

**Motivation in Context: Intraindividual Variability in
Day-to-Day Classroom Learning**

D i s s e r t a t i o n

zur Erlangung des akademischen Grades
Dr. rer. nat. im Fach Psychologie

eingereicht an der
Mathematisch-Naturwissenschaftlichen Fakultät II
der Humboldt-Universität zu Berlin

von
Yi-Miau Tsai, MSc in Psychology

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ABSTRACT

This dissertation focuses on how student motivation emerges and changes in the day-to-day classroom context. Drawing on self-determination theory, it proposes that specific features of the classroom instruction—and of what teachers say and do—may either support or frustrate students' need for autonomy. Autonomy-supportive instruction is hypothesized to enhance interest and competence perception in the classroom. At the same time, students' classroom experience is affected by their individual resources such as interest, integrated values, or positive self-concepts. Given the dynamic nature of the classroom context, the overarching aim of this dissertation is to take a short-term, intraindividual approach to understand how both the learning situation and individual motivational resources shape students' motivational experience.

The dissertation comprises three manuscripts investigating student motivation in a pre–post design over a 1 year period, including a 3-week lesson-specific measurement phase in which students' classroom experience were assessed daily. Drawing on interest theory, *manuscript I* shows that stable individual interest and perceived characteristics of classroom instruction make distinct contributions to students' day-to-day interest experience. Similarly, *manuscript II* shows that both domain-specific self-concept and perceived characteristics of classroom instruction shape students' felt competence in lessons. In particular, empirical support was found for the hypothesis that cognitive autonomy support has effects on student motivation over and above the effects of autonomy-supportive climate and controlling behaviors. From an individual differences perspective, *manuscript III* shows that some students experience higher day-to-day fluctuation in their domain-specific self-concepts than others. Self-concept instability was found to be associated with test anxiety and to predict lower school grades 1 year later. Taking a short-term intraindividual approach, this dissertation thus shows that both the learning situation and individual student resources contribute to motivation in context. An understanding of how motivation evolves over different contexts and time frames of instructional events, in everyday classroom life, and across the school career can usefully inform theories of motivation in context.

ZUSAMMENFASSUNG

Thema der Dissertation ist die Entstehung und Veränderung von Schülermotivation im Unterrichtsalltag. Ausgehend von der Selbstbestimmungstheorie wird angenommen, dass bestimmte Merkmale des Unterrichts das Autonomieerleben der Schülerinnen und Schüler positiv oder negativ beeinflussen. Autonomie fördernder Unterricht, so die Hypothese, erhöht das Interesse und die erlebte Kompetenz im Unterricht. Gleichzeitig wird das Unterrichtserleben der Lernenden von individuellen Ressourcen wie Interesse, Werten und Selbstkonzept beeinflusst. Ausgehend von einem dynamischen Verständnis von Unterrichtskontexten, untersucht die Dissertation den Einfluss von Lernsituation und individuellen motivationalen Ressourcen auf das Motivationserleben der Lernenden in einem intraindividuellen Ansatz.

Unterrichtserleben und Motivation von Schülerinnen und Schülern wurden in einem Prä-Post-Design über den Zeitraum eines Jahres untersucht. Kernstück der Untersuchung ist eine dreiwöchige Erhebungsphase, in der Unterrichtserleben und Motivation täglich, und zwar spezifisch für drei Fächer und die entsprechenden Unterrichtsstunden erfasst wurden. Die Dissertation umfasst drei Manuskripte. *Manuskript I* basiert auf der Interessentheorie und zeigt den differenziellen Einfluss von stabilem individuellen Interesse und variablen Unterrichtsmerkmalen auf das Erleben von Interesse im Unterricht. *Manuskript II* zeigt, dass sowohl das fachspezifische Selbstkonzept als auch die wahrgenommenen Unterrichtsmerkmale das Kompetenzerleben der Schülerinnen und Schüler beeinflussen. Insbesondere bietet es empirische Belege für die Hypothese, dass die Autonomieunterstützung im Unterricht über das Autonomie fördernde Klima und Kontrollverhalten der Lehrkraft hinaus einen Effekt auf das Kompetenzerleben der Schülerinnen und Schüler hat. *Manuskript III* untersucht individuelle Unterschiede und zeigt, dass manche Schülerinnen und Schüler stärkere Schwankungen ihres fachspezifischen Selbstkonzepts erleben als andere. Selbstkonzept-Instabilität ging mit Prüfungsangst einher und war ein Prädiktor für schlechtere Noten nach einem Jahr. Insgesamt konnten in der vorliegenden Dissertation, kurzfristige Veränderungen im Unterricht in einem intraindividuellen Ansatz untersucht werden. Es gelang Belege zu erbringen, dass sowohl die Lernsituation als auch individuelle Schülerressourcen zur Motivation in konkreten Lernumwelten beitragen. Ein Verständnis der Entwicklung der Schülermotivation in unterschiedlichen Unterrichtskontexten und –zeitspannen, im alltäglichen Unterricht und im Verlaufe der Schullaufbahn kann einen nützlichen Beitrag zu Motivationstheorien in konkreten Lernumwelten leisten.

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Introduction

Introduction

Motivational issues cannot be ignored by anyone seeking to understand students' cognition and learning behavior in the classroom [1]. The word "motivation" comes from the Latin verb *movere*, which means to move. In contemporary psychology, motivational theories are developed and invoked to explain what initiates and directs people's behaviors, and especially the intensity and persistence of goal-directed behaviors [2, 3]. Given its broad definition, there is no unified theory of motivation; rather, various theories have been proposed by scholars representing different philosophical standpoints and lines of research. Pintrich [1] differentiates three components of motivation-related constructs in educational psychology: beliefs about one's ability to perform a task; beliefs about the importance, interest, and utility of the task; and feelings about oneself or affective reactions to tasks. The first, expectancy and control component includes constructs such as self-efficacy, self-concept, and competence beliefs. The second, value component includes constructs such as intrinsic motivation. The third, affective component includes constructs such as fear of failure, anxiety, pride, and shame. All of these components serve as energizers or resources for people in learning- and achievement-related contexts [see also 4].

As in many areas of psychology, motivational researchers have become increasingly aware of the importance of *context* [5, 6, 7]. Indeed, several recent special issues [e.g., 8, 9] and edited volumes [e.g., 10, 11, 12] attest to the growing interest in the educational contexts of schools, classrooms, teaching and instruction. Motivation research now pays more attention to the contexts within which participants experience learning and instruction than was the case 20 years ago [see 4, 13]. There is consensus among researchers that contexts such as classrooms and schools influence students' motivation considerably, and that student motivation cannot be understood without taking the context and situation into consideration [6]. Moreover, research on motivation in context has called for more ecologically valid and practically relevant research [14]. Descriptions of the real-life context and its influences may provide educators with concrete guidelines for teaching and inform processes of educational reform.

The aim of this introductory chapter is to illustrate how context can be systematically involved in motivation theory and empirical research. Despite the growing interest in context-related matters, motivation researchers have not yet developed an integrated theory of motivation in context. The chapter therefore starts by addressing general theoretical issues, and by identifying context-related issues in two specific theories, namely interest theory and the hierarchical model of self-concept. In the second section, I outline the specific characteristics of the classroom as a motivating context, and provide a framework for examining instructional support on the basis of self-determination theory. The third section outlines methodological approaches to investigating how motivation evolves in context. Special attention is paid to intraindividual approaches addressing within-person motivational change and the role of context. A short-term intraindividual approach is proposed for the assessment of ongoing classroom

learning. Finally, in the fourth section, I outline the objectives of my dissertation and of the three manuscripts, presenting the dissertation's overarching aim of applying a short-term intraindividual approach to investigate motivation in the ever-changing context of classroom.

Theories of Motivation in Context

The overarching goal of incorporating *context* within theories of motivation is to gain a better understanding of intraindividual dynamics and interpersonal process of motivation in real-life learning environments. The term *context* is defined broadly in the psychological disciplines to include the features and conditions of certain environments (e.g., the school or family context), domains or areas of life (e.g., the leisure context, work context, or academic context), and cultural factors (e.g., nationality, ethnicity) [cf. 12, 14]. For the purposes of this dissertation, the term *context* is used to denote the conditions and circumstances of the immediate environment within which individuals operate and interact—what Bronfenbrenner [15] termed the *microsystem*. In particular, I focus on the teaching and learning context (e.g., learning activities, instructional situations, and social interaction processes in the classroom).

The structure of context is complex. In a classroom learning environment, contextual factors may include task demands and difficulty, teachers' instructional and motivational input, classmates, the physical classroom environment, and classroom climate. Some aspects are general and static (e.g., the physical classroom environment, composition of the peer group), others are fluid and changeable and sometimes referred to *situation* (e.g., teacher feedback). Throughout this dissertation, the terms *context* and *situation* are used interchangeably to denote both static features and changeable conditions of the immediate surroundings [cf. 16]. Despite the growing interest in context, there is not yet a unified theory of motivation in context. Therefore, I begin by discussing general theoretical issues and attempting to identify central content-related issues in current theories of motivation. Having introduced the metatheoretical worldview and discussed the issues of situation specificity and intraindividual continuity [4, 17], I describe two motivational theories and their approaches to these central issues: interest theory and the hierarchical model of self-concept.

General Issues Concerning Theories of Motivation in Context

Metatheoretical Worldview

Motivational theories that consider the person in context typically share a contextualist worldview [18]. According to this metatheoretical view, the motivational process does not happen purely inside the individual's head, but in the interaction between the individual and the environment [see 19]. *Person-in-context* is a process of mutual constitution: the outer world may

provide affordances or constraints, but individuals are actively involved in the interpretation and co-construction of their environment [see 2, 20]. Some contextualists consider context and motivation to be separable sets of variables, identifiable as causes or consequences¹ [e.g., 22]. This dissertation adopts this approach to the mutual influences between the context and the individual. As a general objective, research on motivation in context does not merely describe the contextual characteristics, but seeks to understand the dialectical, mutual relationships between person and context [23].

Situation Specificity and Intraindividual Continuity

Another key issue in motivation theories concerns questions of *specificity* and *continuity* [3, 4, 17]. Motivational research in general has long moved away from a strict *trait model* [24]. Nevertheless, there is still great diversity in the field concerning the extent to which certain motivational constructs are *situational* or *general* [3, 25]. Several affect and value constructs of motivation—e.g., situational interest, state anxiety, and flow—clearly derive from situation-specific (or state-like) approaches [e.g., 26, 27, 28]. The situation specificity of other constructs, such as achievement goals and efficacy beliefs, is debatable. Consensus has not yet not been reached on whether achievement goals should be conceptualized as general, broad orientations or as task specific [e.g., 29, 30].

A related issue concerns the question of continuity. Specifically, on which abstract levels do motivational constructs show intraindividual consistency across contexts? After all, in its pursuit of general principles, motivation research must not disregard questions of intraindividual continuity in human beliefs and behavior across different contexts [4]. Individuals are likely to expect similar experiences in similar situations. In the field, theorists apply diverse strategies to extract situational modules or arenas. For example, similar patterns of self-views or motivational styles may emerge in *life domains* clustered as academic, leisure, or work [e.g., 16, 31]. Consistency of motivation may also be associated with societal roles [e.g., first job and parenthood, see 32]. Other researchers use academic subjects as powerful and convenient modules: students may have similar interests and values across subjects such as biology, languages, etc. [e.g., 33, 34, 35]. In short, the general strategy is to investigate *trait-like* motivation at different abstract levels of context (e.g., academic self-concept, work-related intrinsic motivation). As shown in this brief summary, researchers are still striving to incorporate context more systematically within motivation theories. Because context and situation evolve

¹ In the extreme case, contextualists may posit motivation and context to be so tightly embedded that they are in fact inseparable. This approach encourages researchers to describe the activities and events within which motivation and context unfold, usually by means of qualitative or mixed methods [18], [21]

and unfold naturally over time, often without a clear structure, situation specificity and continuity are often difficult to disentangle. And empirical efforts are yet to be made to demonstrate within-person consistency against the background of developmental continuity or stability over time.

In the following sections, I introduce motivation theories that have attempted to incorporate context systematically. Specifically, I present the theory of interest and interest development and the hierarchical model of self-concept as approaches representing the value and affective components of motivation, on the one hand, and the expectancy and control component, on the other. Both theories share a contextualist worldview and address the issue of situational specificity and individual continuity. I discuss how these issues are addressed in each theory, as well as the hypothesized role of context in the intraindividual dynamic or interpersonal process.

Theory of Interest and Interest Development

The experience of interest is a psychological state of enjoyment and concentration [27, 36, cf. 37]. As a motivational construct, it comprises both value and affective components. Interest theory differentiates between individual interest and situational interest to describe the quality of the relationship between the person and a set of environmental stimuli—i.e., the person–object relationship [33]. Individual interest is a well-developed personal preference to value and enjoy a particular content or activity, usually accompanied by increased knowledge and competence. It is a relatively enduring disposition that guides individuals' engagement behavior over time and across contexts [38, 39, 40]. Situational interest, in contrast, is a transitional state of connection to certain content, usually elicited by the specific characteristics of the situation. It emerges during interaction in context, and may not last over time [41, 42, 43].

The phenomenological experience of individual interest and situational interest is the same, but the two are quite distinct in terms of situation specificity and intraindividual continuity. Interest theory formulates a dichotomous model, proposing a *dispositional* and a *situation-specific* construct to address the level of specificity issue. The two constructs are linked from a developmental perspective. Through repeated interaction, situational interest may evolve into individual interest. In their recent “four-phase model of interest development,” Hidi & Renninger [36] proposed that, in the initial phase, short-term change in situational interest is triggered mainly by situational factors. In the next two phases, situational interest is maintained and develops into dispositional interest. In the final phase, a dispositional interest is fully developed. This developmental approach reflects the notion that continuous situation-specific experiences may gradually become *internalized* into an individual disposition as individuals interact with the context [13].

Interest researchers have stressed the importance of context in all phases of interest development. In each phase, interest experience is not exclusively self-sustained, but is also generated by the external surroundings [36]. Contextual influences are especially pronounced in the early phases of interest development. This focus led to a great deal of research seeking to

identify the appealing characteristics of texts, activities, and stimuli capable of attracting and holding students' interest in learning contexts. For instance, text features such as coherence and vividness were found to arouse students' interest [see 44 for a review]. This line of research produced practical guidelines for educators. However, the emphasis on situational factors resulted in a neglect of how a person's individual interest directs his or her attention and behaviors in different learning settings—the question of intraindividual continuity. The active role of the individual in the co-regulation process of person-in-context has often been ignored.

The theoretical notion that “interest arises through an ongoing interaction among individual dispositions, activity characteristics, and the surrounding contexts” has since been revisited [see 38, 45]. Researchers have stressed that interest experience tends not to be solely situational or individual, but to involve both components [see also 37]. Individual interest is an important motivational resource that individuals bring and apply to a variety of learning contexts [46, 47, 48]. Both individual factors and contextual factors contribute to interest experience in learning contexts, and how to attend to both sources of influences simultaneously is a central topic in interest research.

The Hierarchical Model of Self-Concept

Motivation theorists have shown increasing interest in studying self in educational settings, based on the assumption that individuals' perceptions of themselves and their capabilities are a vital force in their success or failure in achievement settings [49]. Research has addressed various constructs relating to competence perceptions and beliefs, often with overlapping meanings (e.g., self-efficacy, expectancy beliefs, perceived control over outcome, etc). I focus specifically on self-concept because of its clear emphasis on individual's experience and interpretation of the environment and its systematic handling of the specificity issue [31, 50].

Broadly speaking, self-concept refers to one's perception and evaluation of oneself. Shavelson and colleagues have proposed a hierarchical model that addresses the issue of specificity systematically. Self-concepts are construed to be hierarchically structured from a very specific, situational level to a very general, trait-like level [31]. Self-perceptions at the base of the hierarchy pertain to specific activities and tasks; self-views at the upper levels are increasingly general. For example, self-perceptions at the lower level may pertain to the mathematics activities tackled that day; at higher levels, they involve perceptions of one's mathematics competence (i.e., mathematic self-concept) and general academic ability. Global self-evaluation is at the apex of the hierarchy.

Researchers assume that constructs at the lower level are more state-like and variable. Self-concept researchers does not specify at which levels intraindividual continuity emerges, but many empirical findings have shown that academic self-concepts at the domain-specific level (e.g., mathematics self-concept, English self-concept) are rather stable across the school years [51, 52]. The hierarchical model posits mechanisms to explain the emergence of stable self-concept. In a proposed bottom-up process, self-concepts at lower levels provide a basis for

individuals to infer higher-level self-concept, such that self-concepts across specific academic domains are used to infer the overall academic self-concept. Conversely, a developed self-concept may prompt a person to deduce that he or she is good in various subordinate domains; therefore, a top-down process is also plausible [e.g., 53].

Contextual features contribute substantially to the formation of self-concept [54]. Situational information such as feedback, frame of reference, and evaluative information is clearly relevant. Indeed, analyses of representative data sets have provided insights into how self-concept is shaped in the school learning context. Two well-defined phenomena can be used to illustrate the complex process of academic self-concept formation. First, other people's ability and achievement may influence one's self-concept through a process of external comparison (i.e., social comparison with other people in the same context)[55]. Thus, students studying in schools with a higher average achievement level can develop lower academic self-concepts than equally able students in lower achieving schools. This big-fish-little-pond effect [56] has been documented repeatedly across different cultures [57, 58]. Moreover, research on the Internal/External frame of reference model (I/E model) has demonstrated that students not only compare their achievement with that of their peers, but also compare their own achievement in different domains. The near zero correlations generally found between students' mathematics and verbal self-concepts are the logical consequence of these simultaneous social and internal comparisons [59]. These phenomena highlight the importance of the peer composition of the learning environment and of one's own learning experiences in other contexts or domains of life.

Conclusion: Involving Context in Motivational Theories

Taken together, both motivational theories stress the importance of context in understanding how the learning environment shapes motivation. The contextual factors discussed range from text and activity characteristics via informational feedback and peer composition to school-average achievement level. At the same time, the situation specificity of certain motivational constructs is recognized. Interest theory proposes a dichotomous model, clearly differentiating a trait-like component from a state-like component. The hierarchical model of self-concept does not differentiate a specific state-like component, but hypothesizes self-concept to show less and less situational specificity as one moves up the hierarchy. At the same time, researchers generally agree that motivation is not merely situated, but also shows intraindividual continuity. A motivational disposition may direct a person to attend to and select certain topics (e.g., individual interest) or give a person certain expectations in subordinate situations (e.g., the top-down effect of a higher-order self-concept). A developmental perspective explains how these motivational dispositions may evolve as a result of continuous interaction with the context.

In sum, when addressing motivation in context, both contextual and individual factors (i.e., the stable motivational dispositions that people bring to different settings) need to be considered simultaneously. Moreover, individuals may impact the learning context by actively

selecting or interacting with their surroundings. There is a clear need for research examining how individual and contextual factors work together to shape motivation in the everyday learning context, and how motivational resources develop over time in everyday interactions. In the next section, I focus on the classroom as a context within which everyday learning occurs.

The Classroom as a Motivating Context

Classroom environments influence students' motivation to learn [60, 61]. In classroom learning, teaching and learning activities are closely interrelated; thus, there is a long history in educational psychology of investigating teacher-related factors, such as their beliefs, competencies, and relationships with their students [2, see 62]. More recently, the research focus has shifted from stable teacher characteristics to the fluid, ongoing process of instruction, with classrooms being considered as dynamic and interactive learning environments [7, 63, 64, 65]. Classroom influences are assumed to be transmitted through what teachers say and do during instruction, but equally important is how students perceive these instructional behaviors [see 64, 66]. Apparently, the classroom context contains more than static factors (e.g., teacher characteristics); other factors that change across activities or lessons may be more immediate and influential. To account for its ever-changing nature, the classroom context is operationalized as a social interaction guided by the orchestration of instructional activities over time [see also 7].

In the following section, I draw on the dialectical framework provided by self-determination theory (SDT) to examine student motivation in the context of classroom learning. SDT provides general principles for explaining the quality of people's intentional behavior in different social contexts (e.g., leisure, work) and thus allows the social interaction aspect of classroom learning to be addressed in detail. Placing an emphasis on cognitive tasks and activities in the classroom, I outline three aspects of instructional support that can be considered central for student motivation.

Self-Determination Theory: A Dialectical Framework

An SDT approach to human motivation and psychological functioning highlights people's inner motivational resources as well as contextual support. One fundamental proposition of SDT is that humans possess an energizing set of psychological needs—the needs for autonomy, competence, and social relatedness. These needs are innate and universal [67, 68]. Based on these needs, in any intentional interaction with the environment, people strive to feel in control and self-determined (need for autonomy), to master challenges and feel competent (need for competence), and to feel involved socially (need for social relatedness). Therefore, from a dialectical perspective, context plays a crucial role. When the learning context supports students' basic needs, a feeling of self-determination emerges naturally. Consequently, students' engagement and behaviors are truly volitional and autonomous, and acquire an intrinsic quality [69, 70]. In other words, students have the feeling of being an *origin*; they perceive their behavior as being a matter of their own choosing [71, pp. 273-274].

Beyond the dichotomous view of students as either being engaged in autonomous, volitional behavior or being externally controlled, SDT proposes a motivational continuum spanning five categories of regulatory style [72, 73]. These regulatory styles range from the most internally regulated, intrinsic motivation, via integration, identification, and introjection, to extrinsic motivation. Students may engage in an activity because they identify with it or integrate it with their personal goals and values. These gradations of regulatory style form a continuum of self-determination in intentional behavior. The more internally valued or regulated a behavior is, the more it is experienced as autonomous. SDT predicts these regulatory styles to affect other aspects of motivation, engagement behaviors, and psychological adjustment [68, 74].

Learning contexts differ in the extent to which they nurture or frustrate students' inherent basic needs and facilitate a sense of autonomy. Events and contingencies such as rewards, evaluation, and feedback have found to influence motivation in the classroom context. Researchers have also investigated how teachers build contingencies of reinforcement into their interactions with students [e.g., 73]. It has been noted, for example, that students may feel very differently about a difficult, evaluative task depending on what their teachers say and do. Recently, there has been growing research interest in teachers' instructional behavior as an interpersonal factor in the classroom [75]. Particularly, autonomy support has been proposed as crucial for student motivation and learning in the classroom [73, 76, 77].

Instructional Affordances and Constraints for Student Autonomy

Autonomy support has been characterized as the provision of (a) latitude and decision making, (b) rationales for the value of learning in a noncoercive environment, (c) clarification of the relevance of the learning, and (d) positive feedback about competence [78]. Here, I draw on Reeve's [75] conceptualization and define *autonomy support* as occurring in interactions that involve and nurture (rather than neglect and frustrate) students' psychological needs, personal interests, or integrated values. In an autonomy-supportive classroom, students feel psychological freedom and sense that their actions are self-chosen [73, 79]. Researchers have argued that there is more to autonomy support than providing students with choices and options [80]. In the following, I describe different types of autonomy support and control, with a focus on instructional interaction in the classroom context. Specifically, I describe their effect on students' felt competence and interest. Additionally, I introduce another type of autonomy-related instructional behavior, namely "cognitive autonomy support," and its relevance to the classroom context [see 78].

Autonomy-Supportive Climate and Directly Controlling Teacher Behaviors

A number of autonomy-related instructional behaviors have recently been proposed to have differential effects on students' autonomy [80, 81, 82, 83, 84]. Moreover, an intervention study has shown that teachers can learn to incorporate autonomy-supportive instructional behaviors, indicating that such behaviors are more malleable than a trait-like motivating style

[85]. Teachers can create an *autonomy-supportive climate* by attempting to understand students' feelings and thoughts and supporting their personal growth [80]. Specific autonomy-supportive instructional behaviors include listening, asking questions about students' wishes, responding to students' questions and acknowledging their perspective and feelings, allowing students to work on their own, using praise as informational feedback, and offering encouragement [82, 84, 86].

Convergent empirical findings support the hypothesized beneficial effects of autonomy-supportive behavior on student motivation. With respect to students' values and intrinsic interest, classroom-based studies have shown that students experience higher intrinsic motivation and more positive emotion if their teachers have a more autonomy-oriented instructional style [87] or receive training in autonomy-supportive instruction [83]. With respect to students' felt competence, studies have shown that students perceive themselves to be more competent and that they are less likely to drop out of school if taught in an autonomy-supportive climate [88]. Besides classroom-based studies, numerous experimental studies have demonstrated similar effects [e.g., 89].

Despite the favorable effects of autonomy-supportive instructional behavior, the real-life social arrangement of teachers as instructors and students as "receivers" in the classroom often results in teachers neglecting students' needs for autonomy and resorting to overly directive or controlling instructional behaviors [81]. *Directly controlling behaviors* involve teachers' attempts to impose a teacher-centered agenda by having an instantaneous impact on students' behavior and leaving them no room for self-reliant behaviors [70, 80]. Specific instructional behaviors include voicing opinions, disrupting students' natural learning rhythm, anticipating answers, using directive commands, making "should" statements, and asking controlling questions [see 80, 84]. Directly controlling behaviors have been shown to undermine students' intrinsic interest, and even lead to increased anxiety and anger [81]. Similarly, students feel less competent when teachers give directive answers and solve problems for them [87, 88, 90, 91].

Cognitive Autonomy Support in Instruction

Given that the prime objective of instruction is to facilitate learning in the classroom, much classroom time is devoted to cognitive tasks and activities. Based on their observations of authentic classroom activities, Stefanou and colleagues have proposed *cognitive autonomy support* as another type of autonomy support [78]. While autonomy support and control focus primarily on content-free social interaction, cognitive autonomy support goes beyond the teacher–student interaction to emphasize students' sense of autonomy in interacting with the learning content during cognitive activities. Stefanou and colleagues have suggested that teachers can facilitate a sense of autonomy and ownership of the learning process, and argue that cognitive autonomy support "truly leads to psychological investment in learning" [78, p.101]. Specifically, cognitive autonomy is enhanced when teachers explain the purposes of the task at hand and its links to other learning concepts, increase the personal relevance of tasks, give students ample time to work and present their solutions, allow students to debate ideas freely,

and scaffold students' understanding by activating prior knowledge. However, there has as yet been little empirical investigation of cognitive autonomy support in the classroom.

Nevertheless, the idea is closely related to several instructional guidelines and procedures designed to involve and support students cognitively. For instance, enhancing students' active cognitive participation has been shown to foster learning, and to increase intrinsic interest and enjoyment [3, 64, 92, 93, 94, 95]. Students in mathematics classrooms have been found to show more involvement and positive affect when teachers scaffold learning and transfer responsibilities to students [64]. Given the frequency of cognitive activities in classroom, it seems worth investigating how cognitive autonomy support complements autonomy support and control, and thus fosters students' motivation and learning.

It should be noted that although this dissertation draws mainly on the SDT approach in examining the role of autonomy support, other frameworks also recognize the importance of student autonomy [c.f., authoritarian vs. democratic environment 78]. It is a goal of many educators to develop active learners who show interest and self-reliance in learning, even beyond the classroom and school context. With this goal in mind, the idea of autonomy support as a route leading to intrinsic and autonomous regulatory styles seems promising. The dissertation thus places special emphasis on teachers' autonomy-related behaviors as key contextual factors in classroom learning.

To summarize, classroom interactions affects students' motivation and learning, largely through what teachers do and say on an everyday basis. However, research often investigates these instructional features in terms of stable teacher characteristics rather than in terms of variable instructional practice [see also 96]. The conceptualization of the classroom as a social interaction guided by the orchestration of instructional activities underlines the dynamic nature of instructional influences. Drawing on previous research, I argue that the way in which the instructional context promotes or frustrates a sense of autonomy is a crucial element for understanding student motivation in day-to-day classroom learning. Moreover, these influences need to be investigated over time.

Within-Person Motivational Change: Investigating the Role of Context

How do researchers understand students' motivation in an interactive context such as a classroom that involves the continuous accumulation of experience? It is clear that a single snapshot will not be sufficient to understand the interplay of individual and context. The affordances and constraints of the learning setting may vary over time, and the students themselves become more experienced and mature. Thus, studying motivation *over time* has advantages over taking a single snapshot. In recent years, methodological and statistical advances have equipped researchers with a rich toolbox enabling them to conduct longitudinal studies and handle intraindividual data with flexibility. Clearly, longitudinal research promises to yield intriguing findings, but methodological solutions may not be simple. Many issues

embedded in the fluid, complex nature of learning contexts need to be considered. How do researchers select the timeframe for their observation? When would it be more appropriate to examine mean experience over time, or to attend to a particular event or even day-to-day routine to understand how motivation unfolds? A well-articulated theoretical model that describes the nature of change and the time-variant and time-invariant factors that predict this change is clearly required [97].

In the following, I outline research methods frequently used to investigate motivation in various learning settings. First, under the umbrella of experimental and classroom-based surveys, I provide a brief summary of research approaches used to identify specific contextual factors and to determine their short-term and, in some cases, long-term effects. In this section, I focus on the teaching and instruction literature, with the aim of illustrating how contextual effects have been investigated. Second, I outline research on motivational development. Research taking this approach has cast light on the developmental trajectories of motivation and on the developmental mechanisms that may be subject to contextual influence. Third, I focus on *short-term intraindividual variability*, which I propose as a suitable approach for investigating motivation and contextual influences in the ever-changing learning environment.

Experimental and Classroom-Based Surveys

Much of our empirical knowledge of instructional and contextual effects on student motivation—e.g., the use of reward, the nature of tasks, criteria for evaluation—has been informed by experimental research conducted in laboratories or by classroom surveys [see 94 for a review]. Experimental (laboratory) studies have the advantage of establishing causal effects through carefully manipulated conditions. For example, researchers often manipulate contextual factors such as instructor's support or contingencies of reward and feedback as independent variables. They can thus demonstrate that participants' motivation and engagement are elicited or reduced as a consequence of the manipulation [see 72 for a review, 89]. Instead of assigning students to different experimental conditions, other researchers have used classroom-based surveys to study motivation in the context of different schools, classrooms, or teaching styles. Survey studies use methods such as observation, interviews, analysis of classroom discourse, and—most commonly—self-reports to gather data on student motivation and contextual features [see 7 for a review, 98]. Classroom-based research has identified principles underlying teacher–student interactions, and provided corresponding guidelines for educators. For example, effects of autonomy support and control have been examined using teacher or student self-reports [e.g., 81, 87]. Recently, efforts have been made to verify the psychometric quality of self-reports from different sources [66, 99].

Research directly examining the effects of specific contextual factors has produced valuable input for teaching and instruction. Although experimental designs and classroom surveys may shed some light on motivational change, however, the findings largely concern between-person differences and may overlook the active role of the individual. For instance, in

experimental designs, it is assumed that motivational differences emerging between the students randomly assigned to different experimental conditions can be attributed to these conditions having caused them to change in specific ways (individual differences at baseline are controlled or balanced in the study design). The limitation of this approach is that it is impossible to exclude the possibility that the conditions might have had different effects on the same person when administered in a within-person design. Mechanisms derived to explain between-person or between-group differences may not necessarily apply to within-person dynamics [100]. Moreover, in most cases, the contextual factors examined remain constant during the survey or experimental sessions. It is not clear whether nonstatic contextual factors exert the same effect on motivation in ongoing learning settings. It is worth mentioning here that some studies have examined the effects of contextual influences such as instructors' controlling style [e.g., 70] or teacher–student relationships [101] over extended periods of time. Nevertheless, aspects such as how individuals bring these acquired motivational dispositions to different learning settings, and how intraindividual continuity emerges, tend not to be a focus of this approach. Therefore, the effects of changing contexts and the role of the individual may need to be investigated more systematically over time.

The Long-Term Developmental Approach

In response to calls for more longitudinal research on motivation [e.g., 25], the last decade has seen an increase in the numbers of longitudinal projects surveying student motivation on repeated occasions [see 102]. A typical approach is to conduct repeated assessments of student motivation at extended intervals, usually across years or school terms, to describe how motivational dispositions develop with age. Overall, findings have revealed a gradual decline in various aspects of motivation over the school years, especially at the transition from elementary to secondary school [102, 103]. This line of research often focuses on the global or domain-specific level of motivational constructs, such as overall value and intrinsic motivation toward school, individual interest in specific school subjects, and domain-specific self-concept.

A pattern of general decline in students' individual interests and task values over the school years has been found for mathematics [104] as well as for science and languages [e.g., 105, 106]. Studies with a shorter time-frame of a few of years have focused on the transition to secondary school, and found a more abrupt but differentiated pattern of change. Although overall interest in school [107] and interest in mathematics [e.g., 108] tend to decrease, findings for English and social science interest have been less consistent [e.g., 109]. Within-person changes in self-concept and in the expectancy component of motivation seem small. Even at the transition to secondary school, no sharp increase or decrease is observed [110]. Studies have shown that global self-concept and domain-specific self-concepts (i.e., in mathematics, English, and social science) decline gradually during early adolescence, reaching the lowest point after the transition to secondary school, and then recovering steadily over the course of adolescence [but 108, 109, 111].

These longitudinal studies have painted a general picture of motivational development and informed the field about the developmental continuity and stability of different motivational constructs. However, the underlying developmental mechanisms are complex. The observation of gradual decline can be attributed to various individual and contextual sources, which may change considerably over time. Even children's ideas of "competence" differ with age [112]. Declining *competence perceptions* therefore need to be seen against the background of this developmental change. Biological and psychological maturation also change students substantively. As for contextual factors, students experience contextual change on several levels as they progress through school (e.g., school climate, teacher and peer relationships, curricula). All factors that vary across measurement points may relate to the observed change in differing ways.

One prominent developmental model is the stage–environment fit proposed by Eccles and colleagues [113]. This model proposes contextual changes experienced by students in the school and classroom as well as specific developmental needs to explain the motivational decline observed over the secondary years. Eccles and colleagues suggest that, relative to elementary school, the learning environment of the middle grades is characterized by fewer opportunities for students to make important decisions, poor teacher–student relationships, and excessive emphasis on discipline and ability evaluation. These conditions provide little support for students' needs for autonomy and self-determination. The motivational decline can also be attributed in part to social and cognitive development in adolescence. According to Eccles' model, students in early adolescence are best nurtured by a strong sense of autonomy, independence, and social interaction. Taken together, it is thus the developmental mismatch between the psychological needs of early adolescents and the environments of most secondary schools that cause students' motivation to decline [6, 103, 113]. There is now consensus that individual factors impacting motivational development need to be considered alongside contextual factors. Nevertheless, it remains important to delineate contextual influences and their respective contributions relative to other factors. For example, does the effect of environmental autonomy support remain consistently beneficial throughout the school career, as claimed by self-determination theory [e.g., 114]? Or it is especially important in early adolescence, as suggested by the stage–environment fit model? As a complement to the long-term approach, an intraindividual design that keeps the developmental stage constant may help to clarify such issues.

The Short-Term Intraindividual Approach

Short-term intraindividual variability in motivation can be defined as fluctuation in motivational experiences within the individual over a limited period of time (e.g., as reflected by repeated moment-to-moment or day-to-day measurements). This fluctuation (or inconsistency) is characterized by temporary shifts that are generally reversible and are not necessarily related to long-term development [cf. 115]. One straightforward application of short-term variability to

motivational theories is to examine the situation specificity of certain motivational constructs. In order to understand contextual influences, however, the aim is not only to establish variability or fluctuation, but to identify the underlying mechanisms that explain variation from one time point to the next [see also 116]. Is short-term variability a promising approach to understanding contextual effects? Or is everyday variability irregular and unpredictable, as suggested in earlier studies [e.g., 117]. In the following, I propose two theoretical notions to investigating short-term intraindividual variability in student motivation in the everyday classroom context.

Contextual Influences on Short-Term Intraindividual Variation

Intraindividual fluctuation in student motivation can be argued to reflect the contextual affordances and constraints of the daily classroom context. Like long-term motivational development, short-term intraindividual variability may be driven by both individual and contextual factors. In the classroom context, it may thus make more sense to assess factors that can be assumed to vary on the short term (e.g., motivational climates created by what teachers do and say, characteristics of tasks and activities) within a shorter time-frame. Students' motivational experience is likely to co-vary with these contextual features of instruction, resulting in short-term intraindividual variability. Developmental and biological changes that take longer to occur are less likely to account for this short-term within-person variability. Hence, short-term intraindividual variation provides a window for examining contextual influences. When individual factors are time invariant, a distinct effect of context (as opposed to individual factors) can be inferred when a systematic, corresponding pattern of relations emerges between motivational experience and time-variant contextual features.

To date, research on short-term intraindividual variation in student motivation in the classroom learning context remains limited. However, similar approaches have been applied to investigate aspects such as well-being and perceived competence in other contexts. Typically, studies have collected high-density data on individual experience within a short time-frame. For example, a 3-week diary study found everyday well-being to be associated with environmental support for autonomy and competence. Interestingly, a cyclic peak of emotional well-being on weekends was observed, highlighting the distinctive contextual features associated with this period of leisure time [118]. Similarly, findings from a study using dyadic intraindividual variability data suggest that spouse's affect can be seen as a social context that influences emotional well-being [e.g., 119]. In a workplace example, data on perceived performance at work were collected repeatedly using experience sampling [120]. The findings showed that task difficulty, task interest, and skill all contributed to variation in employees' perceived competence in the working environment. These studies show that short-term intraindividual variability is not random, but reflects changes in certain underlying contextual features. Therefore, the short-term approach can be applied to identify contextual factors that explain the within-person dynamics of motivation.

Short-Term Intraindividual Variability as a Trait-Like Attribute

Do all students participate and interact with the learning context in the same way on a day-to-day basis? Harter [111] argues that students differ in how they interact with the learning context. The context shows a greater and more instantaneous impact on some students. This approach echoes an earlier theoretical notion that short-term variability reflects meaningful difference in human attributes [121]. Some people show higher intraindividual variability in day-to-day well-being, emotion, or cognitive performance. Increasing research attention has been paid to short-term variability as a trait-like attribute. Especially relevant for the present focus on motivation are questions such as whether motivation in context varies or changes to the same extent for all students. If some students show greater short-term fluctuation in the same learning environment, what are the factors that differentiate them from their peers?

In several psychological disciplines, there is growing research enthusiasm for examining intraindividual variability in domains such as cognition, and physical and emotional well-being [122, 123, e.g., 124]. The assumption is that intraindividual variability reflects core endogenous attributes of human functioning that are otherwise unobservable. These endogenous attributes are hypothesized to be closely linked to adaptive or maladaptive functioning. For instance, in cognitive development, increasing variability in memory and problem-solving strategies may indicate that a broader repertoire of strategies has been developed; children are likely to experience a qualitative change in cognitive development once the best strategy has been selected and consolidated [125, 126]. In lifespan psychology, trial-to-trial variability has been linked to (a lack of) integrity of executive functioning and cognitive control associated with aging [e.g., 127]. In this case, variability increases with neurological disease, and predicts further decline in cognitive functioning [e.g., 128, 129, 130]. In social and personality psychology, moment-to-moment fluctuation in emotion may reflect regulative ability, which tends to be better in elderly adults [e.g., 122]. Furthermore, day-to-day variability in self-esteem has been shown to reflect a vulnerable self-system that is oversensitive to external information, and is often associated with maladaptive coping strategies [see 131 for a review]. To summarize, some individuals show more state-like variation in cognition, beliefs, affect, and behaviors than others, offering an intriguing approach to the complexities of human processes [111].

In the motivation literature, some initial research investigating variability as an attribute focus on children's self-perceptions. For example, variability in felt competence and control beliefs has been found to be higher among low-achieving students [132]. Another study on students' perceived competence in physical education showed that higher variation led to motivational decline over time [133]. It is also possible that intraindividual variability implies differences in the ways that students approach and regulate their experience in the ongoing learning context. As this line of research is still in its early stage, it is equally important to identify which variability variables reflect these different tendencies, and how they are associated with adaptive and maladaptive functioning over longer time periods.

Toward an Integrated Model of Motivational Change With an Intraindividual Approach

Descriptions of motivational change taking a developmental or a microscopic perspective may be complementary in understanding different aspects of motivation in context. As illustrated in Figure 1, widely spaced “snapshots” taken over a period of years give the impression that motivational change is gradual and continuous from childhood to adulthood. More frequent assessments over the phase of transition indicate that changes also occur over a shorter time-frame. Yet short-term variability may not be as continuous as depicted in Figures 1a and 1b. Our impressions of within-person change may differ when researchers zoom in on everyday classroom learning within a shorter time-frame. Differing types of motivational change may reflect the different mechanisms underlying person-in-context.

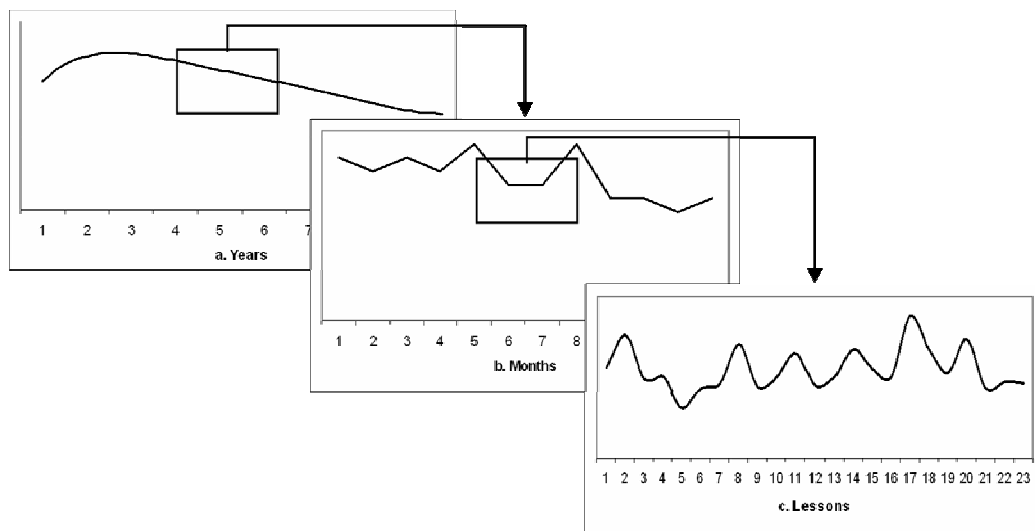


Figure 1. Illustrations of trajectories of motivation change over different time frame.

As everyone is familiar with fluctuations in self-feelings, emotion, and well-being, short-term within-person change may seem trivial. Traditionally, this fluctuation is often seen as measurement error in repeated assessment of psychological constructs, or as random fluctuation that cannot be explained rationally, but represents noise. In this dissertation, I propose that a short-term intraindividual approach attuned to the fluidity of the classroom context be applied to further the scientific understanding of (1) the intraindividual dynamic in daily life and the contextual factors that govern it, and (2) the individual attributes associated with or caused by the different ways in which people approach and interact with the context. Rises and falls in motivation from lesson to lesson as illustrated in Figure 1c may be used to identify influential and changing elements of the instructional context that might be harnessed to boost students’ motivation in ongoing learning settings.

Recent methodological advances have also encouraged research with a more sophisticated intraindividual design. A variety of methods are available for tapping students' experience at the time it is happening—e.g., the experience sampling method [134], ambulatory assessment [135], and various diary methods [136]. Moreover, statistical techniques for handling longitudinal and multilevel data have advanced rapidly—e.g., hierarchical linear modeling [137], growth curve modeling [e.g., 138], and time-series analyses [e.g., 139]. I believe that the rich toolbox being developed for research on short-term within-person change can further the scientific understanding of motivation in everyday learning contexts, a matter of great theoretical relevance, as well as elucidating the theoretical issues of intraindividual continuity and situation specificity.

Outline of the Dissertation

Research Objectives

Features of classroom instruction can shape student motivation through teacher–student interaction. The overarching aim of this dissertation is to understand how student motivation evolves in everyday learning settings, given the different affordances and constraints that emerge during the instructional process. A short-term intraindividual approach is proposed as a suitable method for disentangling the influences of classroom contextual factors, on the one hand, and individuals' own motivational resources, on the other. Figure 2 presents a framework for this research. Based on specific motivational theories of interest and self-concept, motivational experience can be seen as a product of individual and contextual factors. With respect to individual factors, I investigate the motivational resources of individual interest and self-concept. Both are assumed to remain stable on the short term. With respect to classroom contextual influences, I focus on instructional autonomy-related support, which is transmitted through what teachers do and say in classroom and, equally importantly, on the students' uptake of this motivational input. It should be noted that whether a specific variable is time variant or time invariant needs to be decided conceptually depending on the research design. In the present investigation, individual aspects of motivational dispositions can be assumed to be invariant on the short term. However, in a long-term developmental approach, they might well be time variant. According to this framework, both the individual and the learning context need to be investigated simultaneously to determine their relative influences on students' daily interest experience and competence perception.

As a complement to research on long-term motivational development, the present dissertation adopts a shorter time-frame to examine the intraindividual dynamics of motivation in authentic classroom settings. I propose a short-term, day-to-day intraindividual design to be appropriate for the present research purposes, especially in the classroom context. First, the instructional process in the classroom context is dynamic, being shaped by aspects including instructional discourse and implementation of activities. Research using a widely spaced time-

frame of years and months cannot capture the fluid instructional process of everyday learning. Second, because substantial changes occur as a result of development and maturation, individual factors may also cause long-term motivational change. A long-term approach cannot distinguish the relative importance of the classroom context. Third, classroom teaching is often planned lesson by lesson; thus, it is of higher ecological validity to examine within-person experience in daily classroom learning, even with the same teacher. Thus, a diary method that traces students' lesson-to-lesson experience over 3 weeks is applied to address three research objectives.

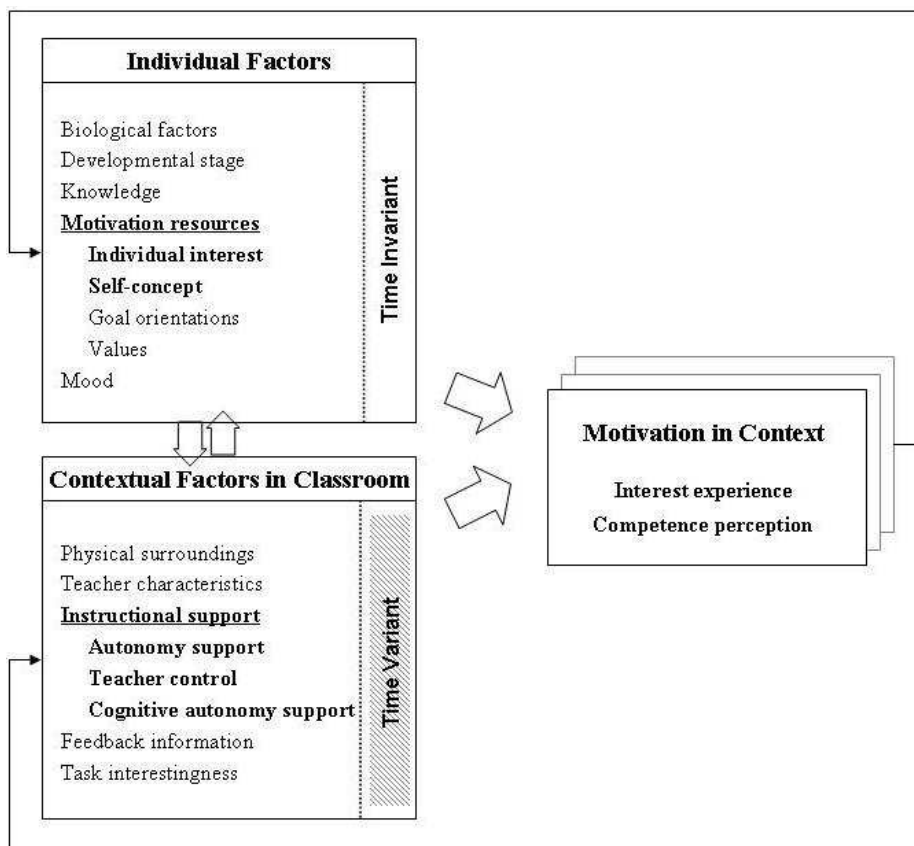


Figure 2. A research framework on motivation in context, and the role of individual and situational factors.

The first objective is to describe the extent of short-term intraindividual variability. To what extent do students experience up and downs in motivation from one lesson to the next? Do students feel more competence and interest in some lessons than others, even with the same teacher? Or does motivational experience remain stable in the structured daily routine of lessons? The extent of intraindividual variance will be examined relative to between-student variance. In general, students' motivational experience is expected to vary substantially from day to day.

The second objective is to predict the variation of student motivation in the classroom. Specifically, do students' motivational experiences co-vary with their perceptions of instructional support and control? Three aspects of instructional support are examined: autonomy-supportive climate, controlling behavior, and cognitive autonomy support. These instructional features are determined by what teachers say and do during the lesson and are thus expected to be less stable than individual traits. The extent to which instructional features, as time-variant predictors, are associated with everyday interest experience and felt competence will be examined. At the same time, intraindividual continuity may also emerge; in other words, motivational resources may lead a person to experience higher or lower motivation in different contexts. What difference do features of classroom instruction really make to students' motivational experience, given the differing levels of motivational resources they accumulate over the school years? The relative importance of both influences will be investigated simultaneously. Moreover, these influences will be investigated in three core school subjects to determine whether they differ across academic domains.

Third, does the classroom context affect students in the same way? This is an important question if the educational context is to provide individualized support for students with differing attributes. Specifically, I examine whether there are individual differences in the patterns of relations between instructional features and motivational experience. Do some students react more positively to autonomy support than others? Harter (2006) suggests that some adolescents' self-perceptions are more state-like than others. The level of fluctuation in domain-specific self-concept and its possible implications for school adjustment will thus be investigated. These research objectives will be addressed by the three manuscripts in the next chapters. The first two manuscripts address the first two objectives, and propose an exploratory analytical strategy for addressing the third objective. The third manuscript focuses on questions of interindividual difference in students' self-concept instability.

Overview of Manuscripts

The first manuscript *What Makes Lessons Interesting? The Role of Situational and Individual Factors in Three School Subjects* focuses on interest experience in the classroom. Interest has been found to be associated with focused attention, higher cognitive functioning, and learning [46, 140] and is therefore an important motivational component in the classroom. Although interest theorists argue that students' psychological state of interest is a function of both situational and individual factors [38, 45], empirical research has rarely examined both factors simultaneously [but 46]. In this paper, individual factors (gender, prior school grades, and individual interest) and situational factors (aspects of teachers' autonomy support) are examined simultaneously. The results provide empirical evidence pertaining to the first and second research objective. Substantial intraindividual variability (proportion of within-student variance) was found in students' interest experience from lesson to lesson over a 3-week period. At the same time, interest experience was found to be associated with perceptions of an

autonomy-supportive climate, controlling behavior, and cognitive autonomy support during the lesson. These contextual effects occurred over and above the effects of individual interest. Gender and prior school grade did not predict interest experience. Moreover, with respect to the third research objective, some initial evidence showed that students were differentially affected by teachers' autonomy support. The association between perception of autonomy support and interest experience varied among students.

The second manuscript *Day-to-Day Variation in Competence Beliefs: How Autonomy Support Predicts Young Adolescents' Felt Competence* focuses on students' competence. This manuscript reviews the literature on self-concept continuity and stability, and identifies sources of information in the learning context that may cause students' self-concept to vary. It is then hypothesized that perceived competence in the daily learning context may not be as stable as has been portrayed in longitudinal studies. There was indeed substantial daily fluctuation in students' felt competence, as indicated by the within-student variance. The intraindividual variance was of almost the same magnitude as the between-person variance. The findings relate to the first research objective by showing that felt competence is not a fixed entity in everyday learning. Moreover, the pattern of variation was explained by students' domain-specific self-concept, on the one hand, and classroom instructional support, on the other. In other words, the observed fluctuation was not random, but reflected two types of instructional support during lessons—support for personal autonomy and cognitive autonomy. The implications for investigating short-term intraindividual variability within the hierarchical model of self-concept are discussed.

The third manuscript *Self-Concept Instability in Everyday Classroom Learning: Does It Predict Long-Term School Performance* focuses on self-concept instability as an individual attribute. Short-term self-concept instability is defined as fluctuation in the self-concept over a short period of time. This study pertains to the first and third research objectives, and examines whether some students show higher intraindividual variability in their perceived competence than others. Self-esteem research suggests that students with a fluctuating self-concept are likely to be more sensitive and easily affected by self-related information in their environment. These students are also more likely to engage in self-handicapping behaviors and may thus learn less in the long run [141]. The study uses a self-concept instability index to examine whether some students are less capable than others of maintaining a stable self-concept in everyday learning situations. The results show that short-term variability in self-concept was significantly correlated across three school domains, indicating consistent individual differences in self-concept instability. Students with unstable self-concepts also tended to be those who were more test anxious. Furthermore, higher self-concept instability predicted lower grades at the end of the school year. Potential mechanisms linking self-concept instability to lower school achievement are discussed.

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2

What Makes Lessons Interesting? The Role of Situational and Individual Factors in Three School Subjects

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Abstract

The present study investigated intraindividual variation in students' interest experience in three school subjects, and the predictive power of perceived autonomy support and control. Participants were 261 students (57% girls) in 7th grade. After a survey of students' individual interests and other individual characteristics, repeated lesson-specific measures of students' interest experience and perceived autonomy support and control during instruction were obtained over a 3-week period. Hierarchical linear modeling showed 36%–45% of the variance to be located at the within-student level. Moreover, perceived autonomy support and control during lessons, as well as individual interest, predicted students' interest experience in the classroom.

3

Day-to-Day Variation in Competence Beliefs: How Autonomy Support Predicts Young Adolescents' Felt Competence

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Summary

Self-concept is widely researched as static motivational construct that develops gradually. As William James (1890) pointed out, however, the barometer of a person's self-view and confidence rises and falls from one day to another. Taking this observation as a starting point, this chapter examines fluctuation in self-concept in everyday learning situations. Specifically, the chapter (1) reviews possible influences on students' perceived competence in terms of both situational factors, which may fluctuate, and individual factors, which are presumably stable, (2) reports a diary study examining the degree of intraindividual variation in students' perceived competence in lesson situations, and its relations to domain-specific self-concept and situational aspects of autonomy support, and (3) discusses the theoretical implications of studying intraindividual variability in student self-concepts. Participants were 261 7th graders in Germany. After a pretest survey of their domain-specific self-concepts and prior achievement, students participated in a lesson-specific repeated-measurement phase in which their felt competence and perceived autonomy support and control during instruction were surveyed over a 3-week period. Findings revealed substantial intraindividual variation in students' day-to-day felt competence. The within-student variance in felt competence was almost as large as the between-student variance. Moreover, consistent with the predictions of self-determination theory, the pattern of fluctuation was explained by teachers' autonomy support during instruction.

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Self-Concept Instability in Everyday Classroom learning: Does It Predict Long-Term School Performance?

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Abstract

The high levels of competition and evaluation involved in everyday classroom learning may make it difficult for students to maintain positive and stable self-concepts. The present study focuses on short-term fluctuation in students' academic self-concept in three subjects (mathematics, German, second foreign language) and its relation to test anxiety and school grades. The participating 209 students' school grades were surveyed twice at a 1-year interval. In addition, diary data of self-concept were collected from students after every mathematics, German, and second foreign language lesson over a 3-week period. Short-term academic self-concept in the three subjects was positively related, pointing to consistent individual differences across academic domains. The self-concepts of high test-anxious students tended to be less stable. A set of regression analyses showed that higher self-concept instability predicted lower grades 1 year later.

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Evaluation, competition, and social comparison are prominent features of everyday classroom life. At the transition to secondary education, in particular, the increased focus on competition and ability evaluation may challenge students' sense of competence [1]. Do students feel competent one day and incompetent the next in their everyday learning, and what are the implications of these fluctuations? Are some students more successful than others in maintaining a stable sense of academic competence, even in the face of challenges? Taking these questions as a starting point, the present study examines the *short-term stability vs. instability* of students' academic self-concepts in three academic subjects. Relative to the *level* of academic self-concept, *stability vs. instability* of academic self-concept has received little research attention. However, several studies [see 2, 3] indicate that short-term instability is indicative of a vulnerable self.

In this article, we first review the literature on short-term instability of self-esteem. We then derive our hypotheses, drawing on the theoretical connection between self-esteem and domain-specific self-concept established in the hierarchical model of self-concept [4]. Based on these theoretical considerations, we use repeated measurement within a longitudinal design to address three research questions. First, we investigate whether students show individual differences in self-concept instability across three core academic subjects, hypothesizing self-concept instability to reflect a domain-general individual tendency. Second, we test the association between self-concept instability and other motivational dispositions, such as the level of self-concept and test anxiety. Third, based on findings from self-esteem research, we speculate that self-concept instability is associated with unfavorable developments in school achievement.

Self-Esteem Instability, Insecure Self-Esteem, and Vulnerability

Descriptions of the fluctuating nature of individuals' perceptions of self can be traced back more than 100 years. In his classic work *Principles of Psychology*, William James noted that individuals' momentary feelings of self-esteem and confidence fluctuate naturally around a typical level [see 5, 6]. James viewed this fluctuation of self-esteem as an everyday phenomenon that is common to everyone. More recently, self-esteem researchers have begun to investigate self-esteem fluctuation from an individual differences perspective. In a series of studies conducted by Kernis and colleagues [7]; [8]; [9]; [3], the self-esteem of children and young adults was surveyed every day. Their findings showed stable interindividual differences, with some individuals exhibiting higher day-to-day fluctuation in self-esteem than others. Kernis et al. termed this short-term fluctuation in daily feelings of self-worth *self-esteem instability*.

The studies conducted by Kernis and colleagues further indicate that self-esteem instability is associated with less adaptive learning behaviors, such as avoiding challenges and self-handicapping. One study surveyed 5th-grade students' momentary self-esteem twice a day for a week and found higher self-esteem instability to be associated with a preference for easy rather than challenging tasks [10]. Even when the level of self-esteem was taken into account, self-esteem instability still had strong predictive power. Similarly, using an experimental design, Newman and Wadas (1997) found that college students with higher self-esteem instability (i.e., larger differences between self-esteem measured at two time points) engaged in more self-handicapping behavior. These students actively chose to listen to music said to impair performance while taking an ability test. Other studies have found higher self-esteem instability to be associated with defensive reactions, such as anger, hostility, or making excuses [8]; [9]. These findings suggest that individuals who perceive frequent threats to self-esteem, and thus exhibit higher self-concept instability, tend to adopt a broad array of defensive strategies [11]. These defensive behaviors are thought to undermine their potential to learn and to impair their adjustment and achievement over time [12].

Why do some people experience greater fluctuations in self-esteem than others? According to the self-esteem literature, this fluctuation is caused by an insecure self that is over-reliant on external information and needs constant validation. Self-esteem instability across time and situations is thus a manifestation of a vulnerable self responding to self-relevant information [12]. Greenier et al. (1999) suggested that individuals with high self-concept instability process self-relevant information quite differently from others: they attend to self-relevant information more rapidly, interpret ambiguous information as self-relevant, and generalize the implications of self-relevant information to overall self-worth. For example, students with high self-concept instability may interpret not being selected to solve a problem in the classroom as a reflection of the teacher's disapproval and a threat to self-worth. These students are thus thought to be more vulnerable in evaluative situations and more likely to engage in self-handicapping behaviors or to avoid evaluation as a means of protecting their self-esteem. However, empirical research linking this vulnerability to long-term school achievement is scarce.

Several developmental and social psychologists have observed that insecure self-esteem is manifested in instability of self-esteem across time and situations. Harter (2006) noted that some individuals' self-worth is more state-like and changeable, reflecting a tendency to be oversensitive to others' feedback and approval—or what she termed a *looking glass self-orientation* [13]. Similarly, Crocker and colleagues [5]; [14] suggested that individuals who rely on various contingencies of self-worth show greater fluctuation in self-worth. To date, these lines of research have focused primarily on overall self-evaluations in terms of self-worth and self-esteem.

Does Academic Self-Concept Instability Also Imply Vulnerability?

Whereas the research outlined in the previous section has tended to focus on the construct of global self-esteem, educational psychology has been more interested in domain-specific academic self-concept. There are several reasons for the popularity of this construct in the educational field. First, because students spend a lot of time at school engaged in academic activities, their perceived academic competence is a major determinant of their overall self-worth. Many students even equate being academically competent with being worthy [15]; [16]. Second, domain-specific academic self-concepts such as mathematics self-concept are powerful predictors of students' achievement [17], interest [18]; [19], and adaptive learning behaviors [20] in that domain. Many longitudinal studies indicate that self-concept is not only affected by school achievement, but also affects later achievement; the association between global self-esteem and academic achievement is much weaker [21]; [22]; [19]; [23]; [20].

As two self-evaluative constructs, domain-specific self-concept and self-esteem share considerable conceptual overlap. In Shavelson and colleagues' (1976) well-known conceptualization of self-concept, the two constructs are integrated within a self-concept hierarchy based on the dimension of generality. Self-perceptions in specific activities and tasks are located at the base of the hierarchy. These perceptions form the basis for inferring self-concept at a more general level. For example, self-perceptions in specific mathematics activities are the basis for inferring the domain-specific self-concept in mathematics; self-concepts across various domains inform the academic self-concept; finally, the general self-concept is at the apex of the hierarchy. Following this approach, general self-concept is commonly referred to as global self-esteem [24]; [25] or self-worth [26]. Both domain-specific and general self-concept reflect a person's self-evaluation, but with differing degrees of generality: one concerns ability in a specific domain, the other concerns the person as a whole.

Based on this model, it is reasonable to assume that when self-esteem is affected by evaluative events in a certain domain, domain-specific self-concept at the lower level of the hierarchy is also likely to be affected. If a poor performance in physical activities causes a student to feel worthless, the same bottom-up effect [e.g., 20] may lead a student to conclude that he or she is poor in the physical domain. Accordingly, short-term instability in self-esteem should be strongly associated with instability in the domain-specific self-concept. Indeed, the few studies that have investigated short-term instability in self-esteem and competence beliefs have reported correlations between .40 and .60 [e.g., 8]; [10]. Based on these findings, Kernis and Goldman (2003) argued that people with unstable self-esteem are likely to experience a similar magnitude of fluctuation in their specific self-concept. In other words, the individual characteristic of insecure self-evaluation is likely to become manifest in both general self-evaluation and domain-

specific self-concept. Accordingly, self-concept instability can be expected to be associated with unfavorable developments in academic motivation, learning, and achievement in the corresponding domain.

The Present Study

Self-concept is affected by competence information such as grades, peer comparisons, and teacher feedback. In day-to-day learning contexts, the information gleaned from various sources may not always be consistent, causing fluctuations in students' self-concept. A repeated measure design is needed to investigate this fluctuation in self-concept; for example, a diary study surveying student self-concept on a daily basis. Moreover, a pretest–posttest design is needed to investigate the long-term consequences of self-concept instability. The present study therefore combines a diary method with a longitudinal design to investigate students' self-concept instability and its implications. The transition from elementary to secondary school, which involves a change of reference group and new environment, may exacerbate self-concept instability. We therefore investigate our research questions shortly after this critical transition.

The study's objectives are threefold. First, we examined interindividual differences in self-concept instability in specific domains. We expected self-concept instability to correlate across academic domains, reflecting a domain-general individual tendency. In other words, students high in self-concept instability in one academic domain were expected to be high in self-concept instability in other domains as well. Using a diary method, we investigated self-concept instability in three core academic domains, namely mathematics, German, and the second foreign language. These subjects are mandatory throughout the secondary curriculum in Germany.

Second, we examined the association between self-concept instability and other individual differences constructs. In particular, we studied relations to the motivational constructs of self-concept and test anxiety. As reported in self-esteem research, *mean level* and *instability* of self-esteem are usually moderately correlated [12]: individuals with a lower level of self-esteem tend to show higher self-esteem instability. The relation between self-concept instability and test anxiety is also especially interesting in the present context. Like students with high self-concept instability, high test-anxious students are more sensitive in detecting evaluative cues in the learning environment [27]. Thus, we expected to find a positive correlation between self-concept instability and test anxiety.

Third, using a longitudinal design with two measurement points at a 1-year interval, we examined the hypothesis that students higher in self-concept instability are more vulnerable in evaluative situations, as proposed by self-esteem researchers. Specifically, we hypothesized that self-concept instability would be associated with lower

level of academic performance. Self-concept instability at the beginning of the school year was expected to predict lower grades 1 year later.

Method

Participants and Procedure

Participants were 261 (57% girls) 7th-grade students. Their mean age was $M = 12.3$ years ($SD = 0.5$). The vast majority of participants were of European origin (> 95%) and reported speaking German with at least one of their parents (91.2%). All students were recruited from nine classes in two academic-track (*Gymnasium*) secondary schools. The *Gymnasium* is the highest track of the three-tiered secondary system in Germany; about one third of all students are enrolled in *Gymnasium* schools based on their achievement at elementary school. In the present study, as is typical of German schools, the class units remained intact across the three academic subjects under investigation. During the lesson-specific phase of the study, the students thus had the same classmates but different teachers. All instruments were administered in the class unit.

The study combined a 2-point longitudinal design with a repeated measurement diary study. Students' stable motivational constructs and school grades were first assessed shortly after the transition to secondary school (T1). One year later, in grade 8, the same constructs were assessed again in a follow-up study (T2). One week after the T1 assessment, the students additionally participated in a 3-week diary study. At the end of each lesson in the targeted subjects (i.e., mathematics, German, and the second foreign language), students were administered a lesson-specific questionnaire assessing their domain-specific self-concept in the subject at that moment in time.

Of the original 261 students, 209 (57% girls) participated at both longitudinal points of measurement. A *t*-test comparison between the T2 participants (continuers) and the dropout group revealed that the continuers reported higher mathematics grades at T1 (Cohen's $d = .47$) and lower instability of mathematics self-concept (Cohen's $d = -.31$) in the lesson-specific assessment phase than did the dropout group. However, they did not differ in any of the other achievement or motivational constructs measured. The following analyses were conducted using the longitudinal sample of 209 students who participated at both T1 and T2. Students' participation was voluntary and required parental written consent at both time points.

Measures

Self-concept. A five-item scale based on the Self Description Questionnaire (SDQ, [see 28]) was used to measure self-concept in the three academic domains at both T1 and T2 (example item: "In [subject] classes I even understand the most difficult tasks"). Students responded to each question for mathematics, German, and the second foreign

language. Responses were given on a 6-point scale anchored by the end points 1 (*disagree strongly*) and 6 (*agree strongly*). The scale showed good reliability. Cronbach's alphas for mathematics, German, and the second foreign language were .91, .78, and .82 at T1, and .90, .88, and .89 at T2.

Test anxiety. A six-item subscale from the Academic Emotions Questionnaire (AEQ; [29]) was used to assess test anxiety (example item: "Before [subject] exams, I am very nervous"). Again, students responded to each question for each academic domain. The reliability of the measures was good, Cronbach's alphas for mathematics, German, and the second foreign language were .90, .86, and .87 at T1, and .90, .88, and .91 at T2.

School grades. School grades were used as a proxy for achievement in each of the academic domains. At both occasions, we obtained the grades that students had been awarded on their recent school reports: at T1, students self-reported the mathematics and German grades they had been awarded on their 6th-grade report cards (the second foreign language is not introduced until 7th grade); at T2, grades for all three subjects were obtained from students' 7th-grade report cards. The German grading system ranges from 1 to 6, with smaller numbers indicating better performance. To ensure consistency with the other scales, grades were reverse coded such that a higher value indicates better performance.

Self-concept instability. Short-term instability in students' domain-specific self-concept was calculated on the basis of students' multiple responses in the lesson-specific assessment phase. Students' feelings of competence at the end of each lesson were measured using two items: "During this lesson, I thought that I was good at the subject" and "During this lesson, I felt more competent than usual." Responses were given on a 6-point scale anchored by the end points 1 (*disagree strongly*) and 6 (*agree strongly*). The two items showed satisfactory internal consistency—a mean Cronbach's alpha of .74 for mathematics, .70 for German, and .73 for the second foreign language. The mean score was thus used to index self-concept in each lesson. All students were timetabled at least 4 hours of mathematics, German, and second foreign language lessons per week. In the present study, we assessed only those lessons in which regular instruction took place, and not those used for other school activities or examinations. The assessments took place at the end of each targeted lesson and focused on that particular domain. For example, at the end of mathematics lessons, students answered the questions with respect to their perceived mathematics competence. On average, self-concept in mathematics, German, and the second foreign language was assessed 8.3 times (range: 2–11 times) over the 3-week lesson-specific phase.

Domain-specific self-concept instability was derived by calculating the standard deviation of students' multiple responses in each of the three domains. Because lessons were given in class units, and instructional practices may cause the self-concept of the whole class to fluctuate in the same manner [30], the standard deviation calculated from

raw scores reflects both individual fluctuation and collective fluctuation due to instructional practice. We therefore removed the class fluctuation by subtracting the class-mean self-concept for the lesson from each student's raw score. All lessons thus had a mean self-concept of zero, and there was no fluctuation at the class level. We then used the adjusted score to calculate the standard deviation for each student. Larger standard deviations indicated higher variability in self-concept over the 3-week response period. To further ensure reliability, instability coefficients derived from fewer than 6 measurement points [12] and outliers with a z-standardized score larger than 3.29 [31] were excluded, resulting in samples of 205, 198, and 209 participants for mathematics, German, and the second foreign language respectively in the subsequent analyses.

Mean 3-week self-concept. Students' multiple responses over the 3-week lesson-specific assessment phase were also used to calculate their mean 3-week self-concept. Mean scores were calculated separately for each of the three domains. Higher mean 3-week self-concepts indicated that students felt generally more competent in the everyday classroom context.

Results

Relationships between Domain-Specific Self-Concept Instability and T1 Measures

Table 1 reports means, standard deviations, and minimum and maximum scores for self-concept instability in the three domains. The mean self-concept instability (i.e., within-student standard deviation in daily feelings of competence) scores ranged from .83 to .86, whereas the standard deviation between students for the mean 3-week self-concept ranged from 1.06 to 1.13. In other words, as expected, the within-student scores did not show as much variability as the between-student scores. Nevertheless, students' responses during the repeated measurement did show a rather substantial degree of variability relative to the standard deviation calculated between students. In addition, the magnitude of self-concept instability was similar across the three academic domains. Our first hypothesis predicted self-concept instability to correlate across academic domains. Indeed, the correlations between self-concept instability in the three academic domains were of considerable size and statistically significant. Mathematics self-concept instability correlated significantly with German and second foreign language self-concept instability, $r = .47$ and $.44$ ($p < .01$) respectively; German self-concept instability correlated significantly with second foreign language self-concept instability, $r = .43$. These correlations indicate that some students exhibited consistently higher self-concept instability than others across the academic domains. However, self-concept instability was not associated with mean 3-week self-concept (see Table 2, column 2) in any of the academic domains.

Table 1. Self-Concept Instability and Mean 3-week Self-Concept: Descriptive Statistics

	Mean	SD	Minimum	Maximum
Mathematics				
Self-concept instability	.86	.41	.03	2.1
Mean 3-week self-concept	3.34	1.13	1.0	6.0
German				
Self-concept instability	.83	.38	.19	2.0
Mean 3-week self-concept	3.44	1.06	1.0	6.0
Second Foreign Language				
Self-concept instability	.83	.39	.11	2.1
Mean 3-week self-concept	3.55	1.08	1.13	6.0

Note: Self-concept was rated on a 6-point scale with 6 as the highest value.

Examination of the correlations between self-concept instability and T1 measures (see rows 3–5 in Table 2) revealed that self-concept instability did not correlate significantly with either domain-specific self-concept or 6th-grade school grades. This finding again indicated that self-concept instability and the level of self-concept are unrelated. Furthermore, fluctuation in self-concept was equally prevalent among low and high self-concept students. However, the mean 3-week self-concept did predict domain-specific self-concept ($.32 \leq r \leq .42$). Positive correlations also emerged between test anxiety and self-concept instability (see row 4 in Table 2). Students with higher test anxiety experienced more self-concept fluctuation across lessons. The same pattern was found in all three academic domains, although statistical significance was only reached in mathematics and the second foreign language. These results are in line with our hypothesis that high test-anxious students react more sensitively to evaluative information, the result being higher self-concept instability.

Longitudinal Analyses: Predicting School Grade at T2

To examine the vulnerability hypothesis, according to which self-concept instability makes students more vulnerable in evaluative situations, with potentially damaging implications for their long-term school performance, we tested whether students with unstable self-concepts had lower school grades at T2. Inspection of the correlations in Table 2 revealed that self-concept instability was associated with lower school grades in mathematics and the second foreign language, $r_s = -.18$ and $-.14$. In mathematics, instability was also associated with lower self-concept at T2. We then conducted hierarchical multiple regression analyses to examine whether self-concept instability explained additional variance in predicting T2 school grades. In Step 1, we entered T1 school grade into the regression model because prior school grades are typically substantially associated with later school grades. Controlling for prior differences also removes variance in the T2 school grade that is associated with the T1 school grade, and thus allows us to interpret the estimated effects of the predictors as

more pure (or unique). In Step 2, we entered self-concept, which we expected to be a significant predictor of school grade when prior grade was controlled. In this step, both the domain-specific self-concept and the mean 3-week self-concept were used to examine the reciprocal effects between self-concept and school achievement.¹ In Step 3, we added self-concept instability as a predictor to test specifically how much additional variance it would explain. In other words, Step 2 tested the effect of the level of self-concept, and Step 3 tested the effect of stability vs. instability of self-concept. Data from the three academic domains were analyzed separately.

The results of these regression analyses are shown in Table 3. In mathematics, as expected, T1 school grade contributed significantly to T2 school grade ($B = .60$), and explained 26% of the variance. In Step 2, the increase in explained variance was significant ($\Delta R^2 = .06, p < .01$). The additional explained variance came mainly from self-concept measured at T1 ($B = .17$); the coefficient for mean 3-week self-concept was not significant. In Step 3, self-concept instability contributed significantly to predicting T2 school grade ($B = -.26; \Delta R^2 = .02, p < .05$). Thus, given the same levels of prior achievement and self-concept, students with self-concept instability scores 1 unit higher than their peers had T2 school grades of .26 units lower. This result is in line with the vulnerability hypothesis: greater fluctuation in self-concept was associated with lower academic performance 1 year later.

Table 2. Correlations Between Self-Concept Instability and Other T1 and T2 Measures

	Mathematics								German								Second Foreign Language							
	2	3	4	5	6	7	8		2	3	4	5	6	7	8		2	3	4	5	6	7	8	
1. SC instability	.08	-.05	.17*	-.10	-.17*	.14	-.18*		.06	.02	.11	-.04	.03	.04	.02		.11	.02	.18*	NA	-.04	.08	-.14*	
2. Daily SC	.42**	.29**	.16*	.35**	-.15*	.15*			.32**	-.05	.02	.27**	.04	.06		.37**	-.05	NA	.21**	-.03	.01			
T1																								
3. SC	.72**	.51**	.61**	.39**	.42**				.48**	.35**	.33**	-.16*	.19**		.53**	NA	.50**	.23**	.25**					
4. Test anxiety	.38**	.48**	.55**	.32**					.19**	.32**	.51**	-.01			NA	.27**	.44**	-.17*						
5. School grades	.44**	.27**	.52**						.33**	-.12	.37**				NA	NA	NA	NA	NA	NA				
T2																								
6. SC	.62**	.56**							.44**	.32**					.49**	.52**								
7. Test anxiety	.30**								-.16*															
8. School grades																								

Note. SC= Self-Concept. NA: Not applicable because no school grade was awarded at T1.

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

Table 3. Predicting T2 School Grade in Mathematics, German, and Second Foreign Language: Results From Hierarchical Multiple Regression Analyses

Predictor	Mathematics				German				Second Foreign Language			
	B	SE	R ²	ΔR ²	B	SE	R ²	ΔR ²	B	SE	R ²	ΔR ²
Step 1			.26	.26**			.15	.15**			--	--
T1 school grade	.60**	.07			.53**	.09			--	--	--	--
Step 2			.32	.06**			.16	.01			.07	.07**
T1 school grade	.45**	.08			.50**	.10			--	--		
T1 self-concept	.17**	.05			.07	.06			.26**	.06		
Mean 3-week self-concept	-.01	.05			.02	.05			-.08	.06		
Step 3			.33	.02*			.16	.00			.09	.02*
T1 school grade	.43**	.08			.50**	.10			--	--		
T1 self-concept	.17**	.05			.07	.07			.25**	.06		
Mean 3-week self-concept	-.01	.05			.01	.05			-.07**	.06		
Self-concept instability	-.26*	.12			.06	.13			-.31*	.15		

Note: N = 201 for mathematics, 194 for German, and 206 for second foreign language. Values reported for B and SE are for the Step 3 model. B = Unstandardized regression coefficient. SE = Standard error of B. R² = Explained variance. ΔR² = Increased explained variance.

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

In German, T1 school grade contributed significantly to T2 school grade ($B = .53$). However, at 15%, the amount of variance explained was lower than in mathematics. Contrary to expectations, there was no increase in explained variance in Step 2 ($\Delta R^2 = .01, p = .48$). Neither T1 self-concept nor the mean 3-week self-concept showed significant predictive power. The same applied to self-concept instability in Step 3. Thus, the other motivational measures did not predict T2 school grade in German.

The regression model for the second foreign language was slightly different because T1 school grades were not available for this newly introduced subject. Step 1 controlling for prior school grades was thus omitted. The results for Steps 2 and 3 were similar to those reported for mathematics. Self-concept explained 7% of the variance in T2 school grade, but only the coefficient for T1 self-concept was significant ($B = .26$). The mean 3-week self-concept did not significantly predict T2 school grade. Step 3 explained an additional 2% of the variance ($\Delta R^2 = .02, p < .05$) and self-concept instability was a unique predictor of T2 school grade ($B = -.31, p < .05$). Overall then, the findings from the regression analyses were consistent with the vulnerability hypothesis for mathematics and the second foreign language, but not for German.

Discussion

In the present study, we investigated short-term fluctuation in students' academic self-concept after the transition to secondary school and its long-term consequences. In this section, we discuss our three main findings. First, cross-sectional data revealed significant cross-domain correlations in self-concept instability. Second, self-concept instability was associated with test anxiety measured a few weeks earlier. These findings support our hypothesis that self-concept instability reflects a domain-general individual tendency. Third, the longitudinal findings partially supported the vulnerability hypothesis, which predicts higher self-concept instability to lead to lower school achievement in the long term.

Interindividual Differences in Self-Concept Instability: Cross-Sectional Findings

Self-concept instability can be defined as fluctuation in self-concept over a short period of time. In the present study, we surveyed students' sense of competence in the natural classroom learning context repeatedly over a 3-week period. The standard deviations calculated on the basis of students' multiple responses indicate how far their responses diverged from an individual central tendency. Our findings revealed intraindividual variability in responses that was not just random noise, but that reflected meaningful individual differences. The intercorrelations between self-concept variability in the three core academic domains were significant. Some students experienced wide swings in their feelings of competence and incompetence across learning situations,

whereas others showed fairly stable day-to-day levels of self-concept. Even across different learning contexts—i.e., in different domains taught by different teachers who may have quite different teaching styles—the individual level of self-concept variability tended to be fairly consistent.

The phenomenon of self-concept fluctuation was found to be associated with test anxiety, a maladaptive motivational disposition. Test-anxious students experience a combination of physiological arousal and worry when exposed to or anticipating an evaluative situation. Its close link to poor school performance, psychological stress, and illness has been frequently discussed [27]; [32]. This finding again shows that fluctuation in self-concept is not just measurement error, but an individual difference that merits systematic investigation.

Kernis and Goldman (2003) argued that the stability vs. instability dimension of self-esteem is relatively independent of the level dimension, although the two tend to be negatively correlated empirically. Our findings suggest that the two dimensions are rather distinct: no significant association was found between them. Regardless of their mean level of self-concept, students were equally likely to experience fluctuations in self-concept. However, this finding should be approached with caution. The present study focused on the first year of secondary school, when self-concept instability may be especially prevalent given that the students are faced with a new, ability-focused learning environment. Future research should thus test whether our finding of non-correlation between the level and the instability of self-concept can be replicated in other student samples.

Long-Term Implications of Self-Concept Instability: Longitudinal Findings

A large body of research shows that students' positive competence-related beliefs are associated with desirable educational outcomes such as higher grades. Longitudinal studies and meta-analyses have confirmed the effects of prior self-concept on subsequent school achievement [22]; [20]; [33]. In the present study, we replicated this effect in two academic domains. Domain-specific self-concept in mathematics and the second foreign language uniquely explained between 5% and 7% of the variance in school grade from 6th grade to 7th grade. We tested the empirical significance of self-concept fluctuation by testing its long-term predictivity on school grades when baseline differences were controlled. Using this conservative method, we showed that the *stability vs. instability* dimension of self-concept had an effect over and above the effect of self-concept level. The explained variance was small but statistically significant and in line with our theoretical predictions. In terms of school grades, students with less stable self-concepts proved to perform less well than their equally capable counterparts. The incremental explained variance in self-concept instability also supports that theoretical notion that the level and stability dimensions are distinguishable, and that both contribute to the

understanding of student achievement [12]. In the student motivation literature, researchers have focused on whether students have a high or a low level of competence beliefs [e.g., 34]; research on the fluctuation or instability of competence beliefs is scarce and primarily cross-sectional. Our findings support the hypothesis that instability as an individual disposition is a less adaptive for long-term school performance [12].

Self-concept instability thus shows meaningful individual differences and relates to text anxiety and unfavorable achievement outcomes. At this point in our discussion, the different patterns of findings across academic domains merit consideration. Overall, our findings for the domains of mathematics and the second foreign language were rather consistent; most exceptions concerned the longitudinal data from the German domain. Specifically, neither self-concept instability nor self-concept level in German predicted school achievement in the domain 1 year later. In addition, the correlation between German school grades at the two measurement occasions was lower than for mathematics. This lower long-term rank-order stability suggests that German grades at primary and secondary school are less closely related than the corresponding mathematics grades. We offer two explanations for this finding. First, our sample was more homogenous in terms of German school achievement. It is possible that the German grades did not capture the individual differences in students' learning and achievement in the sample. Second, we suspect that the German curriculum at primary and secondary school may emphasize different content, and that this fact may partly explain the lower long-term stability.

Self-Concept Instability as an Indicator of Vulnerability

Thus far, our empirical evidence has supported the notion that self-concept instability predicts lower school achievement. Here, we discuss the theoretical mechanisms that may underlie this phenomenon. Individuals with a more vulnerable self are more likely to process self-relevant information in maladaptive ways. For example, they are highly sensitive to evaluative information and tend to generalize its implications [35]. As is evident from the significant correlation between test anxiety and self-concept instability, they share this tendency with test-anxious students, who also scan the environment quickly and seek to detect potential self-relevant or evaluative events [32]. The social-cognitive tendency of biased attribution style—i.e., the tendency to perceive ambiguous information as self-relevant, and to interpret it as reflecting on ones' ability or even worth—may be also related to self-concept instability [35]. Individual students' competence perceptions are naturally less stable if meticulous cues for successes and failures are always attributed to ability, rather than to luck or effort.

Several researchers have demonstrated that these tendencies (i.e., test anxiety and ability attribution) impede subsequent persistence and induce more self-handicapping behaviors [36]; [11]. It has also been shown that higher self-concept instability is associated with defensive strategies [37]; [10]. Taken together, it is possible that these

defensive strategies eventually result in lower school achievement, as found in the present investigation. However, we cannot pinpoint the exact mechanisms responsible for this effect from the present data. Further investigations incorporating students' social-cognitive tendencies and defensive strategies are necessary to clarify how self-concept instability relates to long-term academic outcomes.

Limitations and Future Research

Our findings lend support to the notion that self-concept instability is an individual tendency related to lower school achievement, but several limitations of our research warrant discussion. As mentioned above, we can only speculate on the mechanisms linking self-concept to long-term school performance. In addition, although our study extends prior research by covering three core academic domains, some inconsistent results across these domains, especially in the longitudinal analyses, need to be examined. The generalizability of the present findings should also be considered. The present sample of students who had recently transferred to secondary education was drawn from the academic track of the three-tier German secondary system. Therefore, our results may not be generalizable to low-achieving students or to other phases of schooling. Finally, because students who dropped out of the present study in the second year had higher mathematics self-concept instability, the effects of self-concept instability may be underestimated due to selectivity in our longitudinal sample.

Conclusion

To sum up, our findings confirm that students exhibit consistent individual differences in the daily fluctuation in their domain-specific self-concepts. Maintaining a stable sense of competence is indeed more difficult for some students than for others. Some initial evidence indicates that students with higher self-concept instability may show similar information processing tendencies (e.g., paying more attention to evaluative information) as test-anxious students. These tendencies have unfavorable implications for school performance. It can be speculated that self-concept instability is associated with the use of defensive strategies that impair learning in the long run. However, direct examination of positive and negative coping behaviors is necessary to verify the speculated processes.

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Footnote

¹ Another set of analyses was conducted using either the domain-specific self-concept or the mean 3-week self-concept as predictor. The pattern of results, particularly for the effect of self-concept instability, was very similar to that reported for Step 3 across the academic domains.

5

General Discussion

General Discussion

It is not unusual to hear students complaining about boring lessons or teachers complaining about unmotivated students. A lesson that ends with students packing up their material and waiting impatiently for the bell to ring is frustrating for both the learner and the teacher. Who is to blame: the teacher who gave the lesson or the students who failed to engage? The three manuscripts of this dissertation confirm that students' motivational experience is determined by both contextual features of the learning context and individual student characteristics. In the next sections, I discuss the major findings from the manuscripts with respect to the main issues of situation specificity and within-person continuity of motivation, the short-term intraindividual design as a methodological approach to understanding motivation in context, and instructional support for autonomy and its role in classroom. Following this, several limitations of the dissertation project are outlined. I conclude by discussing theoretical and educational applications of the dissertation findings and proposing further avenues for research.

Motivation in Context: Situation Specificity and Continuity

Motivation is not a personal trait that remains constant, but it is often argued to be a tendency showing continuity across different situations [see 1, 2]. At the same time, classroom-based research has demonstrated that motivation is strongly influenced by the real-life classroom context, and by the affordances and constraints of instructional discourse and activities [3, 4]. The present dissertation project took an empirical approach to the issues of situation specificity and continuity. Students bring different levels of values, interests, and competence beliefs to the classroom. A well-developed individual interest and a positive self-concept may enhance the quality of motivation across structured learning situations in the classroom, producing experiences of higher interest and felt competence. In other words, these attributes can be seen as motivational resources that continually energize students. Contextual features such as instructional support in the learning situation may also enhance motivational experience. As illustrated in Figure 2 (see the introductory chapter), motivation in context is a function of individual and contextual factors. The phenomenal experience of motivation in any given learning situation comprises a situation-specific component and a stable, individual component that is reflected in students' experience of interest or perceived competence.

Such state–trait distinction made by interest researchers for other motivational constructs may guide research on the situation specificity and continuity. Renniger, Hoffmann, and Krapp [5, p. 11] decompose the phenomenal experience of interest into two components: situational interest and actualized individual interest. They conceptualize situational interest as a situation-specific, transitory component of interest experience that is triggered during the interaction with the context. Actualized individual interest, on the other hand, is bound to the individual's dispositional preferences—i.e., individual interest. This dissertation contributes to this theoretical framework by showing that intraindividual data be used to decompose the two

components empirically over time. The findings suggest that motivational experience is partly self-initiated and that, as far as structured learning settings are concerned, there is intraindividual continuity in motivational experience across situations. However, they also show that, over and above the individual's own contribution, the motivational experience is to some extent externally generated. The dissertation examined the extent of both situation specificity and stable, trait-like components, which are likely to co-exist in most motivational constructs.

An Intraindividual Approach to Motivation in Context

Investigations of motivation over different time-frames have been encouraged in the literature. Pintrich [6] suggested that a microgenetic design that uses detailed assessment of motivational processes to trace within-person trajectories over short time spans may help to disentangle the complex intraindividual dynamics of motivation and other aspects of knowledge or cognitive development. In instructional research, intensive real-time assessment has been proposed as a promising approach to understanding the general principles under which classroom dynamics operate [4]. This dissertation investigated motivation in the day-to-day classroom context within a short time-frame. How does this intraindividual approach refine our understanding of motivation in context?

Short-term intraindividual variability reflects inconsistency (or fluctuation) across repeated, high-density measurements [7] that may be experimental trials, school lessons, or days [e.g., 8, 9]. Short-term fluctuation has traditionally been seen as random measurement error when psychological constructs are assessed repeatedly. However, recent theoretical discussions and empirical findings suggest that short-term variability may usefully inform different areas of psychology [e.g., 10, 11, 12]. Indeed, it can contribute to the motivation literature in two ways. First, the nature of short-term motivational change may be rather different from that of long-term development; findings may shed light on the influential role of the changing learning context. *Manuscript I* and *manuscript II* addressed this point, and showed that short-term intraindividual variation was explained by day-to-day instructional affordances and constraints. Second, intraindividual variability as an individual attribute may reflect vulnerability or adaptivity of students. In *manuscript III*, fluctuation in self-concept was found to be correlated across school subjects, and to be associated with anxiety and less favorable achievement gains.

In short, the findings from *manuscript I* and *manuscript II* showed that students' motivational experience is not static. Over the short period of time considered, the proportion of within-student variance, as compared with between-student variance, was substantial. In general, about one third to half of the total variance was located at the within-student level. Clearly, students' interest experience and felt competence was characterized by ups and downs from one lesson to another. Irrespective of their motivational dispositions, all students enjoyed some lessons more than others and perceived themselves as more competent in some lessons than in others. The proportion of variability in classroom experience was comparable to that of positive

and negative affect in everyday life [e.g., 13, 14]. Moreover, the findings confirmed that short-term intraindividual variability in motivational experience is not random fluctuation. Rather, it is predicted by instructional features of classroom instruction (i.e., perceived autonomy support and control). In other words, the variability is partly due to changes in certain classroom features that can be assumed to be fluid in nature.

The dissertation revealed the extent of variability in motivational experience in real-life classrooms. Rather than showing the clear trend which was usually found for long-term developmental data, day-to-day motivational trajectories were found to show seemingly irregular ups and downs. Moreover, the pattern of co-variation underlines the impact of situational, changing environmental determinants. Further studies on motivation need to consider the implications of short-term variability for other research questions. On the one hand, contextual features need to be given careful consideration, and the time-frames and frequency of observations must be appropriate for examining the effects of these time-invariant determinants. On the other hand, the possible biases caused by situation specificity need to be considered in research investigating long-term motivational development. In this case, short-term variability may indeed be noise that is irrelevant to the research questions and should thus be reduced by either removing influential situational factors (e.g., evaluative feedback) from the assessment environment or using an aggregated measure from several time points.

Furthermore, *manuscript III* revealed individual differences in the short-term variability of self-concept. Short-term intraindividual variability has been linked with a vulnerable self-system and with a lack of self-regulation or cognitive control in different aspects of human functioning [e.g., 15, 16]. Drawing on the literature on self-esteem and self-worth [17], short-term variability of students' self-concept was hypothesized to lead to unfavorable school adjustment. The findings showed that self-concept instability seems to be a *trait* that is associated with lower school grades over time. Research on variability can provide insights into individual regulatory styles in authentic learning contexts. A fluctuating, unstable perception of competence seems to indicate a regulatory style that is overly reliant on external information. However, it is important to point out that the conceptual meaning of variability in different motivational constructs may differ widely. A stable (and overly optimistic) self-concept may serve as a protective factor, enabling students to tackle tasks and to show persistence in daily learning. When working on specific tasks, however, a stable tendency to ignore feedback for the sake of maintaining a positive perception of competence may be detrimental to learning outcomes [6, p. 671].

Instructional Support as a Factor Influencing Student Motivation

The classroom is the main learning context for students. To understand what influences it has on students' motivation, it is important to be aware of the motivational affordances and constraints associated with different classroom features. Drawing on self-determination theory,

the dissertation examined how instructional behaviors differ in the degree of *autonomy support and control* they offer. Despite the growing research interest in the effects of ongoing instructional processes [4], few studies have directly addressed the fluidity of instruction. Findings from *manuscript I* and *manuscript II* showed that students do perceive varying degrees of autonomy support and control from lesson to lesson. More than one third of the variance in all aspects of autonomy-related perceptions was found at the within-student level. The largest proportion of within-student variance was found for teachers' controlling behavior. Clearly, students perceived their teachers to provide differing degrees of autonomy support and control. Autonomy support during the ongoing instructional process may vary in the ways that teachers implement tasks and interact with students. Despite the seemingly stable influence of teacher–student relationships [18], students may still be more or less motivated by the same teachers from lesson to lesson.

In addition, three aspects of autonomy-related behavior were differentiated theoretically and empirically. There may be more to controlling behavior than just the opposite of autonomy-supportive behavior. Students perceive it to be a distinct aspect of instructional behavior [cf. 19]. Conceptually, controlling behaviors not only ignore the realization of personal needs, goals, and interests, but driven as they are by a teacher-centered agenda, seek to direct and alter student behavior intrusively. Cognitive autonomy support, on the other hand, addresses students' sense of autonomy while engaging cognitively with instructional activities; thus, it is more specific than support for personal autonomy or freedom in deciding on organizational and procedures aspects during instruction [20]. Empirically, the three kinds of autonomy-related instructional behavior showed differential associations with students' motivational experience. Findings from *manuscript I* and *manuscript II* showed that students experienced an increase in interest and felt competence in lessons where teachers were perceived as autonomy supportive. Specifically, teachers' personal autonomy support (indicated by listening to students, acknowledging their feelings) and cognitive autonomy support (indicated by making the purpose of learning activities transparent, encouraging different solutions and discussion of learning tasks) were both related to higher interest experience and competence perception, but unrelated to feelings of anxiety [21]. On the other hand, directly controlling behaviors (indicated the teacher expecting split-second answers, etc.) reduced student interest and induced anxiety. These behaviors did not consistently undermine felt competence in all school subjects, however. Although the effects of cognitive autonomy support seem to go hand in hand with those of personal autonomy support, cognitive autonomy support is hypothesized to better facilitate a deeper level of cognitive engagement in the classroom [20]. Further research is needed to differentiate the two types of autonomy support and their functions.

Furthermore, can autonomy support be applied to enhance student motivation in different contexts? The findings of this dissertation project suggest that the effects of autonomy-related instructional behavior are rather general across mathematics and language classrooms. Nevertheless, they may not be as clear-cut as suggested by self-determination theory. Almost all

effects had significant random components, indicating that the extent to which autonomy support corresponded with motivational experience varied among students. It may well be that some students need more external autonomy support to boost or sustain their motivation in the learning context. Theoretically, students with an intrinsic or integrated regulatory style may be less dependent on external support in both structured and unstructured learning contexts outside school (see Reeve et al., 2004). However, there is a need for more research on whether and how instructional support is differentially beneficial for boys and girls or for students possessing more motivational resources (e.g., higher interest) to start with.

Is autonomy support a stable, natural ability possessed by some teachers? Research has shown that student teachers can be trained to become more autonomy supportive in their teaching [22]; moreover, the same teacher can be perceived by his or her students to be more or less autonomy supportive in different lessons. How, then can more autonomy-supportive teaching be promoted? A recent study found a stable autonomy-supportive teaching style to be associated with contextual factors such as perceived pressure in school or low student intrinsic motivation [23] as well as with the individual factor of enthusiasm in teaching (Kunter, Tsai, & Klusman, 2007). However, the situational determinants of autonomy-supportive instructional behaviors remain to be investigated. This dissertation showed that teachers' autonomy-supportive behaviors are perceived quite differently across lessons. Training that increases teachers' awareness of the motivational signals they are sending, on the one hand, and offers them more autonomy-supportive instructional strategies, on the other hand, may help them to provide more motivating instruction [24].

Limitations of the Dissertation

There are several limitations of this dissertation that warrant discussion. First, the students' influence on teachers' instruction and the learning situation in general were not examined. It is clear that students contribute to their own experience substantially, but knowledge of how their motivational engagement in turn influences teachers' instructional behavior, and thus indirectly affects the learning situation, is scarce. Research has shown long-term reciprocal effects between student and teacher involvement. There is a mutual influence by which engagement on one side enhances engagement on the other [18, 25]. A reciprocal effect of motivational engagement may also play a role in daily classroom interaction, perhaps to a smaller extent. Teachers may respond to disciplinary problems by showing more controlling behaviors, and to active and engaged student learning by providing more autonomy support. Another limitation associated with the causal direction of effects on instructional affordances and constraints were correlational in nature. Inferences on the causal direction of instructional features and students' motivational experience cannot be drawn purely from this dissertation. Empirical findings from experimental research may complement the present findings by further specifying the nature of the relationship between instructional behavior and student motivation.

Although teachers are assumed to be responsible for their instruction, it should be noted that students' motivation may also affect teaching behaviors.

Second, the dissertation relied on student self-reports. All data on the instructional features of lessons were obtained from students. Associations among instruction and motivation may therefore be overestimated due to shared method variance. Who provides the better measure of the learning environment is an important question in instructional research: is it the teacher, the students, or other observers? The answer may differ depending on the research question. Self-determination researchers have argued that subjective perceptions are better measures of autonomy support or control, and their validity for predicting motivation and engagement has been demonstrated in many studies [e.g., 26, 27]. Nevertheless, the fact that single information sources were used in this study makes it difficult to disentangle actual experienced instructional behaviors from students' personal tendency to perceive interpersonal interaction in a certain way. Various sources of information can be tapped in classroom-based research (e.g., teacher reports, third-person observations, analysis of instructional tasks), and it is desirable for further research to use multiple sources of information, and at the same time establish the validity of different measures [4, 28].

The third limitation relates to the generalizability of the results. The dissertation focuses on students' motivational experience at the beginning of 7th grade—right after the transition to secondary school. Therefore, students participating in the study were at a specific environmental (i.e., secondary school) and developmental stage (i.e., early adolescence). These factors, which can be assumed to be rather stable, may limit the generalizability of the findings. Based on the present data, it is impossible to say whether the instructional affordances and constraints investigated are particularly influential for adolescents at this specific developmental stage because of their special development needs [29] or generalizable to students at other stages of schooling. Given the developmental findings of long-term motivational decline, and the suggested environmental–stage fit explanation, the present study needs to be replicated in different age groups to determine whether environmental support benefits students at different developmental stages.

Conclusions and Future Research Directions

Conclusions

This dissertation took an intraindividual approach assessing students' real-time experiences repeatedly over a short-term period to investigate motivation in educational contexts, and the specific roles of individual and situational determinants. The findings elucidate the interplay between individuals and the learning context, and shed light on processes of co-construction from a conceptualist view of motivation [see 30, 31, 32]. An intraindividual approach tracing motivation as it unfolds over time through sequences of activities and events can usefully inform theories of motivation in context. To this end, researchers need to design

intraindividual studies on the basis of a well-articulated theoretical framework of individual and contextual change. Short-term individual and contextual change needs to be examined through a closer lens. Context is complex and multilayered and so is motivation. Thus, an approach that clearly addresses the specificity of contexts and motivational experiences, and their continuity and change over time, may benefit empirical research on the role of context, and lead to a more integrated view of context in motivational theories.

The findings of this dissertation can also be applied to generate motivating contexts in educational settings. Given the variability found in day-to-day learning, educators do clearly make a real difference to students' competence beliefs, values, and affect during a learning situation. Such aspects of motivational experience have been shown to enhance concentration, engagement, and deeper-level cognitive processing [33]. With its focus on changeable instructional features, namely instructional discourse and the implementation of tasks and activities, this dissertation also offers generally applicable guidelines for educators. The framework of autonomy support seems promising for teacher training. Educational interventions might focus on enhancing teachers' awareness of the motivational signals they send out in their instruction, and on offering teachers a repertoire of instructional strategies for supporting students' personal and cognitive autonomy.

Outlook

Three topics for future research on motivation in context are proposed. First, research investigating the reciprocal influences between student and teacher is needed. Research has shown that teachers' motivation as a disposition is also shaped by the larger context (e.g., school climate) and by their perception of student motivation [23]. On a day-to-day basis, does teaching and instruction impact student motivation as assumed, or the other way around? The causal mechanisms underlying the associations found between perceived instructional support and motivational experience need to be established. The implications are substantial, especially in the field of motivation. Classroom experience affects teacher motivation concerning their professional role as well as students' motivation to learn. Many observers may assume teachers to be more responsible for creating a motivating classroom, but teachers often complain that student motivation is beyond their control. Thus, it is of practical value to inform educators on whether and to what extent the classroom environment affects their motivation and even their instructional behavior.

To this end, it may be beneficial to use an intraindividual approach to disentangle the mutual influences between teacher and student motivation during the instructional process. Do instructional features that are thought to support student motivation really act as causes that lead to change in student motivation, or are they more of a reaction to certain classroom conditions? A related question is whether teachers' controlling behavior is more a cause of decreased interest or a consequence of classroom disciplinary problems. Repeated measures obtained in the ongoing instructional process and data collected from both teachers and students may allow

researchers to model the causal mechanism statistically [34]. Establishing the causal mechanisms of motivating instruction and a motivated classroom may also shed light on how educators can be better prepared during their training.

The second direction for future research concerns intraindividual differences in patterns of change. There may be systematic individual differences in within-person dynamics over time and across contexts. Some initial findings in this dissertation point to influences of gender, individual interest, or vulnerability of self-perception. In a recent study, Durik and Harackiewicz [35] designed situations to catch and hold students' interest. For students with higher individual interest, they found that the *holding* manipulation (e.g., emphasizing the meaning and utility of tasks) enhanced interest experience, but that the *catching* manipulation sometimes undermined interest experience. This finding demonstrates that the same instructional support may not be beneficial to all students and that optimal motivational support needs to be individualized. In the everyday learning context, students may perceive, interpret, and react to teachers' instruction differently. Thus, it may be fruitful to systematically examine differences in within-person change to determine which students need more motivational support in the classroom and, particularly, what types of motivational support may be most beneficial for them. Furthermore, understanding differences in long-term within-person change may help researchers to identify risk factors earlier and to provide adequate support for the students in question.

The third direction for future research relates to how short-term variability contributes to long-term motivational change. To take the example of interest theory, it has been proposed that interest experience triggered in a specific situation may eventually develop into an individual interest [36]. In fact, several hypothetical developmental models of interest development have been proposed, and most of them underscore the importance of interaction with the learning environment [37 p. 396]. Moreover, in the broader motivation literature, it is often argued that motivation becomes more and more differentiated with age, suggesting that variability across topics and domains increases [38]. However, empirical studies testing developmental models are limited and little is known about how an adaptive pattern of motivation emerges. Does it result from positive daily experiences, or is it more dependent on major events or particular contextual factors? Incorporating short-term repeated measurements within longitudinal designs may be a fruitful route to linking daily experience with long-term development [7]. Within such a design, in-depth intraindividual data can be collected more frequently during transitory phases, and cognitive and motivation development can be measured less frequently. The combination of short-term and long-term intraindividual data makes it possible to link daily experience with long-term trajectories. Putting these pieces of the puzzle together can not only disentangle different developmental mechanisms, but also shed light on how educational settings can better prepare students to become independent learners, even beyond the school context.

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Erklärung

Hiermit bestätige ich die Ersteinreichung der vorgelegten Arbeit als Dissertation. Ich versichere, dass ich diese Arbeit eigenständig und nur mit Hilfe der genannten Quellen erstellt habe. Im Weiteren erkläre ich, dass ich die Promotionsordnung der Humboldt-Universität zu Berlin zur Kenntnis genommen habe.