[e] This factor belongs to instructional support in the instrument for secondary education (CLASS-S; Pianta et al., 2012)

[f] This dimension refers to the task orientation of the student and includes, for example, if it is important for them to get a certain amount of work done or to understand the work. It also refers to knowing the goals for the class

[g] This dimension includes aspects of emotional as well as instructional support

ISTOF (student questionnaire: Opdenakker & Minnaert, 2011; observation instrument: for a review, see Muijs et al., 2018) and the ICALT (e.g., Maulana et al., 2017, 2021; Maulana & Helms-Lorenz, 2016; van de Grift et al., 2011[11]).

In addition, regarding some conceptualizations/instruments, evidence was found for the usefulness of a conceptualization in terms of a circumplex model which offered the opportunity to combine dimensions in order to distinguish between teaching styles. A well-known use of the circumplex model is related to dimensions of the Questionnaire on Teacher Interaction, an instrument rooted in learning environments research (Brekelmans et al., 2011). Recently such an approach was successfully adopted as well by Aelterman et al. (2019) using two (of the three)[12] dimensions of need-supportive teaching in line with the SDT framework namely autonomy support and structure. Aelterman et al. (2019) collected self-reports from Belgian secondary school teachers and students using the vignette-based Situations-in-School Questionnaire and applied multidimensional scaling analyses. This resulted in a two-dimensional configuration forming a circumplex with eight subareas, namely participative and attuning, guiding and clarifying, demanding and domineering, and abandoning and awaiting. The correlations between these subareas and various outcome variables followed the expected sinusoid pattern.

Furthermore, although the instruments discussed before can differentiate between the different factors/dimensions/domains and validation studies deliver evidence for the existence of these different factors/dimensions/domains, there are also indications in the literature of positive associations between the factors/dimensions/domains. This could lead to some confusion regarding how the relationship between the dimensions should be conceptualized. Den Brok et al. (2019), reviewing instruments rooted in learning environments research, mention that correlations between dimensions of these instruments often range between 0.20 and 0.60. This indicates some overlap as well as idiosyncrasy. Regarding other instruments rooted in different theoretical frameworks, similar findings are reported. For example, Jang et al. (2010) mention, based on observation measures within the SDT framework, a positive correlation between autonomy support and structure ($r = 0.60$). Also, Sierens et al. (2009) found that autonomy support and structure (of math/Dutch language/educational science teachers as perceived by their students from grade 11–12 academic track classes) is correlated ($r = 0.67$), which is confirmed by Lietaert et al. (2015) doing research in grade-7 Dutch language general and vocational track classes ($r = 0.71$), and by Hospel and Galand (2016) in French language grade-9 vocational and general classes in the French-speaking part of Belgium ($r = 0.60$).

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[11] In this study, primary teachers of the Netherlands, Flanders (Belgium), Germany, Slovakia, Croatia, and Scotland were observed.

[12] The third dimension, namely teacher involvement, which relates to relatedness support, should be studied as well in relation to the circumplex model, since need-supportive teaching relates to three dimensions in order to fulfill the three basic psychological needs of feeling autonomous, competent and related. This view is underscored by Vansteenkiste et al. (2020).

Confirmation is also found in the study of Vansteenkiste et al. (2012)[13] who report a significant correlation ($r = 0.54$) between autonomy support and clear expectations, a subdimension of structure based on research in grade 7–12 mainly general track classes. In addition, Vansteenkiste et al. (2012) found based on cluster analysis evidence for four teaching configurations[14] of which two referred to scoring high or low on both dimensions and two configurations scoring high on one of the two dimensions. Furthermore, Lietaert et al. (2015) reported somewhat lower, but significant, correlations between teacher involvement and autonomy support and structure (respectively $r = 0.58$ and $r = 0.59$).

In addition, regarding the dimensions of the CLASS/CLASS-S instrument similar findings are reported (cf. Pianta et al., 2012). For example, Pöysä et al. (2019) mention correlations between 0.52 and 0.62 in their study on grade-7 Finnish mathematics and language art classes ($r = 0.52$ between instructional support and classroom organization, $r = 0.62$ between instructional support and emotional support, and $r = 0.61$ between emotional support and classroom organization), while Virtanen et al. (2015) report correlations between 0.37 and 0.75 based on observations in Finnish grade-7 literacy, history and civics, science and home economics classes ($r = 0.37$ between instructional support and classroom organization, $r = 0.75$ between instructional support and emotional support, and $r = 0.48$ between emotional support and classroom organization). Reyes et al. (2012) mention comparable correlations related to fifth/sixth-grade classes: $r = 0.57$ between instructional support and classroom organization, $r = 0.68$ between instructional support and emotional support, and $r = 0.60$ between emotional support and classroom organization.

Also, regarding the dimensions of the ICALT observation instrument, clear evidence for associations between dimensions is found. Van de Grift et al. (2011) report correlations[15] between 0.55 and 0.92 with an average correlation of 0.75. Adaptive teaching has the lowest correlations with other dimensions (average correlation: 0.64) and the climate dimension the second lowest (average correlation: 0.70). The reported correlations are quite high in comparison with the mentioned ones of other instruments. One of the reasons could be that several dimensions of the ICALT refer to teacher behaviour related to instruction. Regarding the ICALT, also the one-dimensionality of the scale was explored and evidence for it was found in several studies (e.g., van de Grift et al., 2011; van de Grift et al., 2014; Maulana

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[13] They used the autonomy support dimension of the short version of the TASC (Dutch translation). For the dimension 'clear expectations', the 'clarity of expectations' of the Structure scale of the TASC (Belmont et al., 1988) was used as a source of inspiration. This scale was elaborated by (formulating additional) items on expectations regarding (1) the learning material and tests, and (2) desirable behaviour in class.

[14] To some degree the configurations deliver evidence for the distinctness of the dimensions, although also evidence is found for a positive relation between them (since two out of four configurations refer to scoring in the same way on both dimensions). Moreover, the authors mention that they did not find strong evidence for unique correlates of both dimensions, albeit some relevant exceptions were found as well. Yet, several exceptions deserve being discussed.

[15] The reported correlations are LISREL based φ-coefficients.

et al., 2021). Furthermore, evidence was found for a systematic hierarchy in the difficulty level of teaching activities ranging from more basic (the creation of a safe and stimulating climate, efficient classroom organization and management, the provision of clear and structured instruction) to more complex (activating teaching, adaptive teaching, and teaching learning strategies) (van de Grift et al., 2011, 2014; van der Lans et al., 2018). This hierarchy is in line with Fuller's theory on the development of teachers' stages of concern (Fuller, 1969) and seems to be in line with ideas that novice teachers may need to reach a minimum level of competency in classroom management skills before they are able to develop in other areas of instruction (Emmer & Strough, 2001).

Regarding the ISTOF student questionnaire, an average correlation of 0.44 was found between factors indicating a weak-to-moderate association ($r = 0.25$ between 'teacher as promoter of active learning and differentiation' and 'classroom management', $r = 0.40$ between 'teacher as a helpful and good instructor', $r = 0.68$ between 'teacher as a helpful and good instructor' and 'teacher as promoter of active learning and differentiation' (Opdenakker & Minnaert, 2011). There are also indications of positive associations between the dimensions of the ISTOF observation instrument (for a discussion, see Muijs et al., 2018).

In general, it seems to be that the (overarching) dimensions measured with the instruments must be seen as complementary and (often) uniquely predictive of student outcomes, rather than as separate and independent of each other (Jang et al., 2010), and that the dimensions referring to instruction (and classroom organization and management) seem to refer to an overarching dimension referring to teacher activities with a different level of difficulty. This line of thought agrees with findings of Malmberg et al. (2010) who followed teachers from their last year of teacher education into their first 2 years of teaching practice and found different patterns of evolutions with regard the three dimensions of the CLASS-S (classroom and management skills, instructional support and emotional support). These findings call for considering multiple dimensions/domains rather than an overall indication when examining teaching, teaching quality, teacher effectiveness and teacher development.

4.2   Stability of Teacher and Teaching Behaviour

An important question, also from the perspective of obtaining good measurements of the quality of teaching and teacher behaviour, is if teaching and teacher behaviour is stable across lessons and time.

In general, not many studies have addressed this topic and in the few studies addressing (in)stability of teacher behaviour during a school year evidence is found for (small to large) changes and for, on average, mostly declining trends in the quality of teaching and student learning environment experiences from start to the end of the school year. For example, Maulana et al. (2016) reported declines in (student perceptions of) instructional behaviours (clarity and classroom management) and Opdenakker and Maulana (2010) found declines in structure, autonomy support,

and, to a lesser extent, also decreases in teacher involvement in secondary education in the Netherlands. Also, Maulana et al. (2013) found evidence for a decrease in observed teacher involvement in secondary education. In line with these studies, (small) declines in the quality of interpersonal behaviour were found in secondary education (e.g., Mainhard et al., 2011; Opdenakker et al., 2012; the Netherlands) and regarding teacher involvement in primary education (Skinner & Belmont, 1993; New York). In contrast, research in secondary education in Indonesia revealed evidence for increasing quality during the school year (student perceptions) regarding involvement, structure, and autonomy support (Maulana & Opdenakker, 2014) and regarding interpersonal teacher behaviour (proximity and influence) (Maulana et al., 2014). A mixed picture is visible in the study of Stroet et al. (2015). They found clear decreases of observed autonomy support and teacher involvement, and a small increase in structure in prevocational classes in the Netherlands. In all studies using multilevel growth curve modelling, evidence for differences between classes/teachers regarding the trajectories were reported as well indicating deviations from the average trend.

4.3   Best Informants of Teacher and Teaching Behaviour

Scholars in learning environment and motivation research often stress the importance of tapping students' perceptions of teachers' teaching behaviour (e.g., den Brok et al., 2005; Fraser et al., 2021; Hamre & Pianta, 2010; Ryan & Deci, 2020) and several studies revealed evidence that students' experiences of their teachers' teaching are valuable and can be reliable measured (Fauth et al., 2014: Kunter & Baumert, 2006). In addition, Kulik (2001) concludes in his review study on the validity of student ratings that student ratings have high validity (strong correlation with classroom observations and expert observations) and Cipriano et al. (2019) found evidence of agreements between primary school students of the same class regarding perceptions of teacher support: perceived teacher support at class level was significantly associated with individual student perceptions of teacher support.

Teacher questionnaires are also used, especially in large scale studies, to receive information on teachers' behaviour and the characteristics of the learning environments they create in their classes (Kunter & Baumert, 2006). Some studies addressed the agreement between student and teacher ratings. In general, these studies report weak to moderate correlations (see for example, Cipriano et al. (2019) regarding perceptions of teacher support). Studies comparing student and observer ratings refer, broadly spoken, to moderate associations (Kunter & Baumert, 2006).

Furthermore, student perceptions of their teachers' behaviour and learning environment experiences are often stronger associated with student outcomes (e.g., academic achievement or motivational outcomes) than teachers' self-report about their own teaching (Van Damme et al., 2004) or ratings of external observers (De Jong & Westerhof, 2001; Maulana & Helms-Lorenz, 2016).

Hamre and Pianta (2010) addressed the importance and advantages of observational measures focused on teaching quality and stressed that these measures are better than measuring discrete teaching behaviours since these measures may be more meaningful assessments of higher order organizations of teaching behaviour and 'tend to parse the behavioral stream into more contextually and situationally sensitive "chuncks" (p. 34).

Kunter and Baumert (2006) mention that all informants (students, teacher, observers) can have their own biases and that discrepancy between the mentioned informants can also be viewed from another perspective, namely that they can reflect perspective-specific validities. Based on their study, in which they compared student and teacher ratings of instruction, they concluded that student and teacher ratings were best suited to tapping different aspects of the learning environment. This is in line with Clausen (2002) who found, examining whether the perspectives of the three types of informants could be subsumed in a common model of instructional quality, that the data were best replicated by introducing three method factors, indicating that students, observers, and teachers tend to perceive instruction in specific ways. In addition, the method factor for students' perceptions of instruction, showed that, although students were able to distinguish between diverse instructional aspects, their evaluation of the teacher was also shaped by a generally positive or negative attitude towards their teacher. Furthermore, Brekelmans et al. (2011) found, when examining if students and teachers use a similar frame of reference when thinking about how a teacher relates to students, that although they use a similar framework, they do not agree on the amount of teacher control/influence and affiliation/proximity in a particular class. We agree with Kunter and Baumert (2006, p. 244) that '*because various methods have particular strengths for assessing different instructional features in research on classroom processes … great care [should] be taken in choosing a data source appropriate for the construct to be measured.*'

5 Teacher and Teaching Effectiveness in Relation to Student Motivational Outcomes

In general, it can be stated that there is much evidence for the importance of the previously mentioned dimensions in relation to students' learning and development. This is not surprising since authors of the instruments often explicitly mention that their instrument and underlying framework, model or theory is based on or contains, at least partly, dimensions and/or scales that have been shown in previous studies to be significant predictors of student outcomes (see e.g., Fraser et al., 1996; Hamre & Pianta, 2010; van de Grift, 2007).

However, since motivation and engagement are often seen as antecedents for learning, achievement and development, it is of great importance to explore whether the dimensions in line with the discussed frameworks and instruments are associated with motivational outcomes. Motivational outcomes refer in this review to motivation (autonomous, controlled, extrinsic, intrinsic), engagement, effort, and

motivational attitudes (e.g., interest, enjoyment, pleasure, task value, subject attitude).

To find relevant empirical studies, Web of Science, PsycINFO and Google Scholar were searched (1990–2021). Studies had to address a motivational outcome (see previous paragraph, or mention 'motivation'/'motivational outcome') and refer to teaching, teacher/teaching/instructional quality/effectiveness/behaviour, quality of teaching, teacher support, class/classroom experiences, learning environment, teacher-student relationship(s) or need(−)supportive teaching/style. In addition, a reference to one of the mentioned frameworks, instruments or dimensions of the frameworks/instruments had to be included and an appropriate method of analysis (e.g., account for nested data structure if necessary) had to be used. Furthermore, recent review studies on teacher/teaching effectiveness, need-supportive teaching and quality of teacher-student relationships were consulted.

First of all, evidence was found for effects of overarching or umbrella measurements of teaching quality in line with the earlier discussed frameworks and instruments on motivational outcomes. For example, research of Klem and Connell (2004) conducted in primary and secondary education found that teacher support experiences (combining teacher involvement, structure and autonomy support items) mattered with regard to students' engagement. Tas (2016), investigating effects of teacher support on engagement (agentic, behavioral, emotional, cognitive) in Turkish middle school science classes (grade 6 and 7) and using some of the WIHIC dimensions, among others teacher support (a combination of emotional and instructional support), found positive effects of teacher support on all engagement dimensions. In addition, the study revealed that the effect of teacher support was mediated by students' self-efficacy (except for agentic engagement).

Also, Vandenkerckhove et al. (2019), investigating the relation between weekly need-based experiences and variations (based on, among others, experiences with the teacher) and weekly academic (mal)adjustment, found positive associations between weekly variations in need satisfaction and weekly variations in engagement and autonomous motivation, and between variations in need frustration and variations in controlled motivation. In addition, research of van de Grift et al. (2011, 2014), using the teaching skill scale (RASCH scale) based on the ICALT, delivered evidence of a positive association between teachers' teaching skill and student engagement (at class level). Van de Grift et al. (2011) reported a correlation of 0.62. Maulana and Helms-Lorenz (2016), using a student perceptions and observation version of the ICALT, also found a relationship between the teaching skill scale (observations and student perceptions) and student engagement. However, student perceptions were more strongly associated with student engagement and when both were included in a model to predict student engagement, observations were not significant anymore.

Furthermore, also regarding distinct dimensions, effects on motivational outcomes were found (see for dimensions related to SDT the review study of Stroet et al., 2013; Opdenakker, 2021). Results regarding related dimensions will be discussed together in the next pages.

5.1 Effects of Teachers' Emotional Support, Involvement, and Positive Teacher-Student Relationships

In general, clear evidence is found for positive associations between the quality of teacher-student relationships and (academic) engagement (for reviews see; Opdenakker, 2021; Roorda et al., 2011; Stroet et al., 2013). For example, Roorda et al. (2011), reviewing the influence of affective teacher–student relationships on students' academic engagement (from preschool to high school) and using a meta-analytic approach, found evidence for medium to large associations between the quality of these relationships and (academic) engagement. Also Furrer and Skinner (2003) and King (2015), investigating the relationship between students' relatedness to their teacher (and peers and parents) and students' engagement found evidence for an unique effect of relatedness to their teacher and engagement, while the studies of den Brok et al. (2004, 2005, 2010) and Opdenakker et al. (2012) revealed positive effects of teachers' proximity (a dimension of interpersonal behaviour) on students' motivational and attitudinal outcomes such as (autonomous motivation, pleasure, relevance, confidence, effort, subject attitude). Furthermore, Archambault et al. (2017) found unique effects of close teacher-student relationships on behavioral engagement in Canadian third and fourth grade primary education classes (regular and special education); however, they did not find an effect on emotional engagement. Also, the study of Lam et al. (2012), investigating the relationship between teacher (mainly emotional) support (referring to teachers at school) and student engagement (composite of emotional, behavioral, and cognitive engagement) in the lower grades of secondary education in 12 countries, revealed a significant positive association between teachers' emotional support and engagement. Likewise, Fatou and Kubiszewski (2018), studying the effect of the quality of the relationship between teachers and students (student perceptions) in grade 10–12 classes in France, found positive effects on engagement (composite of behavioral, emotional, and cognitive engagement).

Furthermore, Reyes et al. (2012), using the CLASS observation instrument, revealed that there was a positive relationship between teachers' emotional support to their class and students' engagement in fifth and sixth grade English language art classes even when controlled for the quality of class organization and teacher's instructional support[16] and teacher characteristics (gender, educational attainment, teaching experience, burnout and teaching efficacy). The effects were robust for grade and gender. Furthermore, their study revealed that student engagement partially mediated the relationship between emotional support and academic

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[16] The effects of the quality of class organization and instructional support were not significant when included in the model together with emotional support and the mentioned teacher (and non-mentioned student) characteristics. This was the case for engagement and achievement and is contrary to studies showing that, at least, instructional support matters to academic achievement (Hamre & Pianta, 2005; Mashburn et al., 2008). One possible explanation that the authors mention is that instructional support and class organization may not have fully captured because they used a CLASS version developed primarily for lower elementary classrooms.

achievement. Likewise, the Finnish study of Pöysä et al. (2019), using the CLASS-S, indicated that teacher's emotional support in grade-7 mathematics and language art classes was positively associated with students' situation-specific emotional engagement. However, they did not find significant relations with situation-specific behavioral/cognitive engagement. Virtanen et al. (2015) did not find a direct effect of emotional support on student engagement in Finnish grade 7–9 classes, however, emotional support contributed to student engagement indirectly via its effect on teachers' organizational and instructional support. Malmberg et al. (2010), also using the CLASS-S, found that observed student engagement in English classes was higher in lessons with high emotional support, classroom organization, and instructional support.

Also, other studies investigating the effects of being in emotionally supportive classrooms report positive effects on motivational outcomes such as enjoyment, interest, and engagement (e.g., Wentzel et al., 2010; You & Sharkey, 2009; Fauth et al., 2014). In addition, studies using the WIHIC in primary or secondary classes in a variety of countries found evidence for positive effects of supportive teachers on attitudinal outcomes such as enjoyment related to science, math, or language subjects (e.g., Chionh & Fraser, 2009; Telli et al., 2006; Wolf & Fraser, 2008). Other studies adopting the SDT framework and investigating associations between student perceptions of teacher involvement and motivation or academic engagement, found evidence for the importance of teacher involvement as well. For example, research of Bieg et al. (2011) shows that students' perception of teacher care in eighth grade was linked to higher intrinsic motivation in physics. Skinner and Belmont (1993) found evidence for the importance of student perceptions of teacher's involvement to emotional engagement in primary education, while Lietaert et al. (2015) and Opdenakker (2021) found positive effects on, respectively, behaviour engagement and a composite measure of behavioral and emotional engagement in secondary education (respectively in Dutch language, and EFL/math classes). Also, other work of Opdenakker, Maulana, Stroet and colleagues in the Netherlands (Maulana et al., 2013; Opdenakker, 2013, 2014; Opdenakker & Maulana, 2010; Stroet et al., 2015) indicates the importance of teacher involvement – which is important to meet students' need to feel related to significant others – in relation to student motivational outcomes and academic engagement in primary as well as in general and prevocational secondary education.

In addition, Opdenakker and Minnaert (2014) found evidence for the importance of feeling related with the teacher on primary school students' engagement. Also, the review study of Stroet et al. (2013) confirms these findings with regard to engagement and motivation, as well as their longitudinal study on associations between observed teacher involvement and motivational outcomes in grade-7 prevocational math classes (Stroet et al., 2015).

In line with this, numerous studies have found evidence for the importance of a good relational climate in classes (referring to, among others, good teacher-student relations) (For reviews, see Opdenakker, 2020; Roorda et al., 2011; Stroet et al., 2013). A few studies (e.g., Opdenakker, 2021) also paid attention to need-thwarting teacher behaviour such as teacher neglect and rejection and found negative effects

on students' engagement. Likewise, Archambault et al. (2017) found negative effects of conflictual teacher-student relationships on students' emotional engagement (for boys only). However, they did not find an effect on behavioral engagement.

Some studies also paid attention to the possibility of differential effectiveness of teachers' emotional support, involvement, and positive teacher-student relationships in relation to student (background) characteristics such as gender, socioeconomical status or ethnicity. According to the academic risk hypothesis (Hamre & Pianta, 2001), teacher support in terms of an emotionally warm and caring, low-conflict teacher–student relationship is considered to be more important for students at risk (for school failure). In line with this hypothesis, the meta-analysis of Roorda et al. (2011), investigating the effect of teachers' emotional support/involvement on students' engagement, revealed that this kind of teacher behaviour was more important for boys' than for girls' engagement, indicating a higher sensitiveness of boys. Also, Furrer and Skinner (2003) and Opdenakker (2021) found support for a higher sensitiveness of boys regarding respectively perceived relatedness with the teacher, and teachers' emotional involvement and neglect/rejection.

Archambault et al. (2017) found that only boys seemed to be sensitive to conflictual teacher-student relationships regarding their emotional engagement and Fatou and Kubiszewski (2018) also found that only boys were sensitive to the quality of teacher-student relationships with regard to emotional engagement. However, when focusing on a composite of engagement, cognitive or behavioral engagement they did not find evidence for the differential effectiveness of teacher-student relationships in relation to gender. Also, other studies (e.g., Lam et al., 2012; Lietaert et al., 2015; Wang & Eccles, 2012) found no evidence for differential effectiveness regarding gender and some found that girls seemed to be more sensitive to warm and close relationships with teachers (e.g., Archambault et al., 2017). Likewise, research of Pöysä et al. (2019) suggested that girls benefited more from high emotional support than boys for their situation-specific emotional engagement.

Studies addressing differential effectiveness of teachers' emotional support related to racial or ethnic differences are rather scarce and results seem to be mixed, but when differences are found they seem to be in line with the academic risk hypothesis (Wang & Eccles, 2012; Konold et al., 2017). Den Brok et al. (2010) found no evidence for differential effects of teacher proximity on students' subject attitudes (including enjoyment, interest, and effort) related to students' ethnicity, however they found differential effects of teachers' interpersonal behaviour related to influence indicating that only students with a non-Dutch background (of the second generation) were sensitive to influence in relation to their engagement. Studies addressing differential effectiveness of the quality of teacher-student relationships in relation to the social background of students are scarce as well. Fatou and Kubiszewski (2018) studied the differential effectiveness of perceived quality of teacher-student relationships and found only evidence regarding cognitive engagement indicating that especially students with a more privileged social background were more sensitive.

5.2 Effects of Teachers' Classroom Management and Organization

Many studies have reported positive effects of classroom management on student academic outcomes (Seidel & Shavelson, 2007). Good classroom management helps to create good preconditions for time on task that is, in turn, crucial for students' learning and achievement (Seidel & Shavelson, 2007). An important question is whether good classroom management has also positive effects on motivational outcomes (such as engagement, intrinsic motivation for learning/working in class, and interest). Some researchers point to the possible detrimental effect it can have on students' motivational development (McCaslin & Good, 1992), since well-managed classrooms can be quite teacher-directed and are characterized by external regulation of student behaviour.

There is surprisingly little research on the effects of classroom management on motivational outcomes (Kunter et al., 2007; Korpershoek et al., 2016). Research of e.g., Klieme et al. (2009) reports positive effects of observed classroom management (based on an observation of three lessons) on students' intrinsic motivation (working interest; measured with an immediate posttest and controlled for interest in the subject mathematics at the beginning of the school year) in secondary education of schools in Germany and Switzerland. Also, Kunter et al. (2007), re-analyzing data regarding mathematics education from the German sample of the Third International Mathematics and Science Study (TIMSS, Beaton et al., 1996), found evidence for significant, but weak effects of math teachers' classroom management: (individual) students' perceptions of rule clarity and teacher monitoring were positively related to their math-related interest development. However, no (additional) effects were found for classroom management at class level. In addition, their study demonstrated that the effects of rule clarity and monitoring were partially mediated by students' experiences of autonomy and competence.

From the TTI (Teaching through interactions) framework there is some evidence for the importance of classroom organization. For example, Virtanen et al. (2015), using the CLASS-S, demonstrated a positive relation between both classroom organizational (and instructional) support and student-rated, teacher-rated, and observed general behavioral engagement among lower secondary school students in Finland. Furthermore, Pöysä et al. (2019), using the CLASS-S, found that classroom organization was positively associated with students' situation-specific behavioral/cognitive engagement in Finnish grade-7 mathematics and language art classes. However, they did not find significant relations with situation-specific emotional engagement. Also, Malmberg et al. (2010), using the CLASS-S, found evidence for the importance of the mentioned characteristic: observed student engagement was higher in lessons with high classroom organization, (and high emotional and instructional support).

Van de Grift (2007) found, using the ICALT instrument, a positive association between classroom management and observed student involvement in primary education across four European countries ($r = 0.54$). Also, van de Grift et al. (2017),

using the same instrument in a study on South Korean and Dutch secondary education teachers, reported positive associations between classroom management and observed student engagement at class level (γ-coefficients between latent dimensions and engagement at class level were respectively 0.80 and 0.79).

Also, Opdenakker and Minnaert (2011), using the student perceptions questionnaire of ISTOF, reported effects of classroom management on academic engagement in primary education in the Netherlands. However, the effect disappeared when controlled for student background characteristics (gender, nationality, language spoken at home) and prior engagement. Furthermore, Maulana et al. (2016) found small, but significant, effects of perceived classroom management in secondary education on motivational aspects such as intrinsic value and self-efficacy. However, they did not find an effect on test anxiety.

In addition, Tas et al. (2018) report that it is possible to train student teachers to improve their teaching skills and, in particular, their classroom management. They found a large effect size representing student teachers' improvement in classroom management. Furthermore, research has also established that teachers trained in classroom management principles and concepts were more likely to have engaged students compared to teachers in control groups (Emmer & Strough, 2001). In contrast, in a meta-analysis on classroom management interventions Korpershoek et al. (2016) did not find a significant effect of these interventions on student motivational outcomes. However, their results must be interpreted with caution since they were only related to six studies.

Studies addressing differential effectiveness of teachers' classroom management and organization are very scarce. Pöysä et al. (2019) investigated this in relation to student gender in secondary education and did not find evidence for differential effects on student engagement. Also, Opdenakker and Minnaert (2011), studying this in primary education, did not find evidence for differential effects related to student gender, nor did they find such effects in relation to students' prior engagement and ethnic-cultural background.

5.3   *Effects of Teachers' Instruction and Instructional Support*

Numerous studies have paid attention to effects of teachers' instruction and instructional support on student academic achievement, in particular studies grounded in teacher and educational effectiveness research, and they have found clear evidence of the importance of the quality of teachers' instruction and instructional support (Muijs et al., 2014; Opdenakker, 2020). However, teacher effectiveness frameworks often recognize the importance of motivation and engagement as precursors for achievement. Therefore, it is also relevant to see whether characteristics of teachers' instruction and instructional support have effects on motivational outcomes as well.

In a study of Fauth et al. (2014), which used the model of instructional quality of Klieme et al. (2009), evidence was found for the importance of cognitive activation and supportive climate (referring to teachers' constructive feedback and

encouragement as well as to teachers' warmth and friendliness) to primary school students' development of subject-related interest.

Also, studies rooted in the TTI framework and using the CLASS/CLASS-S instrument deliver information on the relevance of teacher behaviour related to instructional support. For example, Virtanen et al. (2015) demonstrated a positive relation between instructional support and student-rated and observed general behavioral engagement among lower secondary school students in Finland and Malmberg et al. (2010) also found that observed student engagement was higher in lessons with high instructional support. However, surprisingly, Pöysä et al. (2019), investigating relations between observed instructional support in relation to a variety of situation-specific engagement indicators in Finnish grade-7 mathematics and language art classes, did not find a significant effect of (class-level) instructional support on situation-specific engagement.

Based on self-determination theory and using the TASC (student perceptions), Lietaert et al. (2015), Opdenakker (2021), and Opdenakker and Maulana (2010) found evidence for positive effects of students' perceptions of structure support on (growth in) academic engagement in the seventh grade (first year in secondary education) in Flanders (Belgium) and the Netherlands. Also, research of Hospel and Galand (2016), investigating effects of structure (and autonomy support) on behavioral, emotional, and cognitive engagement in secondary education in Belgium (French-speaking part), demonstrated clear positive associations with students' engagement (all aspects). In addition, Skinner and Belmont (1993), studying relations between student perceptions of structure, autonomy support and involvement and behavioral engagement in primary education, found evidence for the importance of (unique) effects of structure, and Opdenakker and Minnaert (2011, 2014) found, respectively, positive effects of the teacher as a helpful and good instructor and of students' basic need fulfilment of competence by the teacher on primary school students' engagement. Also, the study of Lazarides and Rubach (2017) in secondary school classes in Berlin (Germany) showed that support for competence predicted intrinsic motivation and effort (via students' mastery goal orientation). Maulana et al. (2016) found positive effects of clarity of instruction on students' intrinsic value for the subject and self-efficacy and negative effects on test anxiety in secondary education in the Netherlands. Also, Opdenakker (2013, 2014) and Stroet et al. (2015), investigating student motivation and academic engagement in prevocational and general secondary education in the Netherlands, found evidence for the importance of structure.

In addition, the study of Opdenakker (2021) revealed negative effects of chaos and inconsistency, which is often seen as the opposite of structure, on students' engagement. Furthermore, her study revealed evidence for differential effects of structure (but not of chaos/inconsistency) indicating that boys were more sensitive to structure than girls in relation to their engagement. However, the study of Lietaert et al. (2015) did not reveal evidence for this. Furthermore, research of Opdenakker and Minnaert (2014) found that teachers' fulfillment of primary students' needs to feel competent, which can be realized by offering structure, was more important for initially high academic engaged students.

Intervention studies reveal that it is possible to train teachers to successfully apply the more difficult instruction and teaching activities such as adapting instruction (more) to differences between students, and, that this training also has positive effects on student outcomes. However, research also indicates that this requires focused coaching and systematic observation of teacher's teaching during 1 or 2 years (van de Grift et al., 2011).

Furthermore, a few studies addressed the topic of differential effects. For example, Opdenakker and Minnaert (2014)[17] investigated differential effects of primary school teachers' fulfillment of the need to feel competent and found evidence that initially high academic engaged students are more sensitive. Other studies found differential effects of structure in secondary education mathematics and EFL classes for boys and girls in relation to engagement indicating a higher sensitivity of boys (Opdenakker, 2021). In contrast, Tucker et al. (2002) did not find gender differences in the relation between teacher structure and student engagement, nor did Lazarides and Rubach (2017) found this with regard to the relation between teachers' support for competence and student motivational outcomes.

5.4   Learning Climate

Next to the quality of the teacher-student(s) relationship, which makes up the relational climate in classes in addition to student-student relationships, the class learning climate is often mentioned in learning and educational effectiveness research as well in theories and research on motivation, as an important class characteristic that influences students' learning and engagement in school. Characteristics of the classroom context as well as teachers' behaviour play a role in the creation of a good learning climate, which is often defined in terms of a stimulating and safe learning climate or a study-oriented learning climate. Evidence for the effectiveness of a study-oriented learning climate in relation to motivational outcomes is found in a diversity of studies (e.g., Dumay & Dupriez, 2007); Opdenakker, 2004; Opdenakker et al., 2005; Van Landeghem et al., 2002). Also, Telli et al. (2006), using the WIHIC, found indications that task orientation, a dimension in the WIHIC that refers to the learning climate in the class, was associated with students' attitudes towards biology in Turkish secondary education. Van de Grift et al. (2017), using the ICALT, reported a clear positive relation between a safe and stimulating learning climate in teachers' secondary education classes and student engagement in these classes in South Korea and the Netherlands. Likewise, Hughes and Coplan (2018), using a composite classroom climate indicator (based on the COS-instrument) referring to the degree to which the primary school teacher is supportive and creates a positive child-centered classroom, found evidence for a positive association between

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[17] In addition, they found differential effects of teachers' overall fulfillment of students' psychological basic needs on engagement indicating that Dutch-speaking students were more sensitive.

classroom climate and student behavioral engagement. In addition, they also found evidence for differential effects of classroom climate in relation to student gender and anxiety indicating that, in particular, boys and students with high anxious solitude were particularly susceptible to the classroom climate.

5.5 Effects of Teachers' Autonomy Support

There is clear evidence that meeting students' need to feel autonomous and teachers' autonomy support is important for students' engagement and (intrinsic or autonomous) motivation (Opdenakker & Minnaert, 2014; Ryan & Deci, 2020; Stroet et al., 2013). This evidence is clear regarding students' engagement and motivation, across multiple educational settings and cultures, and across a variety of subjects (e.g., STEM, languages, physical education). For example, Hagger et al. (2015) found evidence for the importance of teachers' autonomy support (students' perceptions) on Pakistan secondary school students' math engagement (homework completion), while the study of Tsai et al. (2008) revealed evidence for positive effects of autonomy-supportive teacher behaviour such as understanding and taking the perspectives of students (student perceptions) on students' motivation and interest in math lessons. Studies of Bieg et al. (2011) and Jungert and Koestner (2015) also found evidence of this kind of teacher behaviour in relation to intrinsic motivation in STEM subjects. Also, the studies of Black and Deci (2000), Reeve and Jang (2006), and Roth et al. (2007) revealed positive effects of autonomy support on (autonomous) motivation, while Black and Deci (2000) also found positive effects on students' perceived competence. Assor et al. (2002) found that fostering relevance (a component of autonomy support) was positively associated with student engagement. Effects of autonomy support on students' engagement and autonomous motivation were also found in numerous other studies done e.g., in Europe (e.g., Núñez & León, 2019), the US (e.g., Reeve et al., 2004; Skinner et al., 2008) and Russia (Chirkov & Ryan, 2001), and there is also some evidence of the importance of autonomy support in more advanced educational settings (see Ryan & Deci, 2020).

Also, in the Netherlands and in Flanders (Belgium) research has demonstrated positive effects of autonomy-supportive teaching behaviour on students' academic engagement in secondary education (Lietaert et al., 2015; Opdenakker & Maulana, 2010; Opdenakker, 2014, 2021) and of the stimulation of active learning[18] in Dutch primary education (Opdenakker & Minnaert, 2011). The study of Hospel and Galand (2016) in the French-speaking part of Belgium, found evidence of (unique) effects of autonomy support on emotional (and behavioral) engagement; however, no significant effect on indicators of cognitive engagement were discovered.

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[18] It also included attention to differentiation (and was one of the dimensions of the ISTOF student questionnaire).

Research on the differential effectiveness of autonomy support in relation to student motivational outcomes is scarce. Lietaert et al. (2015) found that only boys seemed to be sensitive to autonomy support regarding their engagement in secondary education, while Opdenakker (2021) found that girls seemed to be less sensitive than boys (but still significant sensitive) to autonomy support. However, Opdenakker (2021) found no evidence for differential effectiveness of controlling teaching behaviour, that is often seen as the opposite of autonomy support, in relation to student gender. Regarding the stimulation of active learning and differentiation, no differential effects were found related to gender, ethnic-cultural background, and prior engagement in a study on primary school students' engagement (Opdenakker & Minnaert, 2011).

In some (other) studies, effects of controlling behaviour on motivational outcomes were explored as well. In general, negative effects of controlling teacher behaviour were found on autonomous motivation (Reeve & Jang, 2006) and engagement (Opdenakker, 2021). In addition, the study of Assor et al. (2005) in Israeli primary education indicated associations with motivational orientations (extrinsic motivation and amotivation), which was partially[19] mediated by negative emotions (anger, anxiety, nervousness). In addition, negative effects were found on engagement. Furthermore, evidence is found that perceptions of increases in controlling teacher behaviour are related to increases in need frustration across the school year which, in turn, relate to lower autonomous motivation, greater fear of failure, contingent self-worth and avoidance of challenges (Liu et al., 2017). In addition, there is some evidence that showing disrespect (a component of autonomy thwarting) is negatively associated with students' engagement (Assor et al., 2002) and that this component has a unique effect (as well as fostering relevance) on students' engagement. There is some evidence of biological mediators at work in the effects of autonomy-supportive versus controlling teacher behaviour indicating that the exposure to a controlling teacher is associated with higher cortisol values compared to a neutral or autonomy-supportive teacher (Reeve & Tseng, 2011), while being in learning environments characterized by autonomy support and attention to relatedness is accompanied by a higher heart rate and emotional arousal indicative of greater mobilization of energy and engagement (Streb et al., 2015).

Several intervention studies indicate that it is possible to help teachers to become more autonomy-supportive, with subsequent positive student outcomes such as engagement and autonomous motivation as a result (Assor et al., 2009; Reeve et al., 2004; see also meta-analysis of Su & Reeve, 2011).

In this context, it is relevant to mention that a lot of research using the framework of SDT delivers evidence of the importance of combining autonomy support with structure (Jang et al., 2010; Vansteenkiste et al., 2012; Sierens et al., 2009; Hospel & Galand, 2016). This means that it is important for students' motivation and engagement that teachers not only consider and welcome students' perspectives, feelings and thoughts, give them choices and allow them multiple approaches and

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[19] The mediation seemed to be stronger for girls compared to boys.

ways to do learning tasks and solve problems, but that teachers also (instructionally) support and guide their students and provide them with clear expectations, instruction(s) and constructive feedback (Jang et al., 2010; Reeve, 2009; Skinner & Belmont, 1993; Stefanou et al., 2004; Vansteenkiste et al., 2006). The combination of high teacher autonomy support and structure has been empirically associated with not only higher autonomous motivation, but also with greater use of self-regulated learning strategies and lower test anxiety, referring to respectively cognitive and emotional engagement/disengagement (e.g., Vansteenkiste et al., 2012; Sierens et al., 2009). In addition, intervention research of, among others, Kiemer et al. (2018) and Cheon et al. (2020) reveal that it is possible to train teachers to behave more autonomy and competence supportive.

5.6 Unique or Joint Effects of Teacher Behaviour Dimensions and What Matters Most in Relation to Motivational Outcomes?

Not many studies address these topics explicitly. However, when studies include several dimensions of teacher behaviour simultaneously in the model of analysis, it is possible to make inferences about the unique effects of the dimensions in relation to the investigated outcome as well as to compare the size of effects.

Overall, there is evidence for statistically significant unique effects of the distinguished teacher behaviour dimensions in instruments discussed before on motivational outcomes (e.g., Furrer & Skinner, 2003; Jang et al., 2010; Nie & Lau, 2009; Opdenakker & Maulana, 2010; Opdenakker & Minnaert, 2011; Skinner et al., 2008; Tucker et al., 2002), although clear joint effects of the dimensions are also present. The existence of joint effects is not surprising since clear associations between dimensions of teacher behaviour were already mentioned in a previous section of this chapter. Finding unique effects of teacher behaviour dimensions indicates that these dimensions operate – at least partly – independent of each other and in a unique way to students' motivational outcomes. There is also some evidence that this is the case with regard to need-supportive versus need-thwarting teacher behaviour in relation to motivational outcomes (e.g., Assor et al., 2002; Opdenakker, 2021). However, there are also a few studies that did not find unique effects for all included (positive) dimensions of teacher behaviour (e.g., the studies of Reyes et al. (2012) and Pöysä et al. (2019), using the CLASS instrument, and the study of Hospel and Galand (2016) measuring autonomy support and structure within the theoretical framework of SDT). In addition, the study of Hospel and Galand (2016) revealed that finding unique (and mutually reinforcing) effects also depends on the type of motivational outcome investigated.

This is also the case regarding the size of effects of teacher behaviour dimensions (see e.g., Skinner & Belmont, 1993), although there are some general tendencies as well. For example, there are some indications in studies investigating teachers'

instructional support or providing structure (including clarity of instruction) and classroom management/organization that the latter has smaller effects on motivational outcomes such as academic engagement and intrinsic value than providing structure, clear instruction or instructional support (Maulana et al., 2016; Opdenakker & Minnaert, 2011).

When comparing effects of emotional support (or positive teacher-student relationships or teacher involvement) with instructional support (or structure or clarity of instruction), results seem at first sight a bit mixed. For example, in some studies (e.g., Lietaert et al., 2015; Reyes et al., 2012; Stroet et al., 2015) teacher involvement is (somewhat) more important than providing structure in relation to students' engagement (or other motivational outcomes), while in other studies (e.g, Opdenakker, 2021; Opdenakker & Minnaert, 2014) the effect of providing structure is (somewhat) larger than the effect of involvement. A deeper inspection of the mentioned studies reveals that differences in student population between the studies might be an explanation, indicating that for students of lower tracks (and with more disadvantaged backgrounds) emotional support of teachers seem to be (a bit more) important then providing structure compared to students of higher tracks (and more advantaged backgrounds) in relation to motivational outcomes, although both forms of support are important for both groups. Skinner and Belmont (1993) found, according to their path analyses, that student perceptions of teacher structure were a unique predictor of students' behavioral engagement, while students' perceptions of teacher involvement were a unique predictor of students' emotional engagement. However, an inspection of the correlations revealed that differences in associations were very small, which is in line with findings of Opdenakker and Maulana (2010) in terms of explained variance by teacher involvement and structure in relation to students' (mainly behavioural) engagement during a school year and is in line with research of de Boer et al. (2016) finding the same results with regard to intrinsic motivation of gifted students in the lower grades of secondary education in the Netherlands. In addition, their study revealed that satisfying the need to feel competent was clearly the most important need to satisfy for the intrinsic motivation of these students. Furthermore, the study indicated that teacher involvement had an additional positive effect to the effect of meeting the need to feel competent on these students' intrinsic motivation.

6 Effects of Contexts and Other Antecedents on Teacher and Teaching Behaviour

Teachers do not operate in a contextual vacuum. In their classes, they are confronted with students with specific characteristics as individuals and as a group and with structural factors such as class size, they must operate in a particular school context with its own culture, climate, policies and leadership style, they have to behave in a particular educational system with its particular characteristics (e.g., mandated

curricula; student grouping system, tracking/no-tracking, etc.), educational policies, etc. In educational effectiveness research, the importance of context is recognized for several decades. For example, educational effectiveness models such as the Comprehensive Model of Educational Effectiveness of Creemers developed in the 1990s already included context factors at class, school and above, and Reynolds, a famous educational effectiveness scholar, stated in a publication in 2000 (Reynolds, 2000) that it was necessary to study the relationships between processes, outcomes, and contexts to understand how different instructional variables relate to student outcomes in different contexts. However, until now not many (educational effectiveness) studies have been conducted to identify factors operating at the context level (Kyriakides et al., 2020). This is also the case regarding relations between school level characteristics (and class level characteristics) and teacher behaviour in classes (Opdenakker, 2020). Furthermore, the studies that investigated relations between school level characteristics and learning environment/teacher behaviour did not find strong associations (Opdenakker, 2020).

A few exceptions are found in research work[20] on the relationship between school/classroom context/group composition and learning environment characteristics (including teacher behaviour) (e.g., of Battistich et al., 1995; Crosnoe & Johnson, 2011; Johnson & Stevens, 2006; Maulana et al., 2016; Opdenakker, 2004; Opdenakker & Van Damme, 2006). In general, indications are found that classes and schools with favorable student populations (with regard to cognitive ability, SES, parental involvement or ethnical background) often have more favorable learning environments including more instructional support (see e.g., Opdenakker, 2004, 2019; Opdenakker et al., 2005; Opdenakker & Van Damme, 2006), more clarity of instruction (e.g., Maulana et al., 2016; Opdenakker, 2019), and a more favorable relational climate in the class (including the relationship between teacher and students and peer relations) (Opdenakker, 2004; Opdenakker & Van Damme, 2006). There is also some evidence of a less decrease in autonomy support during the school year in classes with a favorable student (ability) composition compared to classes with a less favorable composition (Opdenakker, 2014). One of the reasons could be that less favorable student populations are more challenging because they are less inclined to cooperate with teachers.

In addition, also individual student characteristics seem to matter. For example, research of Skinner and Belmont (1993) revealed a positive relationship between signs of students' engagement and the likeliness that their teachers are involved and display greater autonomy support, and more structure (contingency and consistency). Teachers respond to students who are more passive with correspondingly more neglect, coercion, and even inconsistence. When students seem to be disengaged, their teachers are less likely to provide need-supportive teaching (Escriva-Boulley et al., 2021), exhibit more control and less autonomy support over time (Jang et al., 2016). Connell and Wellborn (1991) mentioned that teachers reported

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[20]An overview of this research with regard to Flanders (Belgium) and the Netherlands of the last three decades can be found in Opdenakker (2020).

themselves that they were less involved and offered less autonomy support to disaffected students.

Furthermore, school factors such as cooperation between teachers, school leadership style, constraints at work (e.g., accountability policy), and student-teacher ratio seem important. For example, research of Opdenakker and Van Damme (2006, 2007) revealed that cooperation between teachers at school is positively related to the quality of the relational and learning climate in classes (including teacher-student relationships), and that the school leader leadership style (namely the degree to which the leader uses a participative style and is professionality-oriented with regard to the teachers) seems to be of importance for teachers' instructional support to their classes. In addition, evidence is found for a negative relation between constraints at work (e.g., experiencing a pressuring school environment) and teachers' psychologically controlled teaching behaviour (Soenens et al., 2012). In the same vein, research of Deci et al. (1982) has shown that the use of controlling teaching practices increases when teachers are under pressure (for example, when teachers are evaluated on students' achievement level), indicating that school systems using frequent comparative achievement tests might be pushing their teachers to rely on directly controlling teaching practices. Also, research of Pelletier et al. (2002) indicates that pressures from above (e.g., when teachers must comply with a curriculum, with colleagues, and with performance standards) is associated with more controlling and less autonomy-supportive teacher behaviour because teachers become less self-determined toward teaching. Furthermore, Ryan and Deci (2020) mention negative effects of an excessive emphasis on grades, performance goals, and pressures from high-stakes tests on teachers (and students). In addition, Cipriano et al. (2019) found that student-teacher ratio at school level was negatively associated with student perceptions of teacher support. Furthermore, research of Escriva-Boulley et al. (2021) indicated that need-thwarting teacher behaviour was positively predicted by pressure to display authority and beliefs about the effectiveness of rewards, referring to a pressure at school level.

Lastly, also teacher characteristics such as teaching style, adherence to entity theory, teaching experience, teachers' motivation to teach, teachers' basic need satisfaction and teachers' job satisfaction are of importance. For example, Opdenakker and Van Damme (2006) found that a learner-centered teaching style seemed to matter regarding the amount of instructional support teachers gave to their classes as well as regarding the quality of the teacher-students relationship, and Escriva-Boulley et al. (2021) found that teachers' adherence to entity theory predicted negatively need-supportive teacher behaviour. Cipriano et al. (2019) found positive associations between teaching experience and student perceptions of teacher support. Furthermore, research of Roth et al. (2007) revealed that teachers who were more autonomously motivated to teach were perceived by their students as more autonomy-supportive (and their students were more autonomously motivated to learn). However, Opdenakker (2019) did not find an association between teachers' motives for work and autonomy support, structure/clarity of instruction, classroom management and teacher involvement. Klassen et al. (2012) reported about studies showing that when teachers experienced more satisfaction of the need to feel related

with their students, they were more engaged and reported less emotional exhaustion. However, Opdenakker (2019) did not find a relationship between feeling related or feeling autonomous and teacher behaviour, but, feeling competent and effective seemed to be positively related to classroom management. Furthermore, teachers' job satisfaction was positively related to teachers' involvement towards students.

Effects of teacher gender are seldom found (e.g., Maulana & Opdenakker, 2014; Maulana et al., 2012, 2016; Opdenakker, 2014; Opdenakker & Maulana, 2010) and effects of subject taught are seldom studied, and if investigated, most of the time no effects are found (e.g., Maulana & Opdenakker, 2014; Maulana et al., 2012; Opdenakker, 2014; Opdenakker & Maulana, 2010). An exception is the study of Opdenakker et al. (2012) in which students in classes of female teachers perceived less proximity in their relationship with the teacher compared to students in classes with a male teacher. In addition, the study of Opdenakker and Van Damme (2007) revealed that male teachers tend to maintain classroom order better than their female colleagues. In the same line, the study of Van Petegem et al. (2005) indicated that classroom leadership and friendliness were more associated with male than with female teachers. Furthermore, Opdenakker (2019) found that teacher experience seems to matter only for male teachers regarding (student perceptions of) provided structure, clarity of instruction, autonomy support and teacher involvement; however, regarding classroom management, teacher experience mattered in a positive way for male and female teachers. In addition, there was evidence for differences in the average level of structure and autonomy support of math and English classes in favor of the math classes.

7 Conclusions, Reflections, Implications and Suggestions for Future Research Directions and Practice Related to Effective Teacher and Teaching Behaviour

A first finding reviewing current conceptualizations, measurements and instruments of teacher and teaching behaviour from a variety of perspectives was the number of different terms that were used to refer to classroom processes or practices and behaviour of teachers who appear to be good, successful, or effective in their teaching. A more sparing use of terms and clear definitions is preferable.

Second, the review indicated that a variety of research domains have an interest in classroom processes/practices and behaviour of teachers (and in their effects on student outcomes) and that, within these domains, instruments were developed to measure (the quality of) them. Dependent on the domain, these instruments are more/less grounded in theory; however, most of them are at least based on literature about 'what seems to work'. When comparing the instruments (and the theories on which they were grounded), there are many similarities in terms of the content of quality practices. However, there are differences regarding the number of

distinguished dimensions (sometimes named factors or domains) as well as with the names, wordings, and descriptions of the content of the dimensions leading to concepts with – to some degree – different descriptions and to different concepts with more or less the same meaning. It would be an advancement for the study of teacher behaviour and for the search for quality teaching practice if concepts were well-defined and uniformly used.

In addition, it would be a good idea to combine instruments in future research in the same study to investigate differences and similarities regarding concepts, operationalizations of concepts and effects of them on student outcomes, since this can help with further clarification and defining concepts. Furthermore, taking them together in one study also has more potential to yield a more comprehensive delineation of the phenomenon at hand. Still more work is needed regarding the conceptualization, operationalization, and the measurement of (the quality of) teaching and teacher behaviour and its dimensions. Kyriakides et al. (2020) reached a similar recommendation in their recent work on educational effectiveness research.

Third, the exploration of instruments and theories indicated that, in general, all the instruments (and theories) have in common an attention to teacher support and most of them address support in the domain of relation/emotion and the instructional domain. In most instruments and theories these are separated and in some it is conceptualized as one dimension. Based on the findings described in previous sections of this article, it is preferable to separate them not only because both measure on a conceptual level different things and (can) have different effects on (different) outcomes, but also because it is of importance to know where to work on in the context of professional development and learning.

In addition, most of the instruments/theories include a dimension (or subdimension) referring to class organization/management. Some instruments/theories also refer to other dimensions like autonomy support, cognitive activation, active learning, or attention to differences/differentiation. These dimensions are often included in the instruments to accommodate to newer understandings of learning and teaching. Since not only new theories on learning will be developed, but also learning in an online context will become more and more part of the teaching practice of teachers (due to and stimulated by the COVID-19 pandemic), it will be a challenge for researchers investigating (effects of) the behaviour of teachers and classroom processes to adapt their instruments to these new educational arrangements with corresponding teacher behaviour and teaching practice as well.

Forth, an important question addressed in one of the previous sections is if teaching (and teacher behaviour) must be considered/conceptualized as one-dimensional or as multidimensional/multifaceted. In fact, based on the findings described before, there is something to be said for both sides. Research with the ICALT instrument finds evidence for the one-dimensionality perspective, while research with other instruments often finds, although associations between the distinguished dimensions do exist, for the multidimensional/multifaceted perspective. An interesting perspective in line with the 'more than one' dimensionality perspective is research work on configurations (whether or not combined with the circumplex model). The

results described in the preceding sections reveal that there are, at one side, important associations between the distinguished teacher behaviour dimensions (in instruments and models) and common effects of these dimensions on motivational outcomes, and, at the other side, also evidence for unique effects (on top of the common effects) of teacher behaviour dimensions. These findings emphasize the importance of the need for more research on the dimensionality of teacher behaviour/teaching and of research on configurations and person-centered research to fully account for the importance of teachers and teaching in relation to student (motivational) outcomes.

Fifth, from the rather scarce research on the (in)stability of teaching and teacher behaviour there are indications for some instability of teaching and teacher behaviour (small to large changes) during the school year. There is evidence that, on average, the quality of teaching and teacher behaviour tends to decline from start to the end of the school year. This has implications for measuring teaching and teacher behaviour within a research context, but also within an accountability context. It is relevant to address questions like when and how many times a measurement is necessary to obtain good measurements of the quality of teaching and teacher behaviour.

Furthermore, the positive side of finding indications of some instability in teaching and teacher behaviour is that it is, at least, to some degree malleable and can be (positively) nurtured and advanced by professional development and learning and by favorable context conditions. Some work done in intervention studies, discussed in the preceding sections, underscore the malleability and potential for improvement of teaching and teacher behaviour; studies paying attention to links between teaching and teacher behaviour and context conditions also underscore this statement. Given the scarce research on the topic of (in)stability, more research is needed exploring stability and change between lessons and within teachers.

Sixth, a related question has to do with who the best informants are to obtain a good indication or description of the (quality of) teaching or the behaviour of a teacher. Findings reveal that there is not a straightforward answer on this question since it also depends on the goal of the measurement. There are indications that when this goal is to explain student outcomes, student perceptions are (most) valuable (and observatory information – if possible – can be informative as well), but when the measurement is part of a professional development and learning trajectory of teachers, a combination of teacher perceptions and student perceptions seems to be more valuable as well as a combination with observer ratings. If the study is small-scale and the objective is to get a thick description of the teaching and behaviour of a teacher in a particular context and time period, then observation information as well as student perceptions are perhaps the best option. If the objective is to measure the perspectives of all participants in a teaching and learning context and to tap different aspects of the learning environment, than measuring teacher as well as student perceptions is a good option. The implications of all this are that for future research a deliberate decision is necessary about what the objectives of the study and the measurement of teaching/teacher behaviour are in order to decide who will be the best informants on teaching and teacher behaviour.

Seventh, an exploration of research on the links between teaching and teacher behaviour and student motivational outcomes revealed that teaching and teacher behaviour matter, and that the instruments discussed in the preceding sections to tap information on teaching and teacher behaviour are valuable in this respect.

Furthermore, it became clear that, in particular, supportive teacher behaviour (emotional supportive by being involved and creating warm positive relationships with students and instructional supportive by providing structure and having clear instructive lessons) is of relevance for students' motivational outcomes. In addition, teachers' autonomy support (by which students are valued and supported to become autonomous, active and have a hand in their own learning process) is of importance as well as the creation of a positive (study-oriented) learning climate. In contrast, conflictual teacher-student relationships and neglecting or rejecting teacher behaviour as well as controlling teacher behaviour and teacher behaviour characterized by chaos and uncertainty is harmful for students' motivation and engagement.

Some studies also explored differential effectiveness issues in relation to student (background) characteristics such as gender, socioeconomical status or ethnicity. In general, some evidence has been found for the differential role of teacher (emotional and instructional/structure) support in relation to gender and motivational outcomes such as engagement, most of the time indicating that boys are more sensitive to teachers (involvement/emotional) support, provided structure, autonomy support, positive learning climate and teachers' neglective or rejective behaviour). Studies addressing differential effectiveness of teachers' (emotional) support related to racial or ethnic differences are rather scarce and results seem to be mixed, but when differences are found they seem to be in line with the academic risk hypothesis. Considering these limited (and sometimes contradictory) findings, additional research is needed to expand the knowledge base on differential effects of supportive teaching and teacher behaviour in relation to motivational outcomes.

Effects of classroom organization/management on motivational outcomes were also explored and it became clear that there is surprisingly little research on this topic. Although significant positive effects of this dimension were often found, this dimension was often not as strongly related to motivational outcomes as were the supportive dimensions of teaching and teacher behaviour. In addition, studies on differential effectiveness of this dimension were very scarce and delivered no evidence for the differential effectiveness of this dimension. For future research on the link between teaching and teacher behaviour and motivational outcomes, it seems worthwhile to explore the differential effectiveness of teaching and teacher behaviour in relation to gender. Furthermore, differential effectiveness in relation to other background characteristics, in particular from the academic risk hypothesis perspective, should be explored and perhaps a motivational risk hypothesis should be formulated.

Eight, studies investigating links between teacher behaviour, contexts and antecedents are scarce. The few studies available indicate that it is relevant to consider contextual and antecedent factors (such as student group composition and individual student characteristics, school culture, cooperation between teachers, school

leadership, constraints at work, student-teacher ratio, and teacher characteristics) in research, assessments, and debates about quality of teachers and teaching since they influence how teachers do and construct teaching. This line of thought agrees with ideas and work of Devine et al. (2013). A clear understanding of the effects of context and student (group) characteristics on teaching and teaching behaviour is needed since it is not only relevant to know what is good and effective, but also what the circumstances are under which teachers can manifest teacher behaviour that is defined as good or has proven to be effective regarding students' learning, development and particular outcomes. In addition, it is important to know when (circumstances, context, subject, or development domain) and for who (which kind of students) specific kinds of teacher behaviors or teaching styles are good and effective and to what degree. This asks for a perspective on teaching and teacher behaviour (in the classroom) that pays not only attention to teaching and teaching behaviour as being generic in nature (i.e. which can affect learning and development of all students in most contexts), but which also considers the broader context and situatedness of teaching and teachers' behaviour, and is sensitive to complex and dynamic interactions between teacher behaviour and student characteristics/behaviour, differentiated effectiveness and the dynamic nature of goodness, effectiveness and successfulness of teaching and teacher behaviour. Such a perspective has the potential to contribute to the establishment of stronger links between research on the quality and effectiveness of teachers and teacher behaviour, and the improvement of teaching and classroom practice because by considering context and student (group) characteristics, it assumes more complex relationships between teaching/teacher behaviour and student learning/development/outcomes and as such, it assumes a more realistic model of educational practice. Otherwise stated, by adapting to the specific needs of students, teachers, or student groups, it is expected that the successful implementation of effective teaching factors or teacher behaviours will increase and that this will ultimately maximize their potential effect on students' learning, behaviour, learning outcomes, and development.

In addition, such a perspective has the potential to help define stages of effective teaching and teacher behaviour in relation to (a diversity of) realistic educational settings and links it with equity issues as well since it takes into account differential effectiveness in relation to student (group) characteristics. The dynamic model of educational effectiveness of Creemers and Kyriakides (2008) can be seen as one of the first attempts to develop such a perspective in relation to teacher effectiveness. However, more research and theoretical work is needed to elaborate on the mentioned perspective in relation to (dimensions, dimensionality, and stages of) teaching and teacher behaviour in a diversity of educational settings (including educational levels and stages of schooling) and regarding a diversity of student outcomes and development. This will offer a more fine-grained conceptualization of effective teaching and teacher behaviour, and a more fine-grained insight in the (differential) effectiveness and successfulness of teaching and teacher behaviour, and in the underlying mechanisms and the conditions under which they can operate and contribute to equity in education. Such a perspective has the potential to address the

complex nature of (effective) teaching in a more realistic way compared to most current perspectives. In addition to theoretical work, research is needed to investigate effects of characteristics and circumstances of above school level contexts such as educational systems on teaching and teacher behaviour. To realize this, international studies are also needed.

The literature reviewed in the preceding sections gives an overview of current conceptualizations, theories, operationalizations, instruments and research addressing (the quality of) teaching and teacher behaviour and provides clear evidence of the importance of teaching and teacher behaviour in relation to (the development) of student motivational outcomes such as autonomous and intrinsic motivation and student engagement. Teachers' emotional support, involvement, quality of relationship with students, instruction, provision of structure/instructional support, the learning climate they create in their classes, their autonomy support and, to a lesser extent, also their classroom management and organization are key features accounting for links with students' motivational outcomes. In addition, evidence is delivered that teachers seem to matter even more for specific students (such as boys and vulnerable students). Positive is the finding from intervention studies that teachers can be trained to become better and more supportive teachers. Together these findings endorse the importance of investing in teacher education and teacher professionalization and to focus on the just mentioned teacher and teaching behaviour dimensions since they can stimulate students' (development of) autonomous and intrinsic motivation and engagement for school, which are important for students' achievements in school and later life. The discussed instruments to measure teacher and teaching behaviour can be helpful tools to get an idea of current practices of teachers and to have a starting point for discussions about current and future practice with and between (student) teachers.

There is from a research point of view, however, still a lot of work to do and much about teachers' significance (in a positive and a negative way) towards the development of students' motivation and engagement is not well-understood yet. Continued efforts are needed to integrate findings and research from the variety of domains discussed above to produce new research and new research findings that can help to further our understanding of development processes related to motivation and engagement (and other student outcomes) and of ways in which teachers can help (and can be helped) to ameliorate, facilitate and avoid the hindering of these developments. In addition, the use of more holistic approaches to the study of teaching and teacher behaviour (e.g., the search for configurations) is important as well as the adoption of experimental designs within real classroom settings to study and test (normative) configurations of teaching, teaching strategies and (the improvement of) teacher behaviour. Lastly, it is essential to remember that what happens in classrooms is dependent upon complex interactions between teachers and students, each with its own individual characteristics, the context they are in, and time. This implies the use of more complex models such as cross-lagged panel and dynamic longitudinal designs in future research and further theory development as well.

Appendix

Appendix Instruments Tapping Teacher Behaviour

Classroom Assessment Scoring System (CLASS)

Observation instrument based on the Teaching Trough Interactions Framework (Hafen et al., 2015; Hamre et al., 2013) and originally validated in the USA (variants for pre-K, primary and secondary education). Nowadays widely used and validated in a diversity of cultural contexts outside the USA (except for the latest version for secondary education) such as South America (Leyva et al., 2015) and Europe (Pakarinen et al., 2010).

Focus is on the patterns of interactions between teachers and students in class (because they are seen as central drivers for student learning). Support in and organization of classrooms is scored, but reference is made to teachers' behaviour related to three domains.

Emotional support: the existence of warm and caring relationships between teacher and students and enjoyment and emotional connections between teacher and students, and among students (positive classroom climate); availability of a responsive teacher who has regard for student perspectives and is sensitive to and tries to meet students' academic, affective, and social needs, who helps students resolve problems and who supports positive relations between students. A highly emotional supportive teacher has warm emotional connections with students and cares for them and consistently encourages students, provides comfort and reassurance and acts while considering their interest, motivation, and points of view.

Classroom organization: routines and procedures related to the organization of the classroom and the management of students' behaviour, time, and attention during classroom time. High scores refer to the existence of consistent schedules, established routines, a well-organized classroom, appropriate guidance, and the creation of a learning environment that is characterized by stability, predictability, and supportiveness for learning.

Instructional support: teacher's actions to support students' learning and engagement and to maximize their learning opportunities. It entails the way in which the teacher implements the curriculum to promote cognitive development, makes concepts and skills relevant to students' lives, encourages students to learn by asking questions and providing students with appropriate help and feedback that acknowledges their students' effort. Teacher activities to help students understand the content and the stimulation of higher order thinking and the deleverage of opportunities to applicate knowledge in novel contexts are included as well.

What Is Happening In this Class (WIHIC)

Student perception questionnaire (Fraser et al., 1996) (56 items) with roots in learning environments research; combines salient scales from existing questionnaires (available in the nineties) with new dimensions which became relevant at the end of the nineties; measures seven dimensions including student involvement. Four dimensions refer to a caring learning environment namely student cohesiveness, teacher support, cooperation, and equity. The other dimensions are investigation and task orientation. The original questionnaire was constructed and validated in Australia, but the final version was validated in a variety of other countries (e.g., Greece, Australia; Turkey; Asian countries e.g., Taiwan, Brunei, Singapore, Korea, China; Jordan; South-Africa; Myanmar, India, UAE) and was used for international comparisons of science classes. In contrast to other instruments discussed in this review, not all the items (and dimensions) are formulated in terms of teacher behaviour.

Student cohesiveness: the extent to which students know each other and have positive and supportive relationships with each another.

Teacher support: taking a personal interest in students (and their feelings), befriending and helping them when they have trouble with schoolwork.

Cooperation: extent to which students cooperate with each other (e.g., on assignments) during class activities.

E*quity*: equal treatment by the teacher regarding encouragement, help, and opportunities to be included in discussions.

Task orientation: students' attitudes towards the completion of planned activities and staying on the subject matter (including importance to get a certain amount of work done or to understand class work) and knowing the class goals.

Involvement: students' attentive interest and participation in class (e.g., giving opinions during class discussions, asking questions)" and teachers' activation of students' involvement (by asking questions or asking to explain things).

Investigation: extent to which there is emphasis on skills of inquiry and if they are used in problem solving and investigation.

International Comparative Analysis of Learning and Teaching (ICALT) Instrument

Observation instrument originally developed in and for an international context to investigate the quality of teaching (van de Grift, 2007; Maulana et al., 2021) by members of the inspectorate of the Netherlands, Belgium (Flanders), England and Germany (Lower Saxony); based on mainly earlier reviews of educational/teacher effectiveness research and existing observation instruments teaching quality evaluation. Although originally developed for evaluation purposes and inspectors' use during classroom visits in primary education, it is valid to use in secondary education (and in a variety of other countries, see Maulana et al., 2021; van de Grift, 2014;

van de Grift et al., 2017) as well, as recent research reveals (e.g., Maulana et al., 2017).

The high-inference event sampling instrument consists of 32 high-inference observable teaching acts belonging to six domains of teaching behaviour and are accompanied with 120 low-inference observable teaching activities which are considered as examples of good practices associated with the corresponding high-inference teaching act. The original ICALT distinguishes between five observable domains[21] (with standards and corresponding indicators of good and effective teaching), namely efficient safe and stimulating learning climate, efficient classroom management, clear instruction, teaching learning strategies and adaptive teaching (adapting instruction and assignments) (van de Grift, 2007). In the adapted version (see e.g., van de Grift et al., 2014), a sixth dimension, namely activating teaching was added.

Safe and stimulating learning climate: a relaxed class atmosphere and mutual respect, and an orderly climate and intellectually stimulating environment in which there is an achievement-oriented attitude, and the self-confidence of students is encouraged by positive teacher expectations.

Efficient classroom management: starting and finishing the lesson on time, having efficient transitions between lessons, maintaining order and efficient handling of students' misconduct, and no waste of time during the lesson.

Clear instruction/clarity of instruction: setting clear lesson objectives (and checking whether they are achieved/whether students understand the learning material), having a clear lesson structure and well-structured lessons, explaining subject matter, tools and tasks clearly, and following guidelines for direct or explicit instruction.

Teaching learning strategies: provision of temporary forms of support or scaffolds to students to help them bridging the gap between present and needed skills for achievement improvement; includes teaching cognitive and metacognitive strategies.

Adaptive teaching: adaptation of teaching to student differences (being attentive to diversity of student backgrounds and personalities) to better meet students' learning needs and to optimize the learning potential of each student, in particular weal students. Adaptation can refer to additional instruction and learning time and can be realized by using the principles of pre-teaching and re-teaching.

Activating teaching[22]: asking questions aiming to stimulate active learning, intensive instructions and teacher behaviour aimed at the activation of students' prior knowledge and making use of 'advance organizers' (Maulana et al., 2021).

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[21] Depending on the publication (e.g., van de Grift, 2007; Maulana et al., 2021) also the wordings 'categories', 'dimensions' or 'scales' are used. Opportunities to learn, monitoring pupils' results and special measures for struggling learners, were not addressed in the ICALT because they were not observable in (almost) each lesson and/or most important decisions were taken at school level.

[22] In the original version, this belonged to the domain 'clear instruction' (see e.g., van de Grift, 2007), which is renamed as 'clarity of instruction' in more recent publications (see e.g., van de Grift et al., 2014; Maulana et al., 2021).

The International System for Teacher Observation and Feedback (ISTOF) Instruments

Originally an observation instrument developed by an international team (and country teams) of 20 participating countries (with at least some representation of regions including North and South America, Europe, East Asia, South Asia, Southeast Asia, and Africa) during the International System for Teacher Observation and Feedback (ISTOF) project (Teddlie et al., 2006).[23] In the development phase, an iterative Delphi technique drawing on expert opinion and review was used to ensure cross-cultural relevance and validity (Muijs et al., 2018). Later, the ISTOF instrument has been validated and used in other country settings as well (see for a discussion, Lindorff et al., 2020; Muijs et al., 2018).

The ISTOF instrument draws on teacher/educational effectiveness research evidence and frameworks and expert opinion and is aimed at measuring teacher effectiveness in a reliable and valid way in an international context and providing opportunities for cross-country comparisons as well as possibilities for providing meaningful feedback to teachers (Teddlie et al., 2006; Kyriakides et al., 2020). The final observation instrument consists of seven (observable) components with for each component two to four indicators and for each indicator two items (45 high-inference items in total). The validity and reliability of the instrument were successfully established in a range of different contexts internationally (Muijs et al., 2018). However, in some studies the seven-components structure was not found indicating that the structure seems to be to some degree subject to variation across studies. and in some studies evidence was found for an overarching higher-order effectiveness factor as well (for a discussion, see Muijs et al., 2018).

The seven components are classroom climate, classroom management, clarity of instruction, instructional skills, promoting active learning and developing metacognitive skills, differentiation and inclusion, and assessment and evaluation. The first two belong to the overarching/super-component classroom environment, the next four ones to quality of teaching, and the last two to adaptive teaching (Teddlie et al., 2006).

Classroom climate: classroom environment created by the teacher in which all students are valued, the teacher interacts with all students, communicates high expectations and initiates active interaction and participation of the students.
Classroom management: teachers' effective dealing with misbehaviour and disruption, maximization of learning time and clarity of rules.
Clarity of instruction: well-structured lessons, clear explanation of the lesson purpose, clear communication and regularly checking for understanding by the teacher.
Instructional skills: teacher's ability to engage students, possession of good questioning skills and use of various teaching methods and strategies.

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[23] In their article as well as in the article of Muijs et al. (2018), a detailed discussion can be found on how the ISTOF instrument was developed.

Promoting active learning and developing metacognitive skills: teacher's help to
   students to develop problem-solving and metacognitive strategies, giving stu-
   dents opportunities to be active learners, fostering critical thinking and connect-
   ing course material to students' real-world experiences.

Differentiation and inclusion: taking full account of student differences (e.g., by
   offering additional opportunities for practice for students who need them or by
   differentiating regarding the scope of assignments) and creating an environment
   in which all students are involved.

Assessment and evaluation: degree to which the assessment is aligned with goals
   and objectives and the teacher gives explicit, detailed, and constructive feedback.

In general, the ISTOF observation instrument contains components referring to
more traditional approaches to teaching and learning as well as to more recent
approaches. For example, classroom climate, classroom management and clarity of
instruction are explicitly related to established teacher effectiveness models and
research supporting direct or explicit instruction, while the components promoting
active learning and metacognition, and differentiation have a link to constructivist
approaches which underscore the importance of self-regulated learning (Muijs
et al., 2018); the component instructional skills entail elements of both traditions.

   In addition to and in close alignment with the observation instrument, Van
Damme and Opdenakker developed for Flanders (Belgium) a student questionnaire
(Opdenakker, 2020). This questionnaire was slightly adapted for use in the
Netherlands as well (see, Opdenakker & Minnaert, 2011). The student question-
naire (46 items) revealed to have a three-factor structure and the quality of the
instrument regarding the reliability of the scale scores was good. The three factors
are the teacher as a helpful and good instructor (having good instructional skills,
offering help and clear instruction), the teacher as promoter of active learning and
differentiation, and the teacher as manager and organizer of classroom activities.
Examples of items are for the *teacher as a helpful and good instructor*, 'When stu-
dents encounter difficulties with the subject matter, they get help and are told what
they can do to overcome these difficulties,' 'The lessons are well structured and
organized,' and 'The instruction is clear and understandable.' Examples of items for
the *teacher as promoter of active learning and differentiation* are, 'Examples given
by students are used during class,' 'We are invited to give our personal opinions on
certain subjects,' and 'Our class is divided into different groups according to the
tasks given to the students.' Examples of items referring to the qualities of the
teacher as manager and organizer of classroom activities are, 'Our classroom is
often out of control' (reverse scored), and 'Most of the students are disturbed when
misbehaviour occurs in our classroom.' The first mentioned factor can be inter-
preted as an indicator of (instructional) support and involvement of the teacher, the
second one as an additional indicator of support (instructional and autonomy), and
the last factor as an indicator of classroom management (Opdenakker &
Minnaert, 2011).

The Teacher as a Social Context (TASC) Instruments

Questionnaires originally developed at the University of Rochester (USA) in line with the theoretical frameworks of the self-determination theory (Ryan & Deci, 2020) and the self-system process model of motivational development of Connell and Wellborn (1991). Simultaneously, a teacher and student version (for each a short and long version) were developed. Translations/adaptations and validation studies have been performed for a variety of countries (e.g., Belgium (Flanders), the Netherlands, Spain, Portugal, Indonesia) and evidence for the validity and reliability of measurements based on the TASC were reported. The long version of the student questionnaire will be addressed here (Belmont et al., 1992).

The original long-version student questionnaire consists of 52 items and taps student perceptions of teacher support and involvement referring to three dimensions: teacher involvement (14 items), structure (15 items), and autonomy support (12 items).

Teacher involvement: teacher's affection and attunement towards the student as well as teacher's dedication of resources and dependability towards the student.
Structure: teacher's help and support, adjustment and monitoring of the student, teacher's clear communication of expectations and teacher's contingency.
Autonomy support: approaching the student with respect, paying attention to the relevance of school activities and content for the student, offering choice with regard to learning and tasks and avoiding controlling behaviour and language towards the student.

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