Supported to Stay in School

How Students' Perceptions of the Psychosocial Learning Environment are Related to Intentions to Quit Upper Secondary School

by

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Stavanger, December 2021

Maren Stabel Tvedt

The invisible child [Det usynlige barnet]

How recognition and patience from significant others can give integrity to the invisible, scared, or detached.

Summary

***Background*:** National and international research has repeatedly shown that many late adolescents have poor motivation for school. Moreover, the fact that a considerable proportion of youth do not complete upper secondary education is an insistent challenge with severe costs for the individual and society. This thesis concentrates on upper secondary students' *intentions to quit school,* which is considered an indicator of a negative motivational process that can lead to dropout from school. From a motivation theory perspective (self-determination theory, in particular), intentions to quit school is considered a persistence-related academic outcome.

A theoretical rationale based on self-determination theory (SDT) and achievement goal theory (AGT) of how and why perceptions of the psychosocial learning environment may contribute to the development of such intentions is proposed. Emanating from this theoretical ground and previous evidence, research questions considering how the following aspects of the psychosocial learning environment are related to intentions to quit school were posed: perceived teacher support (emotional support, autonomy granting, and feedback quality), loneliness among peers, and perceived mastery climate.

Thus, while decades of research on school dropout have focused on demographic factors and students' academic achievement level, the current approach scrutinizes the potential in the learning environment on a process that do not limit itself to the final "pass or fail" (dropout vs. completion) yet acknowledges the broader and gradual process of the individual's more or less prominent intentions to quit school. Enhanced knowledge regarding this process can be vital from a dropout preventive perspective, but also for increased understanding of how the psychosocial learning environment in upper secondary school is related to student motivation.

Aims: The overall aim was to empirically investigate how students' perceptions of the psychosocial learning environment in upper secondary school are related to their intentions to quit school. Three separate studies had specific aims subordinate to this. Hopefully, knowledge derived from this work can contribute to inform measures to optimize students' motivation and increase their likelihood of completing upper secondary education.

Methodology: The thesis has a quantitative approach, and all three studies were empirical investigations of a sample of 1379 students in upper secondary schools in Rogaland, Norway. The main data source was self-reports from these students on three occasions during upper secondary school: T1 in the second semester of the first year, T2 in the first semester of the second year, and T3 in the second semester of the second year, giving a total timespan of 13 months. In addition to self-reports, register data on students' previous academic achievement, gender, and study track in upper secondary were obtained from county administration, which were applied as control variables in the structural models.

Study I had a cross sectional design, and *Study II* and *Study III* had longitudinal panel designs. To investigate the specific research questions, different statistical methods were applied, primarily types of structural equation modeling (SEM) in Mplus. This included confirmatory factor analyses (CFA), mediation models, multigroup testing of moderation, latent growth curve models (LGCM), and growth mixture models (GMM).

Results: In the cross-sectional design of *Study I,* the main aim was to investigate the degree to which three aspects of perceived teacher support (i.e., emotional support, autonomy granting, and feedback quality) were related to intentions to quit school, directly, and/or indirectly via emotional engagement and academic boredom. Relevant individual background variables (gender, prior academic achievement, immigrant background, as well as study track) were accounted for. The SEM results showed that all three aspects of perceived teacher support were indirectly negatively associated with intentions to quit school. In addition, emotional support showed a direct negative association with intentions to quit and thus appeared to be a particularly important aspect of perceived teacher support.

In *Study II*, the main aim was to investigate intentions to quit school longitudinally, and specifically scrutinize how individual change in intentions to quit was related to initial levels and changes in perceived emotional support from teachers and loneliness among peers at school. Initially, unconditional latent growth curve models indicated an average increase in intentions to quit school and loneliness among peers during the study period, and no average change in emotional support from teachers. However, substantial individual

differences were found in the trajectories of all these three concepts. A multivariate latent growth curve model with the rate of change in intentions to quit as the final outcome showed no significant prediction from initial levels of either emotional support or loneliness; however, a substantial inverse associated change with perceived emotional support from teachers and a strong positive association with change in loneliness among peers was found.

In *Study III*, individual change in intentions to quit school was kept as the focal outcome yet investigated from the outset of potential trajectory subgroups of perceived emotional support from teachers. The substantial between-student differences in individual trajectories of perceived emotional support detected in *Study II* served as an important ground for this person-centered approach. Furthermore, change in perceived mastery climate was theorized to function as an intermediate variable in a hypothesized association with change in intentions to quit school. Three distinct trajectory subgroups of perceived emotional support from teachers were identified: *stable-high* (84.9%; the normative group), *decreasing* (7.8%), and *low-increasing* (7.3%). Compared to the normative group, membership in the *decreasing* emotional support trajectory subgroup was indirectly associated with more increase in intentions to quit, and this association was fully mediated by a more negative development in perceived mastery climate. Membership in the *low-increasing* group was associated with more positive development in mastery climate, but no significant indirect association with change in intentions to quit was found.

Conclusion: Prominent in all three studies, was the central role of perceived emotional support from teachers as negatively associated with students' intentions to quit school. This was also persistent when accounting for background variables, and predominantly when investigating longitudinal relationships. Students with decreasing trajectories of perceived emotional support during the first and second years of upper secondary school were more likely to have steeper increase in intentions to quit school during this phase. However, the opposite route was not supported and requires further research. In addition to emotional support from teachers, individual trajectories of loneliness among peers were closely related to individual trajectories of intentions to quit school, and these results add to previous research conducted in cross-sectional designs. In sum, the current work contributes to empirical support for psychosocial factors in school having a substantial potential to keep

students motivated to continue upper secondary school, and this should be considered in all efforts to enhance late adolescents' academic motivation and to increase upper secondary completion rates.

List of studies

The following articles are included in the thesis:

Study I

Tvedt, M. S., Bru, E., & Idsoe, T. (2021). Perceived teacher support and intentions to quit upper secondary school: Direct, and indirect associations via emotional engagement and boredom. *Scandinavian Journal of Educational Research, 65*(1), 101-122. https://doi.org/10.1080/00313831.2019.1659401

Published online: August 29, 2019.

Study II

Tvedt, M. S., Bru, E., Idsoe, T., & Niemiec, C. (2021). Intentions to quit, emotional support from teachers, and loneliness among peers. Developmental trajectories and longitudinal associations in upper secondary school. *Educational Psychology, 41*(8), 967-984. https://doi.org/10.1080/01443410.2021.1948505

Published online: July 15, 2021.

Study III

Tvedt, M. S., Virtanen, T. E., & Bru, E. (in press). Trajectory subgroups of perceived emotional support from teachers: Associations with change in mastery climate and intentions to quit upper secondary school. *Learning and Instruction,* 101562. https://doi.org/10.1016/j.learninstruc.2021.101562

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1 Introduction

To progress successfully through the educational system is not a solo performance. Essentially, this doctoral thesis investigates the role of perceived psychosocial support for academic persistence in upper secondary school.

Despite long-term policy priority, the proportion of students who do not complete and graduate from upper secondary education is a major concern (Meld. St. 14 (2020-2021); NOU 2018:15, 2018). This concern is underscored by the increased *importance* of this formal key for societal participation (OECD, 2018). Research that can inform how to increase the proportion of students who complete is warranted (Lillejord et al., 2015), and the role of the psychosocial learning environment in students' continued motivation is particularly relevant from an educational psychology perspective (Frostad et al., 2015; Hardre & Reeve, 2003; Vallerand et al., 1997).

In this thesis, the role of perceived psychosocial learning environment for students' *intentions to quit* upper secondary school is studied. Intentions to quit school is considered an indicator of a negative motivational process that can lead to eventual dropout (Vallerand et al., 1997; Vasalampi et al., 2018). Indeed, dropout from school is typically a culmination of a gradual process of increased disengagement (Archambault et al., 2009; Finn, 1989; Rumberger, 2011). Empirically, the concept of intentions to quit is closely related to academic amotivation (Howard et al., 2021). Because of the evident link with motivational processes, intentions to quit school is in this thesis investigated in light of theories of motivation and engagement (Meece et al., 2006; Niemiec & Ryan, 2009; Reschly & Christenson, 2012; Ryan & Deci, 2017b).

Students who have dropped out of school retrospectively tell stories about lack of appropriate adult support (Ramsdal et al., 2018), boredom and loss of interest in schoolwork (Bridgeland et al., 2006), social exclusion (Ramsdal et al., 2013), and silencing (Bunting & Moshuus, 2016). Motivation theories would approach these issues from a social-contextual perspective on how the environment could better accommodate adolescents' needs (Ryan & Deci, 2017b). Moreover, extant studies have reported that many adolescents exhibit sub-optimal motivation for school (e.g., Diseth et al., 2020; Hafen et al., 2012; Wang &

Peck, 2013), which tends to increase with age (Gnambs & Hanfstingl, 2016; Wang et al., 2015; Wang & Eccles, 2012), and that there has been a negative development in this regard during the last 10 years in Norway (Bakken, 2019). This evidence, in sum, calls for a better understanding of adolescents' academic motivation.

Aspects of the psychosocial learning environment, such as teacher–student relationships, peer relations, school belonging, and school connectedness have been extensively studied, particularly in primary and lower secondary school, in association with favorable student outcomes (e.g., motivation, engagement, and achievement). Considerably less research has addressed negative outcomes, such as absence, dropout intentions, or dropout rates (Korpershoek et al., 2020; Krane et al., 2016). Hence, the role of the psychosocial learning environment in academic challenges specific to the upper secondary level is under-researched.

In contrast, many decades of dropout research have documented the relevance of students' *backgrounds* and, in particular, their academic achievement level from earlier schooling (Battin-Pearson et al., 2000; Markussen et al., 2011; Rumberger & Lim, 2008). Indeed, a Norwegian report recently demonstrated the dominant role of grades from lower secondary school, outperforming other background variables (gender, family background, ethnicity, and cultural capital; Markussen, 2019) to explain upper secondary completion. Nonetheless, alongside the robust evidence of this individual factor that students bring with them from previous schooling, it is important to detail the potential of the psychosocial factors while students are enrolled in upper secondary school, particularly since these factors are malleable and have been subject to less research efforts. In a study based in the United States, Hardre and Reeve (2003) argued on the same lines: "Hence, much can be gained in both theory and practice by thinking about dropout as not only an achievement issue but also as a motivation issue" (p. 354). When investigations stem from the perspective of what nourishes or impedes students' motivation rather than narrowly address strengthened achievement, the development of more holistic efforts might emerge.

The psychosocial environment at school is a wide term, which encompasses the interpersonal conditions, the social environment at school, and how students

perceive this. It also covers students' perceptions of the learning situation (Udir, 2010). In this thesis, the term *psychosocial learning environment,* or interchangeably *psychosocial factors in the learning environment,* are overarching terms covering the specific concepts investigated, namely perceived teacher support, loneliness among peers at school, and perceived mastery climate in class. Hence, this thesis does not cover all facets of the psychosocial learning environment but focuses on perceptions of particular social and cultural aspects, to be elaborated in Chapter 2.

1.1 Aim of the thesis

The overall aim is to empirically investigate how students' perceptions of the psychosocial learning environment in upper secondary school are related to their intentions to quit school. Hopefully, knowledge from this work can contribute to informing measures to optimize students' motivation and increase their likelihood of completing upper secondary education.

An important aspect of this research is that it seeks to add to the existing knowledge of dropout intentions and dropout risk; hence, all analyses consequently apply gender, study track, and academic achievement from lower secondary school as control variables when multivariate associations are investigated. By such, the purpose is to examine the unique contributions of the psychosocial variables over and above more established individual risk factors.

1.2 Background

1.2.1 The Norwegian upper secondary school

In Norway, children start formal schooling the year they turn six, after which they follow 10 years of compulsory schooling (Grades 1 to 10). Grades 1 to 7 are *primary school*, and grades 8 to 10 are *lower secondary school*. After the 10th grade, 98% of adolescents start directly in upper secondary education (that is, the year they turn 16). The main structure of upper secondary education has remained since 1994 (NOU 2018:15), since then all youth have had a statutory right to enter upper secondary education regardless of their prior academic attainment, yet it is not obligatory. Enrolment in private schools is generally

low in Norway but is slightly higher at the upper secondary level (8%; Udir, 2019).

When students apply for upper secondary education,[1] they choose from among 15 educational programs as part of either a vocational or an academic pathway (hereafter, *study track*). Approximately the same proportion choose a vocational track as an academic track (Udir, 2019). In addition to the evident difference in content, the tracks differ in structure; most vocational programs have a 2+2 structure, where the first two years are organized in schools followed by two years of apprenticeship in companies and completed with a journeyman's certificate. The academic track entails three years in school, and a successful graduation qualifies the student for higher education. There is considerable flexibility in the system regarding shifts between schools and programs, and "add-on" blocks exist to change the direction of education. In principle, a student needs to pass all subjects and exams of one academic year to proceed to the next.

Being a student in upper secondary school implies several significant shifts from being a student in lower secondary school, which are relevant for framing motivation research among upper secondary students. The transition itself, and the ongoing adaptation to the new system are likely to affect the motivational process of the individual student in various ways. First, upper secondary school is **not compulsory**, and for the first time in their academic history, students can choose to quit school and, for example, apply for a paid job instead. This implies a potential pull from the outside, which can be relevant to students' motivation. Accompanied by this aspect of free will, greater expectations of a student's responsibility for keeping up with progression, norms, and rules in school are evident at this educational level. The upper limit of 10% unexcused

[1] The term upper secondary *education* denotes the whole upper secondary education system, whereas upper secondary *school* refers to the part of the system where students are educated in school (i.e., the first two years of the vocational track, and the complete academic track). All current studies relied on data from the first two years, and the term upper secondary school is therefore used when referring to these studies and other studies that have investigated this part of the system.

absence in a given subject to obtain a grade (nationally implemented in 2016) can be seen as a reflection of this individual accountability.

Second, for most students, entry in upper secondary education is the result of **an active choice of educational direction**. Approximately 88% of students are admitted to their first priority of study program in the first grade of upper secondary education[2] (Statistics Norway, 2020). This degree of option to select a subject area in line with their own interests is suggested as an explanation of why, on average, the quality of students' motivation is better in the first year of upper secondary school than in the final year of lower secondary school (Diseth et al., 2020; Gillet et al., 2012; Mjaavatn & Frostad, 2018). However, how student motivation develops over time in upper secondary school has been less studied.

Third, upper secondary schools are typically larger than lower secondary schools, and students are **expected to interact with many teachers and peers in a less fixed class structure,** which may contribute to less integration between the social and academic contexts for the individual student (Wang & Hofkens, 2020). It is claimed that these conditions make upper secondary schools poorly equipped to support students' psychological needs, leading to an increased person-environment "mismatch" at this level (Eccles & Roeser, 2009; Farrington et al., 2012). In support for this claim are findings from a Norwegian study focusing on students' perceived emotional support from teachers in 10th grade and in first year of upper secondary school, which indicated lower levels in upper secondary (Mjaavatn & Frostad, 2018). Moreover, compared to teachers in lower secondary school, upper secondary school teachers are found to have less faith in their significance for students' well-being (Holen & Waagene, 2014).

Finally, from a developmental perspective, upper secondary education is regarded as a crucial stage of identity formation (Klimstra et al., 2010), exemplified by this quote from an upper secondary school student (author's

[2] There are no general requirements for entry, but if there are more applicants than places in a particular program, admission depends on attained grades from lower secondary school.

own translation): “It is in these years that we become aware of who we were, who we are, and who we want to become” (NOU 2019: 25, p. 9).

1.2.2 The educational matter of school dropout

Recent reports reveal some optimism regarding completion rates in Norway after 2012; however, 15% of students starting in an academic track and 33% starting in a vocational track have not completed within the normal duration of the program *plus* two years (OECD, 2020). Only 66% complete within the normal duration of the program (81% in academic track and 49% in vocational track), according to Statistics Norway (2021a). Relatively large differences are found between geographic regions, with the two northernmost counties in Norway showing the poorest rates. Rogaland County (the source of the current sample) is positioned slightly above the national average (Statistics Norway, 2021a). From an international comparison perspective, completion rates are particularly low in the vocational track in Norway (OECD, 2020).

Extant evidence points to the completion of upper secondary education as a critical formal key to full participation in society. The doorway to working life has indeed become narrower (Markussen & Røed, 2020), exemplified by an increase in young people receiving disability insurance benefits (Ellingsen, 2020) and an increase in inactive NEETs[3] (Barth et al., 2021). International comparisons indicate that not having completed upper secondary education is a particular risk for NEET status in the Norwegian context (OECD, 2018).

Based on evidence that students’ academic achievement is the single most predictive factor for school dropout, nationwide interventions have been dominated by strategies to strengthen students’ basic skills, particularly among the lowest performers in the transition between lower and upper secondary school. An example of this is the large-scale initiative titled New Possibilities [*Ny Giv]*, launched by the Norwegian Ministry in 2010. An evaluation of this initiative reported only weak positive effects for students at the lowest achievement levels and *negative* effects for students at a moderate achievement level (Holen et al., 2020). This emphasis on strengthening basic skills may

[3] NEET = a category of young people aged 16–24 who are not in employment, education, or training (OECD, 2018).

represent a traditional dualistic view of education, problematized by Allodi (2010), in which cognitive learning is considered the primary objective of education separated from the psychosocial sphere of school. In light of the poor results from these past initiatives, more integrative approaches may be required to counteract dropout and poor academic motivation in school. Indeed, such perspectives have been given increased attention recently (Frostad et al., 2015; Holen et al., 2018; Rogstad & Bjørnset, 2021), of which two programs targeting the psychosocial learning environment in Norwegian upper secondary schools deserve mention: the VIP Partnership Programme (Morin, 2021) and the Dream School Program (Larsen et al., 2021), both of which have proven promising yet weak effects. Nonetheless, large-scale interventions targeting the psychosocial learning environment in upper secondary schools can still be considered in the pioneering phase, and more research is needed to inform the development of such initiatives.

1.2.3 "Look Ahead" – a longitudinal research project

This thesis is part of the research project "Look Ahead" (*Se videre-prosjektet*; 2016–2021), initiated by the Norwegian Centre for Learning Environment and Behavioural Research in Education, and designed in collaboration with Rogaland County's school administration. The aim was to gain more knowledge about the role of the psychosocial learning environment in upper secondary schools for motivation, mental health, and school completion. A longitudinal panel study of student self-reports, combined with register data from the county was designed. Prof. Edvin Bru was the project leader and, as a Ph.D. candidate, I had responsibilities for the development of surveys, as well as planning and monitoring of the data collection together with the research administration at the center. It also involved a pilot in one school (autumn 2016, N = 163). Details about the design, procedures, sample, and data for the current research are provided in Chapter 4.

2 Theory

This chapter starts with a description of the concept of intentions to quit school; how it is theoretically framed and linked to dropout and aspects of motivation. This is followed by an outline of psychosocial factors that are theoretically expected to contribute to or hinder intentions to quit school, including relevant previous research. Finally, an integrated theoretical model is proposed, which summarizes the assumptions about how the psychosocial learning environment can contribute to educational functioning and persistence, and in particular, hinder intentions to quit school.

2.1 Intentions to quit school

Intentions to quit school is the main dependent variable in this thesis, and covers students' considerations about leaving school before graduation, and a sense of pointlessness in continuing in school (Frostad et al., 2015; Vallerand et al., 1997). High levels of intentions to quit are regarded as a warning of the risk of school dropout (Vallerand et al., 1997; Vasalampi et al., 2018), and is used to capture the gradual process of leaving an educational institution (Finn, 1989; Rumberger, 2011; Tinto, 1987). Still, it should be acknowledged that its association with actual dropout is found to be moderate (e.g., Vallerand, et al., [1997] found an association of $\beta = .24$), which is why it could also primarily be considered an indicator of poor motivation for school.

Anyhow, dropout from school rarely occurs as a sudden event; rather, it is a culmination of a process of disengagement over time (Archambault et al., 2009; Finn, 1989; Finn & Zimmer, 2012), reflecting its "processual" nature. Motivational scholars have described this as a disengagement that first occurs psychologically, which can end up physically, particularly if the learning context does not provide appropriate changes aligning with adolescents' needs as they mature (Eccles & Roeser, 2009). With this backdrop, it is suggested that research on school dropout needs to broaden the dependent variable, and investigations of intentions to quit school are advocated (Eicher et al., 2014; Frostad et al., 2015). Research on intentions to quit school has the advantage that one can examine concurrent and possibly influential processes, while in the educational system.

When reviewing research on intentions to quit in the educational domain, studies are typically rooted in one of two theoretical directions: Theory of planned behavior (TPB; Ajzen, 2012) as in the work of Davis et al. (2002) and Freeney and O'Connell (2012), or in self-determination theory (SDT; Deci & Ryan, 2008; Ryan & Deci, 2020). The latter, which holds more explicit and elaborated assumptions about the role of the perceived psychosocial context for the development of such intentions (e.g., Hardre & Reeve, 2003; Vallerand et al., 1997), is particularly relevant for this thesis. Both perspectives consider intentions as a precursor of actual behavior, which has, as previously noted, some empirical support considering intentions to quit school as a precursor of dropout behavior (Davis et al., 2002; Eicher et al., 2014; Samuel & Burger, 2020; Vallerand et al., 1997). The notion that one's intentions are the best predictor of one's behavior is, however, more articulated in the TPB (Ajzen, 2012).

In SDT perspectives, intentions to quit school is categorized as a *persistence*-related student outcome, in the maladaptive end (Howard et al., 2021), that is, as poor academic persistence. Specifically, in the motivational model of Vallerand et al. (1997), intentions to quit school is conceptualized as a response to low levels of self-determined motivation, and as a probable step before actual dropout behavior. Along the same lines (also grounded in SDT), Legault et al. (2006) and Otis et al. (2005) conceptualize intentions to quit as an educational outcome, specifically following high levels of *amotivation.* Amotivation is used to describe people's "lack of intentionality and motivation—that is, to describe the extent to which they are passive, ineffective, or without purpose with respect to any given set of potential actions" (Ryan & Deci, 2017b, p. 16). These SDT studies share the proposed pivotal role of social agents who more or less successfully accommodate students' basic psychological needs for competence, autonomy, and relatedness.

In line with this, and with reference to the motivational models (Deci & Ryan, 2008; Vallerand et al., 1997) intentions to quit school is in this thesis regarded as an indication of lack of motivation for school, which has induced a student's goal direction (intention) *away from* school. Thus, it does not merely represent an unaffected state of an inclination to leave school but bears a motivational component characterized by a sense of pointlessness and that school is a waste of time. From a broad understanding of motivation as a complex process

(Schunk et al., 2014), intentions to quit can be seen as a specific negative dimension of such a process.

In most motivation theories, and SDT in particular, it is postulated that human motivation is malleable, an assumption for the concept of intentions to quit school as well. With a few exceptions (Alivernini & Lucidi, 2011; Eicher et al., 2014; Haugan et al., 2019; Samuel & Burger, 2020) however, intentions to quit has previously been assessed at a single time point and used in cross-sectional (Frostad et al., 2015; Hardre & Reeve, 2003; Legault et al., 2006; Parviainen et al., 2020) or prospective (Davis et al., 2002; Vallerand et al., 1997; Vasalampi et al., 2018) designs that have not assessed individual change. Among the above-mentioned exceptions, Eicher et al. (2014) and Samuel and Burger (2020) investigated individual change but were limited in the sense of having only one item of intentions to quit, and this item was directed toward *change* of education, and not dropping out.[4] This distinction (changing vs. leaving) is important since it likely represents different motivational processes (Hovdhaugen, 2019). The items applied in the current thesis were purposively directed toward dropping out (e.g., *I consider leaving school and finding a job instead)* because the flexibility offered by the Norwegian system could otherwise lead us to a phenomenon reflecting educational mobility. Therefore, to the best of my knowledge, individual change in intentions to quit school during the upper secondary phase and its psychosocial predictors have not been studied so far. This is addressed in *Studies II* and *III* and takes a central position in the thesis.

In light of studies showing that mean levels of aspects of motivation tend to decrease over the time of schooling (Gottfried et al., 2001; Wang & Eccles, 2012), and that dropout is particularly common after the second year of upper secondary school (Udir 2021), we expected an average increase in intentions to quit during the first two years of upper secondary. Interestingly, at least two Norwegian studies (Diseth et al., 2020; Mjaavatn & Frostad, 2018) have indicated a slight positive shift in students' motivation when they move from lower to upper secondary school, particularly among students who choose

[4] Item wording in Eicher et al. (2014) and Samuel and Burger (2020): *What do you generally think of your education lately? As soon as I find something better, I will change my education/apprenticeship.*

vocational track (Mjaavatn & Frostad, 2018). We still expected an increase in intentions to quit since this positive boost could be related to the transition itself and is likely to normalize with time.

2.2 A theoretical perspective on how perceptions of the learning environment are related to intentions to quit school

Scholars from different theoretical groundings have developed various frameworks that postulate which characteristics of, and how, the psychosocial learning environment nurture students' optimal motivation in achievement settings (Patrick et al., 2011). Some frameworks emphasize social climate and perceived social support (e.g., Fraser, 1991), for instance via satisfaction of inherent psychological needs (as in perspectives emanating from SDT; Niemiec & Ryan, 2009), whereas others emphasize the culture and its perceived motivational drivers of success (e.g., achievement goal theory; Ames, 1992; Meece et al., 2006). Inspired by Patrick et al. (2011), a two-fold categorization is integrated in this thesis: 1) a *need-supportive learning environment* framework, and 2) a *motivational climate* framework. SDT is the main representative of the former, whereas achievement goal theory (AGT) represents the second.

Before moving to the two frameworks, the next section clarifies concepts of *motivation* and *engagement*, given that they are prominent in the literature on school dropout and dropout intentions, yet with subtle degrees of overlap, and little consensus in definitions (e.g., Eccles, 2016). Moreover, as will be subsequently elaborated, *emotional engagement* and *academic boredom* are in this thesis considered specific motivational components in a process that may lead to various degrees of intentions to quit school.

2.2.1 Motivation and engagement

Motivation derives from the Latin verb *movere* (to move) and underscores the idea that motivation is something that gets us going (Schunk et al., 2014). Motivation can broadly be defined as "the process whereby goal-directed activities are instigated and sustained" (Schunk et al., 2014, p. 5). Theories of

motivation have been prominent in educational research for many decades, and offer fine-grained conceptualizations related to students' expectancies, values, attributions, control, goal orientations, self-worth, self-regulation, and self-determination (Martin et al., 2017; Schunk et al., 2014). Motivation theories are thus most fundamentally concerned with the psychological processes that *underlie* human action. Still, most current models of motivation also incorporate an action component (e.g., choice, efforts, or engagement; Skinner & Pitzer, 2012).

Since the 1990s, another line of research has developed, partly independent of motivation theories: research on student engagement. This line of research has had an incremental growth the last decade (Salmela-Aro et al., 2021) and has been closely linked to the development of school dropout interventions (Finn, 1989; Reschly & Christenson, 2012). Therefore, concepts derived from this line of research frequently appear in the practical and academic field of dropout prevention. For the same reason, research on student engagement tends to have a more applied nature with a more eclectic theoretical base compared to studies grounded in motivation theories (Reschly & Christenson, 2012; Salmela-Aro et al., 2021). It is claimed that the appeal of the meta-construct of engagement is tied to the issue that it *unifies* literature on how students feel, think, and act (Eccles, 2016; Fredricks et al., 2019). This unifying and eclectic nature does, however, not come without challenges. A continuous elaboration within the engagement literature (Eccles, 2016), as well as tendencies of motivational approaches shifting focus onto engagement (e.g., Reeve, 2012; Skinner et al., 2009), have caused conceptual ambiguities (Fredricks & Wendy, 2012; Reschly & Christenson, 2012) and an ongoing debate as to whether motivation and engagement actually differ (e.g., Martin et al., 2017).

While this thesis does not aim to resolve these conceptual issues, it has urged caution when reviewing existing research and when attempting to draw a consistent theoretical line for this work. In this thesis, theories of motivation are used to understand particular aspects of *the broad process of motivation* (cf. definition of Schunk et al., 2014) and comprise emotional engagement and academic boredom as motivational components potentially driving intentions to quit school. Emotional engagement and academic boredom are proposed as mediators between perceived psychosocial support and the academic outcome

(here, intentions to quit school) (Reschly & Christenson, 2012; Skinner et al., 2008). This represents a position where the academic field of motivation is acknowledged with its long history of fine-grained and empirically supported theories, while operating with concepts that also appear in other frameworks (i.e., engagement). Such a position of grounding in motivation theories is seen in, for example, Skinner et al.'s "Motivational perspective on engagement and disaffection" (Skinner et al., 2008; 2009), which has served as an important theoretical inspiration.

2.2.1.1 Emotional engagement and academic boredom

Emotional engagement comprises students' positive emotions of interest, enthusiasm, and enjoyment when involved in classroom learning activities (Skinner et al., 2009) and is by such, largely overlapping with the concept of intrinsic motivation (Ryan & Deci, 2000). Emotional engagement is indicated as a key to sustained effort (Skinner et al., 2008; Wang & Degol, 2014). Research among late adolescents has, however, evidenced that students do not *need* to be emotionally engaged to attain high academic achievement, yet declining emotional engagement has been related to an increase in depressive symptoms (Wang et al., 2015). In other words, poor emotional engagement seems to take its toll and was therefore expected to be negatively associated with intentions to quit school (*Study I)*. Numerous studies have also linked intrinsic motivation (or the degree of self-determined motivation) to a range of educational outcomes (see Ryan & Deci, 2017a), and some have found it negatively related to dropout intentions (Alivernini & Lucidi, 2011; Hardre & Reeve, 2003; Howard et al., 2021), which supported the expectation regarding emotional engagement and intentions to quit school.

Academic boredom is a specific negative and deactivating emotion during academic work, characterized by a prolonged perception of time, as in "time stands still" (Pekrun et al., 2010). This specific emotion is more than a neutral state of lack of interest, and is therefore not simply regarded as the opposite of emotional engagement (Pekrun et al., 2010; Skinner et al., 2009). In everyday language, boredom may be understood as "having nothing to do;" however, in the academic literature it stems from a situation where what is offered in the setting does not appeal to the person (Mann & Robinson, 2009). When

experiencing academic boredom, the individual's focus is directed to this negative emotional experience, which reduces their cognitive resources for the academic activity. The core psychological determinants of academic boredom are theorized to be low value placed on the activity, coupled with either extensive high control (i.e., activity being too easy) or lack of control (too hard; Pekrun et al., 2006).

In light of the remarkably high reported levels in student populations (Bakken, 2019; Bridgeland et al., 2006; Moeller et al., 2020) academic boredom has received modest explicit attention from motivational perspectives—see, for example, Skinner et al. (2009) who devotes only three items to boredom in a combined scale of emotional disaffection. Likewise, in traditional SDT perspectives, boredom is rarely explicitly referred to, but theorized as an affective response to a less self-determined or controlled motivational state (Ntoumanis, 2001). The antecedents and consequences of academic boredom are more explicitly addressed from Pekrun's (2006; 2010) control-value theory, in which it is signified as a neglected and understudied academic emotion. Its silent and socially inconspicuous nature may be a reason for this "neglection," while increasing evidence now documents its negative academic and health related correlates (Pekrun et al., 2014; Schwartze et al., 2021; Tze et al., 2016). The unpleasant state of boredom, described as triggering an impulse to escape the situation (Pekrun et al., 2010, p. 533), and the negative consequence of experiencing a lack of purpose and self-determination (Ryan & Deci, 2017b) underlie the anticipated association between academic boredom and intentions to quit school (*Study I*). Before *Study I* was undertaken, no other empirical studies were found to focus on academic boredom in association with intentions to quit school. Recently, however, an Italian study explored trajectory subgroups of academic boredom and confirmed an essential association with intentions to quit school (Grazia et al., 2021).

Emotional engagement and academic boredom were treated as intermediate variables in the cross-sectional structural equation model in *Study I*, when investigating how, and to what extent, need-supportive aspects of perceived teacher support are related to intentions to quit school. This notion follows the theoretical assumption that engagement is the "bridge" (or mediator) between perceptions of the psychosocial context and academic outcomes (e.g., Reschly

& Christenson, 2012; Skinner et al., 2008). This notion has not been extensively tested empirically (Roorda et al., 2017), and no other studies have been found focusing on intentions to quit school as the academic outcome. That said, it is also possible that these emotional components (emotional engagement and academic boredom) reflect experiences with the learning content (curriculum) and may thereby be associated with intentions to quit school irrespective of the proposed psychosocial variables.

2.2.2 A need-supportive learning environment

SDT has its roots in humanistic psychology, developed in the mid-1980s (Deci & Ryan, 2008), and is now recognized as one of the most comprehensive and empirically supported theories of motivation (Anderman, 2020; Schunk et al., 2014). It is a broad theory applied in an array of fields, including educational psychology (Ryan & Deci, 2017b), and has also noticeably influenced theoretical development of other frameworks in education (e.g., Pianta et al., 2012).

SDT holds the basic assumption that humans by nature are curious, active and challenge-seeking (Ryan & Deci, 2017b), and postulates that when the three basic psychological needs for *autonomy, competence, and relatedness* are supported (e.g., in the classroom), the internalization process will be strengthened, and students will be increasingly autonomously motivated and persistent in their studies (Niemiec & Ryan, 2009; Ryan & Deci, 2017b; 2020). These assumptions are clearly reflected in how this theory outlines the optimal learning environment. **Autonomy** refers to a sense of initiative, volition, and ownership in one's actions, and is supported by the provision of choice and requesting students' perspectives. **Competence** concerns experiences of optimal challenges, opportunities for growth, and positive feedback, all of which provide a sense that one's behavior is effectively enacted. **Relatedness** refers to a sense of interpersonal connection to others, and presupposes relationships characterized by mutual respect, stability, and affective concern (Ryan & Deci, 2020; Stroet et al., 2013). SDT holds the notion that the benefits of these psychological needs are universal across gender, age, and cultural contexts, yet acknowledges that the way these needs are supported can vary between individuals (Vansteenskiste et al., 2020).

The universality claim of the basic psychological needs, has led SDT to be regarded as "more" than a social cognitive theory of motivation (Wigfield & Koenka, 2020), although it clearly has similarities with such theories. Moreover, the functional significance SDT gives the need for autonomy distinguishes the theory from other theories of motivation (Niemiec & Ryan, 2009).

According to SDT, the core mandate of the educational system is to facilitate *activities* and *interactions* that vitalize students' inner motivational resources (Niemiec & Ryan, 2009; Reeve, 2012). Such perceived interactions, from the perspective of students, are of particular interest in this thesis, as SDT insists that any contextual influence on one's motivation is primarily derived from *individual perceptions* of the environment (Ryan & Deci, 2020; Ryan & Grolnick, 1986). Moreover, the psychological need for *relatedness* plays a central role, represented by perceived emotional support from teachers (addressed in all three studies), and by loneliness among peers (addressed in *Study II*). The latter as a frustration of the need for relatedness (Vansteenkiste et al., 2020). While relatedness may not seem *necessary* for being optimally motivated in an activity (for example, people may be intrinsically motivated to do crossword puzzles in solitude), it is regarded as an essential source when encountering arduous tasks not inherently satisfying (Niemiec & Ryan, 2009; Ryan & Deci, 2017b; Vansteenkiste et al., 2020). This makes aspects of perceived relatedness particularly relevant to investigate, as potential resources for students inclined to a pathway to dropout.

Despite individual's inherent tendencies for challenge-seeking and learning, SDT acknowledges that one can also be passive or disaffected, typically due to situations in which one or more of the psychological needs are thwarted or frustrated. A continuum of qualitatively different types of motivation is proposed (e.g., Ryan & Deci, 2000), defining a continuum from intrinsic motivation and amotivation at each end, and four types of extrinsic motivation in between. In fact, SDT differs from other major theories of achievement motivation in that it includes a particular construct capturing the lack of motivation, namely *amotivation* (Wigfield & Koenka, 2020). Amotivation is considered distinct from the mere absence of the other types of motivation but is characterized by a state in which individuals do not perceive any purpose of an activity, a lack of relationship between behavior and that behavior's

subsequent outcome (Legault et al., 2006; Ryan & Deci, 2017b). As noted previously, intentions to quit school can be a response when this lack of perceived purpose induces the student's direction (intention) away from school.

2.2.2.1 Perceived teacher support

Incorporated in the broad term "social support" are various classifications of the types of support students perceive from their teachers (Bokhorst et al., 2010; Malecki & Demaray, 2003; Tardy, 1985; Thoits, 2011). Following SDT (e.g., Niemiec & Ryan, 2009), the three proposed basic psychological needs point to particular dimensions of teacher support: support for relatedness, support for competence, and support for autonomy. Such an SDT lens on teacher support has been reviewed in Stroet et al. (2013) and guided the selection of investigated aspects of support in this thesis. It is theorized that emotional support primarily reflects need–support for relatedness, feedback quality reflects need–support for competence, and autonomy granting reflects need–support for autonomy. These are elaborated in separate subsections.

Of note, although there is a solid empirical basis for associations between need-supportive learning environments and aspects of engagement and motivation (Stroet et al., 2013; Wang, Degol, et al., 2020), there is limited knowledge when it comes to a) late adolescence, b) differential associations of specific aspects of support, c) maladaptive outcomes, such as intentions to quit school; and d) studies with longitudinal designs.

2.2.2.1.1 Emotional support

Perceived emotional support from teachers is the extent to which students feel they can trust their teachers, that teachers genuinely care about them, and have faith in their ability to learn (Pianta et al., 2012; Wentzel, 2015). Empirically, this affective aspect of teacher support is robustly documented to be associated with student engagement and achievement (Cornelius-White, 2007; Quin, 2017; Roorda et al., 2017; Roorda et al., 2011; Wang, Degol, et al., 2020), intrinsic motivation (Federici & Skaalvik, 2014), less disruptive behavior (Bru et al., 2002) and less socioemotional distress (Wang, Degol, et al., 2020). While the vast majority of prior studies have been conducted with younger students (Wang, Degol, et al., 2020) a meta-analysis indicated that the association

between positive affective teacher–student relationships and student engagement is even stronger in higher grades (Roorda et al., 2011). A possible reason for this may be that relational competence among upper secondary teachers varies greatly, as indicated in an interview study with teachers, leaders, and counselors in upper secondary school (Eriksen, 2010), a situation expressed as particularly adverse for students at risk.

Emotional support evidently entails a conceptual link with the need for relatedness (Niemiec & Ryan, 2009; Stroet et al., 2013; Thuen, 2010); however, this type of support is also likely to involve aspects of competence (e.g., in that teachers have faith in students' abilities) and autonomy (in that teachers appreciate their perspectives). Empirical support for the link with particular psychological needs is, though, rather limited (Ruzek et al., 2016).

Regarding intentions to quit and/or actual dropout as outcomes, very few studies have investigated emotional support as a specific aspect of teacher support, yet attributes such as care and respect are frequently represented in studies addressing a more generic measure of teacher support (Krane et al., 2016). One exception is Studsrød and Bru (2012), who investigated emotional support in conjunction with other aspects of teacher support in an upper secondary school sample. Here, emotional support showed a significant negative bivariate association with intentions to quit, yet there was no significant multivariate association. Still, in light of the substantive body of research that predominantly links emotional support to academic, behavioral, and socioemotional outcomes (Wang, Degol, et al., 2020), we expected emotional support to be uniquely and negatively related to intentions to quit school.

Wilcken and Roseth (2015) are among scholars who emphasize that teacher–student relationships are longitudinal in nature; they develop over time and can shift in quality, purpose, and importance. Moreover, what happens at one time point in a relationship can be influenced by what had happened earlier, indicating a cumulative process (Hamre & Pianta, 2001; Wilcken & Roseth, 2015). Scoping into upper secondary school, students change teachers and interact with several subject-specific teachers, which likely contributes to change in perceived support over time. In the current work, the emotional

aspect of perceived teacher support was investigated longitudinally (*Studies II* and *III*).

Despite the conceptual understanding of teacher–student relationships as changing over time, relatively little research on perceived teacher support has been conducted in longitudinal designs (Quin, 2017; Roorda et al., 2011; Özdemir & Özdemir, 2020), and even fewer have assessed perceived support repeatedly and focused on individual change. Some exceptions exist (e.g., De Wit et al., 2010; De Wit et al., 2011, as well as studies mentioned later, focusing on trajectory subgroups). These exceptions support the notion that the conditions for close relationship with teachers are generally weakened in higher grades (Eccles et al., 1993; Hargreaves, 2000), by documenting an average declining trend in perceived teacher support (De Wit et al., 2010; De Wit et al., 2011). However, substantial differences have been found between students. Furthermore, these studies indicate the importance of sustained support from teachers over time, as individual trajectories of perceived teacher support are associated with trajectories of school attendance (De Wit et al., 2010) and mental health (De Wit et al., 2011).

Some recent studies have shown that individual differences in longitudinal trajectories of student-perceived teacher support or teacher–student relationships emerge as distinct subgroups of students (Ettekal & Shi, 2020; Ratelle & Duchesne, 2014; Özdemir & Özdemir, 2020). These person-centered studies have detailed our insights into how certain longitudinal patterns of support are related to increased risk of academic and/or socioemotional maladjustment. From a perspective of university students' motivation, Gillet et al. (2019) specifically requested future studies examining need-supportive trajectory subgroups in relation to dropout intentions. *Study III* addresses this gap in the literature in the context of upper secondary school.

Moreover, a person-centered approach to perceived teacher support (as applied in *Study III*) permits investigations of whether certain trajectory subgroups are portrayed by particular student characteristics. This has previously been requested (Ratelle & Duchesne, 2014), and in the present context, it was aimed to provide insights into how different types of students perceive being emotionally supported by teachers over time. It was decided to focus on motivational values and beliefs (represented by achievement ambition and

academic self-concept; Eccles & Wigfield, 2002), which could potentially inform risk identification from a more holistic perspective than traditional individual background variables (e.g., grades, gender, SES). It is previously indicated that student motivational characteristics influence how teachers respond to them (Nurmi, 2012; Reeve, 2012), and such characteristics can also influence students' levelled *need* for, as well as perceptual lens for appraisal of support (Lazarus, 2006). For example, students with high achievement ambitions may need and expect extensive support because reaching academic goals is considered important for the individual. In sum, we expected that these characteristics would vary across trajectory subgroups of perceived emotional support from teachers, yet approached this question rather exploratory, since the identification of trajectory subgroups was unknown.

2.2.2.1.2 Feedback quality (informational feedback)

High quality feedback from teachers which is individualized and includes information about how the student can progress, will provide students with a structure critical for experiencing themselves as effective learners (Skinner & Pitzer, 2012). This aspect of teacher support is regarded as central to nurturing students' need for competence (Niemiec & Ryan, 2009; Skinner & Pitzer, 2012; Stroet et al., 2013). Academic feedback that guides the students forward is also a core component of formative assessment (Black & Wiliam, 2009), which has been subject to considerable efforts in Norwegian schools during the last decade (Hopfenbeck et al., 2015). The quality of teachers' feedback (in the sense of being informative, constructive, and individualized) has been shown to influence academic achievement (Hattie & Timperley, 2007), yet little is known about its empirical associations with emotional engagement, academic boredom, and intentions to quit school. Theoretical reasoning, however, anticipates that such feedback can strengthen students' sense of competence and ability beliefs which are found negatively associated with intentions to quit school (Legault et al., 2006) and may contribute to a focus on individual progress more than comparisons with others (Meece et al., 2006). In sum, the degree to which students perceive teachers to provide them with informational feedback was expected to contribute to their involvement with the subject (i.e., more emotional engagement, less academic boredom), which could hinder intentions to quit school.

2.2.2.1.3 Autonomy granting

User participation and agency of the individual are referred to as characteristics of our time, so also in schools (Lillejord et al., 2021). In motivation theory and research, the presumption of choice as a powerful motivator has been prominent for many decades, already in DeCharms's argumentation of the need for *personal causation* (DeCharms, 1968, in Patall et al., 2008). SDT is among contemporary motivation theories that accentuate the role of autonomy most explicitly (Niemiec & Ryan, 2009; Ryan & Deci, 2017b).

In the educational domain, autonomy granting refers to students being offered choices and possibilities to tailor academic tasks toward their own values or interests, and it is assumed to support their need for autonomy (Niemiec & Ryan, 2009). Providing students with a sound rationale for the material being taught is also considered an element of autonomy support (Assor et al., 2002; Niemiec & Ryan, 2009), yet not covered by the measure in the current work, which emphasizes provision of choice (Bru et al., 2010). Autonomy granting is theorized to be particularly relevant in reducing academic boredom, in that the learner can be given appropriate control and tailor the content to own values (Pekrun et al., 2010). Still, the effect of choice seems to depend on several factors, for instance, whether the choice is truly meaningful to the individual or merely involves choosing between pre-set options (Patall et al., 2008).

It is found that high school students' reports of autonomy in the classroom predict changes in both self-reported and observed engagement and disaffection (Hafen et al., 2012; Patall et al., 2018). Moreover, Vallerand et al. (1997) found that students who perceived less autonomy from parents, teachers, and school administration were more likely to drop out a year later. A previous Norwegian study (Studsrød & Bru, 2012) that found a significant bivariate, but no multivariate, association between autonomy granting and intentions to quit school, provides a modest support to our expectations of these being negatively associated.

2.2.2.2 Loneliness among peers at school

During adolescence, peer relationships become increasingly important (Buhrmester, 1990; Steinberg & Morris, 2001), and play a significant role in upper secondary school adjustment (Studsrød & Bru, 2011). Regarding the

particular phenomenon of loneliness, there are three core aspects to a well-established definition (Perlman & Peplau, 1981): (1) it is a subjective experience not synonymous with objective isolation, (2) it is due to deficient social relations or a discrepancy between desired and actual social relations, and (3) it is experienced as distressful. Loneliness is thus an unpleasant subjective experience of a deficiency in one's social relations, and is separable from related concepts of aloneness, solitude, and objective isolation (Buchholz & Catton, 1999; Holt-Lunstad et al., 2015). The prevalence of loneliness reaches a peak during adolescence, possibly related to significant changes in the youth's personal identities and elevated expectations about social relationships (Heinrich & Gullone, 2006).

From an SDT perspective, loneliness is regarded as a *frustration* of the need for relatedness, and such psychological need-frustrations are considered more than the lack of need satisfaction (Vansteenkiste et al., 2020). This impedes the process of internalization that is conducive to engagement in school activities (Niemiec & Ryan, 2009). Thus, while social goals (or needs) can be powerful in itself (such as establishing and developing social relationships), they may also intertwine with academic motivation in complex ways (Wentzel, 1999). A recent interview study with upper secondary vocational students exemplifies this by describing how their peers can be a particular resource for their academic motivation when they are on the edge of giving up school, for example, by requesting each other's attendance and encouraging academic efforts (Schmid, 2021).

Nationally representative surveys indicate that an increasing proportion of youths experience loneliness (Bakken, 2019), which is of great concern given its severe consequences (Holt-Lunstad et al., 2015). Few studies have focused specifically on loneliness among peers at school, yet the works by Frostad et al. (2015) and Haugan et al. (2019) in Norwegian upper secondary schools are important exceptions. These studies have repeatedly shown robust empirical associations between loneliness among peers and intentions to quit school and served as central groundwork for *Study II*. Importantly, these associations have been found for the subjective experience of loneliness, and not the objective number of friends (Frostad et al., 2015), which underscores the saliency of the individual experience. In these studies, the multivariate cross-sectional associations were relatively strong (β ranging from .30 to .53); however, no

aspects of longitudinal change or longitudinal relationships were investigated. Thus, very little is known about the developmental trajectories in upper secondary school and to what extent individual change in intentions to quit can be predicted by initial levels or change in loneliness among peers.

2.2.3 The motivational climate

While SDT in the educational context relies heavily on the notion of the psychological needs for autonomy, competence, and relatedness, AGT is particularly concerned with the acquisition and demonstration of competence, albeit from a distinct conceptual lens. AGT is a social-cognitive approach to achievement motivation developed in the late 1970s and has further developed into a prominent theory to understand choice, persistence, and adjustment in achievement settings (Kaplan & Maehr, 2007; Schunk et al., 2014). The theory has revolved around the reasons (goals) students have to try to succeed, and how they implicitly define success. However, the theory is not only concerned about these individual goal orientations but has also articulated the importance of qualities in the learning environment. These qualities are conceptualized as differences in motivational *climates* (also termed goal structures). That is, students' understanding of what is valued in the academic setting, and what is communicated as success in this context (Ames, 1992; Anderman & Patrick, 2012; Patrick et al., 2011). Since this involves perceived priorities and values, the motivational climate has been denoted as the cultural component of the psychosocial learning environment (Stornes et al., 2008).

Observational, survey-based, and multi-method studies have agreed upon two main types of motivational climates: 1) a *mastery* climate, which is a learning environment where success is defined as personal improvement, and exploration and mistakes are recognized as evident components of learning, and 2) a *performance* climate in which success is defined by outperforming others, and mistakes are considered signs of inability (Meece et al., 2006). Thus, a core component is whether the frame of reference regarding competence and achieved success is the student self, or the others (Urdan & Kaplan, 2020). It is shown that students in the same class can perceive the motivational climate differently, typically reflected in relatively low intra-class correlations (in a range from .04−.29; see Diseth & Samdal 2015; Patrick et al., 2011; Stornes et

al., 2008) and, are therefore typically handled at the individual level (e.g., Bardach et al., 2020; Shim et al., 2013). Evidence suggests that students who perceive a strong mastery climate are facilitated with favorable conditions for learning, sustained efforts, and psychological well-being (Greene et al., 2004; Meece et al., 2006; Stornes & Bru, 2011; Wang & Holcombe, 2010), as elaborated next.

2.2.3.1 Perceived mastery climate

Students' perception of the degree of mastery climate is addressed in *Study III*, in a model where change in mastery climate is theorized to intermediate an association between a trajectory pattern of emotional support from teachers and change in intentions to quit school. Hence, a process of increased mastery climate was theorized to follow a trajectory of strengthened emotional support from teachers and as a mechanism to reduce intentions to quit school. First, the link between perceived emotional support from teachers and a mastery climate is supported by robust positive cross-sectional associations (Skaalvik & Skaalvik, 2013; Stornes et al., 2008); however, very little research has been conducted at the upper secondary school level and with a longitudinal approach. Theoretically, this expected association is understood as teachers playing a key role in shaping the motivational climate perceived by the individual student, and that a solid interpersonal relatedness with the teacher is important for a mastery climate to grow (Ames, 1992).

A negative association between perceived mastery climate and intentions to quit school was recently reported in a cross-sectional multivariate approach (Haugan et al., 2019). Apart from this, remarkably little research has linked aspects of motivational climate to intentions to quit school, or dropout prevention. Still, based on studies showing that a mastery climate is positively related to school identification (Wang & Holcombe, 2010) and advantageous approaches to learning such as self-efficacy (Greene et al., 2004), preference for challenging work (Ames & Archer, 1988), individual mastery goal orientations (Lüftenegger et al., 2014), adaptive help-seeking behavior (Skaalvik & Skaalvik, 2013), and student engagement (Diseth & Samdal, 2015), students who perceive a strengthened mastery climate are likely assigned with a motivational resilience (Skinner et al., 2020) which makes development of intentions to quit school less probable. According to the few

studies investigating *change* in perceived motivational climate, a decrease in mastery climate is particularly decisive for further motivation (affect, beliefs) and achievement development (Urdan & Midgley, 2003). Specifically, Urdan and Midgley (2003) found that a decrease in mastery climate was more strongly associated with negative change in outcomes than an increase was with positive change in the assessed outcomes.

2.3 Integrated theoretical model

The current work integrates assumptions from SDT (e.g., Niemiec & Ryan, 2009; Ryan & Deci, 2017b) and AGT (e.g., Ames, 1992; Meece et al., 2006; Urdan & Kaplan, 2020), as shown in Figure 1. These theories do not operate with delimited entities but highlight different facets of the psychosocial learning environment: In the *need-supportive learning environment framework*, teacher–student and peer relationships are core facets, whereas the culture of valuing individual growth and/or social comparisons are key concerns in the *motivational climate framework.*

Figure 1 depicts perceived relations with teachers and peers to the left, with teacher support separated according to the three basic psychological needs. Loneliness among peers is represented as a frustration of the need for relatedness among peers. According to SDT, these factors are all salient in the motivational process, as they affect students' natural tendencies of challenge-seeking, engagement, and growth. To the right of these need-supportive (or frustrating) relationships, and effectuated by these social agents, are the motivational climate (culture). Particularly articulated in previous work is the link between an emotionally supportive teacher and a mastery climate. Moreover, the communicated value within a mastery climate implies that *all* students can be successful and underlies the expected negative relationship with development of intentions to quit school.

Regarding Figure 1; not all links derived from the theories are empirically investigated in the current research. The dotted non-labeled boxes underpin that the concepts in focus are not exhaustive in explaining the potential complex interplay between psychosocial learning environment, students' motivation, and considerations about leaving school.

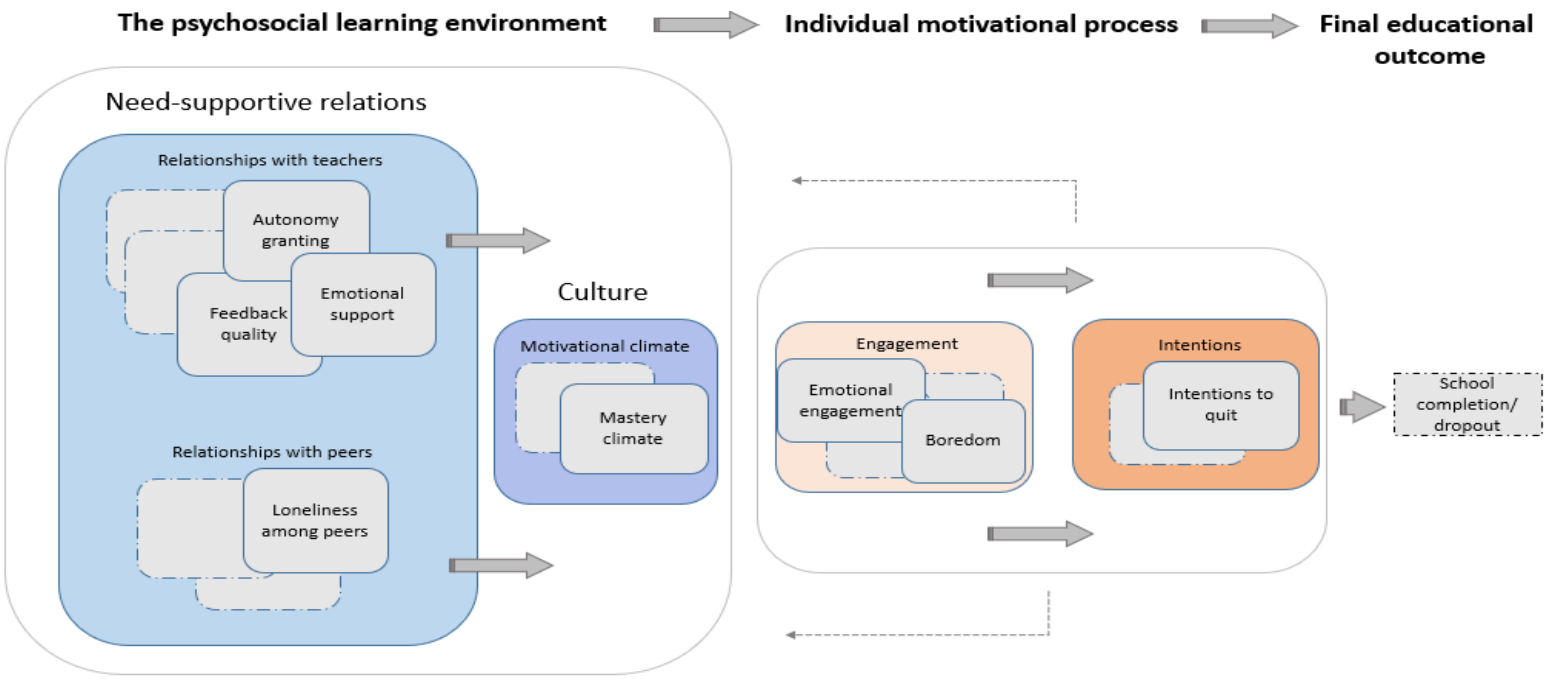

Figure 1. Theoretical model based on self-determination theory (SDT) and achievement goal theory (AGT).

3 Research questions

Based on the reviewed literature, the following areas appeared as particular research gaps in the context of upper secondary school:

- The *unique associations* of need-supportive aspects of perceived teacher support with intentions to quit school;
- Potential *mechanisms* that can explain associations between perceived psychosocial learning environment and intentions to quit school;
- Longitudinal investigations of *individual change in intentions to quit* school during upper secondary school, including the extent to which trajectories of psychosocial learning environment factors covary with such change;
- The presence of *distinct trajectory subgroups of* student-perceived teacher emotional support and whether these subgroups exhibit diverse development in intentions to quit school.

Investigations of initial levels and change in the main constructs were considered important to offer meaningful interpretations of potential statistical relationships. Consequently, the following research questions were addressed:

1. What is the descriptive information of students' self-reports in the first year of upper secondary school, considering:
    a. Levels of intentions to quit school?
    b. Levels of academic boredom and emotional engagement?
    c. Levels of need-supportive aspects of perceived teacher support, i.e., autonomy granting, feedback quality, and emotional support?

    (*Study I*).
2. How are these aspects of teacher support cross-sectionally associated with intentions to quit school? Specifically,
    a. to what extent are potential associations indirect, via academic boredom and emotional engagement, and
    b. does gender moderate any of these potential associations?

    (*Study I*).
3. What are the developmental trajectories during the first and second years of upper secondary school considering

   a. intentions to quit school,
   b. perceived emotional support from teachers, and
   c. loneliness among peers?

   (*Study II*).

4. How, and to what extent, is individual change during the first and second years of upper secondary school in intentions to quit school predicted by[5] initial levels and changes in
   a. perceived emotional support from teachers, and
   b. loneliness among peers?

   (*Study II*).

5. Is the existence of trajectory subgroups of perceived emotional support from teachers during the first and second years of upper secondary school empirically supported? If so, how can this supplement our knowledge of the link between emotional support from teachers and intentions to quit school? Specifically,
   a. how many subgroups, and what growth patterns appear in potential trajectory subgroups of perceived emotional support from teachers,
   b. how do potential trajectory subgroups differ in levels of achievement ambition and academic self-concept, and
   c. to what extent is membership in potential trajectory subgroups related to change in intentions to quit school, indirectly via change in perceived mastery climate?

   (*Study III*).

It was considered that all multivariate investigations should include achievement level from lower secondary school, gender, and study track as control variables given their well-documented associations with dropout, dropout intentions, and aspects of motivation and engagement (Battin-Pearson et al., 2000; Frostad et al., 2015; Hardre & Reeve, 2003; Markussen et al., 2011; Wang & Fredricks, 2014).

Figure 2 visualizes the main concepts and their examined relationships in the three individual studies.

[5] We do not analyze the temporal order of the change processes, so the term *predict* should be interpreted with this caution. Change in intentions to quit school was treated as the outcome variable based on theory.

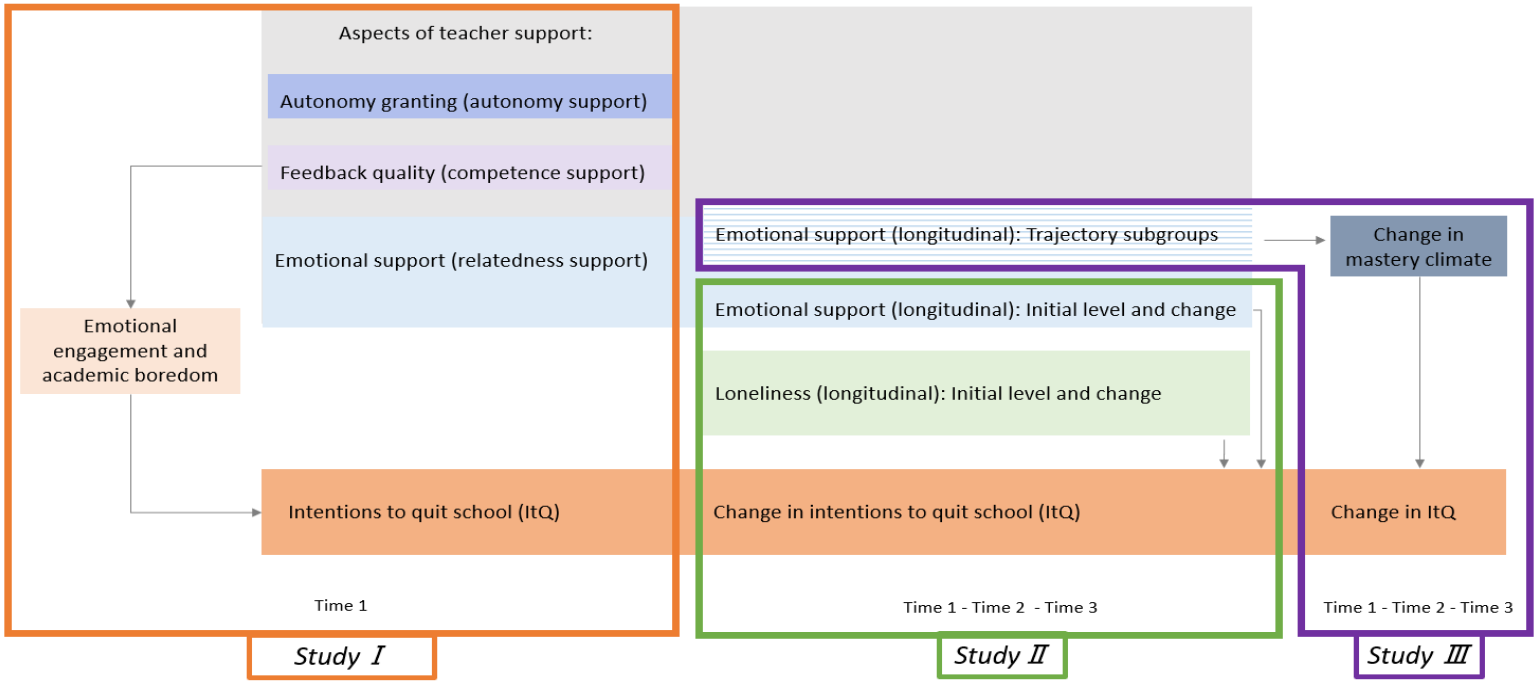

Figure 2. Visualization of the three studies

4 Methodology

This chapter is structured as follows: A brief introduction to the quantitative approach and epistemological foundations is followed by an outline of the study designs, covering the organization of data that lay premises for the possible conclusions that can be drawn. Next, the sample and procedures for data collection are presented, followed by descriptions of measurements, statistical analyses, and considerations of validity and ethics.

4.1 The quantitative approach

The thesis has a quantitative approach, thus aiming to provide knowledge about phenomena that we assume are *measurable*, so that numbered data can be analyzed through statistical procedures (Creswell, 2014). Although measurable, the phenomena of interest are not directly observable or can be measured without error; thus, a post-positivist position is held. That is, it is assumed that there is a reality independent of our thinking, but the researcher needs to critically approach our ability to know this reality (Trochim et al., 2016). The post-positivist researcher acknowledges that observations/data are theory-laden (e.g., that a term in a survey can be interpreted differently depending on students' cultural background), and that these kinds of irregularities need to be critically considered when drawing conclusions (Trochim et al., 2016).

Therefore, knowledge gained through such a post-positivist lens is based on careful measurements of what is believed to be an objective reality, and because all measurements are considered fallible, multiple measures are preferred (Creswell, 2014; Trochim et al., 2016). This post-positivist position is also referred to as critical realism and is broadly accepted in modern quantitative methodology (Kleven, 2008), especially when studying unobservable phenomena (Lund, 2005). Aligned with this post-positivist critical realism position (Kleven, 2008) is the validity system developed by Cook and Campbell (1979; Shadish et al., 2002) which guides the deliberation of the validity of the current research (Section 4.7).

Given that the phenomena under study are psychological and unobservable by nature, multiple indicators are applied to capture presumed manifestations that

may provide information about the true phenomena (i.e., latent constructs). In other words, the level at which a person holds on a latent construct is believed to predict how they respond to the indicators in the survey. The chosen indicators are based on a thorough inspection of previous research, aiming to match the theoretical conceptualization (content validity) as precisely as possible (reliability). Stated simply, the methodological approach aims to capture subjective experiences as objectively as possible.

In this quantitative approach, theory is primarily used deductively, as a basis for advancing research questions and as foundation for statistical model specifications. As such, the theories provide explanations for the investigated relationships between our variables (Creswell, 2014). However, a non-rigid deductive approach has been held, that is, an openness to alternative theories in cases of unexpected findings.

4.2 Research design

Two research designs are represented in the thesis: a cross-sectional design (*Study I*) and a longitudinal panel design (*Study II* and *Study III*). The designs are critical to the internal validity of the research, and hence, to the type of conclusions can be drawn (Trochim et al., 2016). Nonetheless, no method or design alone can guarantee the validity of an inference (Shadish et al., 2002), which is why various aspects of validity are elaborated in Section 4.7.

4.2.1 The cross-sectional design

In the cross-sectional design, information from a single measurement occasion is used, from which descriptive and correlational information is pursued. At the core of the regression-based approach applied in the current cross-sectional design (*Study I*), appropriate control variables are included to deal with the persistent challenge of potential spurious relationships (Skog, 2015). Control variables are included because of their expected influence (by theory and/or prior evidence) on the dependent variable, and they function to detect the unique association of the independent variable of interest (Creswell, 2014). Moreover, the inclusion of multiple independent variables simultaneously (e.g., several aspects of perceived support) can illuminate the unique association of each variable. Still, the main limitation of the cross-sectional design is the

single and simultaneous assessment of the proposed explanatory and outcome variables which makes it poorly equipped to provide causal inferences (Shadish et al., 2002; Skog, 2015).

4.2.2 The longitudinal panel design

Individuals develop and mature, face new challenges, are exposed to varying social environments, and their prolonged experience in a given institution can shift their approach to this institution. So, what characterizes such individual changes, and to what extent are different processes of change within individuals related? These are glimpses of why change is of intuitive interest in the social sciences (Allemand & Martin, 2016; Robinson et al., 2005), and specifically in educational psychology (e.g., Ettekal & Shi, 2020; Wilcken & Roseth, 2015).

A longitudinal panel design refers to a design in which the same individuals are assessed repeatedly (Skog, 2015), allowing investigation of psychological processes that unfold over time. The term "process" is used to refer to within-person variability (change) over time (Hamaker, 2012). With this design, we can investigate individual change, and predictors (or correlates) of such change, but since the design is not experimental, great caution is still warranted regarding causal conclusions. However, since individuals are followed over time, this increases the trustworthiness of the tested relationships because one has better control over factors that are stable over time (Finseraas & Kotsadam, 2013). Examples of such factors could be personality and response sets, which in cross-sectional designs can influence statistical associations (Cooper et al., 2020). The features of longitudinal associations are further discussed in the internal validity section.

4.3 Sample and procedure

The recruitment of students (respondents) to the current research went through recruitment of schools. It started with three upper secondary schools that our research center already had an established relationship with, and was continued by strategically contacting schools that would comprise a sample with geographical spread and a variety of educational programs and academic achievement levels. Due to our collaboration with Rogaland County school administration, only public schools in Rogaland were relevant. We also aimed

a balance between genders, and between academic and vocational track. The county administration advised the final selection of invited schools. Seven schools were contacted, and they all accepted the invitation. The degree to which the final sample resembles the Norwegian upper secondary population on certain characteristics is presented in Table 1.

The main data source was student self-reports through electronic surveys, and since the surveys were to be administered by the students' teachers, we prioritized travel to all schools and set up meetings with these teachers. This was to inform and motivate them to administer the data collection with accuracy at an appropriate time for their class (within a given 3-week span). One or two weeks ahead of the implementation, teachers informed students about the project, orally and through information published on their digital educational platform. In addition, a short film was shown as an introduction to each survey. Through this anchoring with the teachers and the film directly to the students, we aimed to obtain a good response rate and strengthen the quality of students' self-reports.

The first wave of data collection took place in February 2017 (T1; N = 1379), the second in October 2017 (T2; N = 1073), and the third in March 2018 (T3; N = 1008). The time points were chosen to create as equal intervals as possible, as well as to avoid the beginning of the school year, other large research projects in the county, and exam periods. Figure 3 shows the flow of participating students throughout the project. All who consented to participate at T1 were invited to do so at T2 and T3, i.e., participation at T2 was not a criterion for participation at T3. Students who repeated the first year of upper secondary instead of proceeding to the second year (5.7%) were also invited to further participate.

In total, the 1379 students from T1 constituted the study sample, and they were all enrolled in the first year of upper secondary school by T1, in ordinary school classes.[6] Most students (92%) were 16 or 17 years old at T1, which is the

[6] Students enrolled in specially adapted school classes were not invited to participate due to the format and content of the electronic survey. This involved students with special education needs enrolled in introductory classes because of their recent arrival to the country, or adapted education programs due to particular disabilities. This issue was discussed with school leaders and the county administration, and we concluded

expected age by the second semester of the first year in normal educational progress. Two students were aged 15, and the remaining 8% were 18 years or older. Because age was self-reported on a categorized year-by-year scale, with an upper category of "22 or more," an overall computed mean and standard deviation was not suitable. 52% of the study participants were male, and students in vocational tracks were slightly overrepresented (54%). The percentage of students with immigrant backgrounds (i.e., none of the parents born in Norway) was 17, similar as that of the Norwegian youth population (Kale & Hjelde, 2017).

that valid and sound ethical information from this group would require an alternative methodological approach.

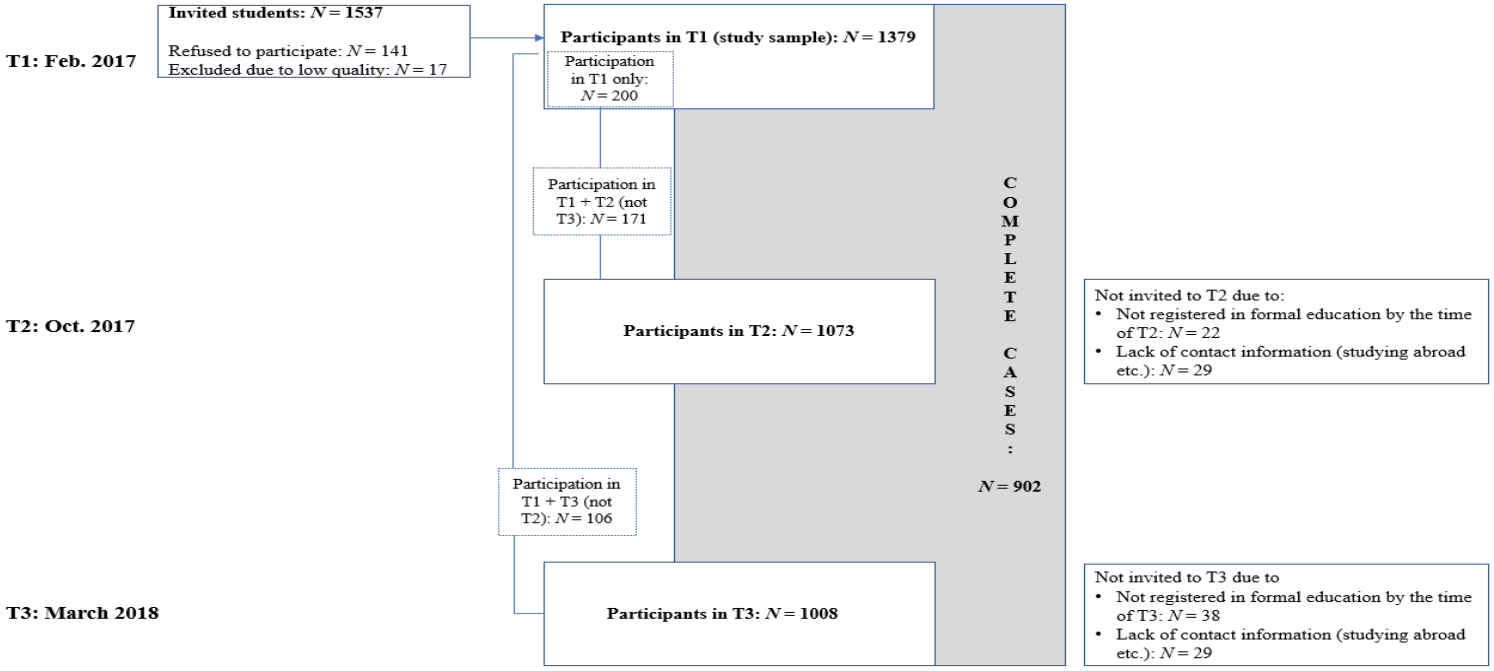

Figure 3. Flow chart of participants in the project

Upon recruitment, students were enrolled in seven different schools and distributed across 82 school classes. Since the structure of upper secondary education allows mobility across schools between the academic years, they were spread into 22 schools and 187 classes by T2. Only minor changes occurred between T2 and T3, as these time points were within an academic year. In total, 25% of the participants changed school during the study period.

A comparison of the sample with the youth population in Rogaland, as well as with the total Norwegian population is presented in Table 1, based on data from Statistics Norway (2021b; 2021c).

Table 1. Characteristics of the sample in comparison with the student population in Rogaland, and in Norway.

	Study sample	**Rogaland county population[a]**	**Norwegian population[a]**
Vocational/academic track	54.0% / 46.0%	52.3% / 47.7%	48.4% / 51.6%
Total grade points (1-60) from lower secondary school	39.7	41.1	41.2
Females:	42.3	43.7	43.4
Males:	37.2	38.7	39.0
Grades (1-6) from lower secondary school, in subjects Norwegian/English/Math	3.7/3.8/3.3	3.8/3.9/3.6	3.8/3.9/3.5
Completion within standard time[b]			
Vocational track:	51.7%	52.7%	48.0%
Academic track:	84.5%	81.5%	79.0%

[a] To correspond with the study sample, figures refer to the academic year 2016-2017 regarding academic/vocational track, and by the end of the academic year 2015-2016 regarding grades from lower secondary school (Statistics Norway, 2021c).
[b] For vocational track, this entails either journeyman's certificate after four years, or completion of an add-on academic year [*Påbygg*] after three years. For academic track, this entails study graduation after three years.

In sum, these comparisons indicate that the study sample had slightly lower achievement levels when they entered upper secondary school compared to regional and national statistics. Standard time completion was, however, quite similar to the regional rates for vocational track and slightly higher for academic track. This may suggest a tendency for the study sample to comprise students with high efforts in upper secondary education despite somewhat lower achievement levels. The sample also has a slight overrepresentation of vocational track (yet accounted for in all multivariate structural models, as a control variable). Except for the fact that the sample only consists of youth from one region in Norway, no further compelling reason was found to conclude that it was not representative of the target population.

4.3.1 Attrition and missing data

Because of the format of the electronic survey (described in *Study I* and in the section of ethics), no missing data yielded at the item level. However, there were missing data at the unit level (see Figure 3). For students who were absent from school at the original time slot for the survey, teachers were asked to organize a second session for completion, to minimize missing data due to absence. At T1, 2% of the study participants conducted the survey within the secondary option provided by the teachers (unfortunately, this information was not able to be traced at T2 and T3). Survey responses from students who started but did not complete the survey were regarded as non-consents and thus deleted from the sample. This was not a widespread problem but accounted for 1.5% of the initial respondents in T1, 1.6% in T2, and 1.9 % in T3.

Seventeen responses were omitted from the dataset due to low quality survey completion at T1 (indicated by particularly low response time combined with exclusively extreme values on target items). We chose this type of "screening" after T1 as an inclusion criterion but did not perform similar screening after T2 or T3. This was based on the concern that this would be too intrusive on the sample, given that students at this point had consented to participation not only once, but repeatedly.

Regardless of whether students participated in T2 and T3, all participants provided matching with county register data. This was specified in the informed consent form at T1 and led to very low missingness in register data. Even so,

due to the national regulation that students who have not obtained grades in at least 50% of the subjects in lower secondary school do not gain overall grade points from compulsory school (*Grunnskolepoeng*)[7], 5.2% of the sample lacked overall grade points. The majority of these students had an immigrant background. To reduce the number of missingness in register data due to this issue, we composed a variable consisting of the average of three main academic subjects from lower secondary school (Norwegian, Mathematics, and English), and for students who did not have any of these grades from lower secondary, we imputed the average grade of the corresponding subjects from the first semester of upper secondary school, to represent "prior academic achievement level."

Analyses that were conducted to detect missing data mechanisms from the self-reports revealed that missingness were *not* completely at random (Enders, 2010). Attrition was associated with several variables, such as academic achievement from lower secondary school and aspect of motivation at T1 (see correlations in supplemental material of *Study II* and *Study III*), suggesting that students who did not provide complete data were less motivated for school and more likely to be low achievers than those who did. Although not surprising, this called for considerations regarding how to avoid potential estimation bias. A full information maximum likelihood procedure (FIML) was applied in Mplus, which retains all observations in the analyses and uses all available data in the model to provide parameter estimations. Additionally, auxiliary variables (specified in the supplementals of *Study II* and *Study III*) were used to support the plausibility of data missing at random (MAR). The MAR assumption implies that missingness is a function of other measured variables (variables included in the model, or intentionally added as auxiliary variables); however, there are no techniques to *confirm* the MAR assumption (Enders, 2010). Importantly, the FIML procedure is regarded a robust approach to handle missing data, requiring a relatively less stringent MAR assumption (Enders, 2010; Widaman, 2006). With this approach, there is no general rule of "how much missing data is ok;" rather, the degree to which the missing data is recoverable is more related to whether the model contains variables that solidly

[7] According to national statistics for the academic year 2016, this came to 4.9% of all students (Statistics Norway, 2021c).

represent the MAR process (Little, 2013). However, there seems to be a consensus that it is preferable to use all available data instead of choosing an exclusive complete case strategy that relies on an often unrealistic missing completely at random (MCAR) assumption (Enders, 2010; Little, 2013).

4.4 Measures

4.4.1 Overview of the measures

An overview of the self-report measures applied in the three studies is presented in Table 2, and the wording of all items are provided in Appendix 4. Except for two scales (perceived feedback quality and achievement ambition), all scales were derived from measures in earlier published work. Some of them had undergone slight adjustments, as noted in the individual papers. Since particular importance lies in the dependent variable (intentions to quit school), a more thorough description is devoted to this measure after Table 2. Strategies to evaluate the psychometric qualities of the measures are described in Section 4.4.2.

Table 2. Overview of measures

Construct (no. of items)	**Item example**	**Response categories**	**Derived from**	**Study**	**Reliability (α)**
Intentions to quit school (5)	*I have concrete plans to quit school.*	1 (*Absolutely not true*) to 6 (*Absolutely true*)	Frostad et al., 2015; Vallerand et al., 1997	*Study I* *Study II* *Study III*	T1: .88 T2: .89 T3: .90
Academic boredom (4)	*While studying, I seem to drift off because it's so boring.*	1 (*Completely disagree*) to 6 (*Completely agree*).	King, 2010; Pekrun et al., 2011	*Study I*	T1: .90
Emotional engagement (5)	*When we work on something in class, I feel interested.*	1 (*Completely disagree*) to 6 (*Completely agree*).	Skinner et al., 2008	*Study I*	T1: .89
Perceived emotional support from teachers (5)	*I feel that my teachers care about me.*	1 (*Completely disagree*) to 6 (*Completely agree*).	Bru et al., 2002; Bru et al., 2010	*Study I* *Study II* *Study III*	T1: .94 T2: .94 T3: .95
Perceived autonomy granting (3)	*I can participate in decisions regarding how I work with my learning tasks.*	1 (*Completely disagree*) to 6 (*Completely agree*).	Bru et al., 2010; Studsrød & Bru, 2012	*Study I*	T1: .87

Perceived feedback quality (5)	*I often get feedback from the teachers that I can use to improve my schoolwork.*	1 (*Completely disagree*) to 6 (*Completely agree*).	-	*Study I*	T1: .89
Loneliness among peers at school (6)	*I feel lonely at school.*	1 (*Absolutely not true*) to 6 (*Absolutely true*).	Asher & Wheeler, 1985; Frostad et al., 2015	*Study II*	T1: .94 T2: .95 T3: .96
Perceived mastery climate (5)	*In my class, mistakes are okay as long as we are learning.*	1 (*Completely disagree*) to 6 (*Completely agree*).	Meece et al., 2006; Midgley et al., 2000	*Study III*	T1: .78 T2: .82 T3: .82
Achievement ambition (3)	*It is important for me to get a good education.*	1 (*Completely disagree*) to 6 (*Completely agree*).	-	*Study III*	T1: .87
Academic self-concept (4)	*I learn easily in all subjects.*	1 (*Completely disagree*) to 6 (*Completely agree*).	Skaalvik & Skaalvik, 2009	*Study III*	T1: .78

Notes.
- denotes that the scale was constructed for the present work.
Reliability (α) is Cronbach's alpha.

4.4.1.1 Detailed description of assessment of intentions to quit school

The five indicators of intentions to quit school in the current research were derived primarily from Frostad et al.'s (2015) measure of intention to leave upper secondary school, which in turn refers to Valås (2001) and Vallerand et al. (1992). The latter (Vallerand et al., 1992) is a validation of the Academic Motivation Scale (AMS) based on the tenets of different types of motivation in SDT. It is in the AMS subscale for *amotivation* that we find some of the formulations included in the scale of intention to leave (e.g., *I really feel that I'm wasting my time in college*). This origin of the measure underscores the conceptual link to amotivation.

In the process of adjusting the scale by Frostad et al. (2015) to the current research, we were guided by three principles. First, we purposely strengthened the element of intentions to *behavior*, aiming to be more in line with the motivational model of dropout by Vallerand et al. (1997), and thus added the item *I have concrete plans to quit school.* Second, we did not allow wording that pointed to an explanation of why these intentions emerge; thus, we excluded the following three items originally in Frostad et al., 2015: *I often consider leaving this school because the subjects are too theoretical; I often consider leaving this school because of problems in my family;* and, *I often consider leaving this school because of continuous conflicts with my teachers.* Finally, we wanted the items to represent intentions to quit school in general, and not an intention to change school or educational program. Item formulations like *I consider leaving this school and finding a job instead* were therefore adjusted to *I consider leaving school and finding a job instead.* Through this process we ended up with the five items reported in Appendix 4.

4.4.2 Measurement models and measurement invariance

In *Study I*, the statistical models were specified with latent factors (and thus all observed indicators), whereas composite scores were created in *Study II* and *III* due to overall model complexity. However, measurement models with latent factors were initially inspected for constructs involved in the latter studies as well, to assess how well the expected measurement model fitted the covariance

matrix of the observed data (Brown, 2015). A well-fitting measurement model would support construct validity. Particular attention was given to factor loadings (preferably > .40), the root mean squared error of approximation (RMSEA, preferably < .070), the standardized root mean square residual (SRMR, preferably < .080), the comparative fit index (CFI, preferably > .95), and the Tucker-Lewis index (TLI, preferably > .95) (Hooper et al., 2008). Modification indices were routinely inspected to identify possible misspecifications. See individual papers for detailed results. In sum, standardized factor loadings were satisfactory (lowest = .47; found for one item of academic self-concept; *Study III*), and an overall consideration of the above-mentioned fit indices indicated acceptable to good model fit (Brown, 2015; Hooper et al., 2008).

Multigroup and longitudinal invariance testing were performed to verify that meaningful comparisons across groups and time could be made with the instruments of interest. Regarding longitudinal measurement models, we followed Little's recommendation (2013) to allow the residuals of items measured repeatedly to correlate; to account for any systematic variance associated with the particular item and avoid forcing it into other parameters in the model (Little, 2013). The measurement models were tested for invariance across genders in *Study I*, and across time points in *Study II* and *Study III*. More and more restrictive models (adding equality constraints) were inspected and evaluated according to the recommendations provided for multigroup and longitudinal invariance testing (Chen, 2007; Cheung & Rensvold, 2002; Meade et al., 2008). The series of tested models allowed us to conclude that the relevant measures were sufficiently invariant across gender (at T1, *Study I*), and across time *(Study II* and *Study III*).

4.4.3 Control variables

Aiming to adjust for potential alternative explanations for the associations between the constructs of interest, gender, academic achievement from lower secondary school, and study track were consequently included as control variables in the structural models. These variables were chosen as control variables because they have repeatedly been found as predictors of motivation, dropout, and dropout intentions (Battin-Pearson et al., 2000; Frostad et al.,

2015; Hardre & Reeve, 2003; Markussen et al., 2011; Wang & Fredricks, 2014), and could also be expected to covary with our independent variables. These variables were obtained from county register data. To represent academic achievement level from lower secondary school, the mean of the three core subjects Norwegian, Mathematics, and English was used (α = .86).

In *Study I*, immigrant background was also included as a control variable (based on participants' reports of their parents' country of birth), but as this variable showed no effect or influence on models in *Studies II* and *III*, it was not used further. As noted in *Study I*, other available variables were initially tested as control variables, but since they did not add or change anything in the models as long as prior achievement was included, they were regarded as inessential and not retained. This supports prior research conclusions, that the effects of family SES and demographic characteristics on educational outcomes in upper secondary education are primarily *indirect* (Markussen et al., 2011), that is, they are captured by the level of academic achievement by the end of lower secondary school.

4.5 Statistical analyses

4.5.1 Structural equation modeling

Structural equation modeling (SEM) is an umbrella term for analyses in which unobservable latent variables are estimated from observed indicator variables, and the estimation of relations among the latent variables are of key interest, free of the influence of measurement error (Wang & Wang, 2020). A key concept in SEM is also the flexibility to model complex relationships among multiple concepts, including direct and indirect effects/associations (mediation), and interaction effects (moderation) (Kline, 2011).

Initial descriptive analyses were conducted in SPSS (v.26), and all SEM-analyses were conducted in Mplus (v.8). Mplus offers particular estimations suited to account for non-normal distributions of variables, hence, all models were run with the maximum-likelihood estimation with robust standard errors (MLR; Muthén & Muthén, 1998-2017). Due to a heavy non-normal distribution of loneliness among peers (kurtosis up to 5.75, *Study II)* which was suspected

to provoke initial computation problems in the multivariate latent growth model, this score was transformed with Templeton's procedure (2011) as described in *Study II*. To examine gender as a moderator in *Study I*, a multigroup approach was used, in which a chi-square difference test with Satorra's correction for MLR (Satorra & Bentler, 2001) functioned to determine whether the strength of associations between concepts of interest significantly differed across genders.

Because of the increasingly complex models in *Study II* and *Study III*, composite scores were chosen to achieve model identification. Such a manifest-variable approach to latent growth curve modeling is popular and widely used (Little, 2013); however, this shift to application of manifest variables represents a lower accuracy in the measures compared to a multiple indicator approach. One may also discuss whether the term SEM can cover these analyses as long as they do not apply multiple indicators in a latent variable approach. However, this is frequently seen in the literature (e.g., Little, 2013) and justified by the issue of modeling latent (unobserved) growth factors disentangled from an estimated residual. The latent growth curve model is described next.

4.5.2 Investigating change: Latent growth curve modeling

To investigate individual change (*Study II* and *Study III)*, latent growth curve modeling (LGCM) was performed (Bollen & Curran, 2006; Duncan & Duncan, 2009; Little, 2013). This approach addresses questions of inter-individual differences in intra-individual change; that is, variability in individual trajectories (Little, 2013). LGCM is denoted as a "static" model of growth,[8] meaning that time is entered explicitly by means of a specified factor loading matrix, and hence, the outcome is modeled as a function of time (Serang et al., 2019). Based on the repeated measures (here, three waves), two latent growth factors are estimated: an *intercept* and a *slope*. The intercept represents the initial level, and the slope represents the rate of change per unit of time. Means of intercepts and slopes represent group-level information (fixed effects),

[8] Contrasted with a "dynamic" model (e.g., a latent change score model), which refers to a model where time enters the model implicitly; a score at a given time point is treated as a function of the score at the previous timepoint (Serang et al., 2019).

whereas individual differences are represented in the variances (random effects) of these growth factors (Duncan & Duncan, 2009).

Because the dataset was restricted to three waves, no functional forms other than the linear could be appropriately tested. Therefore, bearing in mind that assuming linear change is a rather restrictive assumption, freeing up one factor loading can be advocated in cases where theory, plots, and/or fit statistics indicate that a linear form poorly captures the individual growth. This involves allowing the shape of the growth to be determined by the data (Wang & Wang, 2020). As described in *Study II*, this was the case with loneliness, indicating a tendency of non-linear growth (an increase from T1 to T2, which flattened by T3).

4.5.2.1 "Within-person change"

When investigating change in psychology, the distinction between "within-person change" and "between-person change" is debated from methodological and conceptual perspectives (Allemand & Martin, 2016; Gillen-O'Neel & Fuligni, 2013; Hamaker, 2012). In the current research, *individual change* (or simply *change*) refers to "within-person change" (also termed intra-individual change), that is, the change that unfolds within individuals over time. This within-person variability (change) over time is contrasted by approaches that capture "between-person change" (also termed inter-individual change), that is, change in the rank order of individuals over time. Since the theories underlying the current models encompass psychological processes that occur within individuals, within-person change was of main interest (Allemand & Martin, 2016; Hamaker, 2012).

4.5.2.2 Treating change as a predictor of change

The multivariate LGC models in *Study II* and *Study III* allowed multiple processes to be modeled simultaneously, in which one slope (intentions to quit) was modeled as a function of growth factors of one or more concurrently assessed phenomena. This can be referred to as a "directional" multivariate latent growth curve model (Bollen & Curran, 2006). This involves, among other parameters of interest, an investigation of the degree to which the rate of change in one concept is associated with the rate of change in another concept

(correlated change; Allemand & Martin, 2016). Such path modeling within a latent growth curve framework is methodologically discussed in, for example von Soest and Hagtvet (2011) and Cheong et al. (2003), and requires a particularly strong theoretical underpinning, because the part of the model where slope "predicts" slope is not supported by design. As with a cross-sectional path model, great caution must be taken in terms of causal interpretation.

4.5.2.3 Identifying subpopulations with distinct trajectories: Growth mixture modeling

As a person-centered extension of LGCM, growth mixture modeling (GMM) was applied in *Study III* (Morin et al., 2020; Wang & Wang, 2020). Using this strategy, latent subgroups with distinct longitudinal trajectories of perceived emotional support from teachers were explored. This approach allows investigations from the outset of a priori unknown subgroups. GMM is a probabilistic approach in which each individual's probability of belonging to the identified trajectory subgroups is estimated. The determination of the optimal model is based on a combination of recommended statistical indices, theory, and parsimony (Wang & Wang, 2020). The enumeration process was currently conducted without covariates, since mixture model solutions can be largely influenced by adding covariates and this tends to lead to overextraction of groups; thus, it is recommended to perform the GMM unconditionally (Nylund-Gibson & Masyn, 2016).

To further investigate the trajectory subgroups that were identified through the GMM, the auxiliary approaches BCH and R3STEP (Asparouhov & Muthén, 2019) were used to determine differences in achievement ambition and academic self-concept across subgroups. Finally, each case's posterior probabilities of being assigned to the identified subgroups were used as predictors of change in intentions to quit, indirectly via change in perceived mastery climate. The choice of pursuing these auxiliary approaches and the posterior probabilities of subgroup membership, instead of "most likely membership" as a categorical variable in further analyses was to account for the imperfect classification of a case into a subgroup (Wang & Zhou, 2013). By such, we avoided unwanted shifts in the classification (a well-known challenge

when adding external variables into a GMM; McLarnon & O'Neill, 2018) and applied a correction for the evident classification error.

4.6 The hierarchical structure of the data

The data had a hierarchical structure: students were nested in classes and classes in schools. Hence, the assumption about independence of observations was violated (Field, 2013). This required a thorough inspection to determine the degree to which this could affect any statistical inferences, given that standard errors may be underestimated in cases where dependency in data exists but ignored (Hox et al., 2018). Such a scenario can lead to Type I errors (acceptance of a false hypothesis). Since the research questions considered *student-level perceptions* and students' *individual intentions* to quit school and did not involve multilevel theory, multilevel modeling was not considered preeminent. However, an inspection of the amount of variance at the cluster level (intra-class correlations; ICC[9]) and the degree to which the clustering influenced the standard errors (design-effect; *Deff* [10]*)* were imperative to guide further handling of the nested data structure.

School-level variance is typically low in the Norwegian school system (OECD, 2019), and hence, low ICC-values were expected at this level. This expectation was supported; inspections of the relevant variables showed school-level ICC-values typically around .02, and none above .04. No further investigations were therefor considered at this level. Some more clustered variation was detected at the classroom level. The results showed that classroom-level variance was 6% for intentions to quit school (composite score) at T1 (ICC = .061), with a *Deff*

[9] ICC refers to the proportion of the total variance that can be attributed to the cluster level (here, school or class), i.e., how much of the variance in students' responses is explained by cluster membership (Hox et al., 2018).

[10] *Deff* is a quantification of the degree to which the clustering produces bias in the standard errors, taking the cluster size into account (Hox et al., 2018). *Deff* is a function of ICC and average cluster size (*c*), i.e., larger cluster sizes give higher *Deff*: *Deff* = 1 + (*c* - 1) x ICC.

of 1.97 (i.e., just below the suggested cut-off of 2.0; Hox et al., 2018). At T2 and T3, *Deffs* were markedly lower (1.50 and 1.58, respectively), because of the considerably smaller clusters at these occasions (participants were spread into more classes, as described in Section 4.3). By T2, 70 of the participants actually belonged to classes without any classmates involved in the study. For further clarity regarding the classroom variance in the dependent variable, a follow-up investigation was conducted and showed that the ICC (T1) was considerably reduced and non-significant (0.026, $p = .062$) when gender and prior achievement were included as predictors.

Notably, the classroom-level ICC-values were slightly higher for the perceived learning environment factors (range .093-.136 at T1) compared to the dependent variable (intentions to quit). The highest ICC was found for perceived emotional support from teachers with a *Deff* of 3.15 at T1. At T2 and T3, however, all the *Deff*s were below 2.0.

To sum up, since some *Deff*s were just around or above the suggested threshold of 2.0, analyses that could properly adjust the standard errors were actualized. As described in the articles, this was addressed by applying a sandwich estimator (type = complex in Mplus) (McNeish et al., 2017; Muthén & Muthén, 1998-2017). In general, these follow-up analyses[11] with the SE-adjusted estimation detected small changes in the standard errors, but none of the parameters of interest turned from significant to non-significant at the .05 level. Based on these indications of the non-substantial influence of the dependency in the data, results presented in the studies derive from single-level models without controlling for any clustering effect.

4.7 Validity

Validity refers to the approximate truth of an inference. It is not a definite label of true or false; rather, researchers invoke degrees of trustworthiness in different aspects of the study (Shadish et al., 2002). Four dimensions of validity

[11] In *Study I* the follow-up analyses were conducted with factor scores instead of latent variables, to reduce the numbers of parameters in the model. In *Study II* and *Study III*, the numbers of parameters were not that crucial because of the use of composite scores. However, the instability in students' class membership (switches between schools and classes) required this to be done separately for each cluster variable.

are proposed: statistical conclusion validity, construct validity, internal validity, and external validity (Cook & Campbell, 1979; Shadish et al., 2002), and these dimensions structure the following consideration of validity of the present research. Since reliability is an aspect of measurement quality (Trochim et al., 2016), reliability is elaborated in the section on construct validity (Skog, 2015).

Statistical conclusion validity entails how solid a statistical association is (Shadish et al., 2002), and relates to the choice of adequate and relevant statistical methods. Considering the current research, the relatively large sample, application of multiple indicators for each measured construct, and options to use robust estimations (MLR) were conditions that justified the chosen parametric statistical analyses based on SEM. Whereas low statistical power is a common threat to Type II errors (incorrectly conclude that there is no statistical relationship; Shadish et al., 2002), the size of the current sample did not highly actualize this, but rather emphasized the need to consider the strength of identified associations, and not only whether or not it was significant (i.e., p value < .05). Nonetheless, checking all results with the complex option in Mplus was a way to account for the dependency of observations which could have led to erroneous conclusions due to underestimated standard errors (Hox et al., 2018). In addition, application of the bootstrapping approach and inspection of the 95% confidence intervals for indirect effects (*Study I* and *Study III*) were efforts to strengthen the statistical conclusion validity.

Construct validity involves the trustworthiness of any inferences regarding the relationship between the assessments and the higher-order constructs they represent. This entails the "twin" problem of construct validity: *understanding*, and *assessing* the construct (Shadish et al., 2002). The pivotal point lies in the match between the assessments and the construct they are meant to represent. This is a crucial point of validity in this research, since it entails abstract entities.

Regarding the first point (understanding the constructs) the current work relies heavily on existing definitions in the literature. However, the broad field of motivation and engagement has challenges in definitional incongruence, labeling, and partly overlapping constructs (Eccles, 2016; Murphy & Alexander, 2000). This has raised some particular issues, such as the incorporation of engagement in the process of motivation. Also, considering

the concept of intentions to quit school, its nature and ties with other motivational concepts have required a conscious navigation between an understanding of it as a proxy for dropout behavior (e.g., Hardre et al., 2019), as an intention to change educational direction (e.g., Eicher et al., 2014), as an aspect of student engagement (e.g., Garvik, 2017), or as a response to lack of motivation (e.g., Legault et al., 2006; Vallerand et al., 1997) which has led the student's goal direction (intentions) away from school. As described earlier, the latter has functioned as the current understanding of the phenomenon. Nevertheless, it is important to bear in mind these conceptual ambiguities in the field.

Regarding the second point (how well the observed indicators assess the intended phenomenon), this was based on a combination of previous evidence of the psychometric properties of the instruments and through applied statistical tools, primarily confirmatory factor analyses (CFA) and estimation of reliability. It also involved discussions with colleagues (researchers and teachers) of the face validity of the wording of the indicators, since statistical tools cannot alone ensure that the intended meaning of a concept is covered (Alexandrova, 2014).

Reliability is the ability of a measure to produce consistent results for an entity (Field, 2013), and is a prerequisite, though not sufficiency, of construct validity (Skog, 2015; Taber, 2018). If a measure has poor internal consistency, it can reduce statistical power and attenuate observed correlations (Kline, 2011) which is why reliability can also be considered an aspect of statistical conclusion validity (Shadish et al., 2002). In multi-item measures, internal consistency reliability refers to the degree to which responses are consistent across items and is most commonly estimated by Cronbach's alpha (α) (Taber, 2018). All scales included in the current work showed Cronbach's alpha ≥ .78 which is generally considered acceptable (Field, 2013). Importantly, since a high α does not necessarily imply that the scale measures *one* underlying factor (is unidimensional; Taber, 2018), the factor structures were additionally inspected by CFA (Brown, 2015). A very high α value (above .90), which was currently found in emotional support and loneliness among peers, may indicate redundancy, i.e., that fewer items could have been sufficient (Taber, 2018).

Furthermore, because of the known shortcomings of Cronbach's alpha for estimating internal consistency of not perfectly unidimensional scales (Dunn et al., 2014; here indicated by the need for allowing some item residual correlations, see *Study I*), follow-up analyses estimating McDonald's omega *(ω)* for each scale were conducted (Hayes & Coutts, 2020). The *ω* were very similar to the α (none of them diverged more than 0.02), indicating that any tendencies of multidimensionality did not substantively violate the assumptions underlying Cronbach's alpha. In sum, both Cronbach's alpha and McDonald's omega indicated that the measures had good internal consistency.

Finally, a particular dimension of construct validity regards the issue of assessing *change*. The critical question is; if we detect change, is it the person/the phenomenon that has changed (true change), or has how the measure works changed? This has historically been a critical issue in longitudinal methodologies, and statistical approaches have been developed to seek out whether a detected change represents true (alpha) change, and not a person's altered understanding of the phenomenon (gamma change), nor a recalibration of the response categories (beta change; Armenakis & Zmud, 1979; Golembiewski et al., 1976). To this, it was considered that the relatively short duration of the study was unlikely to involve a certain developmental maturation among the adolescents which could have imparted a new meaning to the concepts, and no particular reason was found to expect a recalibration of the scale. The longitudinal measurement invariance testing (described in Section 4.4.2. and in the articles) supported the notion that the measures were satisfactorily stable over time.

Internal validity considers the trustworthiness that any relationship between X and Y represent a causal relationship (Shadish et al., 2002), which is more commonly a "striving for" rather than expected to be perfectly met in applied social science. However, the *interest* in causal effects has been prominent in the social sciences from its very beginning and has faced a renaissance with the popularization of SEM (Bollen & Pearl, 2013). Close considerations about what SEM can and cannot do in terms of supporting causality are still warranted. In this thesis, the structural parts of the SEM models have incorporated causal *assumptions* (Bollen & Pearl, 2013), based on theoretical reasoning and some previous empirical work. For a causal relationship to be established, however, the research must convince that (1) X is associated with Y, (2) X precedes Y in

time, and (3) no other explanation for the relationship is plausible (Shadish et al., 2002; Skog, 2015). Although the first criteria have been verified through robust statistical approaches in the current research, the other two criteria are weaker established. The lack of temporal order of variables in the cross-sectional SEM model in *Study I*, is a main hindrance for criterion 2. The modeled prediction of intercepts to slope in *Study II* has the advantage of time precedence, while the modeled prediction of slopes to slope in *Study II* and *Study III* lacks this advantage. These modeled associations rely heavily on theory, and the estimated effects should be interpreted as "given this model." The inclusion of control variables (relevant in all current studies) generally served to adjust for alternative explanations (criterion 3), yet there may be concerns about whether other control variables should have been included.

Whereas the cross-sectional correlations represent the relationship between levels on variables at a single measurement occasion, the correlated change (or "slope predicting slope") represents the dynamic variant within individuals; the degree to which the rate of individual change in one concept is systematically related, or even caused by, individual change in another variable (Allemand & Martin, 2016). These associations between slopes were also controlled for initial levels and associations between initial levels of the included variables. By such, each individual serves as their own "control group," and the association represents a more precise relationship between variables unaffected by initial differences (Allemand & Martin, 2016; Finseraas & Kotsadam, 2013). Still, we cannot rule out whether there is an unobserved common variable driving the associations between slopes, or whether the associations are recursive (Allemand & Martin, 2016; Robinson et al., 2005). In sum however, associations between rates of change are regarded as one step further in terms of internal validity, compared to cross-sectional associations (Cheong et al., 2003; Skog, 2015).

External validity concerns the extent to which inferences from a particular study are true across persons, settings, or contexts (Shadish et al., 2002). Do conclusions from this work hold for a larger population? This relates to the degree to which this non-random sample from Rogaland differs from the population on observed or non-observed characteristics relevant to the research questions. As indicated by Table 1, the sample appeared to be largely

comparable with Rogaland's and national populations on selected parameters. Still, considerable differences in educational systems are seen from an international perspective, as well as across regions in Norway. Also, students from private schools were not represented; all of which conclusions from the current research must take into account.

Furthermore, the non-completely at random attrition at T2 and T3 (described in Section 4.3.1.) was handled with sophisticated missing data methods, but there is no way of testing (confirming) that the MAR assumption is met (Enders, 2010). Therefore, generalization of the findings regarding developmental change should be done with caution.

Finally, the fact that the whole sample derived from a single cohort (upper secondary first graders in the academic year 2016–2017), our findings might have been related to specific events occurring in this particular group, implying a restriction of full generalization to other cohorts (Little, 2013). The fact that these students started in upper secondary school the same year as the national regulation of absence from upper secondary school was implemented, could be such an influential event. Also, that they were upper secondary students from "pre-COVID-19" times might be relevant for comparisons with future studies.

4.8 Ethical considerations

The overarching research project was approved by the Norwegian Centre for Research Data (NSD) in 2016 (Appendix 5). Leading up to this approval were considerations among colleagues and conversations with NSD addressing the following issues in particular:

First, it was important that the information to the invited adolescents was clear and precise, so that their decision to participate was based on a true **informed consent**. We decided to start the data collection not until the second semester of the first year of upper secondary school, partly because students then had turned 16, an indicated threshold for young people to decide on this type of research participation independently of their parents (NSD, 2021). Emphasis was placed on using a language that the adolescents would understand.

Second, to secure students' **confidentiality,** a coding system was developed in collaboration with the county administration and the center's research administration, which enabled secure matching of individuals' self-reports at each wave, as well as with the register data. This resulted in data files for the researchers that contained no person-identifiable information, and names of schools and classes were also replaced by codes.

Third, to ensure that participation was **voluntary**, this was clearly stated in both written and oral information to the students, and the option to quit at any point was emphasized. However, we decided to keep a survey format in which a response to each question was requested to proceed to the next page in the survey. This was done to avoid unintended missing data but may have provoked some pressure to answer. We introduced this discussion with NSD, who did not consider this a problem, as long as exit from the survey always was an option. Students in the pilot study also did not indicate this as a problem.

Finally, to avoid an exhaustive questionnaire, we critically judged the necessity of each scale in use. We also ensured that the questionnaire was dominated by positively worded items to prevent potential harm by statements of a negative nature. Nonetheless, we instructed teachers who administrated the data collection to be aware of the students' mood and behavior during and after the survey completion.

5 Results

5.1 Summary of findings of *Study I*

Perceived teacher support and intentions to quit upper secondary school: Direct, and indirect associations via emotional engagement and boredom. Co-authors: Edvin Bru and Thormod Idsøe.

The main aim of this cross-sectional study was to investigate how three aspects of perceived teacher support (emotional support, feedback quality, and autonomy granting) were related to intentions to quit school among first-year upper secondary students. Guided by SDT (Niemiec & Ryan, 2009; Skinner et al., 2008; Vallerand et al., 1997), we proposed and tested a structural equation model (SEM) in which emotional engagement and academic boredom acted as intermediate variables between the three need-supportive aspects of perceived teacher support and intentions to quit school. To gain a better understanding of these phenomena among upper secondary school students, an initial aim was to investigate the respective descriptive information from students' self-reports.

About 10% of the students reported intentions to quit school at a level likely to represent serious dropout intentions, and 70% reported no such intentions at all. Approximately half of the students (49%) confirmed academic boredom during class and schoolwork. Most students perceived teachers to be supportive, yet the variance between students was substantial. The SEM model revealed that all three aspects of perceived teacher support were negatively indirectly associated with intentions to quit school (emotional support β = -.12**, feedback quality β = -.07**, autonomy granting β = -.13**),[12] via emotional engagement and academic boredom. In addition, perceived emotional support from teachers showed a direct negative association with intentions to quit school (β = -.12**), thus, was indicated as a particularly important aspect of teacher support (total effect β = -.24**). The association between academic boredom and intentions to quit school was noteworthy (β = .41**). None of the investigated associations were moderated by gender.

[12] ** indicates *p*-value < .01, and * indicates *p*-value < .05 throughout the thesis.

5.2 Summary of findings of *Study Ⅱ*

Intentions to quit, emotional support from teachers, and loneliness among peers: Developmental trajectories and longitudinal associations in upper secondary school. Co-authors: Edvin Bru, Thormod Idsøe, and Christopher Niemiec.

Based on the assumption that dropout from school is a culmination of a *gradual* process (Archambault et al., 2009; Finn, 1989; Rumberger, 2011), intentions to quit school was investigated longitudinally, as unfolding in the psychosocial context of school. Perceived emotional support from teachers and loneliness among peers were considered operationalizations of the degree of relatedness perceived in school (Niemiec & Ryan, 2009; Ryan & Deci, 2017b), and their longitudinal associations with individual change in intentions to quit during the first and second years of upper secondary were of main interest. Initially, the unconditional developmental trajectories of intentions to quit school, loneliness among peers, and emotional support from teachers were investigated.

By means of latent growth curve modeling (LGCM), average increases in intentions to quit school and loneliness among peers were detected, and no average change in perceived emotional support from teachers. Significant variance around all intercepts and slopes was found, indicating substantial individual differences in these trajectories. In a multivariate LGC model, individual change in intentions to quit school was significantly associated with individual change in perceived emotional support from teachers (β = -.30**), and with individual change in loneliness among peers (β = .59**). No significant predictions were found from the initial levels (intercepts) of these aspects of relatedness in school.

5.3 Summary of findings of Study Ⅲ

Trajectory subgroups of perceived emotional support from teachers: Associations with change in mastery climate and intentions to quit upper secondary school. Co-authors: Tuomo Virtanen and Edvin Bru.

Aiming to further explore the variance in individual trajectories of perceived emotional support from teachers, and to detail the relationship with intentions

to quit school, a combined analytic approach of growth mixture modeling (GMM) and multivariate LGCM[13] was applied. First, the presence of distinct trajectory subgroups of perceived emotional support was explored, and the identified subgroups were then further inspected to determine whether they differed in academic self-concept and achievement ambitions. Finally, a model guided by achievement goal theory (AGT; Ames, 1992; Patrick et al., 2011) was tested, in which subgroup membership information from the GMM was used as predictors of change in intentions to quit school, indirectly via change in perceived mastery climate.

Three trajectory subgroups of perceived emotional support were identified: *stable-high* (84.9%; the normative group), *decreasing* (7.8%), and *low-increasing* (7.3%). The subgroups differed in levels of achievement ambitions and academic self-concept: *Low-increasing* was characterized by low levels of both academic self-concept and achievement ambitions, whereas *decreasing* displayed academic self-concept equivalent to *low-increasing* but high achievement ambitions. Notably, membership in *decreasing* was associated with more negative development in perceived mastery climate compared to the normative group, and this was further associated with more increase in intentions to quit school. However, the opposite route (less increase in intentions to quit) of *low-increasing* was not empirically supported.

[13] The term *parallel process latent growth curve model* (PP-LGCM) was used in the article.

6 Discussion

The overall aim of this research was to empirically investigate how students' perceptions of the psychosocial learning environment in upper secondary school are related to their intentions to quit school. Given that each specific research question is discussed in the individual papers, this section attempts to provide a more integrative discussion of the results and is therefore structured thematically. Hence, I first discuss the descriptive results concerning the outcome variable (intentions to quit school) before proceeding to the roles of the factors investigated as its potential predictors. The focus is on their associations with intentions to quit, while their descriptive information is given less attention. To help the reader link back to the specific research questions, these are referred to by their respective numbers in parentheses (e.g., RQ 1a).

6.1 Intentions to quit school: Initial levels and individual change over time

The levels of student-reported intentions to quit school by the initial time point (RQ 1a) can be considered relatively low, in that 70% had scores indicating no such intentions (Table 1, *Study I*). Ten percent of the students had scores indicating that their responses were dominated by the confirming end of the response scale (the three upper categories), and thus interpreted as a certain level of concern. This first time point was expected to be a moment when students have had time to familiarize with the system, while still early in their upper secondary education, and thus represented a "baseline" for this thesis's variable of main interest. Due to the lack of reported descriptives in studies with the similar scale (Frostad et al., 2015; Haugan et al., 2019), and no established cut-off, caution must be given to interpretation of these descriptives. That said, it has been documented that higher level of self-reported intentions to quit school is associated with increased likelihood of dropout behavior and disrupted educational transitions (Vallerand et al., 1997; Vasalampi et al., 2018). Hence, future studies examining the sensitivity and whether there is a dropout risk threshold in this measure, would be a central contribution to the field.

Nonetheless, in light of dropout statistics (referred to in the Introduction), the relatively low scores at this time point questions whether quite some of the dropouts in the official statistics are non-intended and driven more by structural hindrances (e.g., lack of apprenticeships; Markussen, 2016). It may also indicate that such intentions manifest later in upper secondary school. Indeed, further results (RQ 3a) showed a general tendency of students' intentions to quit becoming stronger throughout the second year. This overall increase was expected, primarily based on statistics showing that dropout is particularly prevalent after the second year (Udir, 2021), but also in line with findings of a general motivational impairment as students get older and have spent more time in the educational system (Bask & Salmela-Aro, 2013; Engels et al., 2017; Wang et al., 2015; Wang & Eccles, 2012). As noted in the section on measures, the current measure of intentions to quit has roots in the concept of academic amotivation (Frostad et al., 2015; Vallerand et al., 1992). This further actualizes the perspective of intentions to quit as a severe motivational concern in itself, also independent of the risk of dropout behavior. While the empirical link with dropout behavior is documented, the relationship is found to be moderate (e.g., Vallerand et al., 1997), suggesting that the concept is likely to represent a broader indication of amotivation, devaluing, or alienation from school.

While the expected and empirically supported overall increase provides some validity to the measure of intentions to quit, the significant *variation* between students in their growth rate is considered equally important, since it indicates that a motivational impairment is not absolute (Gnambs & Hanfstingl, 2016). It accentuates the saliency of investigating potential explanations for these differences. Individual differences in individual change in intentions to quit school were therefore investigated as an outcome in *Study II* and *Study III*.

6.2 How perceptions of the learning environment are related to intentions to quit school

6.2.1 Academic boredom and emotional engagement

Academic boredom and emotional engagement, referred to as specific motivational components, were theorized to bridge potential associations between perceived teacher support and intentions to quit school (*Study I)*

(Niemiec & Ryan, 2009; Skinner et al., 2009). Thus, they were not considered learning environment factors per se, but proposed as possible intervening factors in a system where perceived teacher support relates to intentions to quit school. Nevertheless, it is also likely that these variables reflect students' experiences with the learning content and could be regarded as perceptions of the learning environment in a broad sense (cf. definition of psychosocial environment by Udir [2010] referred in the Introduction).

First, the level of academic boredom (at T1, RQ 1b) was noticeably higher than intentions to quit, and indicates that boredom is a common academic emotion expressed by adolescent students (e.g., Bakken, 2019; Moeller et al., 2020). Although somewhat lower than findings in national surveys (Bakken, 2019), the considerable proportion of students who confirmed academic boredom (49%) is a result of concern. A more positive indication was given through reports of emotional engagement (at T1, RQ 1b), where 78% of students *agreed* to some extent. This apparently incongruence between reports of academic boredom and emotional engagement may support that they are conceptually different rather than merely contrasts (Skinner et al., 2009). The mean level of emotional engagement was relatively similar to that reported in lower secondary school (Bru et al., 2021).

In the structural model in *Study 1*, academic boredom showed a stronger association (positive) with intentions to quit compared to emotional engagement (negative); however, they were both supported as significant intermediate variables in the proposed chain from perceived teacher support to intentions to quit (RQ 2a). The considerable strength of the association between academic boredom and intentions to quit also addressed a new question: Can this association partially be driven by a student segment that has not been explicitly mentioned in the current work, namely learners with high academic potential who despite this potential are not well adjusted in school? These "gifted underachievers" typically experience boredom and alienation from school, and they are considered at risk of dropout (Hansen & Toso, 2007; Landis & Reschly, 2013). Since they do not necessarily achieve high grades (McCoach & Siegle, 2003), including academic achievement level as a control variable does not rule out this as an explanation. While the proportion of gifted students who drop out of school is subject to ongoing discussions (partly due to definitional issues; Matthews, 2009), highly able students who disengage and

experience poor acknowledgement of their academic and affective needs is a salient challenge (Ritchotte & Graefe, 2017). In particular, this group struggles to adjust due to a lack of appropriately differentiated teaching and lack of perceived understanding from their teachers (Landis & Reschly, 2013). The current dataset did not have appropriate information to further investigate these reflections empirically.

Anyhow, the substantial association between academic boredom and intentions to quit is a reminder that this silent academic emotion should not be overlooked but taken seriously. Recent research has demonstrated that adolescents who experienced a steep increase in academic boredom were the ones with the most detrimental academic outcomes, including a sharp increase in intentions to quit school (Grazia et al., 2021). The relatively less accentuated (negative) association between emotional engagement and intentions to quit may indicate that poor enthusiasm and interest are not enough to provoke serious considerations about quitting school. Corroborating this, a recent meta-analysis concluded that when it comes to persistence-related academic outcomes (including dropout intentions), intrinsic motivation (conceptually overlapping with emotional engagement) showed weaker associations than identified regulation, the latter involving personal value attributed to the activity (Howard et al., 2021). It makes sense that the lack of identified value in the activity (evident in academic boredom) is more decisive of a long-term decision than a lack of inherent enjoyment (low emotional engagement).

The aspects of perceived teacher support are discussed in Section 6.2.2., however it is relevant to mention here that for academic boredom, autonomy granting was the aspect of teacher support strongest associated. It is thus likely that the provision of choice increases students' options to tailor their academic work more to their values and appropriate levels, reducing the likelihood of academic boredom. Apart from autonomy granting, however, the assessed teacher support variables were only weakly associated with academic boredom and raise a question on whether academic boredom is more influenced by students' direct experiences with the subject content or didactics (Daschmann et al., 2014; Larson & Richards, 1991). The focus on promoting students' deeper learning, addressing real-world issues and coherence across subjects in the renewed national curriculum (Ministry of Education and Research, 2017), are promising in this regard.

6.2.2 Perceived teacher support

All three aspects of need-supportive teacher support (perceived emotional support, autonomy granting, and feedback quality) showed significant negative indirect associations with intentions to quit (RQ 2a). Essentially, this supported theoretical expectations from SDT, in that these need-supportive experiences with teachers in concert function to optimize students' motivation and persistence (Niemiec & Ryan, 2009; Ryan & Deci, 2017b). Furthermore, that the associations did not vary between genders (RQ 2b) can be interpreted in line with the SDT universality claim (Vansteenkiste et al., 2020), although as a rather restricted support, given that other student characteristics (e.g., achievement level, motivational beliefs, ethnicity, etc.) were not addressed as potential moderators.

6.2.2.1 Autonomy granting

The descriptive information from *Study I* showed that autonomy granting was the aspect of assessed teacher support with the lowest mean value, while the variance (SDs) were relatively similar across aspects of support (RQ 1c). This may indicate that autonomy granting is a factor with substantive potential for improvements, and the demonstrated multivariate associations with emotional engagement (positive) and academic boredom (negative), as well as the negative indirect association with intentions to quit, substantiate this. The strength of the associations of autonomy granting with these outcomes further suggests that autonomy granting plays a more prominent role in upper secondary school than in lower grades (Bru et al., 2002; Thuen & Bru, 2000), although directly comparable studies are not found. If autonomy granting is more important in upper secondary, this can be because as individuals mature, the need for sense of choice and independency emerges more imperative (Eccles & Roeser, 2009).

Finally, although the indirect association of autonomy granting with intentions to quit was statistically relatively weak (β = -.13**, RQ 2a), it may reflect an important story of students who feel that school has a controlling approach to them (Vallerand et al., 1997) and leaving them with poor options to influence and express their perspectives. It is likely that this provokes a sense of alienation and disengagement that affects their capacity to persist. Students

have recently voiced that the opportunities to express themselves in various ways are poor in upper secondary school (Ulvik et al., 2021). One may further deliberate whether the associations with emotional engagement, academic boredom, and intentions to quit would have appeared stronger if the element of *relevance*, the degree to which teachers provide a clear rationale for the topic being taught (Assor et al., 2002; Niemiec & Ryan, 2009), had been represented in the current instrument. Since the provision of choice cannot be applied to all activities in a school setting, a strengthening of *why* things are important could be a critical key to students' motivation.

6.2.2.2 Feedback quality

Study I assessed the degree to which students experience teachers giving them informative feedback that helps them structure their subsequent efforts, assumed to foster students' need for competence (Niemiec & Ryan, 2009; Skinner & Pitzer, 2012; Stroet et al., 2013). The descriptive information revealed that although most students agreed to receiving this type of teacher support, almost a quarter (23.7%) had scores that indicated disagreement (RQ 1c). This is somewhat surprising in light of substantive efforts during the last decade on strengthening teachers' feedback practices (Hopfenbeck et al., 2015). At the same time, studies have shown considerable discrepancy between teacher and student reports of the quality of academic feedback, with teachers generally rating it higher (Havnes et al., 2012). Further, the relatively weak associations with emotional engagement and academic boredom resulted in a modest negative indirect association with intentions to quit (β = -.07**, RQ 2a), suggesting that this type of support plays a less prominent role in intentions to quit school. Caution must be given in this conclusion, especially as the measure used to capture this phenomenon not being (or deriving from) an established research instrument. It may be that the current assessment did not identify the type of support most critical for the psychological need for competence.

6.2.2.3 Emotional support

Among the variables assessing perceived teacher support, emotional support was the variable with the highest mean level (RQ 1c). In light of the often-mentioned mismatch between adolescents' needs and what is offered in school (Eccles & Roeser, 2009) and an emotionally distant approach from teachers as

students grow older (Hargreaves, 2000), this high mean level was unexpected. As further findings indicated, however, emotional support was the variable among the teacher support variables with the strongest (negative) association with intentions to quit school. Thus, the (between-person) *variations* in how students feel emotionally supported by teachers seemed pivotal for aspects of their motivation. This constitutes an important argument as to why this relatively high average level should not be a motive for refraining from working systematically to ensure high levels of perceived emotional support for all students.

Specifically, in the SEM model of *Study I*, emotional support from teachers stood out as an aspect with a substantial positive association with emotional engagement and a weak negative association with academic boredom, which formed an indirect negative association with intentions to quit school (β = -.12**, RQ 2a). The additional direct association between emotional support from teachers and intentions to quit (β = -.12**, RQ 2a), indicated that emotional support is particularly critical compared with the other aspects of teacher support. This appeared different from a prior study in upper secondary school (Studsrød & Bru, 2012), where emotional support did not show a significant multivariate association with intentions to quit. This may be related to the operationalization of emotional support in that study (Studsrød & Bru, 2012), which was slightly different, and narrower than in the current work, by not including any component of signalizing faith in students. However, findings are more aligned with a recent meta-analysis (Wang, Degol, et al., 2020) that found emotional support, among several classroom climate dimensions, as the one with the strongest association with student socioemotional distress, an outcome that probably shares facets with the sense of pointlessness in the concept of intentions to quit school.

The direct, in addition to the indirect association with intentions to quit school indicates that emotional support from teachers can also work through mechanisms other than increased emotional engagement or reduced academic boredom. A recent interview study with upper secondary school students reported that students expressed that their relationship with teachers was not primarily a tool for effective learning, but important more broadly for their being, or existence, and had in itself a purpose (Ulvik et al., 2021). This is a reminder of the identity formation that these adolescents encounter (Klimstra

et al., 2010), which the emotional support provided by teachers is likely to scaffold. Others have also suggested that when adolescents gradually become more independent of their parents, teachers can represent the last stable source of adult role models promoting developmental guidance and support (Eccles & Roeser, 2009), all of which indicate teachers as more than an academic resource.

This finding of the centrality of emotional support was important for the justification for choosing to pursue perceived emotional support in the subsequent longitudinal analyses of *Study II* and *Study III*. Here (*Study III*), change in perceived mastery climate was also explored as a mechanism in the association between emotional support from teachers and intentions to quit school (findings discussed in Section 6.2.4).

The developmental trajectory of perceived emotional support from teachers indicated that the mean slope was not significantly different from zero; that is, no particular overall trend was found during the study period (RQ 3b). This flat mean trajectory contrasted with some evidence of decreasing teacher support during this phase (De Wit et al., 2010), albeit limited comparable studies were found. Nevertheless, the finding is rather positive on behalf of the general capacity of teachers in Norwegian upper secondary schools. Still, among the phenomena investigated longitudinally by growth curve modeling in this thesis, emotional support from teachers was the one with the largest variance in the slope factor. As detailed in *Study III,* certain students thus seem to "slip under the radar" and experience decreasing emotional support over time.

Building upon the findings from *Study I*, *Study II* investigated the longitudinal associations between perceived emotional support from teachers and intentions to quit school. This included an investigation of whether initial level and change in emotional support predicted change in intentions to quit school (RQ 4a). This was done in conjunction with the modeled prediction of the respective growth factors of loneliness among peers, to investigate whether teachers and peers could be found to have unique roles in the development of intentions to quit school (loneliness among peers is discussed in Section 6.2.3). No significant prediction of change in intentions to quit was found from the *initial level* of perceived emotional support, while a relatively strong inverse association was found with *change* in perceived emotional support (RQ 4a). The non-significant

prediction from initial level, combined with the negatively associated change, suggests that the saliency of relationship-building is not done once and for all but requires a continuous focus from teachers. This may indicate that enhanced efforts typically invested by schools at the beginning of academic years need to be followed by continued efforts through the academic semesters to sustain the quality of teacher–student relationships. Importantly, this negatively associated change also implies a unique role of teachers in the development of intentions to quit, in addition to the role of loneliness among peers, given the multivariate specification of the model. With this in mind, it is a concern that upper secondary school teachers, to a lesser degree than lower secondary teachers, believe that their relationship with students is central to students' adjustment (here, mental health; Holen & Waagene, 2014).

6.2.2.3.1 Trajectory subgroups of perceived emotional support

The diversity in students' trajectories of perceived emotional support from teachers was considerably detailed in *Study III*: three trajectory subgroups of perceived emotional support were identified, which emerged as a pattern of one large normative group (*stable-high*; 84.9%), a *low-increasing* group (7.3%), and a *decreasing* group (7.8%) (RQ 5a). Further findings on these subgroups detailed the result from *Study II* regarding the negatively associated change of perceived emotional support from teachers and intentions to quit school, in several ways.

First, it indicated that this association is predominantly driven by a tendency of students who perceive *decreased support* to display more increase in intentions to quit ("the negative route"), rather than by students experiencing an increased support to display decreasing intentions ("the recovery route"). This was evidenced by the significant indirect positive association from membership in *decreasing* onto rate of change in intentions to quit (i.e., high probability of membership in this group predicted more increase in intentions to quit compared to the normative group), while no significant indirect association was found for *low-increasing* (i.e., high probability of membership in *low-increasing* did not significantly predict a more positive development; RQ 5c).

Second, it supplemented this finding by providing evidence that individual motivational characteristics (here, achievement ambition and academic self-

concept) were systematically related to these trajectory subgroups (RQ 5b). In particular, the *decreasing* subgroup displayed a high mean level of achievement ambition and a low mean level of academic self-concept. This composition may partly explain the emergence of this subgroup, as well as why this subgroup seems to exhibit the least favorable development of intentions to quit. It is likely (but not explicitly investigated here) that this combination of characteristics elicits a predisposition for perceiving school as stressful and induces high needs for support, while this goes under the radar of teachers, and triggers a less persistent approach to further schooling.

Third, it indicated that change in perceived mastery climate plays a role, plausibly a mediating one, in the dynamics between perceived emotional support from teachers and intentions to quit over time. The role of perceived mastery climate is explicitly discussed in Section 6.2.4, suggesting that emotionally supportive teachers can have the potential to exert influence through mechanisms of building a culture in which effort investment is explicitly valued.

6.2.3 Loneliness among peers

Loneliness among peers at school was brought into the project based on the evident importance of peer relationships in adolescence (Buhrmester, 1990; Steinberg & Morris, 2001) and with a significant backdrop of what had already been conducted yielding its cross-sectional relationship with intentions to quit school among Norwegian upper secondary school students (Frostad et al., 2015). To extend this work, loneliness was subject to the longitudinal investigation in *Study II*, in conjunction with perceived emotional support from teachers (which represented the most prominent teacher support variable from *Study I*). The aims were to describe the developmental trajectory of loneliness among peers during the first and second years of upper secondary school (RQ 3c), and to investigate the degree to which initial level and rate of change were uniquely associated with change in intentions to quit (RQ 4b).

The developmental trajectory of loneliness among peers indicated an average increase that primarily occurred after the transition to the second year. Although not an increase of large magnitude (mean slope in unstandardized metrics = 0.06**), this indicates a vulnerability at this stage of upper secondary school.

One may suspect that such a feeling of loneliness becomes more evident after some time in the system, when the others seemingly have established their peer relationships. It may also reflect a system that gradually promotes less scaffolding to peer relationships, possibly related to the assumption that students handle this more independently as they mature. Teachers' specific role in upper secondary student loneliness has been previously suggested (Morin, 2020), yet several questions on this issue remain unanswered.

Students who experienced more increase in loneliness among peers at school were predicted to have more increase (or less decrease, i.e., a higher slope value) of intentions to quit school, and this association was strong (RQ 4b). Importantly, this expands on previous work that has suggested loneliness to be a critical factor associated with the level of intentions to quit school (Frostad et al., 2015; Haugan et al., 2019), and supports the notion that being in a situation of frustration of the need for relatedness is severely devastating for youth (Vansteenkiste et al., 2020). An intensified feeling of loneliness among peers in a developmental phase where one is expected to be more mature and less reliant on adult support (Eccles & Roeser, 2009) is thus a critical sign of maladjustment that needs to be taken seriously. Not only for matters of health (Heinrich & Gullone, 2006; Holt-Lunstad et al., 2015) but also for academic persistence. In light of the described resource of having peers at school who help regulate your motivation and request your attendance (Schmid, 2021), a lack of this can understandably turn out negatively.

When accounting for the association between initial levels of loneliness among peers and intentions to quit, as well as the associated changes of emotional support and loneliness with intentions to quit, no significant prediction from *initial level* of loneliness to change in intentions to quit was found (RQ 4b). Initially, this was considered a puzzling finding; however, the nature of these processes may be so intertwined (and thus captured in the strong coefficient of associated change), more than predicted from certain experiences early in upper secondary school. As mentioned in *Study II*, this finding may also be explained by the opportunity students have to take action if they do not thrive (for example, socially) to apply for another school the subsequent year. In light of the high policy priority of getting more youth to complete upper secondary school, this flexibility in the structure seems valuable.

Considering that loneliness and intentions to quit were demonstrated as closely related growth processes, this also addresses whether there can be a shared underlying tendency in these phenomena. From a theoretical point of view, this could be emotional distress or depression. It is suggested, that when change processes are found highly correlated, this can be suspected to a shared underlying cause (Allemand & Martin, 2016). Both intentions to quit and loneliness may bear components of worthlessness, hopelessness, and a loss of interest that characterize depressed affect (Paykel, 2008). In fact, Garvik et al. (2013) demonstrated a cross-sectional association between symptoms of depression and intentions to quit school ($\beta = .29^{**}$), and mental health problems are found to be related to school dropout (Hetlevik et al., 2018). Future research exploring the role of emotional distress in the processes of loneliness and intentions to quit school may clarify the dynamics, and/or the degree of conceptual overlap.

6.2.4 Perceived mastery climate

Despite numerous studies demonstrating the association between perceived mastery climate and positive student outcomes (e.g., Meece et al., 2006; Patrick et al., 2011; Stornes & Bru, 2011), only one previous study was found addressing mastery climate in a dropout process (Haugan et al., 2019). The work of Haugan et al. (2019) demonstrated cross-sectional moderate negative associations between perceived mastery climate and intentions to quit school at two time points, yet a longitudinal approach has been lacking. It was therefore mainly based on theoretical reasoning when modeling perceived mastery climate in *Study III;* anticipating that increased sensitivity and warmth from teachers (emotional support) could increase the experience of a mastery climate in class, which could make an increase in intentions to quit less likely. The results demonstrated an inverse associated change between perceived mastery climate and intentions to quit, thus supporting the expected link between the two latter change processes.

From a theoretical perspective, it is likely that this negatively associated change (mastery climate and intentions to quit) involves dynamics of students' need for competence, or ability beliefs – as when perceiving a strengthened mastery climate, the messages about success are experienced to be directed more to

one's efforts and personal progress. When experiencing that effort matters, this could strengthen the confidence that it is worth continuing in school. Students with high intentions to quit have indeed been shown to have poor academic ability beliefs (Legault et al., 2006; Vallerand et al., 1997), which makes it reasonable that a strengthened mastery climate is beneficial to avoid furthering such intentions.

Although the findings in *Study III* suggested that students with high probabilities of membership in the *low-increasing* emotional support trajectory subgroup had more positive trajectories in perceived mastery climate than the normative group, the improvement we could have "hoped for" in terms of more reduction (or less increase) in intentions to quit was not found (the indirect association from membership in this subgroup was non-significant). Yet, a markedly more negative development of mastery climate was found for students with high probabilities of membership in the *decreasing* emotional support trajectory subgroup, which bridged into a more negative development (i.e., steeper increase) in intentions to quit school. Hence, the "negative learning environment route" was more apparently associated with more adverse change in intentions to quit, as compared to the "recovery learning environment route" (RQ 5c). Notably, Urdan and Midgley (2003) concluded similarly when they found that while an increase in perceived mastery climate had benefits, the costs associated with a decrease were even stronger.

The person-centered approach of *Study III* hinted that associations between trajectories of perceived emotional support, mastery climate, and intentions to quit may interplay with motivational beliefs of the students. The characteristics of the *low-increasing* group; low academic self-concept, low achievement ambition, as well as low achievement level from lower secondary school, suggest that this student segment represents a group with histories of academic strive and defeats, which makes a complete reversal at this point in education unrealistic, even though the learning environment is perceived as increasingly supportive. One may speculate, however, how these students' development would have been, had the positive development in perceived emotional support and mastery climate not occurred.

The more negative development in perceived mastery climate that arose for students in the *decreasing* emotional support subgroup seemed to play a pivotal

role for their negative development (steeper increase) in intentions to quit school. The asymmetric levels of high achievement ambitions and low academic self-concept in this subgroup address important questions as to whether this is a subgroup of students in which the upper secondary school system is poorly equipped to support and motivate. They may posit a vulnerability to contextual changes that evoke their uncertainty about the ability to succeed. Since this is indicated as a subgroup whose negative development evolves from experiences during the phase of upper secondary school (given that they enter upper secondary with high achievement ambitions and average achievement levels), these findings are important to purse in future research.

6.3 Methodological considerations

6.3.1 Design

It is considered a strength that this research included both a cross-sectional design that allowed for an initial investigation of multiple aspects of teacher support in relation to intentions to quit school, *and* a longitudinal design that permitted investigation of individual change over time. Still, it is a key consideration whether this longitudinal data covered the most informative period of time. For vocational track, the period represents a natural entity, in that it covers the two years of their upper secondary education in school (before apprenticeship). Acclaiming the relevance of this period is also the figures that show how dropout from school is particularly prevalent after the second year (Udir, 2021). For academic track, however, the study period could preferably have been prolonged to the third year, so that information could be gathered from their final year as well.

The time points in the current data imply that the waves do not uniformly represent students' phases through upper secondary education. Rather, the proceeding data points represent a prolonged experience of being in this educational system. An alternative approach, which would have provided a more homogenous sample in terms of the subsequent phases and milestones in upper secondary education, would be to recruit students from a particular educational program, and more narrowly identify normative and non-normative educational paths within this. Since few longitudinal panel studies have been

conducted in Norwegian upper secondary schools, we chose the current broad approach; yet, future studies could consider more specificity. The relatively large sample is considered a strength, although for generalization, it is to be kept in mind that it is recruited from one region in Norway only, and this region has above-average upper secondary completion rates (Statistics Norway, 2021a).

The longitudinal design was utilized to investigate individual change, longitudinal associations, and distinct trajectory subgroups. This has contributed to new insights into how intentions to quit school develop and relate to processes of the psychosocial learning environment. Still, this research did not test directionality among the variables, which could have permitted conclusions moving one step further toward causality. A design with more time points and a longer time span would have been desirable to precisely capture the directions and interrelations between these processes that are likely to unfold in intricate patterns over a considerable amount of time.

In all analyses, the inclusion of relevant control variables has been of utmost importance. In all regression-based approaches, the inclusion of control variables purposively sought to rule out potential alternative explanations for the detected relationships (Creswell, 2014; Skog, 2015). In this regard, the possibility of using academic achievement level (grades) drawn from register data is regarded as a specific strength of this work, given that self-reported grades have limitations (Kuncel et al., 2005). We cannot completely rule out the possibility, however, that other non-included confounding variables should have been included as control variables (Skog, 2015).

Finally, this thesis is dominated by a variable-centered approach, in which statistical associations between the levels of certain variables and/or individual rate of change have been of prime interest. In *Study III*, this was combined with a person-centered approach, in which the identification of unobserved trajectory subgroups of students served as the outset for further investigations. This allowance of assuming clustered population heterogeneity served as a powerful and relatively more explorative approach, and it provided insights from the viewpoint of certain student segments. The opportunity to learn more about the non-normative subgroups was of particular value. A brief look at recent publications in reputable journals within educational psychology

confirms that person-centered approaches (e.g., GMM and latent profile analyses) have gained increased relevance and popularity. Certainly, there are also caveats to such person-centered approaches to be acknowledged. This is linked to overly data-driven investigations with poor theoretical foundations, which have led to low degree of replication of identified subgroups in some fields (Mäkikangas & Kinnunen, 2016). While the three identified trajectory subgroups in *Study III* appeared theoretically very reasonable, the explorative nature of this technique requires elevated attention to theory, prior evidence, and parsimony, to avoid sample-specific solutions.

6.3.2 Self-reports

From a conceptual viewpoint, students' perceptions of their learning environment are meaningful, and none other than them can rate their motivation for further schooling. Specifically, from an SDT perspective, students' self-reports are advocated: "Unlike psychologists who repudiate self-report instruments, SDT sees them as important tools for assessing the functional significance and meaning of events, and as having a critical role within motivation sciences alongside other methods. In education, experience matters – it predicts the critical outcomes, and it is something we can, through classroom practices, directly influence" (Ryan & Deci, 2020, p. 8). However, from a methodological point of view, self-reports have several known challenges. Although most of the scales in this research derived from well-established self-report instruments, two general issues are regarded as particularly relevant and are elaborated next.

First, social desirability response bias, i.e., the tendency of respondents to respond in ways that present a favorable image of themselves (Huang et al., 1998), cannot be completely ruled out. To prevent this, we emphasized to students about the confidentiality of their data, and specifically that their teachers and peers would not be able to access their answers. None of the current scales were considered particularly socially sensitive (van de Mortel, 2008), but since the social desirability bias may not only be attributed to a fear of others' disapproval but also to a need for self-protection (Huang et al., 1998), this confidentiality could not completely solve the issue. For instance, the

experience of loneliness has been shown to be related to shame (Heinrich & Gullone, 2006), which could have provoked some degree of under-reporting.

Second, the issue of common method variance should be considered, given that both independent and dependent variables were collected from the same source (the individual student). In the literature, this is a concern of potential inflated strength of associations, and thereby a greater risk of Type I errors (false positives; Cooper et al., 2020). Such inflated associations can, for instance, be attributed to response styles and transient occasion factors and should be considered when interpreting the strength of the reported associations. However, having several independent perceptual variables in the same model (as in the multiple regression approaches), one could expect that if the association between independent and dependent variables was driven primarily by this type of shared variance, one would not detect several significant unique associations. Moreover, in the longitudinal approach assessing individual change, each respondent serves as his own "control group," and bias related to stable individual response set is thus argued to be minimized (Finseraas & Kotsadam, 2013; Thuen & Bru, 2009).

6.3.2.1 Perception of the psychosocial learning environment − elaborated methodological reflections

Students' self-reported perceptions of support, or the broader psychosocial learning environment, are more than functions of their teachers' or peers' behavior. This has been acknowledged in the scholarly history of research on perceptions of the learning environment (e.g., Fraser, 1991; Kaplan & Midgley, 1999), which have found only modest alignment between teacher and student perceptions of the same classroom (Wang, Hofkens, et al., 2020), and between students in the same classroom (Ryan & Grolnick, 1986; Stornes et al., 2008). So also in the current research; the primary source of variance was between individuals and not between classes (signified by relatively low ICC-values; Section 4.6). Hence, results need to be viewed through this lens—how students report perceptions of the learning environment is likely also formed by an individual's previous experiences, personality, and personal goals, which in concert form their needs and expected level of support. The large variance within classrooms can also reflect that students are treated differently (Ryan & Grolnick, 1986). Anyhow, this implies that the line from evidence from these

student-perceived assessments to implementation of new educational practice is not straightforward, but involves several "acts of translation" (Wallace et al., 2016).

Moreover, the subjectivity captured in the current work can be traced down to wording of the items, which predominantly (and intentionally) point to the individual level. When asking students about their teachers, we tap the individual's perception of teachers' behavior/approach to them*selves* (e.g., *I feel* that my teachers have faith *in me*). We do not address collective perceptions or how the teachers treat the class as a whole (for an overview of how various item forms capture different levels of perceptions, see e.g., den Brok et al., 2006). An exception is the scale of perceived mastery climate. These items have wording pointing to the class level (*In my class, it is important*…). Still, the scale did not show higher intra-class correlations compared to, for instance, perceived emotional support. These modest levels of shared perceptions of the motivational climate among students in the same class are typically reported (e.g., Diseth & Samdal, 2015; Patrick et al. 2011) and recurrently discussed as conceptual and methodological issues in the AGT literature (Urdan & Kaplan, 2020). It is, however, probably why studies typically handle these perceptions at the individual level (Bardach et al., 2020; Shim et al., 2013).

Finally, when assessing teacher support, students were asked to report on their teachers in general**.** Since they have several teachers, this implies a risk of less accurate responses. To prevent uncertainties, respondents were introduced to think of how their teachers "typically are," a generalized reflection of their experience with their teachers. The piloting students were invited to collaborate on drafting these introductory sentences to the items and did not express particular challenges with the notion of a "generalized experience". The decisive argument for keeping the assessment to teachers in general was this project's focus on intentions to quit school, and not motivation for a particular subject. We deliberated that if teacher–student relationships played an active role for intentions to quit school, this was more likely to stem from the breadth of experiences with teachers rather than from a single subject (Hardre & Reeve, 2003).

6.4 Conclusions and implications

Prominent in all current studies, was the central role of perceived emotional support from teachers as negatively associated with students' intentions to quit school. Emotional support covers the extent to which students perceive that they can trust their teachers, that teachers genuinely care about them and have faith in their ability to learn (Pianta et al., 2012; Wentzel, 2015). This association was also insistent while accounting for relevant background variables, and predominantly when investigating longitudinal relationships. Regarding the latter, it was primarily *a decrease* in emotional support that was related to more increase in intentions to quit, and not an increase in support that was related to more decrease in intentions to quit. This emphasizes the critical importance of monitoring, identifying, and accommodating students' needs throughout upper secondary school, not just an initial effort when students are new in the system.

The cross-sectional approach supported the notion that the three aspects of need-supportive teacher support (Niemiec & Ryan, 2009)—perceived autonomy granting, feedback quality, and emotional support—are all uniquely negatively related to intentions to quit school. It was found plausible that these aspects of teacher support work through increasing students' emotional engagement and reducing academic boredom. The prominent role of emotional support was further explored in a longitudinal design, as possibly mediated by a change in mastery climate. Support was partly given to this, shown by students in a decreasing emotional support trajectory subgroup having a steeper increase in intentions to quit school, an association that was captured by more decrease in perceived mastery climate.

The centrality of emotional support aligns with a large body of literature that accentuates emotional support as a critical factor for students' engagement and learning and is specified here regarding the persistence-related outcome of intentions to quit school. While others have described how disengaged students either "[…] actively resist all outreach efforts or passively slip through the cracks into anonymity" (Daniels & Arapostathis, 2005, p. 34), current findings illuminate teachers' potential to counteract a pathway into such anonymity by communicating to their students that they care, trust, and believe in their abilities.

Loneliness among peers was also supported as a critical factor associated with intentions to quit school, and this work extends prior findings by showing that this is not only a pattern of associated levels on isolated occasions, but closely related processes of change within individuals. Considering the magnitude of the coefficients, associations with loneliness appeared to be even greater than emotional support from teachers. This is reasonable given the psychological centrality of peers' role during this developmental phase. Thus, the demonstrated *additional* role of perceived teacher support for change in intentions to quit school is considered equally interesting and is where the present thesis contributes with the most novel insights. The person-centered approach in *Study III* revealed nuanced information considering the heterogeneity of perceived emotional support from teachers over time, and the need to look beyond traditional risks when trying to identify students with particular need for support to hinder negative academic development.

In general, adding prior academic achievement (or the other control variables) did not affect the specified models to a large extent. Although they demonstrated some expected influence on the investigated outcomes, they did not markedly alter the magnitude of the associations with the psychosocial factors. This suggests they are not dominant underlying factors of the psychosocial variables; for example, students' academic achievement level does not seem to substantially influence the degree to which they experience psychosocial support in upper secondary school. By such, perceived psychosocial support and academic achievement level seem to represent "two distinct stories" in the development of intentions to quit school.

In summary, this research contributes empirical support for psychosocial factors at school having a substantial potential to keep students motivated to continue upper secondary school. It is thus important that traditional and deeply rooted dualistic perspectives on education that tend to devalue the role of social and emotional aspects of learning relative to the cognitive (Allodi, 2010), do not hinder the implementation of practices emanating from new evidence. Insights from this work are not only vital for teachers and teacher educators but also relevant at the policy level when considering structural changes or reforms, so that conditions that provide sources of relatedness are ensured. The role of psychosocial support should be considered in all efforts to increase upper secondary completion rates. Measures to prevent loneliness among peers and

initiatives to strengthen teachers' emotional support to students are indicated as particularly important.

6.5 Suggestions for future research

A first suggestion is to follow the entire phase of upper secondary education, ideally also including the transition from lower secondary school. With a longer span and more data points, research could provide information about transitions and permit growth modeling with non-linear functional forms. This could finetune or rectify the current findings regarding developmental trajectories. More data points would also allow for further steps concerning internal validity and directionality, in that change processes could be temporarily ordered by design. Specifically, further examining the directionality of perceived psychosocial learning environment and students' intentions to quit would be of great theoretical and practical interest. Other theories that more explicitly assume transactional associations could, for instance, guide a cross-lagged panel model with random intercept (Hamaker et al., 2015), which is well suited to test bidirectional associations.

Second, it is important that future works seek to examine the predictive value of intentions to quit school on differentiated objective data of students' completion/non-completion in the Norwegian context. This would detail the usability of this measure and contribute to increased conceptual precision. The inclusion of register data could also involve the degree to which the psychosocial variables predict particular types of non-completion, preferably in combination with information about potential acute stressors (e.g., negative life events; Samuel & Burger, 2020).

Third, the current findings address questions regarding potential moderation effects. Gender was not found to moderate associations in *Study I,* but findings on academic self-concept and achievement ambition in *Study III* could indicate that the role of the psychosocial learning environment can vary by student characteristics. A study by Fandrem et al. (2021) recently indicated that loneliness among peers was particularly strongly associated with intentions to quit school among first generation immigrants. And, competence level has been suggested as a moderator for different aspects of support, in that low ability students tends to be in greater need of emotional support (caring, kindness,

encouragement) whereas higher achieving students benefit more from instrumental support (academic challenges and encouragement to class participation) (Wentzel, 2015). Such potential moderation effects seem largely unexplored at the upper secondary education level and could detail our knowledge of the role of the psychosocial learning environment.

Fourth, to supplement the self-report methodology, observations of teacher–student interactions in upper secondary classrooms could shed light on practices that feed into students' perceptions of support. From a critical realism perspective (Lund, 2005), such knowledge from various data sources is highly valuable. While teaching situations in the academic track are more similar to those of traditional educational practices, teaching and supervision in vocational programs appear particularly under-researched and would be of great interest in an observational methodology.

Finally, randomized controlled interventions are rare at this educational level (and structurally challenging; see Larsen et al., 2019), yet warranted to enhance our understanding of preconditions and effects of systematic efforts in the psychosocial learning environment of upper secondary school.

7 References

Ajzen, I. (2012). The theory of planned behavior. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 438–459). SAGE.

Alexandrova, A. (2014). Well-being. In N. Cartwright & E. Montuschi (Eds.), *Philosophy of social science: A new introduction* (pp. 9–30). Oxford University Press.

Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. *The Journal of Educational Research, 104*(4), 241–252. https://doi.org/10.1080/00220671003728062

Allemand, M., & Martin, M. (2016). On correlated change in personality. *European Psychologist, 21*(4), 237–253. https://doi.org/10.1027/1016-9040/a000256

Allodi, M. W. (2010). The meaning of social climate of learning environments: Some reasons why we do not care enough about it. *Learning Environments Research, 13*(2), 89–104. https://doi.org/10.1007/s10984-010-9072-9

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261–271. https://doi.org/10.1037/0022-0663.84.3.261

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260–267. https://doi.org/10.1037/0022-0663.80.3.260

Anderman, E. M. (2020). Achievement motivation theory: Balancing precision and utility. *Contemporary Educational Psychology, 61*, 101864. https://doi.org/10.1016/j.cedpsych.2020.101864

Anderman, E. M., & Patrick, H. (2012). Achievement goal theory, conceptualization of ability/intelligence, and classroom climate. In S. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 173–191). Springer.

Archambault, I., Janosz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*(3), 651–670. https://doi.org/10.1016/j.adolescence.2008.06.007

Armenakis, A. A., & Zmud, R. W. (1979). Interpreting the measurement of change in organizational research. *Personnel Psychology, 32*, 709–723. https://doi.org/10.1111/j.1744-6570.1979.tb02342.x

Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology, 53*(4), 500–505. https://doi.org/10.1037/0022-006X.53.4.500

Asparouhov, T., & Muthén, B. (2019). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary secondary model. *Mplus Web Notes, 21*(4), 1–22.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72*(2), 261–278. https://doi.org/10.1348/000709902158883

Bakken, A. (2019). *Ungdata 2019. Nasjonale resultater* (NOVA Rapport 9/19). NOVA, OsloMet.

Bardach, L., Oczlon, S., Pietschnig, J., & Lüftenegger, M. (2020). Has achievement goal theory been right? A meta-analysis of the relation between goal structures and personal achievement goals. *Journal of Educational Psychology, 112*(6), 1197–1220. https://doi.org/10.1037/edu0000419

Barth, E., Keute, A. L., Schøne, P., von Simson, K., & Steffensen, K. (2021). NEET status and early versus later skills among young adults: Evidence from linked register-PIAAC data. *Scandinavian Journal of Educational Research, 65*(1), 140–152. https://doi.org/10.1080/00313831.2019.1659403

Bask, M., & Salmela-Aro, K. (2013). Burned out to drop out: Exploring the relationship between school burnout and school dropout. *European Journal of Psychology of Education, 28*(2), 511–528. https://doi.org/10.1007/s10212-012-0126-5

Battin-Pearson, S., Newcomb, M. D., Abbott, R. D., Hill, K. G., Catalano, R. F., & Hawkins, J. D. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92*(3), 568–582. https://doi.org/10.1037/0022-0663.92.3.568

Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability 21*(1), 5–31. https://doi.org/10.1007/s11092-008-9068-5

Bokhorst, C. L., Sumter, S. R., & Westenberg, P. M. (2010). Social support from parents, friends, classmates, and teachers in children and adolescents aged 9 to 18 years: Who is perceived as most supportive? *Social Development, 19*(2), 417–426. https://doi.org/10.1111/j.1467-9507.2009.00540.x

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Wiley.

Bollen, K. A., & Pearl, J. (2013). Eight myths about causality and structural equation models. In S. L. Morgan (Ed.), *Handbook of causal analysis for social research* (pp. 301–328). Springer. https://doi.org/10.1007/978-94-007-6094-3_15

Bridgeland, J. M., DiIulio Jr, J. J., & Morison, K. B. (2006). The silent epidemic: Perspectives of high school dropouts. *Civic Enterprises*. https://docs.gatesfoundation.org/documents/thesilentepidemic3-06final.pdf

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Bru, E., Stephens, P., & Torsheim, T. (2002). Students' perceptions of class management and reports of their own misbehavior. *Journal of School Psychology, 40*(4), 287–307. https://doi.org/10.1016/S0022-4405(02)00104-8

Bru, E., Stornes, T., Munthe, E., & Thuen, E. (2010). Students' perceptions of teacher support across the transition from primary to secondary school. *Scandinavian Journal of Educational Research, 54*(6), 519–533. https://doi.org/10.1080/00313831.2010.522842

Bru, E., Virtanen, T. E., Kjetilstad, V., & Niemiec, C. P. (2021). Gender differences in the strength of association between perceived support from teachers and student engagement. *Scandinavian Journal of Educational Research, 65*(1), 153–168. https://doi.org/10.1080/00313831.2019.1659404

Buchholz, E. S., & Catton, R. (1999). Adolescents' perceptions of aloneness and loneliness. *Adolescence, 34*(133), 203–213.

Buhrmester, D. (1990). Intimacy of friendship, interpersonal competence, and adjustment during preadolescence and adolescence. *Child Development, 61*(4), 1101–1111.

Bunting, M., & Moshuus, G. H. (2016). Framing narratives: Youth and schooling, silencing and dissent. *Studia Paedagogica, 21*(4), 35–52. https://doi.org/10.5817/SP2016-4-2

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cheong, J., MacKinnon, D. P., & Khoo, S. T. (2003). Investigation of mediational processes using parallel process latent growth curve modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 10*(2), 238–262. https://doi.org/10.1207/S15328007SEM1002_5

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for fields settings*. Houghton Mifflin.

Cooper, B., Eva, N., Fazlelahi, F. Z., Newman, A., Lee, A., & Obschonka, M. (2020). Common method variance in vocational behavior research: Reviewing the state of the literature. *Journal of Vocational Behavior*, *121,* 103472. https://doi.org/10.1016/j.jvb.2020.103472

Cornelius-White, J. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research, 77*(1), 113–143.

Creswell, J. W. (2014). *Research design. Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE.

Daniels, E., & Arapostathis, M. (2005). What do they really want? Student voices and motivation research. *Urban Education, 40*(1), 34–59. https://doi.org/10.1177/0042085904270421

Daschmann, E. C., Goetz, T., & Stupnisky, R. H. (2014). Exploring the antecedents of boredom: Do teachers know why students are bored? *Teaching and Teacher Education, 39*, 22–30. https://doi.org/10.1016/j.tate.2013.11.009

Davis, L. E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94*(4), 810–819. https://doi.org/10.1037//0022-0663.94.4.810

De Wit, D. J., Karioja, K., & Rye, B. J. (2010). Student perceptions of diminished teacher and classmate support following the transition to high school: Are they related to declining attendance? *School Effectiveness and School Improvement, 21*(4), 451–472. https://doi.org/10.1080/09243453.2010.532010

De Wit, D. J., Karioja, K., Rye, B., & Shain, M. (2011). Perceptions of declining classmate and teacher support following the transition to high school: Potential correlates of increasing student mental health difficulties. *Psychology in the Schools, 48*(6), 556–572. https://doi.org/10.1002/pits.20576

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology, 49*(3), 182–185. https://doi.org/10.1037/a0012801

den Brok, P., Brekelmans, M., & Wubbels, T. (2006). Multilevel issues in research using students' perceptions of learning environments: The case of the Questionnaire on Teacher Interaction. *Learning Environments Research, 9*(3), 199–213. https://doi.org/10.1007/s10984-006-9013-9

Diseth, Å., Mathisen, F. K. S., & Samdal, O. (2020). A comparison of intrinsic and extrinsic motivation among lower and upper secondary school students. *Educational Psychology, 40*(8), 961–980. https://doi.org/10.1080/01443410.2020.1778640

Diseth, Å., & Samdal, O. (2015). Classroom achievement goal structure, school engagement, and substance use among 10th grade students in Norway. *International Journal of School & Educational Psychology, 3*(4), 267–277. https://doi.org/10.1080/21683603.2015.1084250

Duncan, T. E., & Duncan, S. C. (2009). The ABC's of LGM: An introductory guide to latent variable growth curve modeling. *Social and Personal Psychology Compass, 3*(6), 979–991. https://doi.org/10.1111/j.1751-9004.2009.00224.x.

Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology, 105*(3), 399–412. https://doi.org/10.1111/bjop.12046

Eccles, J. S. (2016). Engagement: Where to next? *Learning and Instruction, 43*, 71–75. https://doi.org/10.1016/j.learninstruc.2016.02.003

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage–environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90–101. https://doi.org/10.1037/0003-066X.48.2.90

Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (Vol. 1, pp. 404–434). John Wiley & Sons.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109–132.

Eicher, V., Staerklé, C., & Clémence, A. (2014). I want to quit education: A longitudinal study of stress and optimism as predictors of school dropout intention. *Journal of Adolescence, 37*(7), 1021–1030. https://doi.org/10.1016/j.adolescence.2014.07.007

Ellingsen, J. (2020). *Utviklingen av uføretrygd per 30. september 2020.* (Statistikknotat NAV). NAV. https://www.nav.no/no/nav-og-samfunn/statistikk/aap-nedsatt-arbeidsevne-og-uforetrygd-statistikk/uforetrygd/uforetrygd-statistikknotater

Enders, C. K. (2010). *Applied missing data analysis*. The Guilford Press.

Engels, M. C., Colpin, H., Van Leeuwen, K., Bijttebier, P., Van Den Noortgate, W., Claes, S., Goossens, L., & Verschueren, K. (2017). School engagement trajectories in adolescence: The role of peer likeability and popularity. *Journal of School Psychology, 64*, 61–75. https://doi.org/10.1016/j.jsp.2017.04.006

Eriksen, O. (2010). *Bortvalg, frafall aller utdanningsbrudd? Hvordan kan vi forhindre at ungdom bryter løpet i videregående skole? Basert på intervjuer med nøkkelpersoner ved 6 videregående skoler i Østfold.* Høgskolen i Østfold. https://hiof.brage.unit.no/hiof-xmlui/handle/11250/148634

Ettekal, I., & Shi, Q. (2020). Developmental trajectories of teacher-student relationships and longitudinal associations with children's conduct problems from Grades 1 to 12. *Journal of School Psychology, 82*, 17–35. https://doi.org/10.1016/j.jsp.2020.07.004

Fandrem, H., Tvedt, M. S., Virtanen, T. E., & Bru, E. (2021). Intentions to quit upper secondary education among first generation immigrants and native Norwegians: The role of loneliness and peer victimization. *Social Psychology of Education, 24*(2), 489–509. https://doi.org/10.1007/s11218-021-09614-1

Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W., & Beechum, N. O. (2012). *Teaching adolescents to become learners. The role of noncognitive factors in shaping school performance: A critical review* (Report, Literature review, June 2012). University of Chicago Consortium on Chicago School Research. https://eric.ed.gov/?id=ED542543

Federici, R. A., & Skaalvik, E. M. (2014). Students' perceptions of emotional and instrumental teacher support: Relations with motivational and emotional responses. *International Education Studies, 7*(1), 21–36. https://doi.org/10.5539/ies.v7n1p21

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59*(2), 117–142.

Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97–131). Springer. https://doi.org/10.1007/978-1-4614-2018-7_5

Finseraas, H., & Kotsadam, A. (2013). Hvordan identifisere årsakssammenhenger i ikke-eksperimentelle data? En ikke-teknisk introduksjon. *Tidsskrift for Samfunnsforskning, 54*(3), 371–387.

Fraser, B. J. (1991). Two decades of classroom environment research. In B. J. Fraser & H. J. Walberg (Eds.), *Educational environments. Evaluation, antecedents and consequences* (pp. 3–27). Pergamon Press.

Fredricks, J. A., Reschly, A. L., & Christenson, S. (2019). Interventions for student engagement: Overview and state of the field. In J. A. Fredricks, A. L. Reschly, & S. Christenson (Eds.), *Handbook of student engagement interventions. Working with disengaged students* (pp. 1–11). Elsevier. https://doi.org/10.1016/B978-0-12-813413-9.00001-2

Fredricks, J. A., & Wendy, M. (2012). The measurement of student engagement: A comparative analysis of various methods and student self-report instruments. In S. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 763–782). Springer. https://doi.org/10.1007/978-1-4614-2018-7_37

Freeney, Y., & O'Connell, M. (2012). The predictors of the intention to leave school early among a representative sample of Irish second-level students. *British Educational Research Journal 38*(4), 557–574. https://doi.org/10.1080/01411926.2011.563838

Frostad, P., Pijl, S. J., & Mjaavatn, P. E. (2015). Losing all interest in school: Social participation as a predictor of the intention to leave upper secondary school early. *Scandinavian Journal of Educational Research, 59*(1), 110–122. https://doi.org/10.1080/00313831.2014.904420

Garvik, M. (2017). *Adolescent depression, school engagement and social functioning: Effects of an early group intervention*. [Doctoral Thesis]. University of Stavanger.

Garvik, M., Idsoe, T., & Bru, E. (2013). Depression and school engagement among Norwegian upper secondary vocational school students. *Scandinavian Journal of Educational Research, 58*(5), 592–608. https://doi.org/10.1080/00313831.2013.798835

Gillen-O'Neel, C., & Fuligni, A. (2013). A longitudinal study of school belonging and academic motivation across high school. *Child Development, 84*(2), 678–692. https://doi.org/10.1111/j.1467-8624.2012.01862.x

Gillet, N., Morin, A. J. S., Huyghebaert, T., Burger, L., Maillot, A., Poulin, A., & Tricard, E. (2019). University students' need satisfaction trajectories: A growth mixture analysis. *Learning and Instruction, 60*, 275–285. https://doi.org/10.1016/j.learninstruc.2017.11.003

Gillet, N., Vallerand, R. J., & Lafrenière, M.-A. K. (2012). Intrinsic and extrinsic school motivation as a function of age: The mediating role of autonomy support. *Social Psychology of Education, 15*(1), 77–95. https://doi.org/10.1007/s11218-011-9170-2

Gnambs, T., & Hanfstingl, B. (2016). The decline of academic motivation during adolescence: An accelerated longitudinal cohort analysis on the effect of psychological need satisfaction. *Educational Psychology, 36*(9), 1691–1705. https://doi.org/10.1080/01443410.2015.1113236

Golembiewski, R. T., Billingsley, K., & Yeager, S. (1976). Measuring change and persistence in human affairs: Types of change generated by OD designs. *The Journal of Applied Behavioral Science, 12*, 133–157. https://doi.org/10.1177/002188637601200201

Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*(1), 3–13. https://doi.org/10.1037//0022-0663.93.1.3

Grazia, V., Mameli, C., & Molinari, L. (2021). Being bored at school: Trajectories and academic outcomes. *Learning and Individual Differences, 90*, 102049. https://doi.org/10.1016/j.lindif.2021.102049

Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology, 29*(4), 462–482. https://doi.org/10.1016/j.cedpsych.2004.01.006

Hafen, C. A., Allen, J. P., Mikami, A. Y., Gregory, A., Hamre, B., & Pianta, R. C. (2012). The pivotal role of adolescent autonomy in secondary school classrooms. *Journal of Youth and Adolescence, 41*(3), 245–255. https://doi.org/10.1007/s10964-011-9739-2

Hamaker, E. L. (2012). Why researchers should think "within-person": A paradigmatic rationale. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 43–61). The Guilford Press.

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*(1), 102–116. https://doi.org/10.1037/a0038889

Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625–638. https://www.jstor.org/stable/1132418

Hansen, J. B., & Toso, S. J. (2007). Gifted dropouts: Personality, family, social, and school factors. *Gifted Child Today, 30*(4), 30–41.

Hardre, P. L., Liao, L., Dorri, Y., & Stoesz, M. B. (2019). Modeling American graduate students' perceptions predicting dropout intentions. *International Journal of Doctoral Studies, 14*(1), 105–132. https://doi.org/10.28945/4161

Hardre, P. L., & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95*(2), 347–356. https://doi.org/10.1037/0022-0663.95.2.347

Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education, 16*(8), 811–826. https://doi.org/10.1016/S0742-051X(00)00028-7

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81–112. https://doi.org/10.3102/003465430298487

Haugan, J. A., Frostad, P., & Mjaavatn, P.-E. (2019). A longitudinal study of factors predicting students' intentions to leave upper secondary school in Norway. *Social Psychology of Education, 22*(5), 1259–1279. https://doi.org/10.1007/s11218-019-09527-0

Havnes, A., Smith, K., Dysthe, O., & Ludvigsen, K. (2012). Formative assessment and feedback: Making learning visible. *Studies in Educational Evaluation, 38*(1), 21–27. https://doi.org/10.1016/j.stueduc.2012.04.001

Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But…. *Communication Methods and Measures, 14*(1), 1–24. https://doi.org/10.1080/19312458.2020.1718629

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review, 26*(6), 695–718. https://doi.org/10.1016/j.cpr.2006.04.002

Hetlevik, Ø., Bøe, T., & Hysing, M. (2018). GP-diagnosed internalizing and externalizing problems and dropout from secondary school: A cross-sectional study. *The European Journal of Public Health, 28*(3), 474–479. https://doi.org/10.1093/eurpub/cky026

Holen, S., Lødding, B., Helgøy, I., & Homme, A. D. (2020). Implementing a targeted, nationwide intervention to promote upper secondary school completion: Does it have the potential to strengthen students' achievement? *Scandinavian Journal of Educational Research*, *64*(6), 869–885. https://doi.org/10.1080/00313831.2019.1629623

Holen, S., & Waagene, E. (2014). *Psykisk helse i skolen. Utdanningsdirektoratets spørreundersøkelse blant lærere, skoleledere og skoleeiere*. NIFU. http://hdl.handle.net/11250/280087

Holen, S., Waaktaar, T., & Sagatun, Å. (2018). A chance lost in the prevention of school dropout? Teacher-student relationships mediate the effect of mental health problems on noncompletion of upper-secondary school. *Scandinavian Journal of Educational Research, 62*(5), 737–753. https://doi.org/10.1080/00313831.2017.1306801

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives on Psychological Science, 10*(2), 227–237. https://doi.org/10.1177/1745691614568352

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53–60. http://arrow.dit.ie/libart/4

Hopfenbeck, T. N., Flórez Petour, M. T., & Tolo, A. (2015). Balancing tensions in educational policy reforms: Large-scale implementation of Assessment for Learning in Norway. *Assessment in Education: Principles, Policy & Practice, 22*(1), 44–60. https://doi.org/10.1080/0969594X.2014.996524

Hovdhaugen, E. (2019). *Årsaker til frafall i høyere utdanning. En forskningsoppsummering av studier basert på norske data* (NIFU Arbeidsnotat 2019:3). NIFU. http://hdl.handle.net/11250/2593810

Howard, J., Bureau, J., Guay, F., Chong, J., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from Self-Determination Theory. *Perspectives on Psychological Science*, 1–24. https://doi.org/10.1177/1745691620966789

Hox, J. J., Moerbeek, M., & Schoot, R. v. d. (2018). *Multilevel analysis. Techniques and applications* (3rd ed.). Lawrence Erlbaum.

Huang, C. y., Liao, H. y., & Chang, S. H. (1998). Social desirability and the clinical self-report inventory: Methodological reconsideration. *Journal of Clinical Psychology, 54*(4), 517–528. https://doi.org/10.1002/(SICI)1097-4679(199806)54:4<517::AID-JCLP13>3.0.CO;2-I

Kale, E., & Hjelde, K. (2017). *Mental health challenges of immigrants in Norway. A literature review 2009-17.* (NAKMI Report 1:17). NAKMI. https://www.fhi.no/publ/2017/mental-health-challenges-of-immigrants-in-norway-a-literature-review-200917/

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*(2), 141–184. https://doi.org/10.1007/s10648-006-9012-5

Kaplan, A., & Midgley, C. (1999). The relationship between perceptions of the classroom goal structure and early adolescents' affect in school: The mediating role of coping strategies. *Learning and Individual Differences, 11*(2), 187–212. https://doi.org/10.1016/S1041-6080(00)80005-9

King, R. B. (2010). What do students feel in school and how do we measure them? Examining the psychometric properties of the S-AEQ-F. *Philippine Journal of Psychology, 43*(2), 161–176.

Kleven, T. A. (2008). Validity and validation in qualitative and quantitative research. *Nordic Studies in Education, 28*(03), 219–233.

Klimstra, T. A., Hale III, W. W., Raaijmakers, Q. A., Branje, S. J., & Meeus, W. H. (2010). Identity formation in adolescence: Change or stability? *Journal of Youth and Adolescence, 39*, 150–162. https://doi.org/10.1007/s10964-009-9401-4

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). The Guilford Press.

Korpershoek, H., Canrinus, E. T., Fokkens-Bruinsma, M., & de Boer, H. (2020). The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: A meta-analytic review. *Research Papers in Education, 35*(6), 641–680. https://doi.org/10.1080/02671522.2019.1615116

Krane, V., Karlsson, B., Ness, O., & Kim, H. S. (2016). Teacher–student relationship, student mental health, and dropout from upper secondary school: A literature review. *Scandinavian Psychologist, 3*(311). https://doi.org/10.15714/scandpsychol.3.e11

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research, 75*(1), 63–82. https://doi.org/10.3102/00346543075001063

Landis, R. N., & Reschly, A. L. (2013). Reexamining gifted underachievement and dropout through the lens of student engagement. *Journal for the Education of the Gifted, 36*(2), 220–249. https://doi.org/10.1177/0162353213480864

Larsen, T., Mathiesen, F. K. S., Burke, H. B., Kristensen, M., Brastad, B., Vik, M., Waldahl, R. H., & Antonsen, K. (2019). *Sluttrapport fra COMPLETE-prosjektet: Kan systematisk arbeid med det psykososiale miljøet bidra til bedre gjennomføring i videregående opplæring?* (HEMIL-Rapport 3/2019). University of Bergen. http://ekstern.filer.uib.no/psyfa/HEMIL-senteret/COMPLETE/Sluttrapport%20COMPLETE.pdf

Larsen, T., Urke, H., Tobro, M., Årdal, E., Waldahl, R. H., Djupedal, I., & Holsen, I. (2021). Promoting mental health and preventing loneliness in upper secondary school in Norway: Effects of a randomized controlled trial. *Scandinavian Journal of Educational Research, 65*(2), 181-194. https://doi.org/10.1080/00313831.2019.1659405

Larson, R. W., & Richards, M. H. (1991). Boredom in the middle school years: Blaming schools versus blaming students. *American Journal of Education, 99*(4), 418–443. https://www.jstor.org/stable/1085554

Lazarus, R. S. (2006). *Stress and emotion. A new synthesis*. Springer Publishing Company.

Legault, L., Green-Demers, I., & Pelletier, L. (2006). Why do high school students lack motivation in the classroom? Toward an understanding of academic amotivation and the role of social support. *Journal of Educational Psychology, 98*(3), 567–582. https://doi.org/10.1037/0022-0663.98.3.567

Lillejord, S., Bolstad, A. K., Fjeld, S.-E., Isaksen, L. S., Lund, T., Myhr, L. A., & Ohm, H. M. (2021). *En skole for vår tid* (Sluttrapport ekspertgruppe for skolebidrag, mai 2021). https://www.regjeringen.no/contentassets/0f38964bb67f4259b74967911799bdac/en-skole-for-var-tid_v5.pdf

Lillejord, S., Halvorsrud, K., Ruud, E., Morgan, K., Freyr, T., Fischer-Griffiths, P., Eikeland, O. J., Hauge, T. E., Homme, A. D., & Manger, T. (2015). *Frafall i videregående opplæring: En systematisk kunnskapsoversikt*. Kunnskapssenter for utdanning, www.kunnskapssenter.no.

Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.

Lund, T. (2005). The qualitative–quantitative distinction: Some comments. *Scandinavian Journal of Educational Research, 49*(2), 115–132. https://doi.org/10.1080/00313830500048790

Lüftenegger, M., van de Schoot, R., Schober, B., Finsterwald, M., & Spiel, C. (2014). Promotion of students' mastery goal orientations: Does TARGET work? *Educational Psychology, 34*(4), 451–469. https://doi.org/10.1080/01443410.2013.814189

Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly, 18*(3), 231–252. https://doi.org/10.1521/scpq.18.3.231.22576

Mann, S., & Robinson, A. (2009). Boredom in the lecture theatre: An investigation into the contributors, moderators and outcomes of boredom amongst university students. *British Educational Research Journal, 35*(2), 243–258. https://doi.org/10.1080/01411920802042911

Markussen, E. (2016). Forskjell på folk! In K. Reegård & J. Rogstad (Eds.), *De frafalne. Om frafall i videregående opplæring* (pp. 22–61). Gyldendal Akademisk.

Markussen, E. (2019). *Karakterene fra tiende betyr (nesten) alt: Om gjennomføring, kompetanseoppnåelse og slutting i videregående opplæring gjennom fire år for unge som gikk ut av ungdomsskolen i Bergen våren 2014* (NIFU Rapport 2019:20). NIFU. https://nifu.brage.unit.no/nifu-xmlui/bitstream/handle/11250/2624310/NIFUrapport2019-20.pdf?sequence=1&isAllowed=y

Markussen, E., Frøseth, M. W., & Sandberg, N. (2011). Reaching for the unreachable: Identifying factors predicting early school leaving and non-completion in Norwegian upper secondary education. *Scandinavian Journal of Educational Research, 55*(3), 225–253. https://doi.org/10.1080/00313831.2011.576876

Markussen, S., & Røed, K. (2020). Bidrar medikalisering av ungdom til utstøtning fra skole og arbeidsliv? *Søkelys på Arbeidslivet, 37*(04), 219–237. https://doi.org/10.18261/issn.1504-7989-2020-04-01

Martin, A. J., Ginns, P., & Papworth, B. (2017). Motivation and engagement: Same or different? Does it matter? *Learning and Individual Differences, 55*, 150–162. https://doi.org/10.1016/j.lindif.2017.03.013

Matthews, M. S. (2009). Gifted learners who drop out: Prevalence and prevention. In L. Shavinina (Ed.), *International handbook of giftedness* (pp. 527–536). Springer.

McCoach, D. B., & Siegle, D. (2003). Factors that differentiate underachieving gifted students from high-achieving gifted students. *Gifted Child Quarterly, 47*(2), 144-154. https://doi.org/10.1177/001698620304700205

McLarnon, M. J., & O'Neill, T. A. (2018). Extensions of auxiliary variable approaches for the investigation of mediation, moderation, and conditional effects in mixture models. *Organizational Research Methods, 21*(4), 955–982. https://doi.org/10.1177/1094428118770731

McNeish, D., Stapleton, L. M., & Silverman, R. D. (2017). On the unnecessary ubiquity of hierarchical linear modeling. *Psychological Methods, 22*(1), 114–140. https://doi.org/10.1037/met0000078

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*, 487-503.

Meld. St. 14 (2020-2021). *Perspektivmeldingen 2021*. Finansdepartementet. https://www.regjeringen.no/no/dokumenter/meld.-st.-14-20202021/id2834218/

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., Gheen, M., Kaplan, A., Kumar, R., Middleton, M. J., Nelson, J., Roeser, R., & Urdan, T. (2000). *Manual for the patterns of adaptive learning scales*. University of Michigan.

Ministry of Education and Research. (2017). *Overordnet del – verdier og prinsipper for grunnopplæringen.* https://www.udir.no/lk20/overordnet-del/?lang=eng

Mjaavatn, P. E., & Frostad, P. (2018). Fra ungdomsskole til videregående skole - hvordan opplever elevene overgangen? *Norsk Pedagogisk Tidsskrift, 3*, 282–297. https://doi.org/10.18261/issn.1504-2987-2018-03-07

Moeller, J., Brackett, M. A., Ivcevic, Z., & White, A. E. (2020). High school students' feelings: Discoveries from a large national survey and an experience sampling study. *Learning and Instruction, 66*, 101301. https://doi.org/10.1016/j.learninstruc.2019.101301

Morin, A. H. (2020). Teacher support and the social classroom environment as predictors of student loneliness. *Social Psychology of Education, 23*(6), 1687–1707. https://doi.org/10.1007/s11218-020-09600-z

Morin, A. H. (2021). The VIP Partnership Programme in Norwegian schools: An assessment of intervention effects. *Scandinavian Journal of Educational Research*, *65*(7), 1238-1251. https://doi.org/10.1080/00313831.2020.1791247

Morin, A. J. S., McLarnon, M. J. W., & Litalien, D. (2020). Mixture modeling for organizational behavior research. In Y. Griep & S. Hansen (Eds.), *Handbook on the temporal dynamics of organizational behavior* (pp. 351–379). Edward Elgar Publishing. https://doi.org/10.4337/9781788974387.00031

Murphy, K. P., & Alexander, P. A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology, 25*, 3–53.

Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). CA: Muthén & Muthén.

Mäkikangas, A., & Kinnunen, U. (2016). The person-oriented approach to burnout: A systematic review. *Burnout Research, 3*(1), 11–23. https://doi.org/10.1016/j.burn.2015.12.002

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education, 7*(2), 133–144. https://doi.org/10.1177/1477878509104318

NOU 2018:15. (2018). *Kvalifisert, forberedt og motivert: Et kunnskapsgrunnlag om struktur og innhold i videregående opplæring.* https://www.regjeringen.no/no/dokumenter/nou-2018-15/id2621801/sec1

NOU 2019:25. (2019). *Med rett til å mestre: Struktur og innhold i videregående opplæring*. https://www.regjeringen.no/no/dokumenter/nou-2019-25/id2682947/

NSD. (2021). *Barnehage- og skoleforskning.* Norwegian Centre for Research Data (NSD). https://www.nsd.no/personverntjenester/oppslagsverk-for-personvern-i-forskning/barnehage-og-skoleforskning/

Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *British Journal of Educational Psychology, 71*(2), 225–242. https://doi.org/10.1348/000709901158497

Nurmi, J.-E. (2012). Students' characteristics and teacher–child relationships in instruction: A meta-analysis. *Educational Research Review, 7*(3), 177–197. https://doi.org/10.1016/j.edurev.2012.03.001

Nylund-Gibson, K., & Masyn, K. E. (2016). Covariates and mixture modeling: Results of a simulation study exploring the impact of misspecified effects on class enumeration. *Structural Equation Modeling: A Multidisciplinary Journal, 23*(6), 782–797. https://doi.org/10.1080/10705511.2016.1221313

OECD. (2018). *Investing in Youth: Norway*. OECD Publishing. https://doi.org/10.1787/9789264283671-en

OECD. (2019). *PISA 2018 results (Volume II): Where all students can succeed*. OECD Publishing. https://doi.org/10.1787/b5fd1b8f-en

OECD. (2020). *Education at a glance 2020: OECD indicators.* OECD Publishing. https://doi.org/10.1787/69096873-en

Otis, N., Grouzet, F. M., & Pelletier, L. G. (2005). Latent motivational change in an academic setting: A 3-year longitudinal study. *Journal of Educational Psychology, 97*(2), 170–183. https://doi.org/10.1037/0022-0663.97.2.170

Parviainen, M., Aunola, K., Torppa, M., Poikkeus, A.-M., & Vasalampi, K. (2020). Symptoms of psychological ill-being and school dropout intentions among upper secondary education students: A person-centered approach. *Learning and Individual Differences, 80*, 101853. https://doi.org/10.1016/j.lindif.2020.101853

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: a meta-analysis of research findings. *Psychological Bulletin, 134*(2), 270–300. https://doi.org/10.1037/0033-2909.134.2.270

Patall, E. A., Steingut, R. R., Vasquez, A. C., Trimble, S. S., Pituch, K. A., & Freeman, J. L. (2018). Daily autonomy supporting or thwarting and students' motivation and engagement in the high school science classroom. *Journal of Educational Psychology, 110*(2), 269–288. https://doi.org/10.1037/edu0000214

Patrick, H., Kaplan, A., & Ryan, A. M. (2011). Positive classroom motivational environments: Convergence between mastery goal structure and classroom social climate. *Journal of Educational Psychology, 103*(2), 367–382. https://doi.org/10.1037/a0023311

Paykel, E. S. (2008). Basic concepts of depression. *Dialogues in Clinical Neuroscience, 10*(3), 279–289. https://doi.org/10.31887/DCNS.2008.10.3/espaykel

Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology, 98*(3), 583–597.

Pekrun, R., Goetz, T., Daniels, L. M., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in achievement settings: Exploring control-value antecedents and performance outcomes of a neglected emotion. *Journal of Educational Psychology, 102*(3), 531–549. https://doi.org/10.1037/a0019243

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology, 36*(1), 36–48. https://doi.org/10.1016/j.cedpsych.2010.10.002

Pekrun, R., Hall, N. C., Goetz, T., & Perry, R. P. (2014). Boredom and academic achievement: Testing a model of reciprocal causation. *Journal of Educational Psychology, 106*(3), 696–710. https://doi.org/10.1037/a0036006

Perlman, D., & Peplau, L. A. (1981). Toward a social psychology of loneliness. In R. Gilmour, & S. Duck (Eds.), *Personal relationships* (pp. 31–56). Academic Press.

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In *Handbook of research on student engagement* (pp. 365–386). Springer. https://doi.org/10.1007/978-1-4614-2018-7_17

Quin, D. (2017). Longitudinal and contextual associations between teacher–student relationships and student engagement: A systematic review. *Review of Educational Research, 87*(2), 345–387. https://doi.org/10.3102/0034654316669434

Ramsdal, G., Gjærum, R. G., & Wynn, R. (2013). Dropout and early unemployment. *International Journal of Educational Research, 62*, 75–86. https://doi.org/10.1016/j.ijer.2013.06.011

Ramsdal, G. H., Bergvik, S., & Wynn, R. (2018). Long-term dropout from school and work and mental health in young adults in Norway: A qualitative interview-based study. *Cogent Psychology, 5,* 1455365. https://doi.org/10.1080/23311908.2018.1455365

Ratelle, C. F., & Duchesne, S. (2014). Trajectories of psychological need satisfaction from early to late adolescence as a predictor of adjustment in school. *Contemporary Educational Psychology, 39*(4), 388–400. https://doi.org/10.1016/j.cedpsych.2014.09.003

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149–172). Springer. https://doi.org/10.1007/978-1-4614-2018-7_7

Reschly, A. L., & Christenson, S. L. (2012). Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 3–19). Springer. https://doi.org/10.1007/978-1-4614-2018-7_1

Ritchotte, J. A., & Graefe, A. K. (2017). An alternate path: The experience of high-potential individuals who left school. *Gifted Child Quarterly, 61*(4), 275–289. https://doi.org/10.1177/0016986217722615

Robinson, K., Schmidt, T., & Teti, D. M. (2005). Issues in the use of longitudinal and cross-sectional designs. In D. M. Teti (Ed.), *Handbook of research methods in developmental science* (pp. 3–20). Blackwell Publishing Ltd.

Rogstad, J., & Bjørnset, M. (2021). *Unge i flyt. Om et livsmestringsprogram for ungdom på 10.trinn* (NOVA Rapport 4/21). NOVA OsloMet. https://oda.oslomet.no/oda-xmlui/handle/11250/2768039

Roorda, D. L., Jak, S., Zee, M., Oort, F. J., & Koomen, H. M. (2017). Affective teacher–student relationships and students' engagement and achievement: A meta-analytic update and test of the mediating role of engagement. *School Psychology Review, 46*(3), 239–261. https://doi.org/10.17105/SPR-2017-0035.V46-3

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493–529. https://doi.org/10.3102/0034654311421793

Rumberger, R. W. (2011). *Dropping out. Why students drop out of high school and what can be done about it*. Harvard University Press.

Rumberger, R. W., & Lim, S. A. (2008). *Why students drop out of school: A review of 25 years of research*. https://www.issuelab.org/resources/11658/11658.pdf

Ruzek, E. A., Hafen, C. A., Allen, J. P., Gregory, A., Mikami, A. Y., & Pianta, R. C. (2016). How teacher emotional support motivates students: The mediating roles of perceived peer relatedness, autonomy support, and competence. *Learning and Instruction, 42*, 95-103. https://doi.org/10.1016/j.learninstruc.2016.01.004

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Ryan, R. M., & Deci, E. L. (2017a). Schools as contexts for learning and social development. In R. M. Ryan & E. L. Deci (Eds.), *Self-determination theory: Basic psychological needs in motivation, development, and wellness* (pp. 351–381). The Guilford Press.

Ryan, R. M., & Deci, E. L. (2017b). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology, 50*(3), 550–558. https://doi.org/10.1037/0022-3514.50.3.550

Salmela-Aro, K., Tang, X., Symonds, J., Upadyaya, K. (2021). Student engagement in adolescence: A scoping review of longitudinal studies 2010-2020. *Journal of Research on Adolescence, 31*(2), 256–272. https://doi.org/10.1111/jora.12619

Samuel, R., & Burger, K. (2020). Negative life events, self-efficacy, and social support: Risk and protective factors for school dropout intentions and dropout. *Journal of Educational Psychology, 112*(5), 973–986. https://doi.org/10.1037/edu0000406

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507–514. https://doi.org/10.1007/BF02296192

Schmid, E. (2021). «Alle sammen støtter hverandre og hjelper hverandre hvis vi trenger motivasjon»: Et elevperspektiv på læring og relasjoner i flerkulturelle videregående skoler med lave inntakskrav. *Nordisk Tidsskrift for Ungdomsforskning, 2*(1), 44–60. https://doi.org/10.18261/issn.2535-8162-2021-01-03

Schunk, D., Meece, J., & Pintrich, P. (2014). *Motivation in education: Theory, research and applications* (4th ed.). Pearson.

Schwartze, M. M., Frenzel, A. C., Goetz, T., Pekrun, R., Reck, C., Marx, A. K., & Fiedler, D. (2021). Boredom makes me sick: Adolescents' boredom trajectories and their health-related quality of life. *International Journal of Environmental Research and Public Health, 18*(12), 6308. https://doi.org/10.3390/ijerph18126308

Serang, S., Grimm, K. J., & Zhang, Z. (2019). On the correspondence between the latent growth curve and latent change score models. *Structural Equation Modeling: A Multidisciplinary Journal, 26*(4), 623–635. https://doi.org/10.1080/10705511.2018.1533835

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin.

Shim, S. S., Cho, Y., & Wang, C. (2013). Classroom goal structures, social achievement goals, and adjustment in middle school. *Learning and Instruction, 23*, 69–77. https://doi.org/10.1016/j.learninstruc.2012.05.008

Skaalvik, E. M., & Skaalvik, S. (2009). Elevenes opplevelse av skolen: Sentrale sammenhenger og utvikling med alder. *Spesialpedagogikk, 8*, 36-47.

Skaalvik, E. M., & Skaalvik, S. (2013). School goal structure: Associations with students' perceptions of their teachers as emotionally supportive, academic self-concept, intrinsic motivation, effort, and help seeking behavior. *International Journal of Educational Research, 61*, 5–14. https://doi.org/10.1016/j.ijer.2013.03.007

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100*(4), 765–781. https://doi.org/10.1037/a0012840

Skinner, E., Graham, J. P., Brule, H., Rickert, N., & Kindermann, T. (2020). "I get knocked down but I get up again": Integrative frameworks for studying the development of motivational resilience in school. *International Journal of Behavioral Development, 44*(4), 290–300. https://doi.org/10.1177/0165025420924122

Skinner, E., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493–525. https://doi.org/10.1177/0013164408323233

Skinner, E. A., & Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In *Handbook of research on student engagement* (pp. 21–44). Springer. https://doi.org//10.1007/978-1-4614-2018-7_2

Skog, O.-J. (2015). *Å forklare sosiale fenomener. En regresjonsbasert tilnærming*. Gyldendal Akademisk.

Statistics Norway. (2020). *Innfrielse av utdanningsprogram og eller skole etter prioritert ønske.* https://www.ssb.no/435393/innfrielse-av-utdanningsprogram-og-eller-skole-etter-prioritert-onske.prosent

Statistics Norway. (2021a). *Gjennomføring i videregående opplæring.* https://www.ssb.no/utdanning/videregaende-utdanning/statistikk/gjennomforing-i-videregaende-opplaering

Statistics Norway. (2021b). *Gjennomføring i videregående opplæring. Statistikkbanken.* https://www.ssb.no/statbank/list/vgogjen

Statistics Norway. (2021c). *Karakterer ved avsluttet grunnskole. Statistikkbanken*. https://www.ssb.no/statbank/table/07495/

Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology, 52*(1), 83–110.

Stornes, T., & Bru, E. (2011). Perceived motivational climates and self-reported emotional and behavioral problems among Norwegian secondary school students. *School Psychology International*, *32*(4), 425–438. https://doi.org/10.1177%2F0143034310397280

Stornes, T., Bru, E., & Idsoe, T. (2008). Classroom social structure and motivational climates: On the influence of teachers' involvement, teachers' autonomy support and regulation in relation to motivational climates in school classrooms. *Scandinavian Journal of Educational Research,* *52*(3), 315–329. https://doi.org/10.1080/00313830802025124

Stroet, K., Opdenakker, M.-C., & Minnaert, A. (2013). Effects of need supportive teaching on early adolescents' motivation and engagement: A review of the literature. *Educational Research Review, 9*, 65–87. https://doi.org/10.1016/j.edurev.2012.11.003

Studsrød, I., & Bru, E. (2011). Perceptions of peers as socialization agents and adjustment in upper secondary school. *Emotional and Behavioural Difficulties,* *16*(2), 159–172. https://doi.org/10.1080/13632752.2011.569401

Studsrød, I., & Bru, E. (2012). Upper secondary school students' perceptions of teacher socialization practices and reports of school adjustment. *School Psychology International,* *33*(3), 308–324. https://doi.org/10.1177/0143034311412841

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Tardy, C. H. (1985). Social support measurement. *American Journal of Community Psychology,* *13*(2), 187–202. https://doi.org/10.1007/BF00905728

Templeton, G. F. (2011). A two-step approach for transforming continuous variables to normal: Implications and recommendations for IS research. *Communications of the Association for Information Systems, 28*(4), 41–58. https://doi.org/10.17705/1CAIS.02804

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior, 52*(2), 145–161. https://doi.org/10.1177/0022146510395592

Thuen, E. (2010). *Learning environment, students' coping styles and emotional and behavioural problems*. [Doctoral Thesis]. University of Bergen.

Thuen, E., & Bru, E. (2000). Learning environment, meaningfulness of schoolwork and on-task-orientation among Norwegian 9th grade students. *School Psychology International, 21*(4), 393–413. https://doi.org/10.1177/0143034300214004

Thuen, E., & Bru, E. (2009). Are changes in students' perceptions of the learning environment related to changes in emotional and behavioural problems? *School Psychology International, 30*(2), 115–136. https://doi.org/10.1177/0143034309104153

Tinto, V. (1987). *Leaving college. Rethinking the causes and cures of student attrition*. The University of Chicago Press.

Trochim, W. M. K., Donnelly, J., & Arora, K. (2016). *Research methods: The essential knowledge base* (2nd ed.). Cengage Learning, Inc.

Tze, V. M., Daniels, L. M., & Klassen, R. M. (2016). Evaluating the relationship between boredom and academic outcomes: A meta-analysis. *Educational Psychology Review, 28*(1), 119–144. https://doi.org/10.1007/s10648-015-9301-y

Udir. (2010): *Retten til et godt psykososialt miljø etter opplæringsloven kapittel 9a. Rundskriv-2-2010*. Norwegian Directorate for Education and Training. https://www.udir.no/regelverkstolkninger/opplaring/Laringsmiljo/Udir-2-2010-psykososialt-miljo/

Udir. (2019). *Utdanningsspeilet 2019.* Norwegian Directorate for Education and Training. https://www.udir.no/tall-og-forskning/finn-forskning/tema/utdanningsspeilet-2019/

Udir. (2021). *Utdanningsspeilet 2017.* Norwegian Directorate for Education and Training. https://utdanningsspeilet.udir.no/2017/

Ulvik, M., Kvam, E. K., & Eide, L. (2021). School experiences that make an impression. A study on how to promote bildung and the desire to learn. *Scandinavian Journal of Educational Research*, *65*(7) 1327–1340. https://doi.org/10.1080/00313831.2020.1869071

Urdan, T., & Kaplan, A. (2020). The origins, evolution, and future directions of achievement goal theory. *Contemporary Educational Psychology, 61,* 101862. https://doi.org/10.1016/j.cedpsych.2020.101862

Urdan, T., & Midgley, C. (2003). Changes in the perceived classroom goal structure and pattern of adaptive learning during early adolescence. *Contemporary Educational Psychology, 28*(4), 524–551. https://doi.org/10.1016/S0361-476X(02)00060-7

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*(5), 1161–1176. https://doi.org/10.1037/0022-3514.72.5.1161

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement, 52*(4), 1003–1017. https://doi.org/10.1177/0013164492052004025

Valås, H. (2001). Learned helplessness and psychological adjustment: Effects of age, gender, and academic achievement. *Scandinavian Journal of Educational Research, 45*(1), 71–90. https://doi.org/10.1080/00313830020042689

van de Mortel, T. F. (2008). Faking it: Social desirability response bias in self-report research. *Australian Journal of Advanced Nursing, 25*(4), 40–48.

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion, 44*, 1–31. https://doi.org/10.1007/s11031-019-09818-1

Vasalampi, K., Kiuru, N., & Salmela-Aro, K. (2018). The role of a supportive interpersonal environment and education-related goal motivation during the transition beyond upper secondary education. *Contemporary Educational Psychology, 55*, 110–119. https://doi.org/10.1016/j.cedpsych.2018.09.001

von Soest, T., & Hagtvet, K. A. (2011). Mediation analysis in a latent growth curve modeling framework. *Structural Equation Modeling: A Multidisciplinary Journal, 18*(2), 289–314. https://doi.org/10.1080/10705511.2011.557344

Wallace, T. L., Kelcey, B., & Ruzek, E. (2016). What can student perception surveys tell us about teaching? Empirically testing the underlying structure of the tripod student perception survey. *American Educational Research Journal, 53*(6), 1834–1868. https://doi.org/10.3102/0002831216671864

Wang, J., & Wang, X. (2020). *Structural equation modeling: Applications using Mplus* (2nd ed.). Wiley.

Wang, M.-T., Chow, A., Hofkens, T., & Salmela-Aro, K. (2015). The trajectories of student emotional engagement and school burnout with academic and psychological development: Findings from Finnish adolescents. *Learning and Instruction, 36*, 57–65. https://doi.org/10.1016/j.learninstruc.2014.11.004

Wang, M.-T., & Degol, J. L. (2014). Staying engaged: Knowledge and research needs in student engagement. *Child Development Perspectives, 8*(3), 137–143. https://doi.org/10.1111/cdep.12073

Wang, M.-T., Degol, J. L., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review, 57*, 100912. https://doi.org/10.1016/j.dr.2020.100912

Wang, M.-T., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development, 83*(3), 877–895. https://doi.org/10.1111/j.1467-8624.2012.01745.x

Wang, M.-T., & Fredricks, J. A. (2014). The reciprocal links between school engagement, youth problem behaviors, and school dropout during adolescence. *Child Development, 85*(2), 722–737. https://doi.org/10.1111/cdev.12138.

Wang, M.-T., Hofkens, T., & Ye, F. (2020). Classroom quality and adolescent student engagement and performance in mathematics: A multi-method and multi-informant approach. *Journal of Youth Adolescence, 49*(10), 1987–2002. https://doi.org/10.1007/s10964-020-01195-0

Wang, M.-T., & Hofkens, T. L. (2020). Beyond classroom academics: A school-wide and multi-contextual perspective on student engagement in school. *Adolescent Research Review, 5*(4), 419–433. https://doi.org/10.1007/s40894-019-00115-z

Wang, M.-T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal, 47*(3), 633–662. https://doi.org/10.3102/0002831209361209

Wang, M.-T., & Peck, S. C. (2013). Adolescent educational success and mental health vary across school engagement profiles. *Developmental Psychology, 49*(7), 1266–1276. https://doi.org/10.1037/a0030028

Wang, M., & Zhou, L. (2013). Latent class procedures: Recent development and applications. In J. M. Cortina & R. S. Landis (Eds.), *Modern research methods for the study of behavior in organizations* (pp. 137–160). Taylor and Francis.

Wentzel, K. R. (1999). Social-motivational processes and interpersonal relationships: Implications for understanding motivation at school. *Journal of Educational Psychology, 91*(1), 76–97. https://doi.org/10.1037/0022-0663.91.1.76

Wentzel, K. R. (2015). Teacher-student relationships, motivation and competence. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 167–176). Routledge.

Widaman, K. F. (2006). Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development, 71*(3), 42–64. https://doi.org/10.1111/j.1540-5834.2006.00404.x

Wigfield, A., & Koenka, A. C. (2020). Where do we go from here in academic motivation theory and research? Some reflections and recommendations for future work. *Contemporary Educational Psychology, 61,* 101872. https://doi.org/10.1016/j.cedpsych.2020.101872

Wilcken, A. J., & Roseth, C. J. (2015). The importance of teacher-student relationships for student engagement and achievement. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 177–187). Routledge.

Özdemir, S. B., & Özdemir, M. (2020). How do adolescents' perceptions of relationships with teachers change during upper-secondary school years? *Journal of Youth and Adolescence, 49*(4), 921–935. https://doi.org/10.1007/s10964-019-01155-3

Appendix 1: Study Ⅰ

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Perceived teacher support and intentions to quit upper secondary school: Direct, and indirect associations via emotional engagement and boredom

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Abstract

Teachers are crucial agents in adolescents' school life, and teachers' roles involve both academic and socio-emotional functions. This study examined how first-year students in upper secondary school in Norway (n = 1379) perceive aspects of teacher support (emotional support, feedback quality, and autonomy granting), and the associations with intentions to quit school. Based on priori considerations, direct associations of teacher support with intentions to quit and indirect associations via emotional engagement and boredom were tested through structural equation modeling. The model was adjusted for GPA, gender, immigrant background, and study track. Results indicated that perceived emotional support was the most central aspect of teacher support, as revealed by both indirect and direct associations with intentions to quit. Feedback quality and autonomy granting were weakly and indirectly associated with intentions to quit. Boredom was an important factor associated with intentions to quit.

Keywords: Teacher support, emotional engagement, boredom, intentions to quit school, upper secondary school.

Introduction

Completion of upper secondary school has a substantial effect on future employment and education (Falch & Nyhus, 2011; OECD, 2018), health (Freudenberg & Ruglis, 2007), and later welfare dependency (De Ridder et al., 2012; Sagatun, Wentzel-Larsen, Heyerdahl, & Lien, 2016). Despite long-term policy priority, rates of non-completion of upper secondary school have been characterized by stability in Norway, and dropout rates are high as compared with other OECD countries (OECD, 2018). Recent national statistics indicate that 59% of students graduate with standard study progression, and 74.5% graduate within five years (Statistics Norway, 2018).

Although dropout can depend on individual background factors and previous experience with school (Battin-Pearson et al., 2000; Markussen, Frøseth, Sandberg, Lødding, & Borgen, 2011; Rumberger & Lim, 2008), more research is needed to determine the extent to which the learning environment in upper secondary school can promote optimal motivational processes. This is where the current study aims to contribute. In Norway, 17% of youth who dropped out from school specified low school motivation as the main reason why they did not continue (Markussen & Seland, 2012).

There exists some evidence that socio-emotional aspects in school are related to dropout, or dropout intentions. A recent review (Krane, Karlsson, Ness, & Kim, 2016) concluded that the quality of the teacher-student relationship (covering teacher support) is associated with intentions to drop out or actual dropout, but findings are inconsistent (Lessard, Poirier, & Fortin, 2010; Ricard & Pelletier, 2016). Furthermore, most extant studies are from North America, whose educational context is quite different from that of Norway in many respects. A study conducted in Norway found no direct longitudinal association between 10th grade students' relationship with teachers and dropout from upper secondary, but suggested that lack of supportive relationships plays an important role in the dropout process, through its

association with grades (Holen, Waaktaar, & Sagatun, 2017). However, Frostad and colleagues (2015) found that perceived teacher support and experience of loneliness in upper secondary school was associated with intentions to quit, when controlling for previous academic achievement and parents' educational level.

The present study considers how three aspects of perceived teacher support (emotional support, perceived feedback quality, and autonomy granting) in upper secondary school may relate to intentions to quit in Norway. These dynamics are explored within an analytic model in which students' emotional engagement and boredom are included as intermediate variables between aspects of teacher support and intentions to quit school. Such investigations of aspects of engagement as possible mediators between social context and relevant academic outcomes have been requested (Fredricks, Blumenfeld, & Paris, 2004). The hypothetical mechanism by which emotional engagement and boredom could act as mediators relies on a motivational model of student engagement grounded in self-determination theory (SDT: Connell & Wellborn, 1991; Skinner, Furrer, Marchand, & Kindermann, 2008). This suggests that students' perceptions of their teachers influence students' engagement in school by nurturing psychological needs for relatedness, competence, and autonomy in motivational processes that might, in turn, affect potential dropout intentions.

Intentions to quit

The decision to quit school seems to be characterized by more of a process than an event; a process of withdrawal and disengagement from school that occurs over years (Frostad et al., 2015; Rumberger & Rotermund, 2012). This makes *intentions* to drop out highly relevant to assess, to capture students' dropout risk while still in school. The concept of intentions to quit has been used for at least two decades in research on motivation and school dropout (e.g., Alivernini & Lucidi, 2011; Bergeron, Chouinard, & Janosz, 2011; Frostad et al., 2015; Hardre & Reeve, 2003; Studsrød & Bru, 2011; Vallerand, Fortier, & Guay, 1997), and the relevance

of the concept is also supported by motivational models emphasizing intentions as a prerequisite of behavior (Ajzen, 2012; Vallerand et al., 1997). There is empirical support for the link between intentions to drop out and actual dropout behavior (Davis, Ajzen, Saunders, & Williams, 2002; Frostad et al., 2015; Vallerand et al., 1997).

Social and motivational factors associated with school dropout

Emotional engagement and boredom

Student engagement is prominent in research on school dropout, with promising empirical findings (Archambault, Janosz, Morizot, & Pagani, 2009; Blondal & Adalbjarnardottir, 2012; Janosz, Archambault, Morizot, & Pagani, 2008; Lamote, Speybroeck, Van Den Noortgate, & Van Damme, 2013; Reschly & Christenson, 2012; Wang & Fredricks, 2014). Student engagement is commonly considered a multidimensional construct, covering behavioral, emotional, and cognitive dimensions (Fredricks et al., 2004), with its distinctive maladaptive counterparts termed disengagement or disaffection (Skinner et al., 2008). Among the engagement dimensions, behavioral engagement has been most extensively studied (Fredricks et al., 2004) and found to be a predictor of academic outcomes, including dropout (Archambault, Janosz, Morizot, et al., 2009; Wang & Fredricks, 2014).

Here, we focus on emotional components of engagement, namely emotional engagement and boredom during schoolwork activity, because such emotional components have been less explored with respect to dropout. Previous research examining how social contextual factors are indirectly associated with dropout via engagement lack these emotional components (Fall & Roberts, 2012). Engagement, including emotional engagement, has been defined in several ways (Eccles, 2016; Fredricks et al., 2004). In this study, emotional engagement refers to students' positive emotions when involved in classroom learning activities, such as interest, enthusiasm, and enjoyment (Skinner et al., 2008; Skinner, Kindermann, & Furrer, 2009). This

operationalization originates from a motivational approach to student engagement, which represents a more narrow scope compared to other frameworks of engagement in which emotional engagement extends to cover school belonging or identification (e.g. Lamote et al., 2013; Li & Lerner, 2011). The approach represented by Skinner and colleagues clearly has similarities with the concept of intrinsic motivation — the highest level of self-determined motivation (Ryan & Deci, 2000) — and is appropriate given our purpose of focusing on emotional experiences when involved in academic work. Knowledge regarding students' emotions during schoolwork and their contextual correlates is of great importance as it highlights the core of classroom life. Previous research indicates that emotional engagement is key in sustaining school-related effort (Skinner et al., 2008; Wang & Degol, 2014), but how it is related to dropout intentions is unclear: some studies have found that higher levels of self-determined motivation are negatively associated with (intentions to) dropout (Alivernini & Lucidi, 2011; Hardre & Reeve, 2003; Vallerand et al., 1997) whereas other studies have not replicated this (Ricard & Pelletier, 2016). Furthermore, although some studies have indicated that among the engagement dimensions, the behavioral dimension is the only one that predicts dropout (Archambault, Janosz, Fallu, & Pagani, 2009), others have found that emotional engagement also significantly predicts dropout (here, interest and identification with school in general; Wang & Fredricks, 2014).

In Skinner et al.'s (2008; 2009) motivational conceptualization of engagement, boredom is one component of the maladaptive counterpart to emotional engagement. However, boredom in school is more explicitly examined within the control-value theory of academic emotions, wherein boredom is categorized as a negative and deactivating emotion, mainly constituted by a person's appraisal of *low value* of the activity, combined with *too high* or *too low control* (Pekrun, 2006; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). Even though there are multiple indications that boredom is frequently experienced by adolescents in school (Bakken,

2017; Larson & Richards, 1991; Yazzie-Mintz, 2010), boredom is claimed to be a neglected construct within educational research (Pekrun et al., 2010). Importantly, academic boredom is theorized to be more than just the neutral state of absence of interest; rather, it is an unpleasant state that triggers impulses to escape the situation (Pekrun et al., 2010). This makes boredom relevant to explore in addition to emotional engagement, in relation to dropout intentions. Previous interview-studies with retrospective designs suggest that boredom may be an important factor in school dropout (Bearden, Spencer, & Moracco, 1989; Bridgeland, DiIulio Jr, & Morison, 2006; Farrell, Peguero, Lindsey, & White, 1988; Tidwell, 1988). Quantitative studies covering larger samples, and from the Scandinavian context, seem to be particularly lacking.

Teacher support

Social support refers to functions performed for the individual by significant others, and those functions can be sub-grouped in different ways (Thoits, 2011). Teachers are core agents in providing students with multiple resources for their learning; hence, aspects of *teacher support* are relevant (Bru, Stornes, Munthe, & Thuen, 2010; Lei, Cui, & Chiu, 2018; Malecki & Demaray, 2003). Numerous studies indicate that when students perceive that their teachers appreciate them, acknowledge their perspectives, and offer progress-enabling feedback, they are more likely to reach positive academic and psychological outcomes (Ryan & Deci, 2017). The terms “teacher-student relationships” and “teacher support” are often used interchangeably in the field (e.g., Pianta, Hamre, & Allen, 2012), and Wentzel (2015) clarified that the relationship between teacher and student is defined by multiple dimensions of support. According to SDT, how teachers provide students with support for their psychological needs for relatedness, competence, and autonomy is critical to promote optimal motivation and engagement (Niemiec & Ryan, 2009; Ryan & Deci, 2000; Ryan & Deci, 2017). The three aspects of teacher support investigated in this study are assumed to represent

support according to these psychological needs: *Emotional support* reflects the interpersonal bonding between teacher and student and is assumed to support students' need for relatedness. *Feedback quality* is academic support that informs and guides students regarding their efforts and academic progression, thereby supporting students' need for competence. *Autonomy granting* denotes providing students with choices and influence, thus supporting their need for autonomy.

Previous research regarding aspects of teacher support is characterized by diverse terminology and extensive use of combined measures denoted by the generic term "teacher support" (Lei et al., 2018; Stroet, Opdenakker, & Minnaert, 2013) or the closely related term "teacher-student relationships" (Krane et al., 2016). In the current paper, "teacher support" represents an overarching term for the aspects of teacher support considered in this study.

The role of teacher support has been extensively studied regarding the *positive* facets of engagement and found to be a key factor in the motivational dynamics of engagement, including emotional engagement (Jang, Kim, & Reeve, 2016; Quin, 2016; Roorda, Koomen, Spilt, & Oort, 2011; Skinner et al., 2008; Wang & Eccles, 2012; Zimmer-Gembeck, Chipuer, Hanisch, Creed, & McGregor, 2006). However, research on the impact of teacher support is dominated by studies of younger students (Davis, 2003; Wang & Eccles, 2012), and few studies have investigated the unique importance of different aspects of support (Fredricks et al., 2004; Stroet et al., 2013).

There is little extant research on the possible antecedents of boredom in achievement-related activities (Daschmann, Goetz, & Stupnisky, 2014; Pekrun et al., 2010). Boredom has been not only linked to the content and characteristics of instruction (e.g., monotony), but also attributed to students' perception of teacher characteristics, lack of interaction with teachers, and low control over the lessons (Daschmann et al., 2014; Fallis & Opotow, 2003; Yazzie-Mintz, 2010). A recent meta-analysis of teacher support and different academic emotions

indicated that teacher support is negatively associated with boredom (Lei et al., 2018); however, boredom as a specific academic emotion was represented in very few studies, and these studies were conducted among younger pupils.

In a recent review of the role of teacher-student relationships in dropout from upper secondary school, nine out of ten included studies supported the hypothesis that positive teacher-student relationships may serve as a protective factor (Krane et al., 2016). Several uncertainties regarding this evidence exist, some of which were raised by the authors: most studies relied on somewhat dated datasets and divergent conceptualizations that insufficiently illuminated the complex nature of support and teacher-student relationships, and only one study was conducted in a Scandinavian country (Frostad et al., 2015). Furthermore, in contrast to the dominant findings, a recent study found that teacher support did not predict dropout (Ricard & Pelletier, 2017). Several previous investigations used assessments that subtly combine different aspects of teacher support (Croninger & Lee, 2001; Frostad et al., 2015; Holen et al. 2017; Lessard et al., 2010; Ricard & Pelletier, 2017), although affective components, such as care and trust appear most prevalent. Accordingly, the present study contributes with an examination of how three different aspects of teacher support are related to intentions to quit in upper secondary school in Norway; the three aspects of support are drawn from a theoretical framework of need-supportive relationships (Niemiec & Ryan, 2009; Stroet et al., 2013).

Perceived emotional support. Emotional support is characterized by perceived trust, care, and personal involvement (Bru et al., 2010; Pianta et al., 2012), and is assumed to nurture students' psychological need for relatedness (Niemiec & Ryan, 2009; Ryan & Deci, 2000). Multiple studies have shown that this affective aspect of teacher support is associated with student engagement and achievement (Cornelius-White, 2007; Quin, 2016; Roorda et al., 2011), intrinsic motivation (Federici & Skaalvik, 2014), and less disruptive behavior (Bru,

Stephens, & Torsheim, 2002; Lerang, Ertesvåg, & Havik, 2018). Support for relatedness has been identified as of particular relevance for students' emotional engagement (Quin, Hemphill, & Heerde, 2017). Interestingly, a meta-analysis examining grade level as a moderator between positive affective teacher-student relationships and student engagement suggested that such an association could be stronger in higher grades (Roorda et al., 2011). This may be because older students have fewer contact points with teachers, which makes the students more sensitive to the emotional support they receive. Regarding intentions to drop out and actual dropout, very few studies have investigated emotional support as a specific aspect of teacher support, but attributes such as care and respect are clearly represented (Krane et al., 2016). One study conducted in Norway found a weak bivariate association between emotional support and students' intentions to quit, but no multivariate associations (Studsrød & Bru, 2011).

Perceived quality of academic feedback. Students in upper secondary school frequently ask for clear and constructive academic feedback (Havnes, Smith, Dysthe, & Ludvigsen, 2012), and informational feedback that guides the learner is central to nurture their need for competence (Niemiec & Ryan, 2009; Skinner and Pitzer, 2012; Stroet et al., 2013). When students receive individualized feedback that guides them forward, it can provide the structure needed for them to experience themselves as effective learners (Skinner & Pitzer, 2012). Feedback is a core component of formative assessment that is found to influence student achievement (Black & Wiliam, 2009; Hattie & Timperley, 2007), and nationwide efforts have been made in Norwegian schools to exploit this potential (Hopfenbeck, Florez Petour, & Tolo, 2015). Although there are indications that the quality of feedback given to, and perceived by, students is associated with engagement (Quin et al., 2017; Virtanen, Lerkkanen, Poikkeus, & Kuorelahti, 2013), empirical evidence is limited regarding how perceived quality of feedback is related to emotional components of engagement and dropout intentions. One

Canadian study indicated that low ability beliefs among students were associated with higher intentions to quit and that competence-support from teachers was crucial to nurture such beliefs (Legault, Green-Demers, & Pelletier, 2006). It is argued that future research into possible antecedents of engagement should consider more than the emotional component of teacher-student relationships, such as by assessing additional instructional factors of teachers (Quin, 2016). Accordingly, the present study included perceived quality of academic feedback as an aspect of teacher support, to illuminate its relationship with emotional engagement, boredom, and intentions to quit school.

Perceived autonomy granting. Autonomy granting entails students being offered choices and influence to tailor academic tasks more toward their own values or interests. To give students "voice and choice" is assumed to facilitate the internalization process and to support students' need for autonomy (Niemiec & Ryan, 2009; Reeve, 2012; Ryan & Deci, 2000). Teacher provision of autonomy is associated with more positive academic emotions among students (Hospel & Galand, 2016), and a sense of autonomy predicts changes in emotional engagement and disaffection, including boredom, among younger pupils (Skinner et al., 2008) and university students (Tze, Klassen, & Daniels, 2014). High school students' reports of autonomy in the classroom are found to predict changes in both self-reported and observed classroom engagement and disaffection (Hafen et al., 2012; Patall et al., 2018). In the Norwegian context, modest associations between autonomy granting and intentions to quit have been found, but no multivariate associations (Studsrød & Bru, 2011). Interestingly, students who drop out report more controlling behavior from social agents, such as parents, teachers, and school administration (Vallerand et al., 1997). As externalized problem behavior appears more prevalent among students at risk of dropping out (Sagatun, Heyerdahl, Wentzel-Larsen, & Lien, 2014; Wang & Fredricks, 2014), this might reflect a strategy of social agents trying to handle challenging situations through increased control. Moreover, it has also been

suggested that dropouts are less socially conforming and have a stronger need for autonomy (Rosenthal, 1998).

Gender as a moderator

Given the gender differences in school achievement and dropout rates (Markussen, Frøseth, & Sandberg, 2011; OECD, 2018), it is relevant to question whether gender moderates any associations between perceived teacher support, engagement, and intentions to quit. Are any of the aspects of teacher support more salient for males than females, or vice versa? From a gender role socialization perspective (Maccoby, 1998), the intimacy and warmth embedded in emotional support may be more beneficial for females than males. By contrast, the academic risk perspective (Hamre & Pianta, 2001) implies that males have more to gain or lose through their relationship with their teachers. A meta-analysis (Roorda et al., 2011) indicated stronger associations between the affective teacher-student relationships and engagement for boys, while the opposite was indicated for achievement. Autonomy granting appears more salient for behavioral engagement in males compared to females in secondary school (Lietaert, Roorda, Laevers, Verschueren, & De Fraine, 2015), but no relevant studies were found regarding emotional engagement or boredom. Accordingly, we proposed no hypothesis regarding the direction of any gender moderations; rather, this study is explorative in this respect.

Control variables

Prior research has robustly documented that dropout from upper secondary school is more prevalent among males than females, among students with previously poor academic achievement, students in vocational tracks, and students with an immigrant background (Battin-Pearson et al., 2000; Markussen, Frøseth, Sandberg, et al., 2011; Rumberger & Lim, 2008). These were, therefore, included as control variables in our structural model.

Aims of the present study

The present study aims to:

1. Assess and describe students' responses concerning intentions to quit, emotional engagement, and boredom, as well as their perceptions of three aspects of teacher support: emotional support, feedback quality, and autonomy granting.
2. Examine associations of emotional engagement and boredom with intentions to quit.
3. Examine associations of perceived support from teachers (emotional support, feedback quality, and autonomy granting) with intentions to quit.
4. Examine the extent to which emotional engagement and boredom act as intermediate variables between perceived teacher support and intentions to quit.
5. Examine whether gender moderates any of the aforementioned relationships.

Methods

Sample and procedure

First-year students in ordinary classes from seven public upper secondary schools in south-west Norway were invited to participate. This was a nonprobability sample, but the selection of schools was purposive (Trochim, 2006), whereby we aimed to represent a variety of study programs, GPAs from lower secondary school, and city vs. suburban/rural locations.

Initially, school leaders, teachers, and students received written and oral information about the study and about students' voluntary participation. Respondents were asked to complete an electronic questionnaire during an ordinary class administrated by their main teacher. In addition to the self-report data, GPAs from lower secondary school, study track, and gender were gathered from county registries. According to Norwegian guidelines for research ethics

(NESH, 2016), students were considered capable of deciding whether to participate or not themselves, given their age and the characteristics of the project. Therefore, informed consent was considered provided if participants chose to complete the questionnaire.

The questionnaire was designed so that respondents were required to answer all questions on each screen in order to continue so as to reduce the number of missing values. However, to ensure responses were voluntary, the option to exit the questionnaire was always available. Respondents who exited prior to completion were not considered consenting participants, and were deleted from the sample (1.5% of initial participants). Ethical considerations followed national guidelines (NESH, 2016), and the project was approved by Norwegian Centre for Research Data (NSD).

Out of 1537 invited students, 1396 completed the questionnaire, 17 of whose responses were omitted due to low quality (< 12-minutes response time, combined with exclusively extreme values on target items). This resulted in 1379 students in the analysis sample (response rate: 90%; 52% male), of whom 54% were in a vocational track, and 46% in an academic track. The enrollment in specific educational programs represented a distribution similar to that of the Norwegian population of upper secondary students. Students in schools that primarily recruit from suburban/rural districts accounted for 53% of the sample. Most students (92%) were 16 or 17 years old, 98% ranged from 15 to 21 years old, and 2% were 22 years or older[1]. Students with an immigrant background (both parents born outside Norway) formed 17% of the sample, consistent with the percentage in the Norwegian population (Kale & Hjelde, 2017). The mean GPA from lower secondary school in the sample did not differ from the mean GPA in the student population in the county, in neither vocational nor academic tracks

[1]The question regarding age was categorized, year-by-year from 15 to 21 years old, with an upper category of 22 or more.

(RCC, 2016). Three students had missing GPA values and were by default excluded from the structural equation model in Mplus.

Measures

For complete wordings of items, see Appendix. The psychometric properties of items and the factor structure were evaluated using CFA (Brown, 2015; Jöreskog, 1993). Results are reported in *Measurement models*.

Intentions to quit school were measured through five items, which assessed students' serious considerations about dropping out of school. Four items were drawn from Frostad et al. (2015; items 1, 3-5), and one item was added to emphasize explicit behavioral intentions. The scoring format was from 1 (Absolutely not true) to 6 (Absolutely true), in accordance with Frostad et al. (2015). Cronbach´s α was .88.

Emotional engagement was measured by using a five-item scale documented in Skinner et al. (2008; 2009), which assessed students' positive emotional involvement during class, in terms of interest and enjoyment. The measure originates from Skinner and colleagues' motivational approach to engagement, grounded in SDT. Cronbach´s α was .89. In this study, the scale had a six-category scoring format to better capture variations in students' perceptions (1 = Completely disagree, 2 = Quite disagree, 3 = Slightly disagree, 4 = Slightly agree, 5 = Quite agree, and 6 = Completely agree). The same scoring format was used for the scales on boredom, feedback quality, emotional support, and autonomy granting.

Boredom was measured through four statements about being bored during class and schoolwork. Items were translated and slightly adjusted from the S-AEQ-F (King, 2010; items 2 and 4) and AEQ (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; items 1 and 3). Cronbach's α was .90.

Feedback quality was measured through five items created for this study to capture students' perception of the quality of feedback received from teachers, namely feedback that helps them see strengths and weaknesses in their work, accompanied by information about how to progress. Given the lack of a validated Norwegian instrument, we drew on relevant sources to construct the scale (Havnes et al., 2012; Pat-El, Tillema, Segers, & Vedder, 2013; Wendelborg, Røe, & Caspersen, 2016). A pilot survey was conducted with 170 students, followed by discussion with four of them about item content and formulations. The final version had a Cronbach´s α of .89.

Emotional support was assessed by using a five-item scale that captured students' perception of teachers as caring and whether teachers communicate faith and appreciation toward them as individuals. The scale was documented in previous studies (e.g., Havik, Bru & Ertesvåg, 2015; Studsrød & Bru, 2011). Cronbach´s α was .94.

Autonomy granting was measured by using three items regarding provision of choices and influence on learning tasks and how to work with the learning material. The scale has been documented previously (Bru et al., 2010; Studsrød & Bru, 2011; Thuen & Bru, 2000). Originally, the scale consisted of five items, but only three items that were theoretically and empirically distinct from emotional support were used, as in Bru et al. (2010). Cronbach's α was .87.

Control variables. Gender (male/female), study track (vocational/academic), and GPA from lower secondary school (average grade for Norwegian, mathematics, and English) were obtained from register data. Immigrant background was defined based on reports of mother

and father's country of birth; students with both parents born outside Norway were coded as having an immigrant background[2].

Statistical analyses

Conventional analyses were conducted in SPSS (version 25), and Mplus (version 8.1) was used for confirmatory factor analysis (CFA) and structural equation modeling (SEM) (Muthén & Muthén, 1998–2017). Due to some high skewness and kurtosis values (highest values for one indicator of intentions to quit: kurtosis = 8.3, skewness = 2.9), the MLR estimator was chosen because of its robustness to non-normality (Muthén & Muthén, 1998–2017).

Because of the questionnaire response method previously described, no missing values occurred in the self-reported data. However, three respondents had missing GPA values; no further missing data analysis was considered necessary given this low missing-data rate. In SEM, the three respondents with missing values on the exogenous variable GPA were omitted by default in Mplus; hence, 1376 cases were included in this analysis.

Students were nested within 82 classes; therefore, we calculated design effects (Hox, 2002) for the indicators of the dependent variable. Design effects ranged from 1.47 to 2.26, and thus did not strongly suggest any two-level models. However, because a few of the calculated effects were slightly above the recommended cutoff (2, in Hox, 2002), we investigated how the class-clustering affected the standard errors by using the complex solution in Mplus (Muthén & Muthén, 1998-2017). For item-level analyses (latent variables), the number of parameters in the model exceeded the number of clusters, and thus we examined these issues using saved factor scores instead of latent variables. Standard errors and *p*-values were almost identical in the complex and non-complex solution (differences in SE ranged from < .001 to

[2] Additional control variables were tested initially, but were omitted because they did not have any influence in the structural model: cultural capital, whether the student was eligible for their first priority course in upper secondary school, and whether they lived with both parents.

.006). Therefore, we concluded that further analysis could be conducted with latent factors on one level, without controlling for the clustering effect.

In SEM, multi-item constructs were treated as latent factors, and the psychometric properties were examined by CFA. We evaluated goodness of fit according to Hooper et al. (2008), whereby good fit was indicated by RMSEA < .07, SRMR < .08, and TLI and CFI > .95. A 90% CI around the RMSEA value was also inspected; an upper limit of .08 was considered acceptable (Hooper, Caughlan, & Mullen, 2008). However, evaluation of measurement models did not simply rely on fit criteria as universal thresholds, but rather on sound overall considerations, per recommendations (Kline, 2011; West, Taylor, & Wu, 2012). Composite scores were created for descriptive and bivariate analysis.

A multi-group approach was used to investigate whether gender moderated any of the structural paths in the model, and a chi-square difference test with scaling correction was used to compare the nested models (Satorra & Bentler, 2001).

Results

To describe patterns of students' responses, variables were created that represented categorized composite scores; the categorizations were obtained by dividing the range of composite scores into six equal intervals so that they reflected the original response alternatives for single items. The categories were labeled according to these original response alternatives. Percentages of responses in each category are provided in Table 1, in addition to means and standard deviations for the continuous composite scores.

Insert Table 1 here

Emotional support received the most positive responses; 83% of the students agreed to some extent that teachers were emotionally supportive. By contrast, autonomy granting was the aspect of support with the least positive reports. Twenty-two percent of students disagreed

that they were emotionally engaged in class and schoolwork, however more than double this percentage (49%) reported boredom to some extent. Approximately 10% of the students reported intentions to quit corresponding to the three highest ratings (scores 4–6 in Table 1).

Bivariate correlations

Table 2 shows bivariate associations between all variables in the study. All three teacher-support variables and emotional engagement were significantly negatively associated with intentions to quit. Boredom was significantly positively associated with intentions to quit and yielded the strongest association.

Insert Table 2 here

Measurement models

Measurement models were evaluated by CFA (Brown, 2015; Jöreskog, 1993), using a stepwise procedure (Jöreskog, 1993). First, each latent factor was analyzed separately (with the exception of autonomy granting, which yielded a saturated model and was therefore tested together with emotional support). For three of the factor models (emotional support, emotional engagement, and intentions to quit), it was empirically supported that two item-residuals should be specified to correlate. As this was conceptually meaningful, these residual-correlations were maintained in all further analyses. The six separate measurement models provided good to fair fit to the data (see Appendix for details). Further, to ensure discriminant validity, we conducted CFAs in three steps: a) the three independent variables together, b) the two mediating variables together, and c) the complete six-factor measurement model. Results are presented in Table 3.

Insert Table 3 here

CFAs indicated well-fitting measurement models with satisfactory factor loadings and no cross-loadings required, thus supporting that the indicators represented six correlated but distinct latent constructs.

Measurement invariance across gender

Examining gender moderation effects was one of the study aims; hence, the complete measurement model was tested for measurement invariance across gender. A model assuming metric and scalar invariance fit the data equally well as the configural version, following the recommended criteria of differences in CFI ≤ -.010 and RMSEA ≤ .015 (Chen, 2007; Cheung & Rensvold, 2002). We, therefore, concluded that the measurement model was gender invariant. The model with factor loadings and intercepts constrained to be equal across gender (scalar invariance) yielded the following fit: RMSEA = .043 (90% CI: .040–.046), CFI = .96, TLI = .96, SRMR = .055.

Structural model

The initial structural model specified perceived teacher support variables as independent variables, emotional engagement and boredom as intermediate variables, and intentions to quit as the dependent variable. Control variables were specified with paths to both intermediate and dependent variables. This initial mediation model yielded good fit (RMSEA = .044 [90% CI: .042–.047]; CFI = .95; TLI = .95; SRMR = .06), but modification indexes indicated a direct path from emotional support to intentions to quit, and this model yielded significantly better fit ($\Delta\chi^2$ (2) = 9.37, $p < .05$). Direct paths from feedback quality and autonomy granting to intentions to quit did not improve fit. Consequently, a model with a direct path from emotional support to intentions to quit was kept.

Moderation effects of gender were tested in a multi-group approach. Gender did not moderate any structural parameters in the model. We, therefore, pooled the data to have one observed

covariance matrix and increased power in further analysis. The final model yielded χ^2 (404) = 1347, $p < .001$; RMSEA = .041 (90% CI: .039–.044); CFI = .96; TLI = .95; SRMR = .051. Standardized effects[3] and explained variance (R^2) are shown in Figure 1.

Insert Fig. 1 here

Of the variance in intentions to quit, 37% was explained by the model as a whole. Boredom showed the strongest association (β = .41**) with intentions to quit. Emotional engagement had a relatively weak multivariate association with intentions to quit. However, the bivariate association was relatively strong (r = -.44**). This reflects the strong association between emotional engagement and boredom (r = -.61**). Of the variables assessing perceptions of teacher support, only emotional support was directly associated with intentions to quit.

The variables assessing perceptions of teacher support, together with the control variables, accounted for 23% of the variance in boredom. For emotional engagement, 44% of variance was explained. Regarding boredom, perceived autonomy granting was the teacher support variable with the strongest multivariate association (β = -.24**), and for emotional engagement, the strongest multivariate association was found with emotional support (β = .34**). Perceived feedback quality was significantly but relatively weakly associated with both boredom and emotional engagement.

Direct, indirect, and total effects

To test the significance of the indirect effects, a bias-corrected bootstrap analysis was used to calculate a confidence interval around the estimated effect (Hayes, 2013; MacKinnon, Lockwood, & Williams, 2004). As bootstrap is not possible with MLR estimation in Mplus, this was conducted with ML estimation. No *p*-values or structural parameters were

[3] "Effect" does not denote causality, but is a conventional term in SEM that refers to multivariate associations/beta coefficients.

substantially affected by the alteration from MLR to ML. Standardized indirect, direct, and total effects of the teacher support variables on intentions to quit are provided in Table 4.

Insert Table 4 here

Perceived emotional support was directly and indirectly negatively associated with intentions to quit. Perceived autonomy granting and feedback quality yielded statistically significant but weak negative indirect associations with intentions to quit.

A hierarchical follow-up analysis was conducted to estimate the total variance accounted for by the teacher support variables. First, we specified a model with only control variables as independent variables, which accounted for 5% of the variance in intentions to quit. Next, the three teacher variables were added; the variance explained in intentions to quit increased to 18%. Thus, the teacher support variables explained about 13% of the variation in intentions to quit.

Influence of control variables

Multivariate associations of the control variables with intermediate variables and dependent variable were generally weak. The significant associations were as follows: GPA showed a weak positive effect on emotional engagement (β = .13**) and a negative effect on intentions to quit (β = -.16**). Gender had a weak effect on emotional engagement (β = .07**, in favor of males), and study track had a weak effect on emotional engagement (β = .12**, in favor of vocational) and intentions to quit (β = .09**, more in vocational). Immigrant background showed a weak positive effect on emotional engagement (β = .09**) and intentions to quit (β = .08**), and a weak negative effect on boredom (β = -.13**).

Discussion

Dropout from upper secondary school is a pervasive challenge; thus, it is important to gain more knowledge about learning environment factors associated with drop out intentions. The

main focus of this study was, therefore, to examine how intentions to quit school are associated with emotional engagement, boredom, and perceived teacher support in terms of feedback quality, emotional support, and autonomy granting, after accounting for other known predictors of dropout. A structural model was examined, wherein students' emotional engagement and boredom were handled as intermediate variables between aspects of teacher support and intentions to quit. The proposed model was guided by motivational theory (Connell & Wellborn, 1991; Niemiec & Ryan, 2009; Reeve, 2012; Skinner et al., 2008), assuming that teachers who create learning environments sensitive to students' psychological needs will foster optimal motivation and positive engagement in schoolwork, and thereby prevent considerations about quitting school. Finally, given marked gender differences in dropout rates, gender was examined as a potential moderator.

Perceptions of teacher support and reports of engagement, boredom, and intentions to quit

One initial aim of this study was to describe students' reports of intentions to quit, emotional engagement, and boredom, and the three aspects of teacher support. Approximately 70% of the students reported no intentions to quit, whereas 10% had scores that likely represented serious considerations about quitting school. These proportions appear reasonable, considering previous data that c. 15% of upper secondary school population are "early leavers" (Markussen, Frøseth, Sandberg, et al., 2011). Almost half of the students reported academic boredom to some extent, which supports previous findings that boredom is a common academic emotion (Bakken, 2017; Nett, Goetz, & Hall, 2011; Yazzie-Mintz, 2010) and that many secondary school students are not fully engaged (Conner & Pope, 2013; Garvik, Idsoe, & Bru, 2013). However, students' reports of their emotional engagement were less negative, as only 22% considered they were not emotionally engaged. Although this appears to contradict the reports of boredom, the discrepancy can possibly be attributed to

assessment of emotional engagement likely encompassing elements of positive engagement in the social context in the classroom, not only interest and involvement in schoolwork.

Most students perceived teachers as supportive. Students responded most positively concerning emotional support from teachers, feedback quality somewhat less positively, whereas autonomy granting was perceived the least positively (41% of responses on the negative side of the scoring range). This is consistent with observational studies in Norwegian lower-secondary classrooms, which noted that teachers generally create emotionally supportive climates but less actively consider adolescents' views and perspectives (Westergård, Ertesvåg, & Rafaelsen, 2018). Previous studies using self-reports from students in Norwegian lower and upper secondary schools also indicate stronger perceived emotional support than autonomy granting (Bru et al., 2010; Studsrød & Bru, 2011). Thus, even though secondary school may be characterized by many different subject teachers and a more emotionally distant approach of teachers (Hargreaves, 2000), most students feel emotionally well-supported by their teachers. Given nationwide efforts in the latest decade to strengthen formative assessment practices in Norwegian schools (Hopfenbeck et al., 2015), students' reports of academic feedback still indicate some potential for improvement.

Associations of emotional engagement and boredom with intentions to quit

The structural model showed that boredom was more strongly related to intentions to quit than emotional engagement. This can be interpreted as a lack of emotional engagement is insufficient to provoke serious considerations about quitting school, whereas the negative state of boredom is more crucial. This underscores the importance of examining students' negative and positive emotional processes, as they might represent distinct associations with different academic outcomes (Pekrun, 2006; Wang, Chow, Hofkens, & Salmela-Aro, 2015).

According to Pekrun (2006), boredom is evoked by assigning a low value to a task or activity, combined with excessive or insufficient control. Thus, the association between boredom and intentions to quit is consistent with previous findings that assigning a lack of value to academics and low academic ability beliefs are closely related to intentions to drop out (Legault et al., 2006). Moreover, academic boredom may over time evoke the psychological flight dimension embedded in this emotion (Pekrun, 2006). This could be substantially more serious than poor engagement and advance to considerations about dropout as the most bearable alternative.

Associations between the three aspects of teacher support and intentions to quit

Bivariate analyses revealed moderate, negative correlations of all teacher support variables with intentions to quit. Perceived emotional support showed the strongest association. Emotional support was also prominent in the structural model, with a direct multivariate association with intentions to quit (Fig. 1). This finding supports previous results that perceived trust and involvement from teachers are closely related to positive academic adjustment among late adolescents (Roorda et al., 2011). Importantly, current results were found in a context in which most students perceived teachers to be quite emotionally supportive. It is likely that the association would have been stronger if the responses represented more critical variance.

The direct multivariate association between emotional support and intentions to quit indicates that this relationship cannot exclusively be explained by mechanisms of emotional engagement or boredom. Given the correlational design of this study, this association can be interpreted in different ways. Lack of interpersonal connectedness with teachers might give students fewer reasons to persist, and according to motivational theory, students are less likely to adopt values and practices from teachers who do not promote them with care and warmth (Ryan & Deci, 2000; Wilcken & Roseth, 2015). As dropout rates receive intensive attention

from educational stakeholders and school staff, students probably perceive school completion as a high-stakes value held by their teachers. Moreover, externalized problems are a risk factor for dropping out (Sagatun et al., 2014), and emotional support could prevent such behavioral problems (Bru et al., 2002).

Neither perceived feedback quality nor autonomy granting had significant direct multivariate associations with intentions to quit. However, these aspects were prominent in the dynamics of indirect associations and are discussed in the following section.

Emotional engagement and boredom as intermediate variables

An important aim of this study was to investigate the plausibility of emotional engagement and boredom as *mechanisms* through which teacher support may influence dropout intentions. The structural model and the follow-up analysis of indirect associations supported the hypothesized model. Perceived feedback quality and autonomy granting showed only indirect associations with intentions to quit, whereas emotional support showed both direct and indirect associations. Indirect associations were relatively weak, but findings may indicate that the three aspects of teacher support contribute to preventing considerations about quitting school by reducing students' boredom and increasing their emotional engagement. This can be interpreted in line with the notion that contextual support can facilitate the internalization process of external demands embedded in the school context (Ryan & Deci, 2000), and is consistent with findings confirming that how teachers relate to their students predicts students' emotions (Mainhard, Oudman, Hornstra, Bosker, & Goetz, 2018). However, results indicate that emotions like enthusiasm and interest are more likely than boredom to be influenced by teachers (44% of variance in emotional engagement and 23% in boredom was explained). This may indicate that boredom in upper secondary school also depends on other variables, such as the learning content or methods of instruction (Daschmann et al., 2014), or on individual disposition (Larson & Richards, 1991).

The multivariate association between autonomy granting and boredom (β = -.24**) and the significant indirect association with intentions to quit (β = -.13**) are noteworthy, as they suggest that students at risk of quitting school are likely to feel that they have little influence and few choices in their learning process. From a motivational point of view, influence and choice are crucial for autonomous motivation, well-being, and growth (Niemiec & Ryan, 2009; Reeve, 2012). Moreover, perceived autonomy granting was the aspect of teacher support with the least positive reports from the students, which might imply that this is an area with potential for valuable improvement.

Gender as a moderator

Given marked gender differences in school achievement and dropout rates (Markussen, Frøseth, & Sandberg, 2011), we investigated gender as a moderator of any paths in the model. There were no significant moderation effects, indicating that patterns of statistical associations are not gender-dependent.

Methodological considerations

This study has both strengths and limitations. The sample was not randomly drawn from the population, but schools were purposively selected (Trochim, 2006) to represent the variety of schools and educational programs in Norwegian upper secondary education. The response rate was good, and the sample size was rather large. Furthermore, because we focused on statistical associations rather than level estimations, potential bias in the sample is not as intrusive as it might be otherwise.

We assessed students' *perceptions* of teacher support, which is not a direct representation of teachers' classroom behaviors. However, researchers have argued that the perception of behavior is more important than behavior per se in influencing motivation and engagement (e.g., Stroet et al., 2013; Vallerand et al., 1997). Nevertheless, it is not straightforward to suggest what teachers should do to enhance student engagement based on current findings.

Few studies have actually sought to understand the interplay between moment-to-moment interactions in class, and students' generalized perception of a supportive relationship (Wubbels et al., 2015); this should be addressed in future research. Students rated teacher support based on perceptions of teachers in general, which may have been detrimental to the response process for students who perceive teachers as very different from each other. Similarly, we used a domain-general measure of students' emotional engagement and boredom, but as engagement likely differs among subjects, future research could consider domain-specific measures.

The design of this study was cross-sectional, and it is, therefore, not appropriate to test causal relationships. Our findings should thereby be interpreted with care. The proposed model is grounded in established theory that addresses how supportive teachers can affect engagement and persistence in school (Connell & Wellborn, 1991; Ryan & Deci, 2000; Skinner et al., 2008; Vallerand et al., 1997). Nevertheless, there is growing evidence that dynamics between the social context and student engagement are bidirectional (Jang et al., 2016; Quin, 2016; Reeve, 2012). Additional longitudinal studies are needed to better understand the dynamics of perceived social context, engagement, and risk of dropping out.

Our selection of teacher support variables was based on theoretical assumptions that they reflect need-supportive teaching (Niemiec & Ryan, 2009; Stroet et al., 2013). However, these aspects of teacher support are not exhaustive, and future studies might consider other facets of support, as well as links between assessed aspects of support and students' need satisfaction, which were not part of the current model. Moreover, a robust examination of the predictive value of intentions to quit on actual dropout behavior is needed (Frostad et al., 2015; Krane et al., 2016).

The reliability of the unique associations of the different teacher support and engagement variables is strengthened by inclusion of relevant control variables. Additionally, access to

GPAs from register data meant that we did not need to rely on self-reported grades (Kuncel, Credé, & Thomas, 2005). Advanced statistical methods were applied, which contribute to statistical validity. A larger sample would have allowed for multilevel analysis, which is recommended when studying learning environment factors (Marsh et al., 2012). However, low ICCs and design effects in the current study did not suggest that a multilevel approach would be substantially more informative, and the complex solution confirmed that class clustering did not influence the results.

Conclusion and further implications

Approximately 13% of the variance in intentions to quit school was explained by teacher-support variables, after adjusting for well-established risk factors for dropout. The unique associations of different aspects of teacher support with intentions to quit school were moderate, but stronger than the association between GPA from lower secondary school and such intentions. Although the results indicate that students are satisfied with the support given by teachers, improvements in perceived support from teachers may reduce students' intentions to quit. Teachers' investment in supporting students emotionally was indicated as particularly important.

Much of the associations of perceived teacher support with intentions to quit school were indirect via emotional engagement and students' experience of boredom. Particularly, experience of boredom showed a strong association with intentions to quit. This "silent" emotion, characterized by low physiological arousal (Pekrun et al., 2010), might not receive attention from teachers as boredom does not necessarily lead to class disruption. However, this study points toward the importance of teachers and schools strategizing to reduce academic boredom. This may include providing students with meaningful choices and carefully investing in their perspectives (autonomy granting and emotional support). Furthermore, promoting both self-oriented and self-transcendent purposes for learning activity

can foster persistence in tedious or boring academic tasks (Yeager et al., 2014). As some level of boredom is inevitable in school, practicing specific coping strategies to consciously deal with boredom should also be considered (Nett et al., 2011). As the current findings rely on a cross-sectional design, practical implications should be regarded tentative, and research with longitudinal or experimental designs are needed to make conclusions about measures to prevent or counteract processes toward school dropout.

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Disclosure statement

No conflicts of interest to disclose.

Appendix

Intentions to quit

RMSEA = .038 (90% CI: .015–.064), CFI = .99, TLI = .98, SRMR = .013. Standardized factor loadings range: .67–.89. (Cronbach's α: .88).

1. *I often consider quitting school*
2. *I have concrete plans to quit school**
3. *I consider leaving school and finding a job instead**
4. *I wonder if there is any point in continuing at school*
5. *I really feel that I am wasting my time at school*

* residuals of the two items were allowed to correlate (*r* = .27**)

Boredom

RMSEA = .027 (90% CI: .000–.066), CFI = 0.99, TLI = 0.99, SRMR = .006. Standardized factor loadings range: .74–.88. (Cronbach's α: .90).

1. *I get bored at school*
2. *Because schoolwork is boring, I have no desire to learn*
3. *While studying, I seem to drift off because it's so boring*
4. *Schoolwork is dull and monotonous*

Emotional engagement

RMSEA = .054 (90% CI: .032–.078), CFI = .993, TLI = .983, SRMR = .011. Standardized factor loadings range: .54–.86. (Cronbach's α: .89).

1. *When I'm in class, I feel good**
2. *When we work on something in class, I feel interested*
3. *Class is fun**
4. *I enjoy learning new things in class*
5. *When we work on something in class, I get involved*

* residuals of the two items were allowed to correlate (*r* = .11**)

Perceived quality of academic feedback

RMSEA = .061 (90% CI: .041–.082), CFI = .99, TLI = .97, SRMR = .018. Standardized factor loadings range: .67–.89. (Cronbach´s α: .89).

1. *The teachers explain the qualities of my work*
2. *The teachers explain the weaknesses of my work*
3. *I often get feedback from the teachers that I can use to improve my schoolwork*
4. *The feedback I receive helps me understand how I can improve next time*
5. *After an assessment, the teachers always give me feedback on how I should work to do it better next time*

Perceived emotional support

RMSEA = .065 (90% CI: .043–.089), CFI = .99, TLI = .98, SRMR = .014. Standardized factor loadings range: .76–.94. (Cronbach´s α: .94)

1. *I can trust my teachers**
2. *My teachers will always help me if I have problems**
3. *I feel that my teachers have faith in me*
4. *I feel that my teachers care about me*
5. *I feel that my teachers appreciate me*

*residuals of the two items were allowed to correlate (*r* = .44**)

Perceived autonomy granting

Saturated model. Standardized factor loadings range: .76–.91 (Cronbach's α: .87).

1. *I can participate in decisions regarding choice of my learning tasks*
2. *I feel I can influence my working situation at school*
3. *I can participate in decisions regarding how I work with my learning tasks*

Table 1. Descriptive information for independent, intermediate, and dependent variables. Distribution of composite scores, categorized in accordance with the original response alternatives for single items (n = 1379).

	Completely disagree 1	Quite disagree 2	Slightly disagree 3	Slightly agree 4	Quite agree 5	Completely agree 6	*M*	*SD*
Feedback quality	2.4%	6.5%	14.8%	28.1%	29.9%	18.2%	4.20	1.07
Emotional support	3.0%	3.8%	10.0%	23.0%	30.3%	29.9%	4.50	1.12
Autonomy granting	6.2%	13.3%	21.2%	25.8%	24.9%	8.6%	3.72	1.15
Emotional engagement	3.1%	5.6%	13.1%	27.8%	32.1%	18.3%	4.21	1.02
Boredom	11.6%	13.6%	26.2%	20.4%	16.3%	12.0%	3.56	1.29
	Absolutely not true 1	2	3	4	5	Absolutely true 6	*M*	*SD*
Intentions to quit	69.7%	12.0%	8.7%	4.4%	3.4%	1.8%	1.78	1.11

Note: Categories represent the following ranges of composite scores: 1 (1 – 1.83); 2 (1.84 – 2.66); 3 (2.67 – 3.49); 4 (3.50 – 4.33); 5 (4.34 – 5.16); 6 (5.17 – 6).

Table 2. Correlations (Pearson's *r*) between all variables in the study (*n* = 1379).

	1	2	3	4	5	6	7	8	9
1. Gender									
2. GPA from lower secondary school	.27**								
3. Study track	.21**	.57**							
4. Immigrant background	-.01	-.26**	-.02						
5. Feedback quality[i]	-.01	-.01	-.11**	.08**					
6. Emotional support[i]	-.06*	.06*	-.09**	-.02	.56**				
7. Autonomy granting[i]	.01	.04	-.06*	.12**	.48**	.58**			
8. Emotional engagement[i]	-.08**	.06*	-.10**	.08**	.48**	.59**	.52**		
9. Boredom[i]	.06*	.04	.08**	-.15**	-.33**	-.38**	-.39**	-.61**	
10. Intentions to quit[i]	-.01	-.22 **	-.11**	.04	-.21**	-.34**	-.24**	-.44**	.47**

Note: * $p < .05$; ** $p < .01$. Gender: 1 = male, 2 = female. Study track: 1 = vocational, 2 = academic. Immigrant: 0 = at least one parent born in Norway, 1 = neither parent born in Norway.

[i]Composite scores.

Table 3. Measurement models based on CFA: independent variables together, intermediate variables, and the complete six-factor measurement model (n = 1379).

	Goodness of fit	Standardized factor loadings
Independent variables: *Feedback quality, Emotional support,* and *Autonomy granting*	RMSEA = .049 (90% CI: .043–.055); CFI = .98; TLI = .97; SRMR = .039.	.67 – .94
Intermediate variables: *Emotional engagement and Boredom*	RMSEA = .044 (90% CI: .035–.054), CFI = .99; TLI = .98; SRMR = .023.	.55 – .88
Complete six-factor model	RMSEA = .039 (90% CI: .037–.042); CFI = .97; TLI = .96; SRMR = .048.	.58 – .94

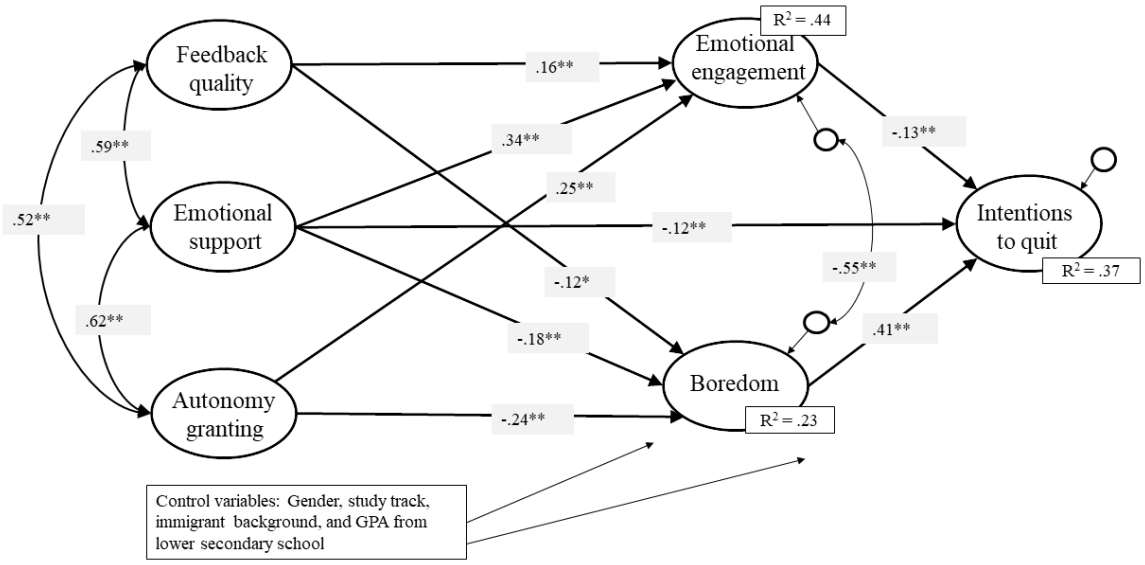
Table 4. Direct, indirect, and total effect of independent variables on intentions to quit, including 95% confidence intervals conducted by bootstrapping (n = 1376).

	Intentions to quit		
	Direct (95% CI)	Sum indirect (95% CI)	Total (95% CI)
Feedback quality	- -	-.07** (-.11 – -.03)	-.07** (-.11 – -.03)
Emotional support	-.12** (-.19 – -.04)	-.12** (-.17 – -.08)	-.24** (-.30 – -.16)
Autonomy granting	- -	-.13** (-.17 – -.09)	-.13** (-.17 – -.09)

Note: ** $p < .01$

Gender, GPA, immigrant background, and study track were included as control variables.

Fig.1: Structural equation model (n = 1376).



Note: * $p < .05$; ** $p < .01$

References

Ajzen, I. (2012). The theory of planned behavior. In P. A. M. Lange, A. W. Kruglanski, & H. T. E. (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 438-459). London: Sage.

Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. *The Journal of Educational Research, 104*(4), 241-252. doi:10.1080/00220671003728062

Archambault, I., Janosz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*(3), 651-670. doi:0.1016/j.adolescence.2008.06.007

Archambault, I., Janosz, M., Morizot, J., & Pagani, L.S. (2009). Adolescent behavioral, affective, and cognitive engagement in school: Relationship to dropout. *Journal of School Health, 79*(9), 408-415. doi:10.1111/j.1746-1561.2009.00428.x

Bakken, A. (2017). *Ungdata. Nasjonale resultater 2017 [Youth Survey. National results 2017]* (Nova Report 10/17). Oslo: OsloMet University, Nova. www.oslomet.no/om/nova.

Battin-Pearson, S., Newcomb, M. D., Abbott, R. D., Hill, K. G., Catalano, R. F., & Hawkins, J. D. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92*(3), 568-582. doi:10.1037/0022-0663.92.3.568

Bearden, L. J., Spencer, W. A., & Moracco, J. C. (1989). A study of high school dropouts. *The School Counselor, 37*(2), 113-120.

Bergeron, J., Chouinard, R., & Janosz, M. (2011). The impact of teacher-student relationships and achievement motivation on students' intentions to dropout according to socio-economic status. *US-China Education Review B, 2*, 273-279.

Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability (formerly: Journal of Personnel Evaluation in Education), 21*(1), 5. doi:10.1007/s11092-008-9068-5

Blondal, K. S., & Adalbjarnardottir, S. (2012). Student disengagement in relation to expected and unexpected educational pathways. *Scandinavian Journal of Educational Research, 56*(1), 85-100. doi:10.1080/00313831.2011.568607

Bridgeland, J. M., DiIulio Jr, J. J., & Morison, K. B. (2006). *The silent epidemic: Perspectives of high school dropouts*. Washington DC: Civic Enterprises.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (Second ed.). New York and London: The Guilford Press.

Bru, E., Stephens, P., & Torsheim, T. (2002). Students' perceptions of class management and reports of their own misbehavior. *Journal of School Psychology, 40*(4), 287-307. doi:10.1016/S0022-4405(02)00104-8

Bru, E., Stornes, T., Munthe, E., & Thuen, E. (2010). Students' perceptions of teacher support across the transition from primary to secondary school. *Scandinavian Journal of Educational Research, 54*(6), 519-533. doi:10.1080/00313831.2010.522842

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. doi:10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255. doi:10.1207/S15328007SEM0902_5

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of Self-System Processes. In M. R. Gunnar & L. A. Stroufe

(Eds.), *Self Processes and Development: The Minnesota Symposia on Child Psychology* (Vol. 23). New Jersey: Lawrence Erlbaum Associates, Inc.

Conner, J. O., & Pope, D. C. (2013). Not just robo-students: Why full engagement matters and how schools can promote it. *Journal of Youth and Adolescence, 42*(9), 1426-1442. doi:10.1007/s10964-013-9948-y

Cornelius-White, J. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research, 77*(1), 113-143. doi:10.3102/003465430298563

Croninger, R. G., & Lee, V. E. (2001). Social capital and dropping out of high school: Benefits to at-risk students of teachers' support and guidance. *Teachers College Record, 103*(4), 548-581.

Daschmann, E. C., Goetz, T., & Stupnisky, R. H. (2014). Exploring the antecedents of boredom: Do teachers know why students are bored? *Teaching and Teacher Education, 39*, 22-30. doi:10.1016/j.tate.2013.11.009

Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist, 38*(4), 207-234. doi:10.1207/S15326985EP3804_2

Davis, L. E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94*(4), 810. doi:10.1037//0022-0663.94.4.810

De Ridder, K. A., Pape, K., Johnsen, R., Westin, S., Holmen, T. L., & Bjorngaard, J. H. (2012). School dropout: A major public health challenge. A 10-year prospective study on medical and non-medical social insurance benefits in young adulthood, the Young-HUNT 1 Study (Norway). *Journal of Epidemiology and Community Health, 66*(11), 995-1000. doi:10.1136/jech-2011-200047

Eccles, J. S. (2016). Engagement: Where to next? *Learning and Instruction, 43*, 71-75. doi:10.1016/j.learninstruc.2016.02.003

Falch, T., & Nyhus, O. H. (2011). Betydningen av fullført videregående opplæring for sysselsetting og inaktivitet blant unge voksne [The importance of completed upper secondary education for employment and inactivity among young adults]. *Søkelys på arbeidslivet, 4*, 285-301.

Fall, A.-M., & Roberts, G. (2012). High school dropouts: Interactions between social context, self-perceptions, school engagement, and student dropout. *Journal of Adolescence, 35*(4), 787-798. doi:10.1016/j.adolescence.2011.11.004

Fallis, R. K., & Opotow, S. (2003). Are students failing school or are schools failing students? Class cutting in high school. *Journal of Social Issues, 59*(1), 103-119. doi:10.1111/1540-4560.00007

Farrell, E., Peguero, G., Lindsey, R., & White, R. (1988). Giving voice to high school students: Pressure and boredom, ya know what I'm sayin'? *American Educational Research Journal, 25*(4), 489-502. doi:10.3102/00028312025004489

Federici, R. A., & Skaalvik, E. M. (2014). Students' perceptions of emotional and instrumental teacher support: Relations with motivational and emotional responses. *International Education Studies, 7*(1), 21-36. doi:10.5539/ies.v7n1p21

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59-109. doi:10.3102/00346543074001059

Freudenberg, N., & Ruglis, J. (2007). Reframing school dropout as a public health issue. *Preventing Chronic Disease: Public Health Research, Practice, and Policy, 4*(4).

Frostad, P., Pijl, S. J., & Mjaavatn, P. E. (2015). Losing all interest in school: Social participation as a predictor of the intention to leave upper secondary school early.

Scandinavian Journal of Educational Research, 59(1), 110-122. doi:10.1080/00313831.2014.904420

Garvik, M., Idsoe, T., & Bru, E. (2013). Depression and school engagement among Norwegian upper secondary vocational school students. *Scandinavian Journal of Educational Research, 58*(5), 592-608. doi:10.1080/00313831.2013.798835

Hafen, C. A., Allen, J. P., Mikami, A. Y., Gregory, A., Hamre, B., & Pianta, R. C. (2012). The pivotal role of adolescent autonomy in secondary school classrooms. *Journal of Youth and Adolescence, 41*(3), 245-255. doi:10.1007/s10964-011-9739-2

Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625-638.

Hardre, P. L., & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95*(2), 347. doi:10.1037/0022-0663.95.2.347

Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education, 16*(8), 811-826. doi:10.1016/S0742-051X(00)00028-7

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112. doi:10.3102/003465430298487

Havik, T., Bru, E., & Ertesvåg, S. K. (2015). School factors associated with school refusal- and truancy-related reasons for school non-attendance. *Social Psychology of Education, 18*(2), 221-240. doi:10.1007/s11218-015-9293-y

Havnes, A., Smith, K., Dysthe, O., & Ludvigsen, K. (2012). Formative assessment and feedback: Making learning visible. *Studies in Educational Evaluation, 38*(1), 21-27. doi:10.1016/j.stueduc.2012.04.001

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.

Holen, S., Waaktaar, T., & Sagatun, Å. (2017). A chance lost in the prevention of school dropout? Teacher-student relationships mediate the effect of mental health problems on noncompletion of upper-secondary school. *Scandinavian Journal of Educational Research*, 1-17. doi:10.1080/00313831.2017.1306801

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6(1),* 53-60.

Hopfenbeck, T. N., Flórez Petour, M. T., & Tolo, A. (2015). Balancing tensions in educational policy reforms: Large-scale implementation of assessment for learning in Norway. *Assessment in Education: Principles, Policy & Practice, 22*(1), 44-60. doi:10.1080/0969594X.2014.996524

Hospel, V., & Galand, B. (2016). Are both classroom autonomy support and structure equally important for students' engagement? A multilevel analysis. *Learning and Instruction, 41*, 1-10. doi:10.1016/j.learninstruc.2015.09.001

Hox, J. (2002). *Multilevel analysis techniques and applications*. London: Lawrence Erlbaum.

Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction, 43*, 27-38. doi:10.1016/j.learninstruc.2016.01.002

Janosz, M., Archambault, I., Morizot, J., & Pagani, L. S. (2008). School engagement trajectories and their differential predictive relations to dropout. *Journal of Social Issues, 64*(1), 21-40. doi:10.1111/j.1540-4560.2008.00546.x

Jöreskog, K. (1993). Testing structural equation models. In K. A. Bollen & S. J. Long (Eds.), *Testing structural equation models* (pp. 294-316). Newbury Park: Sage.

Kale, E., & Hjelde, K. (2017). *Mental health challenges of immigrants in Norway. A litterature review 2009-17* (NAKMI Report 1:17). Retrieved from:

https://www.fhi.no/publ/2017/mental-health-challenges-of-immigrants-in-norway-a-literature-review-200917/

King, R. B. (2010). What do students feel in school and how do we measure them? Examining the psychometric properties of the S-AEQ-F. *Philippine Journal of Psychology, 43*(2), 161-176.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (Third ed). New York: The Guilford Press.

Krane, V., Karlsson, B., Ness, O., & Kim, H. S. (2016). Teacher–student relationship, student mental health, and dropout from upper secondary school: A literature review. *Scandinavian Psychologist, 3*(e11). doi:10.15714/scandpsychol.3.e11

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research, 75*(1), 63-82. doi:10.3102/00346543075001063

Lamote, C., Speybroeck, S., Van Den Noortgate, W., & Van Damme, J. (2013). Different pathways towards dropout: The role of engagement in early school leaving. *Oxford Review of Education, 39*(6), 739-760. doi:10.1080/03054985.2013.854202

Larson, R. W., & Richards, M. H. (1991). Boredom in the middle school years: Blaming schools versus blaming students. *American Journal of Education, 99*(4), 418-443.

Legault, L., Green-Demers, I., & Pelletier, L. (2006). Why do high school students lack motivation in the classroom? Toward an understanding of academic amotivation and the role of social support. *Journal of Educational Psychology, 98*(3), 567. doi:10.1037/0022-0663.98.3.567

Lei, H., Cui, Y., & Chiu, M. M. (2018). The relationship between teacher support and students' academic emotions: A meta-analysis. *Frontiers in Psychology, 8*, 1-12. doi:10.3389/fpsyg.2017.02288

Lerang, M. S., Ertesvåg, S. K., & Havik, T. (2018). Perceived classroom interaction, goal orientation and their association with social and academic learning outcomes. *Scandinavian Journal of Educational Research*, 1-22. doi:10.1080/00313831.2018.1466358

Lessard, A., Poirier, M., & Fortin, L. (2010). Student-teacher relationship: A protective factor against school dropout? *Procedia - Social and Behavioral Sciences, 2*(2), 1636-1643. doi:10.1016/j.sbspro.2010.03.250

Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: implications for grades, depression, delinquency, and substance use. *Developmental Psychology, 47*(1), 233-247. doi:10.1037/a0021307

Lietaert, S., Roorda, D., Laevers, F., Verschueren, K., & De Fraine, B. (2015). The gender gap in student engagement: The role of teachers' autonomy support, structure, and involvement. *British Journal of Educational Psychology, 85*(4), 498-518. doi:10.1111/bjep.12095

Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. London: Harvard University Press.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99. doi:10.1207/s15327906mbr3901_4

Mainhard, T., Oudman, S., Hornstra, L., Bosker, R. J., & Goetz, T. (2018). Student emotions in class: The relative importance of teachers and their interpersonal relations with students. *Learning and Instruction, 53*, 109-119. doi:10.1016/j.learninstruc.2017.07.011

Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental

support. *School Psychology Quartely, 18*(3), 231-252. doi:10.1521/scpq.18.3.231.22576

Markussen, E., Frøseth, M. W., & Sandberg, N. (2011). Reaching for the unreachable: Identifying factors predicting early school leaving and non-completion in Norwegian upper secondary education. *Scandinavian Journal of Educational Research, 55*(3), 225-253. doi:10.1080/00313831.2011.576876

Markussen, E., Frøseth, M. W., Sandberg, N., Lødding, B., & Borgen, J. S. (2011). Early leaving, non-completion and completion in upper secondary education in Norway. In S. Lamb, E. Markussen, R. Teese, N. Sandberg, & J. Polesel (Eds.), *School dropout and completion: International comparative studies in theory and policy* (pp. 253-271): Springer.

Markussen, E., & Seland, I. (2012). *Å redusere bortvalg - bare skolens ansvar? [Reducing dropout – only resposibility of the school?]* (NIFU rapport 6/2012). Oslo: Nordisk institutt for studier av innovasjon, forskning og utdanning (NIFU). https://www.nifu.no/publications/924501/

Marsh, H. W., Lüdtke, O., Nagengast, B., Trautwein, U., Morin, A. J., Abduljabbar, A. S., & Köller, O. (2012). Classroom climate and contextual effects: Conceptual and methodological issues in the evaluation of group-level effects. *Educational Psychologist, 47*(2), 106-124. doi:10.1080/00461520.2012.670488

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (Eighth ed.). Los Angeles: CA: Muthén & Muthén.

NESH (2016). *Guidelines for research ethics in the social sciences, humanities, law and theology*. Oslo: The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH).

Nett, U. E., Goetz, T., & Hall, N. C. (2011). Coping with boredom in school: An experience sampling perspective. *Contemporary Educational Psychology, 36*(1), 49-59. doi:10.1016/j.cedpsych.2010.10.003

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *School Field, 7*(2), 133-144. doi:10.1177/1477878509104318

OECD (2018). *Investing in Youth: Norway*. Paris: OECD Publishing.

Pat-El, R. J., Tillema, H., Segers, M., & Vedder, P. (2013). Validation of Assessment for Learning Questionnaires for teachers and students. *British Journal of Educational Psychology, 83*(Pt 1), 98-113. doi:10.1111/j.2044-8279.2011.02057.x

Patall, E. A., Steingut, R. R., Vasquez, A. C., Trimble, S. S., Pituch, K. A., & Freeman, J. L. (2018). Daily autonomy supporting or thwarting and students' motivation and engagement in the high school science classroom. *Journal of Educational Psychology, 110*(2), 269-288. doi:10.1037/edu0000214reeve

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315-341. doi:10.1007/s10648-006-9029-9

Pekrun, R., Goetz, T., Daniels, L. M., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in achievement settings: Exploring control-value antecedents and performance outcomes of a neglected emotion. *Journal of Educational Psychology, 102*(3), 531. doi:10.1037/a0019243

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology, 36*(1), 36-48. doi:http://dx.doi.org/10.1016/j.cedpsych.2010.10.002

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In *Handbook of research on student engagement* (pp. 365-386): New York. Springer.

Quin, D. (2016). Longitudinal and contextual associations between teacher–student relationships and student engagement. *Review of Educational Research, 87*(2), 345-387. doi:10.3102/0034654316669434

Quin, D., Hemphill, S. A., & Heerde, J. A. (2017). Associations between teaching quality and secondary students' behavioral, emotional, and cognitive engagement in school. *Social Psychology of Education, 20*(4), 807-829. doi:10.1007/s11218-017-9401-2

RCC, Rogaland County Council (2016). *Kvalitetsmelding videregående opplæring 2016. [Quality report on upper secondary education 2016]*. Retrieved from: http://www.rogfk.no/Vaare-tjenester/Utdanning/Videregaaende-skole/Kvalitetsmeldinger

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149-172). New York: Springer.

Reschly, A. L., & Christenson, S. L. (2012). Jingle, Jangle, and Conceptual Haziness: Evolution and Future Directions of the Engagement Construct. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 3-19). New York: Springer.

Ricard, N. C., & Pelletier, L. G. (2016). Dropping out of high school: The role of parent and teacher self-determination support, reciprocal friendships and academic motivation. *Contemporary Educational Psychology, 44*, 32-40. doi:10.1016/j.cedpsych.2015.12.003

Roorda, D. L., Koomen, H. M., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493-529. doi:10.3102/0034654311421793

Rosenthal, B. S. (1998). Non-school correlates of dropout: An integrative review of the literature. *Children and Youth Services Review, 20*(5), 413-433.

Rumberger, R. W., & Lim, S. A. (2008). *Why students drop out of school: A review of 25 years of research*. Santa Barbara: University of California.

Rumberger, R. W., & Rotermund, S. (2012). The relationship between engagement and high school dropout. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 491-513). New York: Springer.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi:10.1037110003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2017). Schools as contexts for learning and social development. In R. M. Ryan & E. L. Deci (Eds.), *Self-determination theory: Basic psychological needs in motivation, development, and wellness* (pp. 351-381). New York: The Guilford Press.

Sagatun, Å., Heyerdahl, S., Wentzel-Larsen, T., & Lien, L. (2014). Mental health problems in the 10th grade and non-completion of upper secondary school: The mediating role of grades in a population-based longitudinal study. *BMC Public Health, 14*(1), 16. doi:10.1186/1471-2458-14-16

Sagatun, Å., Wentzel-Larsen, T., Heyerdahl, S., & Lien, L. (2016). Mental health in adolescence and subsequent receipt of medical benefits in young adulthood: The

mediating role of upper secondary school completion. *Scandinavian Journal of Public Health, 44*(4), 431-438.

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507-514. doi:10.1007/BF02296192

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100*(4), 765-781. doi:10.1037/a0012840

Skinner, E., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493-525. doi:10.1177/0013164408323233

Skinner, E., & Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In *Handbook of research on student engagement* (pp. 21-44). New York: Springer

Statistics Norway (2018). *Gjennomføring i videregående opplæring [Completion rates of pupils in upper secondary education]*. Retrieved from: https://www.ssb.no/en/utdanning/statistikker/vgogjen

Stroet, K., Opdenakker, M.-C., & Minnaert, A. (2013). Effects of need supportive teaching on early adolescents' motivation and engagement: A review of the literature. *Educational Research Review, 9*, 65-87. doi:10.1016/j.edurev.2012.11.003

Studsrød, I., & Bru, E. (2011). Upper secondary school students' perceptions of teacher socialization practices and reports of school adjustment. *School Psychology International, 33*(3), 308-324. doi:10.1177/0143034311412841

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior, 52*(2), 145-161. doi:10.1177/0022146510395592

Thuen, E., & Bru, E. (2000). Learning environment, meaningfulness of schoolwork and on-task-orientation among Norwegian 9th grade students. *School Psychology International, 21*(4), 393-413. doi:10.1177/0143034300214004

Tidwell, R. (1988). Dropouts speak out: Qualitative data on early school departures. *Adolescence, 23*(92), 939-954.

Trochim, William M. (2006) *The research methods knowledge base* (second ed.). Retrieved from: http://www.socialresearchmethods.net/kb/

Tze, V. M. C., Klassen, R., M., & Daniels, L. M. (2014). Patterns of boredom and its relationship with perceived autonomy support and engagement. *Contemporary Educational Psychology, 39*, 175-187. doi:10.1016/j.cedpsych.2014.05.001

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*(5), 1161-1176.

Virtanen, T. E., Lerkkanen, M.-K., Poikkeus, A.-M., & Kuorelahti, M. (2013). The relationship between classroom quality and students' engagement in secondary school. *Educational Psychology, 35*(8), 963-983. doi:10.1080/01443410.2013.822961

Wang, M.-T., Chow, A., Hofkens, T., & Salmela-Aro, K. (2015). The trajectories of student emotional engagement and school burnout with academic and psychological development: Findings from Finnish adolescents. *Learning and Instruction, 36*, 57-65. doi:10.1016/j.learninstruc.2014.11.004

Wang, M. T., & Degol, J. (2014). Staying engaged: Knowledge and research needs in student engagement. *Child Development Perspectives, 8*(3), 137-143. doi:10.1111/cdep.12073

Wang, M. T., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development, 83*(3), 877-895. doi:10.1111/j.1467-8624.2012.01745.x

Wang, M. T., & Fredricks, J. A. (2014). The reciprocal links between school engagement, youth problem behaviors, and school dropout during adolescence. *Child Development, 85*(2), 722-737. doi:10.1111/cdev.12138.

Wendelborg, C., Røe, M., & Caspersen, J. (2016). *Elevundersøkelsen 2015. Rapport 2016: Mangfold og inkludering [National pupil survey 2015. Report 2016: Diversity and inclusion*]. Trondheim: NTNU Samfunnsforskning.

Wentzel, K. R. (2015). Teacher-student relationships, motivation and competence. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 167-176). London & New York: Routledge

West, S. G., Taylor, A. B., & Wu, W. (2012). Model fit and model selection in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 209-231). New York: The Guilford Press.

Westergård, E., Ertesvåg, S. K., & Rafaelsen, F. (2018). A preliminary validity of the classroom assessment scoring system in Norwegian lower-secondary schools. *Scandinavian Journal of Educational Research*, 1-19. doi:10.1080/00313831.2017.1415964

Wilcken, A. J., & Roseth, C., J. (2015). The importance of teacher-student relationships for student engagement and achievement. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 177-187). London and New York: Routledge.

Wubbels, T., Brekelmans, M., den Brook, P., Wijsman, L., Mainhard, T., & van Tartwijk, J. (2015). Teacher-student relationships and classroom management. In E. Emmer & E. Sabornie (Eds.), *Handbook of classroom management* (Second ed.) (pp. 363-386). New York: Routledge.

Yazzie-Mintz, E. (2010). *Charting the path from engagement to achievement: A report on the 2009 High School Survey of Student Engagement*. Bloomington, IN: Center for Evaluation and Education Policy.

Yeager, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D'Mello, S., Spitzer, B. J., & Duckworth, A. L. (2014). Boring but important: A self-transcendent purpose for learning fosters academic self-regulation. *Journal of Personality and Social Psychology, 107*(4), 559-580. doi:10.1037/a0037637

Zimmer-Gembeck, M. J., Chipuer, H. M., Hanisch, M., Creed, P. A., & McGregor, L. (2006). Relationships at school and stage-environment fit as resources for adolescent engagement and achievement. *Journal of Adolescence, 29*(6), 911-933. doi:dx.doi.org/10.1016/j.adolescence.2006.04.008

Appendix 2: Study Ⅱ

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Intentions to Quit, Emotional Support from Teachers, and Loneliness among Peers: Developmental Trajectories and Longitudinal Associations in Upper Secondary School

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Abstract

The current longitudinal study examined students' intentions to quit school as a process that unfolds over time in a social context of upper secondary school. Based on self-report data collected from 1379 students at three time points over 13 months, the results from latent growth curve modeling revealed average increases in intentions to quit school and loneliness among peers at school, and no average change in perceived emotional support from teachers. In line with hypotheses, there was (1) a negative association between change in perceived emotional support from teachers and change in intentions to quit school and (2) a positive association between change in loneliness among peers and change in intentions to quit school, while controlling for gender, study track, and previous academic achievement. It is important that schools implement strategies to prioritize the quality of interpersonal relationships as an integral component of their educational mandate.

Keywords: Intentions to Quit School, Loneliness among Peers at School, Perceived Emotional Support from Teachers, Self-Determination Theory, Upper Secondary School

Introduction

Successful completion of upper secondary school has become increasingly important for full societal participation, and not earning this formal certification presents a major risk for individuals and society (De Ridder et al., 2012; OECD, 2020). In Norway, as in many other industrialized countries, dropout from upper secondary school is regarded as a severe problem to which considerable public and political attention is given (NOU 2018:15, 2018). Previous research has shown that intentions to quit school are a precursor to actual dropout (Davis et al., 2002; Eicher et al., 2014; Vallerand et al., 1997) and lack of further educational progress (Vasalampi et al., 2018). Accordingly, the current longitudinal study will examine students' intentions to quit school as a process that unfolds over time in a social context of upper secondary school.

To our knowledge, the current study is the first to assess the *development* of intentions to quit school, which will offer an important step beyond previous cross-sectional (Frostad et al., 2015; Hardre & Reeve, 2003; Tvedt et al., 2021) and longitudinal (Davis et al., 2002; Vallerand et al., 1997; Vasalampi et al., 2018) studies in which intentions to quit school were assessed at one time point only. Although some research has measured intentions to quit school at two time points (Alivernini & Lucidi, 2011; Haugan et al., 2019), they did not examine individual change. Thus, there remains limited understanding of the developmental process of intentions to quit school and how psychosocial experiences at school might affect this process. Therefore, we will examine the trajectories of perceived emotional support from teachers and loneliness among peers at school as they are associated longitudinally with students' development of intentions to quit school. These two psychosocial factors (emotional support from teachers and loneliness among peers at school) are determinants of the amount of relatedness students experience at school (Niemiec & Ryan, 2009; Vansteenkiste et al., 2020) and have been shown to be associated with intentions to quit school in cross-sectional

analyses (Frostad et al., 2015; Tvedt et al., 2021). With our focus on these psychosocial factors and individual change in intentions to quit school over time, we aim to offer insight into how school-based efforts might counteract a process that can lead to dropout from school.

The Development of Intentions to Quit School

Dropout from school rarely occurs as a sudden event; rather, dropout is characterized as a process of gradual academic disengagement that can lead to the decision to leave school prior to graduation (Rumberger & Lim, 2008). Thus, the current study will use a longitudinal approach focusing on the development of intentions to quit school during the first and second years of upper secondary school. We expect to find that the trajectory of students' intentions to quit school will increase during this time, as dropout from school is particularly prevalent after the second year of upper secondary school in Norway (Udir, 2020). This expectation is also supported by research showing that student engagement tends to decrease from Grade 7 to Grade 11 (Wang & Eccles, 2012) and that academic burnout tends to increase during upper secondary school (Bask & Salmela-Aro, 2013). Students' intentions to quit school can range from non-existent to strongly held, and they have been associated with an array of academic and psychosocial factors in school (Alivernini & Lucidi, 2011; Eicher et al., 2014; Frostad et al., 2015; Hardre & Reeve, 2003; Tvedt et al., 2021; Vallerand et al., 1997; Vasalampi et al., 2018).

The Importance of Social Relationships at School

The quality of relationships that students have with teachers and peers is viewed as an important determinant of academic engagement by several theoretical perspectives. For instance, self-determination theory (Ryan & Deci, 2017) underscores the importance of relatedness as a basic psychological need that is essential for full functioning and organismic wellness (Niemiec & Ryan, 2013). Indeed, high school students' experience of relatedness is associated with higher levels of autonomous motivation, engagement, achievement, and well-

being in school (Guay et al., 2017; King, 2015), as well as lower levels of amotivation (Legault et al., 2006). Also, feeling connected to important others in school is particularly critical for students who are not intrinsically motivated, for whom the process of internalization is essential (cf. Guay et al., 2017).

With this idea in mind, although factors such as disadvantaged family background and poor academic performance are well-known predictors of dropout from school, it is possible that the quality of students' social relationships at school also plays a role in this process (Fortin et al., 2013; Krane et al., 2016; Lee & Burkam, 2003). Unfortunately, studies that use repeated measures to examine aspects of the psychosocial learning environment with rigorous longitudinal designs are very limited. Actually, we are aware of no studies that have investigated intentions to quit school and their potential correlates using latent growth curve modeling (LGCM). Hence, the current study will address this gap by using a methodological approach that allows for investigation of intra-individual change in multiple concurrent processes (Bollen & Curran, 2006; von Soest & Hagtvet, 2011). Specifically, we will use LGCM to examine (1) the development of intentions to quit school, perceived emotional support from teachers, and loneliness among peers at school over time, and (2) whether initial levels and changes in perceived emotional support from teachers and loneliness among peers at school predict individual change in intentions to quit school.

As such, this study relies on theory (Ryan & Deci, 2017) and some preliminary evidence (Alivernini & Lucidi, 2011; Vallerand et al., 1997) suggesting that the development of intentions to quit school is a function of how students perceive their psychosocial learning environment. This previous work offers justification for the model in the current study, in which change in intentions to quit school is the outcome that is predicted by initial levels and changes in emotional support from teachers and loneliness among peers. Yet the term *predict* should be interpreted cautiously as the change processes were co-occurring and not

temporally ordered in the research design (von Soest & Hagtvet, 2011). Hence, these multivariate associations do not infer causality.

Perceived Emotional Support from Teachers. With perceived emotional support from teachers, students feel that they can trust their teachers, that their teachers genuinely care about them, and that their teachers have faith in them (Pianta et al., 2012), which can contribute to an experience of relatedness. Indeed, perceived emotional support is associated with higher levels of student attendance, engagement, and achievement (De Wit et al., 2010; Hamre & Pianta, 2001; Quin, 2017; Roorda et al., 2011), as well as lower levels of disruptive behavior (Bru et al., 2002). Yet notably, the interactions between students and teachers are qualitatively different in upper secondary school than in the lower grades (Newman et al., 2000), with more emphasis on academic matters. This shift might have led some (Goodenow, 1993; Studsrød & Bru, 2012) to suggest that emotional support from teachers is less important for older students. However, considerable evidence suggests that the affective qualities of the student-teacher relationship remain important as students grow older (Roorda et al., 2011).

To this point, in retrospective interviews students who have dropped out from school indicated that a lack of appropriate adult support—including from teachers—was an important determinant of their decision to do so (Ramsdal et al., 2018), and teacher support has been shown to buffer the decline in student engagement that typically occurs in adolescence (Wang & Eccles, 2012). Undoubtedly, teachers provide different kinds of support to their students (Pianta et al., 2012); however, we decided to focus on emotional support from teachers in light of its robust inverse association with students' intentions to quit school (Tvedt et al., 2021). Other findings speak to the potential for perceived emotional support from teachers as well. For instance, supportive relationships with teachers in Grade 10 were found to be related to completion of upper secondary school via students' mental health and grades (Holen et al., 2018), whereas negative student-teacher interactions during the first year of high school (at

age 12 – 13) predict dropout from school at age 19 (Fortin et al., 2013). Also, Lan and Lanthier (2003) found that students who had dropped out from school experienced a negative shift in the quality of their relationships with teachers prior to leaving. Taken together, these findings suggest that (1) perceived emotional support from teachers might influence the subsequent development of intentions to quit school and (2) change in such support from teachers might be associated with change in intentions to quit school.

Loneliness among Peers at School. Loneliness is an unpleasant subjective experience of the discrepancy between an individual's desired and actual social relations (Perlman & Peplau, 1981). Herein, we focus on loneliness among peers at school—that is, a perceived deficit in social integration and the quantity and/or quality of friendships at school (Asher & Wheeler, 1985; Frostad et al., 2015; Russell et al., 1984). In light of the negative consequences of loneliness (Holt-Lunstad et al., 2015), serious concerns can be raised around evidence showing that an increasing proportion of youth experience loneliness (Bakken, 2019), an increase in loneliness occurs during the first seven months of upper secondary school (Larsen et al., 2019), and a decrease in belongingness occurs among girls (but not boys) during high school (Gillen-O'Neel & Fuligni, 2013).

Peer relationships become increasingly important in adolescence (Buhrmester, 1990), and peers tend to be significant agents for school adjustment during upper secondary school (Studsrød & Bru, 2011). Of note, not only are students' social goals powerful in their own regard, but they also intertwine with academic goals and motivation in complex ways (Wentzel, 1999). According to self-determination theory, students can experience frustration of their basic psychological need for relatedness when peer relationships at school are unsupportive or lacking, which can forestall the process of internalization (Niemiec & Ryan, 2009). Indeed, social integration with peers who value the learning process affords students an important motivational resource that can be tapped when they encounter challenging

academic tasks that are not inherently satisfying (Furrer et al., 2014). This can be particularly important for academic persistence among students who struggle and are at risk for dropping out (Hymel et al., 1996).

Recent research among middle and high school students has shown that relatedness with classmates predicts behavioral engagement in school (Mikami et al., 2017), which has been found to serve as a protective factor against dropout (Archambault et al., 2009). Indeed, previous research (albeit, cross-sectional) has revealed a strong positive association between loneliness among peers in upper secondary school and intentions to quit school (Frostad et al., 2015; Haugan et al., 2019). Also, students who have dropped out tell stories of poor peer relations and feelings of loneliness when they reflect on their time at school (Ramsdal et al., 2013). Taken together, these findings suggest that (1) loneliness among peers at school might influence the subsequent development of intentions to quit school and (2) change in such loneliness might be associated with change in intentions to quit school.

Upper Secondary School in Norway

Upper secondary school is not part of the Norwegian compulsory education system, yet 98% of all youth in Norway enter upper secondary school directly after lower secondary school (10th grade; NOU 2018:15, 2018). Upon entry, students apply either for a vocational or an academic track. The vocational tracks typically entail two years in school and two years of apprenticeship in a company, and they are completed with a journeyman's certificate. The academic tracks are standardized to three years in school, and they are completed with a certification for higher education. Completion rates, which refer to rates of completion after the theoretical duration plus two years, are higher in academic tracks (85%) than in vocational tracks (67%; OECD, 2020). It is more common for students to leave the educational system during the transition between school years than within school years, and 7% of students who are enrolled in the first year of upper secondary school leave the system before their second

year. This proportion is 12% among students who are enrolled in the second year and leave the system before their third year (Udir, 2020). The current study included students from both vocational and academic tracks during first and second years of upper secondary school.

The Present Research

The present research was designed to examine two research questions and, in doing so, test the following three hypotheses concerning developmental trajectories during the first and second years of upper secondary school.

Research Question 1. What are the developmental trajectories of intentions to quit school, perceived emotional support from teachers, and loneliness among peers at school?

Hypothesis 1. The developmental trajectory of intentions to quit school will increase during the first and second years of upper secondary school. In light of limited and equivocal previous research, no hypothesis was stated for the developmental trajectory of perceived emotional support from teachers or loneliness among peers at school.

Research Question 2. How, and to what extent, do initial values and changes in perceived emotional support from teachers and loneliness among peers at school predict change in intentions to quit school, while controlling for gender, study track, and previous academic achievement?

Hypothesis 2. Initial values (Hypothesis 2a) and change (Hypothesis 2b) in perceived emotional support from teachers will be negatively associated with change in intentions to quit school.

Hypothesis 3. Initial values (Hypothesis 3a) and change (Hypothesis 3b) in loneliness among peers at school will be positively associated with change in intentions to quit school.

Method

Participants and Procedure

Participants were 1379 (667 female, 712 male) upper secondary school students (mean age at T1: 16.5 years old) from seven public schools located in the southwestern region of Norway. A slight majority of participants were on a vocational track (54%). Participants with an immigrant background represented 17% of the sample.

The current study is part of a larger longitudinal research project that was approved by the Norwegian Centre for Research Data to ensure compliance with ethical standards, and a more detailed description of the study procedure is offered in Tvedt et al. (2021). Participants provided responses to an electronic questionnaire during a normal class, supervised by a teacher. The first wave occurred in February 2017 (T1; N = 1379), the second in October 2017 (T2; N = 1073), and the third in March 2018 (T3; N = 1008)—a total study duration of 13 months. These time points were selected to create time intervals that were as equal as possible, as well as to avoid the beginning of the school year and exam periods. At T1, the response rate from among all eligible students was 90%, and all students who provided data at T1 were invited to do so at T2 and T3 (i.e., participation at T2 was not a criterion for participation at T3). Collaboration with the county's school administration enabled matching of self-report data with registry data (viz., gender, study track, and previous academic achievement, which was based on the average of scores in math, Norwegian, and English from the last year of lower secondary school).

Measures

Intentions to Quit School

Intentions to quit school refers to serious considerations about quitting school and have roots in Vallerand et al.'s (1997) motivational model of high school dropout. The scale has been modified for use in the Norwegian upper secondary school (Frostad et al., 2015; Tvedt et al., 2021) and the five items reported in Tvedt et al. (2021) were used in this study (e.g., I wonder if there is any reason to continue school, I have concrete plans to quit school).

Responses were made on a 6-point scale from 1 (*absolutely not true*) to 6 (*absolutely true*). The reliability was α = .88 at T1, α = .89 at T2, and α = .90 at T3.

Perceived Emotional Support from Teachers

Perceived emotional support from teachers, as assessed using the items in Tvedt et al. (2021), refers to a sense of trust in, care from, and ability to communicate openly with teachers (5 items; I feel that my teachers have faith in me, I can trust my teachers). The scale derives from an established measure of perceived emotional support from teachers among primary and lower secondary school students (e.g., Bru et al., 2002). Responses were made on a 6-point scale from 1 (*completely disagree*) to 6 (*completely agree*). The reliability was α = .94 at T1, α = .94 at T2, and α = .95 at T3.

Loneliness among Peers at School

The Norwegian version of the Loneliness and Social Dissatisfaction Questionnaire (Asher & Wheeler, 1985; Valås, 1999) assessed loneliness among peers at school. The items were documented previously in Frostad et al. (2015) and refer to a perceived lack of social integration and a feeling of loneliness among peers at school (6 items; I feel lonely at school, I have no one to talk to in class, I have no one to be together with at school). Responses were made on a 6-point scale from 1 (*absolutely not true*) to 6 (*absolutely true*). The reliability was α = .94 at T1, α = .95 at T2, and α = .96 at T3.

Analytic Overview

Analyses were conducted in SPSS 25 and Mplus 8.3. In an initial phase, we examined missingness, measurement models, measurement invariance, and the nested nature of the data, after which we examined descriptive statistics and zero-order correlations. The composite score for loneliness among peers deviated considerably from normality at each time point (skewness ≤ 2.44; kurtosis ≤ 5.75), Thus, we used Templeton's (2011) procedure, which retains the original means and standard deviations, to transform them toward normality. The

correlation between these transformed variables and their respective raw scores ranged from .90 to .92, and the transformed variables were used in all analyses involving these composites. Model fit was evaluated according to Hooper et al. (2008), whereby good fit was indicated by CFI > .950, TLI > .950, RMSEA < .070, and SRMR < .080.

Primary analyses were conducted using latent growth curve modeling (LGCM), as this approach can estimate inter-individual variability in intra-individual change among multiple concurrent processes (Bollen & Curran, 2006; von Soest & Hagtvet, 2011). In LGCM, individual growth trajectories are fitted based on the repeated measures, and two latent growth factors are estimated; an intercept that represents the initial level and a slope that represents the rate of change. The means of intercepts and slopes represent group-level information and individual differences are represented in the variances of these growth factors, which can be subject to further analyses of correlates and/or predictors (Duncan & Duncan, 2009). Although LGCM has been used in the field of educational psychology (see De Wit et al., 2010; Wang et al., 2015), its use has been remarkably modest given its advantages over other approaches for longitudinal data (Allemand & Martin, 2016).

Two procedural steps were performed in the LGCM. First, we specified each of the three unconditional LGC models separately to inspect their model fit, the means and variances of intercepts and slopes, and the associations between intercepts and slopes. Intercepts were set to T1, and the factor loadings of the slopes were fixed to 0 at T1, 1 at T2, and 2 at T3 to reflect the equal time passage between time points (Bollen & Curran, 2006). The MLR estimator (Muthén & Muthén, 1998-2017) was used to handle tendencies toward non-normal distributions in the study variables. Second, we specified a multivariate LGC model in which the intercepts and slopes of perceived emotional support from teachers and loneliness among peers were used to predict the slope of intentions to quit school. The slope of intentions to quit was treated as the final outcome variable, based on previous theory and research. Yet as noted

above, the term *predict* should be interpreted cautiously because we did not analyze the temporal order of the change processes. The slope of each variable was regressed onto its respective intercept, and gender, study track, and previous academic achievement were modeled as control variables. Scatterplots were inspected to confirm the linearity of the longitudinal associations and to check for outliers that might affect the estimates.

Results

Initial Analyses

Missing Data

There were missing data at the unit level at T2 (22%) and T3 (27%), yet 86% of the sample provided data at two or three time points. Analyses used to detect the mechanisms of missingness revealed that data were not missing completely at random. Attrition was associated with baseline levels of several variables (e.g., intentions to quit school and previous academic achievement; see Supplemental Material), and thus the full information maximum likelihood (FIML) procedure with auxiliary variables was used to minimize potential estimation bias (Enders, 2010; Widaman, 2006). The FIML procedure assumes that missingness is random after accounting for all available data (MAR) and is a robust approach to handling missing data in which available data from all cases are retained for analyses and the inclusion of appropriate auxiliary variables serves to increase the plausibility of the MAR assumption (Enders, 2010).

Measurement Models and Measurement Invariance

We inspected the psychometric properties of measurement models with latent variables at each time point, although we used composite scores based on observed indicators in the LGCM to reduce model complexity. The fit of the measurement model was good at T1 [CFI = .96; TLI = .95; SRMR = .03; RMSEA = .047 (90% CI: .042 - .052)], at T2 [CFI = .95; TLI = .94; SRMR = .04; RMSEA = .058 (90% CI: .052 - .063)], and at T3 [CFI = .96; TLI =

.95; SRMR = .04; RMSEA = .055 (90% CI: .049 - .060)]. All standardized factor loadings were ≥ .70. Invariance tests indicated that the measures remained stable over time. Specifying equality constraints on the factor loadings of the measurement model across time points yielded good model fit (CFI = .96; TLI = .95; SRMR = .04; RMSEA = .031), and specifying equality constraints on the intercepts of the observed indicators yielded trivial changes in model fit (ΔCFI, ΔTLI, ΔSRMR, and ΔRMSEA ≤ .001). These changes were within recommended cutoffs (Cheung & Rensvold, 2002), so we concluded that the observed indicators reflected three correlated yet distinct constructs that were invariant over time.

Nested Nature of the Data

At T1, students were from 82 classes in seven schools. A new school year began between T1 and T2, which generated some mobility among students. Indeed, 25% of the participants changed schools, such that at T2 students were from 187 classes in 22 schools. Only a small amount of mobility occurred between T2 and T3, as these time points were within the same school year. We performed the following checks on whether the dependency among the observations affected the analyses. First, we calculated the intraclass correlations for the observed indicators at each time point, which ranged from .02 to .13 (classroom level). Second, we calculated the design effects, which ranged from below to slightly above Hox's (2002) suggested threshold of 2.0; design effects for intentions to quit school ranged from 1.4 to 2.2. This led us to inspect the three unconditional LGC models as well as the multivariate LGC model with a sandwich estimator (type is complex, i.e., with cluster-robust standard errors; McNeish et al., 2017), which was done separately with each cluster variable because some students changed class and/or school during the study period. We observed a slight increase in standard errors when applying the sandwich estimator (Δ ≤ .03), but importantly no parameters of interest changed from significant to non-significant at the .05 level. Thus, we

continued within a single-level approach without the sandwich estimator because the dependency among the observations did not affect the analyses substantially.

Descriptive Statistics and Zero-Order Correlations

Table 1 presents descriptive statistics and intercorrelations for the study variables. Autocorrelations ranged from .42 to .61, and all correlations between constructs were in the expected direction. Intentions to quit school were negatively associated with perceived emotional support and positively associated with loneliness among peers. The means indicated that at the group level the study variables remained relatively stable over time, yet LGC models were estimated next to examine rates of individual change and possible individual differences in those rates.

Table 1

Descriptive Statistics and Intercorrelations for the Study Variables

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Emotional support, T1	---								
2. Emotional support, T2	.50	---							
3. Emotional support, T3	.42	.61	---						
4. Loneliness, T1	-.24	-.19	-.15	---					
5. Loneliness, T2	-.22	-.27	-.19	.49	---				
6. Loneliness, T3	-.21	-.19	-.22	.44	.56	---			
7. Intentions to quit, T1	-.34	-.24	-.23	.32	.20	.18	---		
8. Intentions to quit, T2	-.29	-.35	-.26	.21	.36	.28	.53	---	
9. Intentions to quit, T3	-.26	-.31	-.36	.13	.22	.34	.44	.57	---
Mean	4.50	4.50	4.53	1.57	1.64	1.62	1.78	1.79	1.84
Standard deviation	1.12	1.09	1.12	0.79	0.85	0.83	1.11	1.07	1.15
Skewness	-0.74	-0.76	-0.75	1.04	1.00	1.22	1.69	1.69	1.58
Kurtosis	0.41	0.64	0.51	-0.05	-0.13	0.33	2.26	2.38	1.82
Estimated mean	4.50	4.46	4.49	1.57	1.66	1.65	1.78	1.85	1.91

Descriptive statistics were sample statistics, whereas estimated means and intercorrelations were estimated using FIML in Mplus.

All correlations were significant at $p < .01$.

Primary Analyses

Unconditional Latent Growth Curve Models

As presented in Table 2, good model fit was obtained for each unconditional LGC model, and significant variance was observed around all intercepts and slopes. Initially, however, a poor fit was obtained for loneliness among peers [χ^2 (1) = 9.88], which was susceptible to a non-linear trajectory. Model fit improved when the time score at T3 was estimated freely (rather than fixed to 2, as with a linear trajectory); thus, this was retained in subsequent analyses. This loading was fixed to 1.5 in the unconditional model, as informed by its estimated loading in the conditional model.

Hypothesis 1 posited that the developmental trajectory of intentions to quit school will increase during the first and second years of upper secondary school. This prediction was supported, as the mean slope for intentions to quit school (0.06, $p < .01$) was positive and significantly different from 0. Likewise, a positive mean slope was found for loneliness among peers (0.06, $p < .01$), but no significant mean slope was found for perceived emotional support from teachers (-0.01, *ns*).

Table 2

Results from the Three Unconditional Latent Growth Curve Models

	Intercept	**Slope**	**Intercept—Slope Correlation**	**Model Fit**			
	Mean (Variance)	Mean (Variance)	*r*	$\chi^2(1)$	RMSEA	CFI	TLI
Intentions to quit	1.78 (0.72**)	0.06** (0.12**)	-.25*	0.04	.000	1.00	1.00
Emotional support	4.50 (0.69**)	-0.01 (0.15**)	-.24*	1.67	.022	.99	.99
Loneliness[1]	1.58 (0.40**)	0.06** (0.12**)	-.32**	3.69	.044	.99	.98

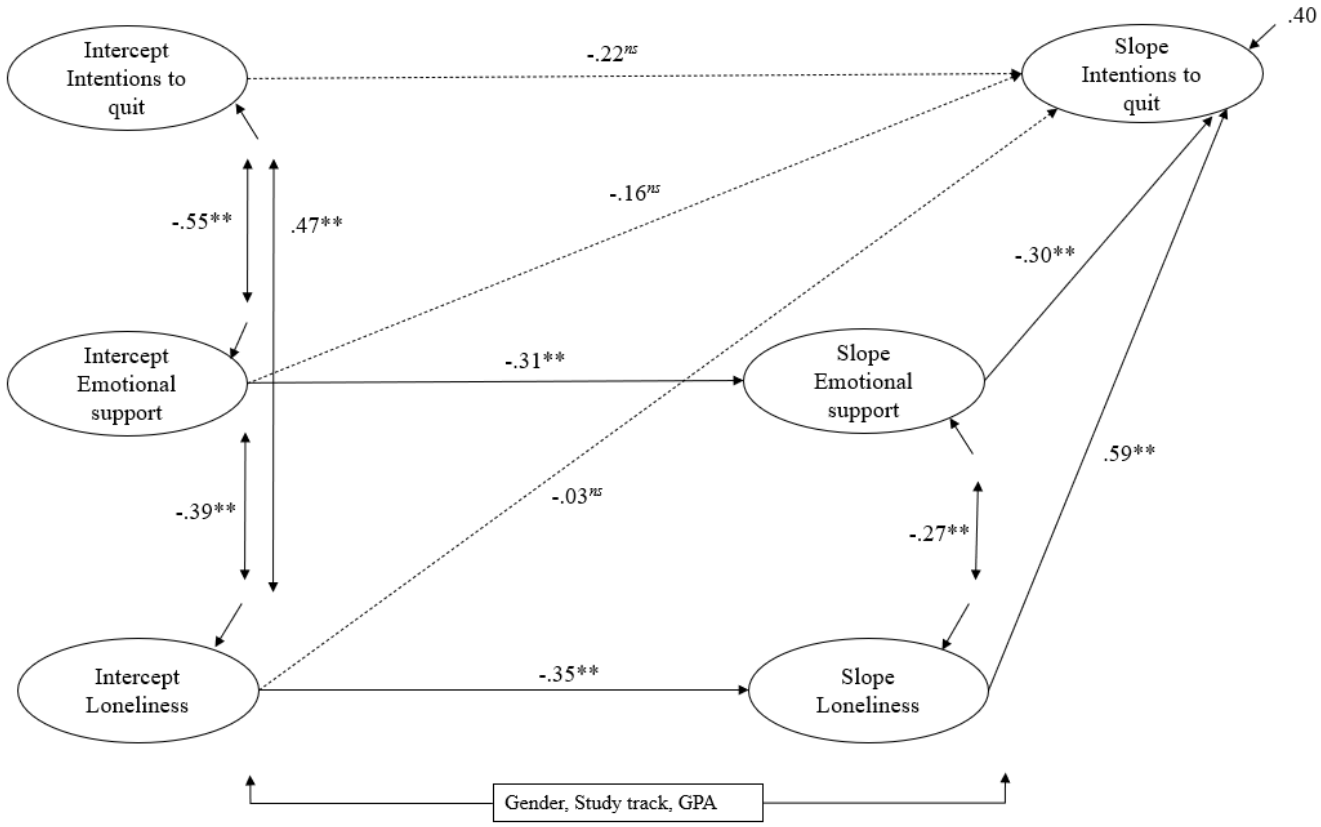
[1]A deviation from linearity was indicated for the trajectory of loneliness, so time scores were fixed to 0 at T1, 1 at T2, and 1.5 at T3 to obtain good model fit.

Means of intercepts and slopes were reported using unstandardized metrics.

$^{*}p < .05$, $^{**}p < .01$.

Multivariate Latent Growth Curve Model

Figure 1 presents standardized parameter estimates from the multivariate LGC model in which the processes were modeled simultaneously and change in intentions to quit school was specified as the final outcome. In this model, we controlled for gender, study track, and previous academic achievement (see Supplemental Material), as well as initial level within each process and associations between the intercepts. Occasion-specific residuals at T2 were allowed to covary to account for some remaining associations between the measures (Bollen & Curran, 2006), and the freely estimated T3 score of the loneliness slope was retained as per the unconditional model. The fit of the final model was good [χ^2 (27) = 38.68, p = .068; CFI = .99; TLI = .99; SRMR = .02; RMSEA = .018 (90% CI: .000 - .029)].



Note. Paths from the control variables (gender, study track, and GPA) were specified to all intercepts and slopes. $^{ns}p > .05$, $^{**}p < .01$.

Figure 1

Standardized Parameter Estimates from the Multivariate Latent Growth Curve Model

Hypothesis 2 posited that initial values (Hypothesis 2a) and change (Hypothesis 2b) in perceived emotional support from teachers will be negatively associated with change in intentions to quit school; these predictions were partially supported. Regarding Hypothesis 2a, the association between the intercept of perceived emotional support from teachers and the slope of intentions to quit school was non-significant ($\beta = -.16$, $p = .11$). Regarding Hypothesis 2b, the association between the slope of perceived emotional support from teachers and the slope of intentions to quit school was significant and negative ($\beta = -.30$, $p < .01$). Hypothesis 3 posited that initial values (Hypothesis 3a) and change (Hypothesis 3b) in loneliness among peers will be positively associated with change in intentions to quit school; these predictions were partially supported. Regarding Hypothesis 3a, the association between the intercept of loneliness among peers and the slope of intentions to quit school was non-significant ($\beta = -.03$, $p = .73$). Regarding Hypothesis 3b, the association between the slope of loneliness among peers and the slope of intentions to quit school was significant and positive ($\beta = .59$, $p < .01$). Follow-up analyses using raw scores for loneliness yielded similar results to those shown in Figure 1.

Discussion

The current study examined trajectories of intentions to quit school, perceived emotional support from teachers, and loneliness among peers at school during the first and second years of upper secondary school. The research questions focused on the developmental trajectories and longitudinal associations among these three constructs, which we discuss next.

Developmental Trajectories

In line with our first hypothesis, the results revealed an average increase in intentions to quit school as students progress through upper secondary school, which aligns with other research that has shown a decrease in student motivation and engagement over time (Wang et

al., 2015; Wang & Eccles, 2012). The results also revealed an average increase in loneliness among peers at school, which raises concerns given the detrimental correlates of loneliness (Holt-Lunstad et al., 2015). This increase was particularly pronounced after the transition to the second year, which might reflect the challenges of social adjustment in a restructured educational environment (Russell et al., 1984). Indeed, it also raises the question of whether the academic system is less attuned to social relationships as students age, and it underscores the importance of giving attention to how schools can scaffold this transition. There was no average change in perceived emotional support from teachers over time, which is encouraging given the relatively high mean values on this construct. Thus, it seems that, in general, teachers were able to provide emotional support to students throughout upper secondary school, which is not always noted in educational contexts (De Wit et al., 2010). At least in a Norwegian context, this finding casts doubt on the notion that the structural and cultural conditions in upper secondary school undermine the closeness and empathy that students perceive from teachers (Eccles et al., 1993). Importantly, though, significant variance around the mean slope was found, indicating that some students *do* perceive less emotional support from teachers over time whereas others do not.

Longitudinal Associations

Contrary to Hypothesis 2a, initial values of perceived emotional support from teachers were unassociated with change in intentions to quit school. Although previous research has shown an impact of student-teacher relationships on future academic outcomes (Hamre & Pianta, 2001), other research has found that support from teachers is unassociated with subsequent change in school attendance (De Wit et al., 2010). Yet this finding is best interpreted alongside the robust correlation between the initial values of intentions to quit school and perceived emotional support from teachers, which suggests that this relation might have been established early in upper secondary school. Student mobility across classes and/or

schools during the study period might also explain the lack of support for Hypothesis 2a, such that students who perceived less emotional support from teachers might be more likely to initiate this mobility and, in doing so, enhance their academic adjustment. In line with Hypothesis 2b, the rate of c*hange* in perceived emotional support from teachers negatively predicted the rate of change in intentions to quit school. This suggests that sustained or improved levels of emotional support from teachers can help prevent the development of serious considerations about quitting school, which complements previous research in less rigorous designs (Frostad et al., 2015; Haugan et al., 2019; Tvedt et al., 2021).

Contrary to Hypothesis 3a, initial values of loneliness among peers were unassociated with change in intentions to quit school. Again, student mobility might explain the lack of support for Hypothesis 3a. Students who are lonelier might be more likely to change classes and/or schools in an attempt to deal with this negative experience, which can affect the development of both loneliness and intentions to quit school. In line with Hypothesis 3b, the rate of *change* in loneliness among peers positively—and strongly—predicted the rate of change in intentions to quit school. This points to loneliness and intentions to quit school as two processes that are closely related over time. Alongside the robust correlation between initial values of intentions to quit school and loneliness among peers, this finding highlights the relevance of loneliness to the development of intentions to quit school (Haugan et al., 2019) and clarifies the importance of students' *current experiences* and *changes over time*.

Students' social goals are powerful during adolescence (Wentzel, 1999), and these findings accentuate the detrimental influence that diminished social integration at school can have on educational functioning. Without supportive social relationships with peers at school, students can experience frustration of their basic psychological needs for both relatedness *and* competence (Furrer et al., 2014), as these students are less likely to ask for and receive help or encouragement from their classmates (Mikami et al., 2017). Also, students who feel lonely at

school and who are prone to consider quitting school might affiliate with peers who have already dropped out (Hymel et al., 1996; Studsrød & Bru, 2011; Vitaro et al., 2001), thereby reinforcing their intention to quit and stifling their affiliation with classmates. Such a scenario suggests a reciprocal chain of associations.

With regard to change in intentions to quit school, the non-significant predictions from initial values, alongside the robust associatons with changes in the psychosocial variables suggest that any impact is generated by ongoing experiences, rather than single events occuring early in upper secondary school. This underscores the important work that school staff can do by continually soliciting students' perspectives on their psychosocial experiences and implementing adjustments that benefit those experiences.

Limitations and Future Research Directions

The longitudinal design of the current study represents a methodological strength, as it enabled an investigation of individual change over time. Also, the impact of stable individual characteristics, such as response set, that can inflate empirical associations in cross-sectional designs with one data source (Furnham, 1986) were minimized with this approach. Nonetheless, some limitations deserve mention. First, the total duration of the current study was 13 months. It is important for future research to replicate this work using a longer study duration and more time points. Indeed, although we used theory to guide the ordering of variables in the multivariate LGC model, the synchronous assessment leaves open the possibility for alternative explanations. Future research that uses more time points could be important in discerning directionality by temporally ordering the change processes by design (von Soest & Hagtvet, 2011) and investigating reciprocal associations. Second, although missing data were handled carefully using sophisticated statistical techniques, the representativeness of the sample may have been affected adversely by individuals who had dropped out of school prior to T1 and by the possibility that the 10% of students who chose

not to participate in the study did not do so on a random basis. Third, the study relied primarily on self-report data, which have various limitations (Fulmer & Frijters, 2009). Yet it is important to note that the constructs in the current study were phenomenological in nature, and thus require students' own reports of their experiences. That said, it is important for future research to replicate this work while going beyond self-report data.

Conclusion

Findings from this longitudinal study suggest that a sense of relatedness at school—operationalized as the presence and maintenance of perceived emotional support from teachers and the absence of loneliness among peers at school—is associated with less negative trajectories of intentions to quit school. Hence, additional research and practical efforts to enhance student-teacher relationships and social inclusion among peers at school are warranted. Such efforts could include teacher training on (1) increasing awareness of communication styles with students, (2) providing support to students regardless of ability or effort, (3) structuring cooperative learning opportunities, and (4) building an ethos of social responsibility among students. Indeed, it is important that schools implement such strategies to prioritize the quality of interpersonal relationships as an integral component of their educational mandate.

References

Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. *The Journal of Educational Research, 104*(4), 241-252. https://doi.org/10.1080/00220671003728062

Allemand, M., & Martin, M. (2016). On correlated change in personality. *European Psychologist, 21*(4), 237-253. https://doi.org/10.1027/1016-9040/a000256

Archambault, I., Janosz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence, 32*(3), 651-670. https://doi.org/10.1016/j.adolescence.2008.06.007

Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology, 53*(4), 500-505. https://doi.org/10.1037/0022-006X.53.4.500

Bakken, A. (2019). *Ungdata 2019. Nasjonale resultater [Youth data 2019. National results], Nova Rapport 9/19*. NOVA, OsloMet. http://www.hioa.no/Om-OsloMet/Senter-for-velferds-og-arbeidslivsforskning/NOVA/Publikasjonar/Rapporter/Ungdata-2019.-Nasjonal-resultater

Bask, M., & Salmela-Aro, K. (2013). Burned out to drop out: Exploring the relationship between school burnout and school dropout. *European Journal of Psychology of Education, 28*(2), 511-528. https://doi.org/10.1007/s10212-012-0126-5

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Wiley.

Bru, E., Stephens, P., & Torsheim, T. (2002). Students' perceptions of class management and reports of their own misbehavior. *Journal of School Psychology, 40*(4), 287-307. https://doi.org/10.1016/S0022-4405(02)00104-8

Buhrmester, D. (1990). Intimacy of friendship, interpersonal competence, and adjustment during preadolescence and adolescence. *Child Development, 61*(4), 1101-1111. https://doi.org/10.2307/1130878

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5

Davis, L. E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94*(4), 810-819. https://doi.org/10.1037//0022-0663.94.4.810

De Ridder, K. A. A., Pape, K., Johnsen, R., Westin, S., Holmen, T. L., & Bjørngaard, J. H. (2012). School dropout: A major public health challenge: A 10-year prospective study on medical and non-medical social insurance benefits in young adulthood, the Young-HUNT 1 Study (Norway). *Journal of Epidemiology and Community Health, 66*(11), 995-1000. https://doi.org/10.1136/jech-2011-200047

De Wit, D. J., Karioja, K., & Rye, B. J. (2010). Student perceptions of diminished teacher and classmate support following the transition to high school: Are they related to declining attendance? *School Effectiveness and School Improvement, 21*(4), 451-472. https://doi.org/10.1080/09243453.2010.532010

Duncan, T. E., & Duncan, S. C. (2009). The ABC's of LGM: An introductory guide to latent variable growth curve modeling. *Social and Personality Psychology Compass, 3*(6), 979-991. https://doi.org/10.1111/j.1751-9004.2009.00224.x.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Iver, D. M. (1993). Development during adolescence: The impact of stage-environment fit

on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90-101.

Eicher, V., Staerklé, C., & Clémence, A. (2014). I want to quit education: A longitudinal study of stress and optimism as predictors of school dropout intention. *Journal of Adolescence, 37*(7), 1021-1030. https://doi.org/10.1016/j.adolescence.2014.07.007

Enders, C. K. (2010). *Applied missing data analysis*. The Guilford Press.

Fortin, L., Marcotte, D., Diallo, T., Potvin, P., & Royer, É. (2013). A multidimensional model of school dropout from an 8-year longitudinal study in a general high school population. *European Journal of Psychology of Education, 28*(2), 563-583. https://doi.org/10.1007/s10212-012-0129-2

Frostad, P., Pijl, S. J., & Mjaavatn, P. E. (2015). Losing all interest in school: Social participation as a predictor of the intention to leave upper secondary school early. *Scandinavian Journal of Educational Research, 59*(1), 110-122. https://doi.org/10.1080/00313831.2014.904420

Fulmer, S. M., & Frijters, J. C. (2009). A review of self-report and alternative approaches in the measurement of student motivation. *Educational Psychology Review, 21*(3), 219-246. https://doi.org/10.1007/s10648-009-9107-x

Furnham, A. (1986). Response bias, social desirability and dissimulation. *Personality and Individual Differences, 7*(3), 385-400. https://doi.org/10.1016/0191-8869(86)90014-0

Furrer, C. J., Skinner, E. A., & Pitzer, J. R. (2014). The influence of teacher and peer relationships on students' classroom engagement and everyday motivational resilience. *Teachers College Record, 113*(1), 101-123.

Gillen-O'Neel, C., & Fuligni, A. (2013). A longitudinal study of school belonging and academic motivation across high school. *Child Development, 84*(2), 678-692. https://doi.org/10.1111/j.1467-8624.2012.01862.x

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *The Journal of Early Adolescence, 13*(1), 21-43. https://doi.org/10.1177/0272431693013001002

Guay, F., Denault, A.-S., & Renauld, S. (2017). School attachment and relatedness with parents, friends and teachers as predictors of students' intrinsic and identified regulation. *Contemporary Educational Psychology, 51*, 416-428. https://doi.org/10.1016/j.cedpsych.2017.10.001

Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625-638. https://www.jstor.org/stable/1132418

Hardre, P. L., & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95*(2), 347-356. https://doi.org/10.1037/0022-0663.95.2.347

Haugan, J. A., Frostad, P., & Mjaavatn, P.-E. (2019). A longitudinal study of factors predicting students' intentions to leave upper secondary school in Norway. *Social Psychology of Education, 22*(5), 1259-1279. https://doi.org/10.1007/s11218-019-09527-0

Holen, S., Waaktaar, T., & Sagatun, Å. (2018). A chance lost in the prevention of school dropout? Teacher-student relationships mediate the effect of mental health problems on noncompletion of upper-secondary school. *Scandinavian Journal of Educational Research, 62*(5), 737-753. https://doi.org/10.1080/00313831.2017.1306801

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science, 10*(2), 227-237. https://doi.org/10.1177/1745691614568352

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *The Electronic Journal of Business Research Methods, 6*(1), 53–60.

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. Lawrence Erlbaum.

Hymel, S., Comfort, C., Schonert-Reichl, K., & McDougall, P. (1996). Academic failure and school dropout: The influence of peers. In J. Juvonen & K. R. Wentzel (Eds.), *Cambridge studies in social and emotional development: Social motivation: Understanding children's school adjustment* (pp. 313-345). Cambridge University Press. https://psycnet.apa.org/doi/10.1017/CBO9780511571190.015

King, R. B. (2015). Sense of relatedness boosts engagement, achievement, and well-being: A latent growth model study. *Contemporary Educational Psychology, 42*, 26-38. https://doi.org/10.1016/j.cedpsych.2015.04.002

Krane, V., Karlsson, B. E., Ness, O., & Kim, H. S. (2016). Teacher-student relationship, student mental health, and dropout from upper secondary school: A literature review. *Scandinavian Psychologist, 3*(311). https://doi.org/10.15714/scandpsychol.3.e11

Lan, W., & Lanthier, R. (2003). Changes in students' academic performance and perceptions of school and self before dropping out of schools. *Journal of Education for Students Placed at Risk, 8*(3), 309-332. https://doi.org/10.1207/S15327671ESPR0803_2

Larsen, T. B., Urke, H., Tobro, M., Årdal, E., Waldahl, R. H., Djupedal, I., & Holsen, I. (2019). Promoting mental health and preventing loneliness in upper secondary school in Norway: Effects of a randomized controlled trial. Advance online publication. *Scandinavian Journal of Educational Research*. https://doi.org/10.1080/00313831.2019.1659405

Lee, V. E., & Burkam, D. T. (2003). Dropping out of high school: The role of school organization and structure. *American Educational Research Journal, 40*(2), 353-393. https://doi.org/10.3102/00028312040002353

Legault, L., Green-Demers, I., & Pelletier, L. (2006). Why do high school students lack motivation in the classroom? Toward an understanding of academic amotivation and the role of social support. *Journal of Educational Psychology, 98*(3), 567-582. https://doi.org/10.1037/0022-0663.98.3.567

McNeish, D., Stapleton, L. M., & Silverman, R. D. (2017). On the unnecessary ubiquity of hierarchical linear modeling. *Psychological Methods, 22*(1), 114-140. https://doi.org/10.1037/met0000078

Mikami, A. Y., Ruzek, E. A., Hafen, C. A., Gregory, A., & Allen, J. P. (2017). Perceptions of relatedness with classroom peers promote adolescents' behavioral engagement and achievement in secondary school. *Journal of Youth and Adolescence, 46*(11), 2341-2354. https://doi.org/10.1007/s10964-017-0724-2

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Newman, B. M., Lohman, B. J., Newman, P. R., Myers, M. C., & Smith, V. L. (2000). Experiences of urban youth navigating the transition to ninth grade. *Youth & Society, 31*(4), 387-416. https://doi.org/10.1177/0044118X00031004001

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education, 7*(2), 133-144. https://doi.org/10.1177/1477878509104318

Niemiec, C. P., & Ryan, R. M. (2013). What makes for a life well lived? Autonomy and its relation to full functioning and organismic wellness. In S. A. David, I. Boniwell, & A. C. Ayers (Eds.), *The Oxford handbook of happiness* (pp. 214-226). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199557257.013.0016

NOU 2018:15. (2018). *Kvalifisert, forberedt og motivert: Et kunnskapsgrunnlag om struktur og innhold i videregående opplæring [Qualified, prepared, and motivated: A knowledge base on the structure and content of upper secondary education]*. Ministry of Education and Research. https://www.regjeringen.no/no/dokumenter/nou-2018-15/id2621801/sec1

OECD. (2020). *Education at a glance 2020: OECD indicators*. OECD Publishing. https://doi.org/10.1787/69096873-en

Perlman, D., & Peplau, L. A. (1981). Toward a social psychology of loneliness. In R. Gilmour, & S. Duck (Eds.), *Personal relationships* (pp. 31-56). Academic Press.

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365-386). Springer. https://doi.org/10.1007/978-1-4614-2018-7_17

Quin, D. (2017). Longitudinal and contextual associations between teacher-student relationships and student engagement: A systematic review. *Review of Educational Research, 87*(2), 345-387. https://doi.org/10.3102/0034654316669434

Ramsdal, G. H., Bergvik, S., & Wynn, R. (2018). Long-term dropout from school and work and mental health in young adults in Norway: A qualitative interview-based study. *Cogent Psychology, 5*(1), Article 1455365. https://doi.org/10.1080/23311908.2018.1455365

Ramsdal, G., Gjærum, R. G., & Wynn, R. (2013). Dropout and early unemployment. *International Journal of Educational Research, 62*(1), 75-86. https://doi.org/10.1016/j.ijer.2013.06.011

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493-529. https://doi.org/10.3102/0034654311421793

Rumberger, R. W., & Lim, S. A. (2008). *Why students drop out of school: A review of 25 years of research*. https://www.issuelab.org/resources/11658/11658.pdf

Russell, D., Cutrona, C. E., Rose, J., & Yurko, K. (1984). Social and emotional loneliness: An examination of Weiss's typology of loneliness. *Journal of Personality and Social Psychology, 46*(6), 1313-1321. https://doi.org/10.1037//0022-3514.46.6.1313

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Studsrød, I., & Bru, E. (2011). Perceptions of peers as socialization agents and adjustment in upper secondary school. *Emotional and Behavioural Difficulties, 16*(2), 159-172. https://doi.org/10.1080/13632752.2011.569401

Studsrød, I., & Bru, E. (2012). Upper secondary school students' perceptions of teacher socialization practices and reports of school adjustment. *School Psychology International, 33*(3), 308-324. https://doi.org/10.1177/0143034311412841

Templeton, G. F. (2011). A two-step approach for transforming continuous variables to normal: Implications and recommendations for IS research. *Communications of the Association for Information Systems, 28*(4), 41-58. https://doi.org/10.17705/1CAIS.02804

Tvedt, M. S., Bru, E., & Idsoe, T. (2021). Perceived teacher support and intentions to quit upper secondary school: Direct, and indirect associations via emotional engagement and boredom. *Scandinavian Journal of Educational Research, 65(1), 101-122*. https://doi.org/10.1080/00313831.2019.1659401

Udir. (2020). *Utdanningsspeilet 2017 [Education mirror, Report 2017]*. Norwegian Directorate for Education and Training. http://utdanningsspeilet.udir.no/2017/

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*(5), 1161-1176. https://doi.org/10.1037/0022-3514.72.5.1161

Valås, H. (1999). Students with learning disabilities and low-achieving students: Peer acceptance, loneliness, self-esteem, and depression. *Social Psychology of Education, 3*(3), 173-192. https://doi.org/10.1023/A:1009626828789

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion, 44*, 1-31. https://doi.org/10.1007/s11031-019-09818-1

Vasalampi, K., Kiuru, N., & Salmela-Aro, K. (2018). The role of a supportive interpersonal environment and education-related goal motivation during the transition beyond upper secondary education. *Contemporary Educational Psychology, 55*, 110-119. https://doi.org/10.1016/j.cedpsych.2018.09.001

Vitaro, F., Larocque, D., Janosz, M., & Tremblay, R. E. (2001). Negative social experiences and dropping out of school. *Educational Psychology, 21*(4), 401-415. https://doi.org/10.1080/01443410120090795

von Soest, T., & Hagtvet, K. A. (2011). Mediation analysis in a latent growth curve modeling framework. *Structural Equation Modeling: A Multidisciplinary Journal, 18*(2), 289-314. https://doi.org/10.1080/10705511.2011.557344

Wang, M.-T., Chow, A., Hofkens, T., & Salmela-Aro, K. (2015). The trajectories of student emotional engagement and school burnout with academic and psychological development: Findings from Finnish adolescents. *Learning and Instruction, 36*, 57-65. https://doi.org/10.1016/j.learninstruc.2014.11.004

Wang, M.-T., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development, 83*(3), 877-895. https://doi.org/10.1111/j.1467-8624.2012.01745.x

Wentzel, K. R. (1999). Social-motivational processes and interpersonal relationships: Implications for understanding motivation at school. *Journal of Educational Psychology, 91*(1), 76-97. https://doi.org/10.1037/0022-0663.91.1.76

Widaman, K. F. (2006). Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development, 71*(3), 42-64. https://doi.org/10.1111/j.1540-5834.2006.00404.x

Supplemental Material

Auxiliary variables

Nine variables were included as auxiliary variables in all latent growth curve models to support the FIML procedure's handling of missing data (Enders, 2010; Widaman, 2006). These variables were selected after inspecting all variables in the dataset and searching for correlation with (1) missingness at T2 (MT2), (2) missingness at T3 (MT3), or (3) initial values in intentions to quit school at T1 (IT1). Supplemental Table 1 presents the strongest correlations between the auxiliary variables and MT2, MT3, and IT1.

Supplemental Table 1

Strongest Correlations between the Auxiliary Variables and MT2, MT3, and IT1

Auxiliary variable	**MT2**	**MT3**	**IT1**
GPA after first semester in upper secondary school			-.29**
GPA after fourth semester in upper secondary school	-.27**		
Attending a school that was not initially in the project	.23**		
Age	.14**		
Amount of immigrants in class	.13**		
Absence (in hours) after first year		.30**	
Perceived academic hopelessness, Time 1			.47**
Perceived academic boredom, Time 1			.47**
Perceived meaningfulness of schoolwork, Time 1			-.42**

MT2 = Missingness at T2; MT3 = Missingness at T3; IT1 = Intentions to quit school at T1.

**$p < .01$.

Associations with control variables

The multivariate latent growth curve model included paths from three control variables that were specified to all intercepts and slopes. Supplemental Table 2 presents the standardized parameter estimates of these control variables.

Supplemental Table 2

Standardized Parameter Estimates of the Control Variables in the Multivariate Latent Growth Curve Model

	Intercept			Slope		
	Intentions to quit	Emotional support	Loneliness	Intentions to quit	Emotional support	Loneliness
Gender	*ns*	-.21**	.20**	*ns*	*ns*	-.24**
Study track	*ns*	-.44**	*ns*	*ns*	*ns*	*ns*
GPA	-.31**	.22**	-.10*	*ns*	*ns*	-.11*

Gender was coded as 1 = Male and 2 = Female. Study track was coded as 1 = Vocational and 2 = Academic. STDYX standardization (standardizing both X and Y) was used for the continuous variable GPA (i.e., previous academic achievement), and STDY standardization (standardizing only Y) was used for the binary variables gender and study track (Muthén & Muthén, 1998-2017).

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

References for Supplemental Material

Enders, C. K. (2010). *Applied missing data analysis*. The Guilford Press.

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Widaman, K. F. (2006). Missing data: What to do with or without them. *Monographs of the Society for Research in Child Development, 71*(3), 42-64. https://doi.org/10.1111/j.1540-5834.2006.00404.x

Appendix 3: Study Ⅲ

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Trajectory subgroups of perceived emotional support from teachers: Associations with change in mastery climate and intentions to quit upper secondary school

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ABSTRACT

The aims of this three-wave longitudinal study were to identify and describe trajectories of perceived emotional support from teachers and investigate whether these trajectories were related to the development of intentions to quit upper secondary school via change in perceived mastery climate. Among 1379 Norwegian upper secondary school students, three trajectory subgroups were identified: stable high (84.9%), decreasing (7.8%), and low increasing (7.3%). The subgroups differed in levels of achievement ambition and academic self-concept. Further, a parallel process latent growth curve model revealed essential associations with change in intentions to quit school. Specifically, students with high probabilities of membership in the decreasing emotional support subgroup appeared to be at particular risk, perceiving a decrease in mastery climate that was related to a worrying development of intentions to quit school. The results are discussed considering the importance of a sustained supportive learning environment for late adolescents.

1. Introduction

The extent to which students feel emotionally supported by teachers who they can trust, who care about them, and who signal confidence in students' ability to realize their learning potential (Pianta et al., 2012; Wentzel, 2015) is regarded one of the most important characteristics of a supportive educational context (Eccles & Roeser, 2009). Numerous studies have suggested that this contributes to students' engagement and learning (Roorda et al., 2011, 2017) and is key to promote a mastery climate in class (Ames, 1992; Patrick et al., 2011; Stornes et al., 2008). Recently, poor perceived emotional support has been associated with intentions to quit school (Tvedt et al., 2021a), a warning sign of actual dropout (Vallerand et al., 1997; Vasalampi et al., 2018). While the negative consequences of dropout from school are well documented (Freudenberg & Ruglis, 2007; Organisation for Economic Co-operation and Development [OECD], 2020), there is a need for enhanced knowledge of how the psychosocial learning environment can restrain the development of intentions to quit school (Lillejord et al., 2015). Intentions to quit school represent students' serious considerations about leaving school (Frostad et al., 2015), and when assessed over time, it may express a gradual process towards dropout behavior (Rumberger, 2011).

Therefore, the present study provides detailed knowledge regarding the diversity in students' trajectories of perceived emotional support from teachers, including whether possible trajectory subgroups differ in achievement ambitions and academic self-concept, as well as the extent to which subgroup membership is associated with change in intentions to quit school. Based on previous work that emphasized motivational benefits of a mastery climate in class (Urdan & Kaplan, 2020; Patrick et al., 2011) and how an emotionally supportive teacher is crucial for establishing such climate (Ames, 1992), potential associations with change in intentions to quit were theorized to be *indirect*, via change in perceived mastery climate. As such, the study primarily concentrated on factors in the learning environment, which can be targeted by educational intervention efforts. Individual background variables, previously documented as predictors of dropout intentions and behavior (i.e., gender, study track, and prior GPA; Battin-Pearson et al., 2000; Tvedt et al., 2021a), were accounted for in the structural models.

First, the presence of trajectory subgroups of perceived emotional support during the first and second years of upper secondary school were explored using growth mixture modeling (GMM). Second, student characteristics (academic self-concept and achievement ambition)

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across subgroups were examined to improve understanding of how different types of students perceive being emotionally supported over time. Third, to examine whether membership in trajectory subgroups was associated with development in intentions to quit school indirectly via change in perceived mastery climate, membership information from GMM was treated as explanatory variables in a parallel process latent growth curve model (PP-LGCM). Fig. 1 is a conceptual model of the study.

The proposed directionality in Fig. 1 is justified by theory elaborated in subsequent sections. However, the empirically analyzed change processes were concurrent; therefore, the paths elucidate associations and do not claim causality.

1.1. The context of upper secondary school

Upper secondary education is not part of the compulsory educational system in Norway, yet 98% of all youth enter upper secondary directly after the final year of lower secondary school (Udir, 2020), i.e., the year they turn 16. Upper secondary completion rates are higher in academic (85%) than in vocational tracks (67%; OECD, 2020), and dropout is particularly prevalent after the second year (Udir, 2020). This study followed students during the first two years, permitting assessment while all students received education in schools. After these two years, most vocational programs proceed with two years of apprenticeships, whereas academic programs continue with a third year in school.

1.2. Trajectories of perceived emotional support

Perceived emotional support from teachers represents the affective dimension of student-perceived relationships with their teachers (Wentzel, 2015). While students in older age groups tend to experience weaker support from their teachers (Bokhorst et al., 2010; Bru et al., 2010), evidence suggests that the *importance* of emotional support is even greater in older age groups (Roorda et al., 2011).

Unfortunately, there is limited knowledge of teacher-student relationship trajectories during upper secondary school (Ettekal & Shi, 2020). However, using a traditional latent growth curve approach, De Wit et al. (2010) indicated an average decrease in perceived teacher support during high school, while another study Tvedt et al. (2021b) identified no average change over 13 months in upper secondary school. These studies were limited by the restrictive assumption that all students vary around the same growth pattern. However, compelling evidence from other age groups (Bosman et al., 2018; Spilt et al., 2012; Özdemir & Özdemir, 2020) has articulated between-student differences in these trajectories by acknowledging the presence of distinct trajectory subgroups. Such person-centered approaches enable investigating subgroups with similar developmental trajectories, which make them distinct from other subgroups (Morin et al., 2020). Atypical, yet genuine trajectories may thereby be uncovered, which is critical to understand non-normative or unexpected academic adjustment.

Students in upper secondary school are exposed to multiple and changing teachers and the diversity of student and institutional characteristics makes it reasonable that variability in perceived emotional support over time emerges as trajectory subgroups. Indeed, significant variance among students in their initial levels and rates of change over time has been reported (De Wit et al., 2010; Tvedt et al., 2021b). Person-centered research on closely related concepts also speaks to the plausibility of subgroups: Ratelle and Duchesne (2014) assessed perceived relatedness in school among students from grades 6 to 11 and identified four trajectory subgroups: *Stably low* (10%), *Stably moderate* (37%), *Moderate increasing* (48%), and *High increasing* (5%). Four trajectory subgroups of teacher-reported teacher-student warmth were also identified by Ettekal and Shi (2020) from grades 1 to 12: *Low-increasing* (7%), *Moderate* (9%), *High early-declining* (25%), and *High-declining* (59%). Among university students, Gillet et al. (2019) identified three trajectory subgroups of perceived global need support: *Low-decreasing* (27%), *Moderate decreasing* (12%), and *Moderate-increasing* (61%). Finally, Özdemir and Özdemir (2020) identified three trajectory subgroups of perceived teacher support among students from grades 7 to 9: *Average declining* (10%), *Average stable* (66%), and *High increasing* (24%).

Therefore, despite sparse evidence among late adolescents (Ettekal & Shi, 2020), it was expected that trajectory subgroups of perceived emotional support from teachers would appear in our sample of upper secondary school students. While the number and growth patterns of identified trajectory subgroups vary slightly across relevant studies, one pattern seems to transpire: most students follow trajectories of fairly stable, moderate, or high support from teachers. In addition, one or more subgroups tend to follow deviating paths, and students following these trajectories display disparate emotional, behavioral, or academic adjustment (Ettekal & Shi, 2020; Gillet et al., 2019; Ratelle & Duchesne, 2014; Özdemir & Özdemir, 2020). Accordingly, we expected that certain non-normative trajectory subgroups of perceived emotional support would display particular change in intentions to quit school.

1.3. Student characteristics in trajectory subgroups

Student-perceived support is a product of a teacher-student dialectic process in which teachers respond and relate differently to students depending on students' characteristics (Nurmi, 2012; Reeve, 2012). This process involves the mutual influence of student resources and the learning environment (Reeve, 2012), which is likely to produce differences in how student characteristics are distributed in trajectory subgroups of perceived emotional support. While prior person-centered studies of younger students have investigated the role of background variables (e.g., gender, ethnicity, SES, intellectual ability; Bosman et al., 2018; Özdemir & Özdemir, 2020; Spilt et al., 2012) the current study addresses the need for more knowledge regarding student motivational characteristics in such trajectories (Ratelle & Duchesne, 2014). Hence, salient motivational values and beliefs, represented by initial achievement ambitions and academic self-concept (Eccles & Wigfield, 2002) were investigated. Ultimately, this information could enable better identification of students at risk.

From a teacher-student dialectic perspective (Reeve, 2012),

Fig. 1. Conceptual model.

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high-quality motivation (e.g., high achievement ambition and/or high academic self-concept) of students may lead to a reinforcing process of positive interactions with teachers that contribute to perceptions of being well emotionally supported. Contrastingly, students with a low academic self-concept may represent a segment more evidently in *need* of support, and thus receive more attention and encouragement from teachers (Mercer et al., 2011), potentially generating a positive trajectory of emotional support for these students.

Finally, while having high achievement ambitions is generally regarded as beneficial (Reeve, 2012), they can make individuals prone to stress, especially if goal attainment is considered uncertain (Lazarus, 2006). Having poor academic self-concept can induce such uncertainty. Students with a combination of high achievement ambition and poor academic self-concept are thus likely to be especially sensitive to negative changes in teacher support. Small or subtle signs of negative change may be overwhelming due to this sensitivity and increase the likelihood of unstable trajectories of perceived emotional support.

1.4. Mastery climate and the role of an emotionally supportive teacher

The construct of mastery climate stems from research on motivational climate (also termed *goal structure*) in the context of achievement goal theory (Ames, 1992; Urdan & Kaplan, 2020). If a student perceives that the motivational climate is characterized by valuing personal efforts and improvement rather than outperforming others, and that mistakes are a recognized part of the learning process, this indicates a strong mastery climate. A weak mastery climate could reflect a performance climate (Ames, 1992) or a learning environment with inconsistent or ambiguous norms. Students who perceive a strong mastery climate have more optimal motivation and attain favorable academic outcomes (Meece et al., 2006; Wang & Holcombe, 2010). Notably, a mastery climate is related to adaptive coping responses after failure (Patrick et al., 2011), suggesting that such a climate is particularly beneficial for students who experience frequent academic defeats.

All social agents in school can affect the motivational climate in class; however, teachers' behaviors and communication style are key determinants (Ames, 1992). Recommended strategies to promote a mastery climate involve recognition of efforts and endorsement of student perspectives (Lüftenegger et al., 2014), assumed to be catered by emotional support. Indeed, several studies have reported positive cross-sectional associations between perceived emotional support from teachers and a mastery climate (Patrick et al., 2011; Skaalvik & Skaalvik, 2013; Stornes et al., 2008). This indicates that when teachers are perceived as warm and caring, they proliferate a culture in which it feels safe and valued to invest and persevere in academic efforts independently of immediate success.

However, few studies have investigated these relationships in upper secondary school. Given the persistent need to address how teachers and educational contexts can optimize the motivational resources of their adolescent students (e.g., Lillejord et al., 2015), this is a critical gap in the literature.

1.5. Mastery climate as a resource to restrain intentions to quit school

A negative association between perceived mastery climate and intentions to quit school was recently reported in a study of upper secondary students and interpreted as mastery climate having a protective role against a dropout decision (Haugan et al., 2019). With this exception, few studies have examined the qualities of motivational climate related to intentions to quit school or dropout prevention. Nonetheless, studies consistently suggest that students who experience a strong mastery climate have a key motivational resilience (Skinner et al., 2020), which can be crucial to prevent intentions to quit school: Mastery climate is positively related to school identification (Wang & Holcombe, 2010), self-efficacy (Greene et al., 2004), effort, and adaptive help-seeking behavior (Skaalvik & Skaalvik, 2013). Furthermore, a mastery climate can be especially important for students with lower achievement (Eccles & Roeser, 2009), which is typical of students with stronger intentions to quit school (Tvedt et al., 2021a).

In summary, previous work suggests that students who perceive a strengthened mastery climate are likely to reduce their intentions to quit school. Conversely, if the climate is perceived as less appreciative of individual growth and with reduced generosity toward failure, an increase in intentions to quit is expected.

1.6. Current study

This study was designed to detail knowledge of trajectories of feeling emotionally supported by teachers, and how this can counteract a negative motivational process whose endpoint can be dropout from school. The following research questions were posed:

RQ 1: What trajectory subgroups of perceived emotional support from teachers emerge during the first and second years of upper secondary school? Based on previous work (Ettekal & Shi, 2020; Gillet et al., 2019; Ratelle & Duchesne, 2014; Özdemir & Özdemir, 2020), a total of three or four subgroups was considered most likely, with most students following trajectories of fairly stable moderate-to-high levels of support, and one or more subgroups displaying marked change or persistent low levels.

RQ 2: How do subgroups differ in students' initial achievement ambition and academic self-concept? Because a positive circle of initiative and interaction with teachers tends to occur for highly motivated students (Nurmi, 2012; Reeve, 2012), relatively high levels of achievement ambition and academic self-concept were expected in subgroups of stable moderate-to-high levels of perceived emotional support. However, different mechanisms can occur in particular combinations of these characteristics. Due to the a priori unknown trajectory patterns, we were reluctant to formulate more specific expectations.

RQ 3: To what extent is membership in trajectory subgroups related to change in intentions to quit school, indirectly via change in perceived mastery climate? We were guided by theory that (a) emotionally supportive teachers are important for establishing and maintaining a mastery climate in class (Ames, 1992; Patrick et al., 2011), and (b) a mastery climate provides the optimal conditions for sustained efforts and confidence among all learners (Eccles & Roeser, 2009; Urdan & Kaplan, 2020), which could potentially counteract the development of intentions to quit school. Accordingly, we hypothesized that membership in trajectory subgroups of emotional support would be associated with change in perceived mastery climate, which in turn would exhibit a negative association with change in intentions to quit school.

2. Methods

2.1. Sample and procedure

This study was part of a research project (Tvedt et al., 2021a; 2021b) with 1379 upper secondary school students (52% male; 94% aged 16–18 years $M = 16.25$ $SD = 0.49$, and 6% $\geq$ 19 years old at T1). Participants were recruited from seven public schools in the southwest of Norway. A slight majority (54%) followed a vocational track, and students with immigrant backgrounds formed 17% of the sample. Although not a probability sample, schools were selected purposively (Trochim et al., 2016) in collaboration with the county's school administration, aiming to resemble the student population considering gender, study programs, GPAs from lower secondary school, and city/suburban locations.

The study comprised three waves of self-reports combined with register data from the county's administration. Self-reports were obtained through electronic questionnaires in a normal classroom setting supervised by a teacher. The first wave (T1) was collected in the second semester of the first year in upper secondary school (February 2017), and the second and third waves (T2 and T3) were collected in the first

and second semester, respectively, of the following school year (October 2017 and March 2018). The total time span was 13 months. Consent to participate included consent to match self-reports with register data via a confidential coding system approved by the Norwegian Centre for Research Data. Gender, study track, and prior GPA were obtained from the county's register.

At T1, 90% of invited students participated ($N = 1379$), and all students who provided data at T1 were invited to do so at T2 ($N = 1073$) and T3 ($N = 1008$). Indeed, 86% of the participants provided data at two or more time points, and 65% of the participants provided data for all waves.

2.2. Missing data

Attrition at T2 and T3 was associated with lower GPA from lower secondary school ($r = -0.12$ and -0.11, $p < .01$, for T2 and T3, respectively) and higher intentions to quit at baseline ($r = 0.15$ and 0.12, $p < .01$); thus, missingness was not completely at random. Full information maximum likelihood (FIML) with auxiliary variables (see Supplemental Material) was therefore applied to increase the plausibility of the missing at random assumption (Enders, 2010).

2.3. Measures

Wordings of all self-reported items are provided in Supplemental Material.

2.3.1. Perceived emotional support

Emotional support from teachers was self-reported with five items (e.g., *I feel that my teachers care about me)*. Responses were provided on a six-point scale from 1 (*completely disagree*) to 6 (*completely agree*). The scale is widely used among younger students (e.g., Bru et al., 2010), and the upper secondary school version has demonstrated good psychometric qualities (Tvedt et al., 2021a). A composite score was formed for each time point (T1 $\alpha = 0.94$; T2 $\alpha = 0.94$; T3 $\alpha = 0.95$).

2.3.2. Perceived mastery climate

Students' perception of a mastery climate was self-reported via five items (e.g., *In my class, mistakes are okay as long as we are learning)*. The items were derived and slightly adjusted from the Classroom Mastery Goal Structure subscale from Patterns of Adaptive Learning Scales (PALS), which has been widely used and shown to be valid and reliable in various samples (Meece et al., 2006; Midgley et al., 2000; Urdan & Kaplan, 2020). Responses were made on a 6-point scale from 1 (*completely disagree*) to 6 (*completely agree*). A composite score was formed for each time point (T1 $\alpha = 0.78$; T2 $\alpha = 0.82$; T3 $\alpha = 0.82$).

2.3.3. Intentions to quit school

Intentions to quit school were self-reported via five items (e.g., *I consider leaving school and finding a job instead*) derived from Frostad et al. (2015), with the wordings reported in Tvedt et al. (2021a); both studies reported adequate psychometric properties. Responses were made on a six-point scale from 1 (*absolutely not true*) to 6 (*absolutely true*). A composite score was obtained for each time point (T1 $\alpha = 0.88$; T2 $\alpha = 0.89$; T3 $\alpha = 0.90$).

2.3.4. Achievement ambition

Three self-report items were created for this study to encompass achievement ambitions at T1. The items captured attitudes regarding the value of academic attainment (e.g., *It is important for me to get a good education*). Responses were provided on a six-point scale from 1 (*completely disagree*) to 6 (*completely agree*). A composite score was formed ($\alpha = 0.87$).

2.3.5. Academic self-concept

Academic self-concept was self-reported at T1 by a four item-scale (e.g., *I learn easily in all subjects)* previously used with primary and lower secondary students (Skaalvik & Skaalvik, 2009, 2013), in which it displayed good psychometric qualities. Responses were provided on a six-point scale from 1 (*completely disagree*) to 6 (*completely agree*). Two items were negatively worded and thus reverse-coded; higher scores indicated higher academic self-concept. A composite score was formed ($\alpha = 0.78$).

2.3.6. Control variables

Prior GPA was captured as the average grade point of three core subjects (Norwegian, Mathematics, and English) after the final year of lower secondary school (lowest = 1, highest = 6; $\alpha = 0.86$). These were obtained from the county register, together with gender (0 = male, 1 = female) and study track (0 = vocational track, 1 = academic track).

2.4. Analytic strategy

Analyses were conducted in Mplus 8.3, using maximum likelihood estimation with robust standard errors (MLR) to account for non-normal distributions of observed variables (Muthén & Muthén, 1998–2017). First, preliminary analyses were performed, including a measurement model of all constructs measured at T1, as well as examination of longitudinal measurement invariance of the three constructs assessed longitudinally. Model fit was evaluated according to Hooper et al. (2008), whereby good fit was indicated by CFI > 0.950, RMSEA < 0.070, and SRMR < 0.080. For longitudinal measurement invariance, a change less than 0.010 in CFI when comparing increasingly restrictive models was used as indication of invariance (Cheung & Rensvold, 2002). Although composite scores were used in the primary analyses, these steps were taken with the indicators to ensure the factorial structure and that the measures were consistent over time (Wang & Wang, 2020).

Second, the presence of trajectory subgroups was explored using growth mixture models (GMM). GMM is a person-centered extension of a latent growth curve model (LGCM) that can identify unknown a priori groups of individuals who follow discrete longitudinal trajectories over time (Morin et al., 2020; Wang & Wang, 2020). Individuals' membership in trajectory subgroups is inferred probabilistically; various solutions (models) estimate each case's probability of belonging to each identified subgroup. To determine the optimal model, a set of statistical criteria is assessed (AIC, BIC, entropy, the VLMR test, and average posterior probabilities [AvePP] for most likely membership), alongside the principles of parsimony and interpretability (Morin et al., 2020; Wang & Wang, 2020). Accordingly, a series of unconditional models with increasing numbers of subgroups were inspected.

Third, when the optimal model was chosen, student characteristics across subgroups were investigated by auxiliary approaches (BCH and R3STEP), which are recommended to avoid unwanted shifts in the classification model while also accounting for its inaccuracy (Asparouhov & Muthén, 2019). The BCH was used to estimate levels of achievement ambition and academic self-concept across subgroups, and R3STEP was used to test whether these levels differed significantly across subgroups while accounting for gender, study track, and prior GPA.

Fourth, to test whether trajectory membership was associated with the development of intentions to quit indirectly via change in mastery climate, a parallel process latent growth curve model (PP-LGCM) of mastery climate and intentions to quit was specified (Cheong et al., 2003; von Soest & Hagtvet, 2011), in which posterior probabilities from the GMM functioned as independent variables. The continuous posterior probabilities were chosen instead of categorized membership to account for the degree of uncertainty in the class membership information (Wang & Zhou, 2013). The slope of intentions to quit was treated as the final outcome, and the slope of mastery climate as the intermediate variable, according to theory (Ames, 1992; Eccles & Roeser, 2009; Patrick et al., 2011). Both slopes were regressed onto their respective intercepts to account for between-student differences at baseline,

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together with the control variables (gender, study track, and prior GPA). To ensure that individual changes in perceived mastery climate and intentions to quit school could be appropriately captured by linear growth curve models, these unconditional models were established prior to the PP-LGCM.

Fifth, because of the nested structure of the data (students nested in classes), all models were additionally run with the complex option in Mplus, accounting for potential bias in standard errors (McNeish et al., 2017). Since some alteration in class structure occurred across academic years, this was conducted separately for each cluster variable. However, since only minor changes in standard errors and no change in significance levels appeared in these analyses, results from models without the complex option are reported to avoid inessential complexity.

3. Results

3.1. Preliminary results

The measurement model with all indicators loading on their expected factor yielded acceptable fit to the data: CFI = 0.927, RMSEA = 0.056 (90% CI: 0.053–0.060), SRMR = 0.052, supporting satisfactory structural validity of the measures (details in Supplemental Material). Longitudinal measurement invariance was supported by comparing a configural version of the measurement model (CFI = 0.940) against a metric (ΔCFI = 0.001) and scalar model (ΔCFI = −0.002; Cheung & Rensvold, 2002). Correlations, means, and standard deviations of the study variables are presented in Table 1.

3.2. Identification of trajectory subgroups

The first research question addressed identification of trajectory subgroups of perceived emotional support from teachers. The statistical criteria (Table 2) supported solutions with more than one trajectory. While BIC and AIC-values continued to decrease with increasing number of groups, the decrease was less steep when the number of groups exceeded three. A non-significant VLMR test and a drop in AvePP also disfavored the four-group solution, and the five-group solution comprised one subgroup of only 1% of the students. The statistical criteria thus suggested a three-group solution, which yielded high substantive interpretability and accorded with expectations. Sensitivity analyses that verified the robustness of the three-group solution are described in Supplemental Material.

The final solution (Fig. 2) consisted of one large group (84.9%) following trajectories of high and stable emotional support (*Stable-high*; the normative group) and two groups distinctly deviating from this: a decreasing group (7.8%; *Decreasing*), and a low-increasing group (7.3%; *Low-increasing*).

3.3. Student characteristics across trajectory subgroups

The second research question addressed student characteristics (achievement ambition and academic self-concept) across trajectory subgroups. As shown in Table 3, *Low-Increasing* was characterized by low achievement ambition and poor self-concept; these levels were significantly lower than those of *Stable-high* when adjusting for gender, study track, and prior GPA. Further, *Decreasing* displayed equally low academic self-concept as *Low-Increasing*, while the achievement ambitions of the former were pointedly higher. Also worth noting is that prior GPA in *Low-increasing* was significantly lower than in *Stable-high* ($Z = -3.49$, $p < .01$), while no difference was found between *Decreasing* and *Stable-high* ($Z = 0.13$, $p = .90$).

3.4. Parallel process latent growth curve model

The third research question addressed the extent to which membership in trajectory subgroups was indirectly related to change in intentions to quit school, via change in mastery climate. Prior to specifying the parallel process latent growth curve model (PP-LGCM), which included membership information from the GMM as independent variables, the unconditional growth curve models of mastery climate and intentions to quit were specified. Their respective growth factors and model fits are reported in Table 4. For mastery climate, two residuals (T1 and T3) were equated to obtain a well-fitting unconditional model. This equality was supported by a non-significant Wald test ($\chi^2(1) = 0.73$, $p = .39$) and retained in the PP-LGCM.

The posterior probabilities (range 0.0–1.0) of membership in either of the non-normative groups (*Decreasing* or *Low-increasing*) were applied in the PP-LGCM (Fig. 3), while the probability of membership in the normative group (*Stable-high*) was the reference. Consequently, a significant coefficient for either *Decreasing* or *Low-increasing* should be interpreted as a predicted divergence from the normative group. The model yielded good fit: $\chi^2(22) = 52$, $p < .01$; RMSEA 0.031 (90% CI: 0.020–0.043); CFI = 0.986; SRMR = 0.020.

Fig. 3 shows that a high probability of membership in *Decreasing* was associated with more negative change in mastery climate compared to membership in *Stable-high*. Conversely, probabilities of *Low-increasing* were associated with relatively more positive development of mastery climate, compared to *Stable-high*. A significant negative relationship was

Table 1
Correlations, means, and standard deviations of study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Emotional support T1	–													
2. Emotional support T2	.50**	–												
3. Emotional support T3	.42**	.61**	–											
4. Academic self-concept T1	.28**	.19**	.19**	–										
5. Achievement ambition T1	.20**	.11**	.07*	.17**	–									
6. Mastery climate T1	.37**	.28**	.19**	.07*	.16**	–								
7. Mastery climate T2	.29**	.48**	.33**	.05	.10**	.52**	–							
8. Mastery climate T3	.26**	.36**	.41**	.05	.19**	.43**	.58**	–						
9. Intentions to quit T1	-.34**	-.24**	-.22**	-.28**	-.28**	-.19**	-.11**	-.15**	–					
10. Intentions to quit T2	-.29**	-.34**	-.25**	-.23**	-.24**	-.10**	-.14**	-.14**	.53**	–				
11. Intentions to quit T3	-.26**	-.31**	-.35**	-.19**	-.19**	-.14**	-.17**	-.21**	.44**	.57**	–			
12. Gender	-.06*	-.13**	-.09**	-.08**	.18**	-.07*	-.09**	-.09**	-.01	-.07*	-.07*	–		
13. Study track	-.09**	-.12**	-.08**	.06*	.15**	-.22**	-.31**	-.27**	-.11**	-.10**	-.11**	.21**	–	
14. Prior GPA	.06*	-.03	.00	.33**	.22**	-.17**	-.25**	-.22**	-.22**	-.23**	-.20**	.27**	.57**	–
Mean	4.50	4.50	4.53	3.70	5.07	4.17	4.28	4.16	1.78	1.79	1.84	0.48	0.46	3.59
Standard deviation	1.12	1.09	1.12	1.03	0.97	0.93	0.97	0.98	1.10	1.07	1.15	0.50	0.50	1.02

Note. All self-reported measures (variables no. 1–11) had the scoring range 1–6. Gender was coded 0 male, 1 female; and study track 0 vocational, 1 academic. Prior GPA range: 1–6.
*$p < .05$, **$p < .01$.

Table 2
Goodness of fit-statistics and group sizes for various growth mixture models.

No. groups	No. Free parameters	LL	aBIC	AIC	Entropy	*p*VLMR	AvePP	Group sizes	
								%	*N*
1	8	−4900	9833	9817	–	–	–	–	–
2	11	−4845	9735	9712	.83	< .01	.83–.97	90.4/9.6	1247/132
3[a]	**12**	**−4807**	**9662**	**9638**	**.81**	**< .01**	**.81–.94**	**84.9/7.8/7.3**	**1171/108/100**
4[a]	15	−4784	9629	9598	.82	.12	.68–.94	83.3/6.0/5.6/5.1	1149/83/77/70
5[a]	18	−4769	9612	9575	.82	< .01	.69–.92	80.5/9.4/4.8/4.2/1.0	1111/130/66/58/14

Note. LL Log likelihood, aBIC adjusted Bayesian information criterion, AIC Akaike information criterion, VLMR Vuong-Lo-Mendell-Rubin test, AvePP Average posterior probabilities.
[a] No significant group-specific slope variance was found in this model; thus, this parameter was restricted to zero.

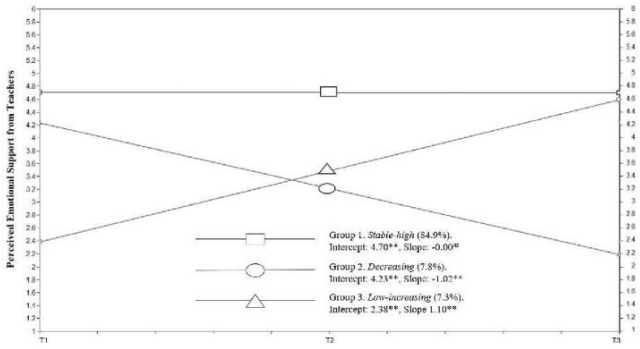

Fig. 2. Visual plot and growth factors of trajectory subgroups of perceived emotional support.

Table 3
Student characteristics across trajectory subgroups.

	1. *Stable-high*	2. *Decreasing*	3. *Low-increasing*	Differences across groups
Achievement ambition	5.08	5.37	4.54	1 > 3, 2 > 3
Academic self-concept	3.80	3.12	3.11	1 > 2, 1 > 3

Note. Results obtained by BCH for estimating means and R3STEP to test differences adjusting for gender, study track, and prior GPA. Marked differences were significant at $p < .05$.

found between change in perceived mastery climate and change in intentions to quit, indicating that students experiencing a decreasing mastery climate, were more likely to increase their intentions to quit. The indirect association between membership in *Decreasing* and change in intentions to quit was significant ($B = 0.35$, $p < .01$) and confirmed by the 95% confidence interval in a bias-corrected bootstrap analysis (MacKinnon et al., 2004). The indirect association of *Low-increasing* was not significant ($B = -0.16$, $p = .10$). To check the robustness of these findings, a sensitivity analysis was performed, in which achievement ambition and academic self-concept, as well as the interaction between them, were included in the final model (predicting both change in mastery climate and change in intentions to quit). The results given above were unchanged.

Finally, a follow-up analyses with the auxiliary BCH (Asparouhov & Muthén, 2019) provided levels of intentions to quit across subgroups by the final time point (T3): *Decreasing* had the highest mean level of intentions to quit ($M = 3.02$, $SE = 0.22$), followed by *Low-increasing* ($M = 2.44$, $SE = 0.25$), and *Stable-high* ($M = 1.66$, $SE = 0.04$).

4. Discussion

This study investigated trajectory subgroups of perceived emotional support from teachers, student characteristics (achievement ambition and academic self-concept) across subgroups, and whether membership in trajectory subgroups was indirectly associated with change in intentions to quit school via change in perceived mastery climate. Thus, we aimed to elucidate possible mechanisms that can culminate in dropout from upper secondary school.

Table 4
Results from unconditional latent growth curve models.

	Intercept	Slope	Intercept—Slope Correlation	Model Fit		
	Mean (Variance)	Mean (Variance)	*r*	$\chi^2(df)$	RMSEA	CFI
Intentions to quit	1.78** (0.72**)	0.06** (0.12**)	-.25*	0.04 (1)	.000	1.00
Mastery climate	4.19** (0.56**)	0.01[ns] (0.11**)	-.32**	14.6 (2)	.068	.98

Note. Means of intercepts and slopes are unstandardized metrics.
*p < .05, **p < .01.

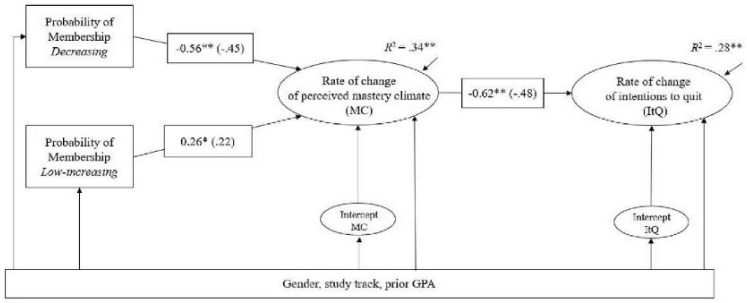

Fig. 3. Parallel Process Latent Growth Curve Model (PP-LGCM) with Probabilities of Trajectory Subgroup Membership as Independent Variables.
Note. Unstandardized coefficients, standardized in parentheses. Probability of membership in *Stable-high* (normative) was the reference. $^{*}p < .05$, $^{**}p < .01$.

4.1. Three trajectory subgroups of perceived emotional support

Consistent with our expectations, the resource of having emotionally supportive teachers over time was not uniformly experienced by students. Three trajectory subgroups were identified: (1) high and stable levels of perceived emotional support (84.9%), (2) decreasing levels (7.8%), and (3) low but increasing levels (7.3%). In relation to prior person-centered studies with younger students (e.g., Bosman et al., 2018; Özdemir & Özdemir, 2020), a larger proportion of students with high and stable support were currently identified, which is promising given numerous studies linking emotional support to engagement and learning (e.g., Roorda et al., 2017). However, the two non-normative subgroups raise concerns. The decreasing subgroup comprised students whose initial level was quite similar to that of the stable-high group, but showed a steep downward trend, which by Time 3 indicated "quite disagreement" that their teachers were emotionally supportive (Fig. 2). Conversely, students in the low-increasing group experienced initially low levels, but considerable enhancement of support.

4.2. Associations with change in perceived mastery climate and intentions to quit, in light of student characteristics

The parallel process latent growth curve model with trajectory membership as explanatory variables predominantly supported theoretical expectations. First, the relatively strong inverse association between change in mastery climate and change in intentions to quit expands on conclusions from repeated cross-sectional analyses (Haugan et al., 2019) and supports the potential of a mastery climate to prevent dropout. This indicates that intentions to quit school are less likely to develop when students experience a culture in which progression is explicitly valued more than grades or test scores, and failure is viewed as integral to the learning process (Urdan & Kaplan, 2020). Furthermore, patterns of student characteristics across subgroups illuminate these complex processes of change.

Findings regarding the *Decreasing* group indicate a student segment at risk. These students are apparently in a learning environment that over time poorly fits their needs (Eccles & Roeser, 2009), which seems to propel negative motivational development in the form of increased intentions to quit school. Compared to the normative group, they were more prone to experience a decrease in mastery climate, which was further associated with an increase in intentions to quit school. Indeed, the mean level of intentions to quit in this group by Time 3 was more than one standard deviation above the sample mean, implying a warning about disrupted educational progress (Vasalampi et al., 2018). The characteristics of this group, namely highly ambitious but with fragile academic self-concept, frame them as a late-onset risk group, and actualizes what Blondal and Adalbjarnardottir (2012) refer to as unexpected educational pathways. That their prior GPA did not differ from the normative group accentuates this, and may explain why their needs apparently slip under the radar of teachers. To teachers, these students may primarily appear engaged and self-driven. However, their poor academic self-concept could indicate that they have high needs when facing demanding tasks (Lazarus, 2006) and may also be key to why a decrease in mastery climate appears to be a salient mechanism for their increased intentions to quit school: A weakened mastery climate will provide elevated uncertainty about how academic mistakes are addressed, which may lead to a sense of hopelessness and increased intentions to quit school. Indeed, the combination of low academic self-concept and high achievement ambition resembles a profile found among younger students (Virtanen et al., 2019), and may be related to aspects of school burnout, which is associated with dropout from school (Bask & Salmela-Aro, 2013).

The *Low-increasing* subgroup exhibited equally low levels of academic self-concept as the *Decreasing* group, but otherwise portrayed a dissimilar student typography, namely the lowest level of achievement ambition and poor prior GPA. From a school dropout risk perspective (e.g., Battin-Pearson et al., 2000; Markussen et al., 2011), this group would be regarded a typical risk group; low ability beliefs, low value placed on educational attainment, and poor academic performance. Interestingly, the positive growth of perceived emotional support within this subgroup indicates that their need for relatedness with teachers is well identified and met, at least after some time in the system. However, the degree to which this strengthened support is efficient in hindering negative academic development remains ambiguous. Membership in the *Low-increasing* group was related to more positive trajectories of perceived mastery climate, although divergence from the normative group was relatively weak. This suggests that improvements in emotional support have a potential to strengthen a mastery climate among students with suboptimal academic beliefs. However, the non-significant indirect association between membership in this subgroup and change in intentions to quit indicates that it is more demanding to counteract a negative pathway of intentions to quit, at least during this limited period of time. More comprehensive support may be required. Indeed, other studies have provided modest support for a recovery hypothesis (i.e., low yet increasing social support reducing maladjustment; Bosman et al., 2018; Cornwell, 2003), and Cornwell (2003) showed that the impact of reduced social support was more decisive than that of strengthened support.

4.3. Methodological considerations

The current person-centered approach represents a strength in that atypical trajectories that would not have been crystallized from a traditional latent growth curve approach were identified. However, given the few previous person-centered studies in this age group, research from other educational contexts is needed.

Since the measured change processes were concurrent in the present design, causal relationships were not tested. Future designs with more time points over longer time could permit sequential ordering of the growth processes (von Soest & Hagtvet, 2011). Furthermore, while initial achievement ambition and academic self-concept were auxiliary variables in the current GMM, alternative perspectives (e.g., Skaalvik & Skaalvik, 2013) could guide valuable investigations of whether these characteristics change as functions of change in the learning environment.

Although self-reported dropout intentions are valuable, future work including dropout behavior is needed. Moreover, that the study relied on self-reported emotional support must be considered when determining practical implications. Future studies using combined data sources could illuminate the complex phenomenon of teacher-student relationships in relation to intentions to quit school.

4.4. Conclusions and practical implications

This study found heterogeneity in students' perceived emotional support from teachers over time and highlighted the saliency of a consistent supportive learning environment for late adolescents. While most students experience supportive teachers, two non-normative trajectory subgroups were identified. At particular risk was the group who experienced a substantive deterioration of emotional support that was related to a decrease in perceived mastery climate and a worrying development of intentions to quit school.

It is therefore imperative that teachers identify students who may have an understated need for encouragement and support, so that these students do not lose their motivation for schoolwork. Students with high achievement ambitions and low academic self-concept may display such vulnerability. If this identification fails, initially well-adjusted students may shift into negative pathways with an amplified risk of dropping out. This is an appeal to teachers and schools to systematically monitor all students' perception of teacher support, so that they are able to identify whether some students are heading towards negative development, and to intervene accordingly. Students at more traditional risk appeared to be well emotionally supported by teachers, although a more comprehensive support system seems required to counteract these students' development of intentions to quit. The role of emotional support thus appeared notably pivotal when decreasing over time (the negative pathway). This indicates that it requires more to repair than to tear down late adolescents' motivation for further schooling.

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Declaration of competing interest

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Appendix A. Supplementary data

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References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261–271. https://doi.org/10.1037/0022-0663.84.3.261

Asparouhov, T., & Muthén, B. (2019). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary secondary model. *Mplus Web Notes, 21*(4), 1–22.

Bask, M., & Salmela-Aro, K. (2013). Burned out to drop out: Exploring the relationship between school burnout and school dropout. *European Journal of Psychology of Education, 28*(2), 511–528. https://doi.org/10.1007/s10212-012-0126-5

Battin-Pearson, S., Newcomb, M. D., Abbott, R. D., Hill, K. G., Catalano, R. F., & Hawkins, J. D. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92*(3), 568–582. https://doi.org/10.1037/0022-0663.92.3.568

Blondal, K. S., & Adalbjarnardottir, S. (2012). Student disengagement in relation to expected and unexpected educational pathways. *Scandinavian Journal of Educational Research, 56*(1), 85–100. https://doi.org/10.1080/00313831.2011.568607

Bokhorst, C. L., Sumter, S. R., & Westenberg, P. M. (2010). Social support from parents, friends, classmates, and teachers in children and adolescents aged 9 to 18 years: Who is perceived as most supportive? *Social Development, 19*(2), 417–426. https://doi.org/10.1111/j.1467-9507.2009.00540.x

Bosman, R. J., Roorda, D. L., van der Veen, I., & Koomen, H. M. Y. (2018). Teacher–student relationship quality from kindergarten to sixth grade and students' school adjustment: A person-centered approach. *Journal of School Psychology, 68*, 177–194. https://doi.org/10.1016/j.jsp.2018.03.006

Bru, E., Munthe, E., & Thuen, E. (2010). Students' perceptions of teacher support across the transition from primary to secondary school. *Scandinavian Journal of Educational Research, 54*(6), 519–533. https://doi.org/10.1080/00313831.2010.522842

Cheong, J., MacKinnon, D. P., & Khoo, S. T. (2003). Investigation of mediational processes using parallel process latent growth curve modeling. *Structural Equation Modeling, 10*(2), 238–262. https://doi.org/10.1207/S15328007SEM1002_5

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Cornwell, B. (2003). The dynamic properties of social support: Decay, growth, and staticity, and their effects on adolescent depression. *Social Forces, 81*(3), 953–978. https://doi.org/10.1353/sof.2003.0029

De Wit, D. J., Karioja, K., & Rye, B. J. (2010). Student perceptions of diminished teacher and classmate support following the transition to high school: Are they related to declining attendance? *School Effectiveness and School Improvement, 21*(4), 451–472. https://doi.org/10.1080/09243453.2010.532010

Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner, & L. Steinberg (Eds.), *Handbook of adolescent psychology* (Vol. 1). John Wiley & Sons.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109–132. https://doi.org/10.1146/annurev.psych.53.100901.135153

Enders, C. K. (2010). *Applied missing data analysis*. The Guilford Press.

Ettekal, I., & Shi, Q. (2020). Developmental trajectories of teacher–student relationships and longitudinal associations with children's conduct problems from Grades 1 to 12. *Journal of School Psychology, 82*, 17–35. https://doi.org/10.1016/j.jsp.2020.07.004

Freudenberg, N., & Ruglis, J. (2007). Reframing school dropout as a public health issue. *Preventing Chronic Disease, 4*(4), 1–11.

Frostad, P., Pijl, S. J., & Mjaavatn, P. E. (2015). Losing all interest in school: Social participation as a predictor of the intention to leave upper secondary school early. *Scandinavian Journal of Educational Research, 59*(1), 110–122. https://doi.org/10.1080/00313831.2014.904420

Gillet, N., Morin, A. J. S., Huyghebaert, T., Burger, L., Maillot, A., Poulin, A., & Tricard, E. (2019). University students' need satisfaction trajectories: A growth mixture analysis. *Learning and Instruction, 60*, 275–285. https://doi.org/10.1016/j.learninstruc.2017.11.003

Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology, 29*(4), 462–482. https://doi.org/10.1016/j.cedpsych.2004.01.006

Haugan, J. A., Frostad, P., & Mjaavatn, P.-E. (2019). A longitudinal study of factors predicting students' intentions to leave upper secondary school in Norway. *Social Psychology of Education, 22*(5), 1259–1279. https://doi.org/10.1007/s11218-019-09527-0

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53–60.

Lazarus, R. S. (2006). *Stress and emotion. A new synthesis*. Springer Publishing Company.

Lillejord, S., Halvorsrud, K., Ruud, E., Morgan, K., Freyr, T., Fischer-Griffiths, P., Eikeland, O. J., Hauge, T. E., Homme, A. D., & Manger, T. (2015). *Frafall i videregående opplæring: En systematisk kunnskapsoversikt [dropout from upper secondary education: A systematic review]*. Kunnskapssenter for utdanning. http://www.kunnskapssenter.no.

Lüftenegger, M., van de Schoot, R., Schober, B., Finsterwald, M., & Spiel, C. (2014). Promotion of students' mastery goal orientations: Does TARGET work? *Educational Psychology, 34*(4), 451–469. https://doi.org/10.1080/01443410.2013.814189

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). January 1). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99. https://doi.org/10.1207/s15327906mbr3901_4

Markussen, E., Frøseth, M. W., & Sandberg, N. (2011). Reaching for the unreachable: Identifying factors predicting early school leaving and non-completion in Norwegian upper secondary education. *Scandinavian Journal of Educational Research, 55*(3), 225–253. https://doi.org/10.1080/00313831.2011.576876

McNeish, D., Stapleton, L. M., & Silverman, R. D. (2017). On the unnecessary ubiquity of hierarchical linear modeling. *Psychological Methods, 22*(1), 114–140. https://doi.org/10.1037/met0000078

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*, 487–503. https://doi.org/10.1146/annurev.psych.56.091103.070258

Mercer, S. H., Nellis, L. M., Martínez, R. S., & Kirk, M. (2011). Supporting the students most in need: Academic self-efficacy and perceived teacher support in relation to within-year academic growth. *Journal of School Psychology, 49*(3), 323–338. https://doi.org/10.1016/j.jsp.2011.03.006

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., Gheen, M., Kaplan, A., Kumar, R., Middleton, M. J., Nelson, J., Roeser, R., & Urdan, T. (2000). *Manual for the patterns of adaptive learning scales*. University of Michigan.

Morin, A. J. S., McLarnon, M. J. W., & Litalien, D. (2020). Mixture modeling for organizational behavior research. In Y. Griep, & S. Hansen (Eds.), *Handbook on the temporal dynamics of organisational behavior* (pp. 351–379). Edward Elgar Publishing. https://doi.org/10.4337/9781788974387.00031.

Muthén, L. K., & Muthén, B. O. (1998). 2017). Mplus user's gu. In *ide* (8th ed.). Muthén and Muthén.

Nurmi, J.-E. (2012). Students' characteristics and teacher–child relationships in instruction: A meta-analysis. *Educational Research Review, 7*(3), 177–197. https://doi.org/10.1016/j.edurev.2012.03.001

Organisation for Economic Co-operation and Development. (2020). *Education at a glance 2020: OECD indicators*. OECD Publishing. https://doi.org/10.1787/69096873-en

Özdemir, S. B., & Özdemir, M. (2020). How do adolescents' perceptions of relationships with teachers change during upper-secondary school years? *Journal of Youth and Adolescence, 49*(4), 921–935. https://doi.org/10.1007/s10964-019-01155-3

Patrick, H., Kaplan, A., & Ryan, A. M. (2011). Positive classroom motivational environments: Convergence between mastery goal structure and classroom social climate. *Journal of Educational Psychology, 103*(2), 367–382. https://doi.org/10.1037/a0023311

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher–student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In *Handbook of research on student engagement* (pp. 365–386). Springer. https://doi.org/10.1007/978-1-4614-2018-7_17.

Ratelle, C. F., & Duchesne, S. (2014). Trajectories of psychological need satisfaction from early to late adolescence as a predictor of adjustment in school. *Contemporary Educational Psychology, 39*(4), 388–400. https://doi.org/10.1016/j.cedpsych.2014.09.003

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149–172). Springer. https://doi.org/10.1007/978-1-4614-2018-7_7.

Roorda, D. L., Jak, S., Zee, M., Oort, F. J., & Koomen, H. M. Y. (2017). Affective teacher–student relationships and students' engagement and achievement: A meta-analytic update and test of the mediating role of engagement. *School Psychology Review, 46*(3), 239–261. https://doi.org/10.17105/SPR-2017-0035.V46-3

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493–529. https://doi.org/10.3102/0034654311421793

Rumberger, R. W. (2011). *Dropping out. Why students drop out of high school and what can be done about it*. Harvard University Press.

Skaalvik, E. M., & Skaalvik, S. (2009). Elevenes opplevelse av skolen: Sentrale sammenhenger og utvikling med alder [Pupils' perceptions of school: Central associations and development with age]. *Spesialpedagogikk, 8*, 36–47.

Skaalvik, E. M., & Skaalvik, S. (2013). School goal structure: Associations with students' perceptions of their teachers as emotionally supportive, academic self-concept, intrinsic motivation, effort, and help seeking behavior. *International Journal of Educational Research, 61*, 5–14. https://doi.org/10.1016/j.ijer.2013.03.007

Skinner, E. A., Graham, J. P., Brule, H., Rickert, N., & Kindermann, T. A. (2020). 'I get knocked down but I get up again': Integrative frameworks for studying the development of motivational resilience in school. *International Journal of Behavioral Development, 44*(4), 290–300. https://doi.org/10.1177/0165025420924122

Spilt, J. L., Hughes, J. N., Wu, J. Y., & Kwok, O. M. (2012). Dynamics of teacher–student relationships: Stability and change across elementary school and the influence on children's academic success. *Child Development, 83*(4), 1180–1195. https://doi.org/10.1111/j.1467-8624.2012.01761.x

Stornes, T., Bru, E., & Idsoe, T. (2008). Classroom social structure and motivational climates: On the influence of teachers' involvement, teachers' autonomy support and regulation in relation to motivational climates in school classrooms. *Scandinavian Journal of Educational Research, 52*(3), 315–329. https://doi.org/10.1080/00313830802025124

Trochim, W. M. K., Donnelly, J., & Arora, K. (2016). *Research methods: The essential knowledge base* (2nd ed.). Cengage Learning, Inc.

Tvedt, M. S., Bru, E., & Idsoe, T. (2021a). Perceived teacher support and intentions to quit upper secondary school: Direct, and indirect associations via emotional engagement and boredom. *Scandinavian Journal of Educational Research, 65*(1), 101–122. https://doi.org/10.1080/00313831.2019.1659401

Tvedt, M. S., Bru, E., Idsoe, T., & Niemiec, C. (2021b). Intentions to quit, emotional support from teachers, and loneliness among peers: Developmental trajectories and longitudinal associations in upper secondary school. *Educational Psychology, 41*(8), 967–984. https://doi.org/10.1080/01443410.2021.1948505

Udir. (2020). *Utdanningspeilet 2017 [education mirror. Report 2017]*. Norwegian Directorate for Education and Training http://utdanningsspeilet.udir.no/2017/.

Urdan, T., & Kaplan, A. (2020). The origins, evolution, and future directions of achievement goal theory. *Contemporary Educational Psychology, 61*. https://doi.org/10.1016/j.cedpsych.2020.101862

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*(5), 1161–1176. https://doi.org/10.1037//0022-3514.72.5.1161

Vasalampi, K., Kiuru, N., & Salmela-Aro, K. (2018). The role of a supportive interpersonal environment and education-related goal motivation during the transition beyond upper secondary education. *Contemporary Educational Psychology, 55*, 110–119. https://doi.org/10.1016/j.cedpsych.2018.09.001

Virtanen, T. E., Vasalampi, K., Torppa, M., Lerkkanen, M.-K., & Nurmi, K.-E. (2019). Changes in students' psychological well-being during transition from primary school to lower secondary school: A person-centered approach. *Learning and Individual Differences, 69*, 138–149. https://doi.org/10.1016/j.lindif.2018.12.001

von Soest, T., & Hagtvet, K. A. (2011). Mediation analysis in a latent growth curve modeling framework. *Structural Equation Modeling: A Multidisciplinary Journal, 18*(2), 289–314. https://doi.org/10.1080/10705511.2011.557344

Wang, M.-T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal, 47*(3), 633–662. https://doi.org/10.3102/0002831209361209

Wang, J., & Wang, X. (2020). *Structural equation modeling: Applications using Mplus* (2nd ed.). Wiley.

Wang, M., & Zhou, L. (2013). Latent class procedures: Recent development and applications. In J. M. Cortina, & R. S. Landis (Eds.), *Modern research methods for the study of behavior in organizations* (pp. 137–160). Taylor & Francis.

Wentzel, K. R. (2015). Teacher–student relationships, motivation and competence. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson (Eds.), *The Routledge international handbook of social psychology of the classroom* (pp. 167–176). Routledge.

Appendix 4: Self-report items

All text in the surveys was in Norwegian. The English translations provided below (in parentheses) are for communication purpose only; they are not validated English versions of the items.

Scale: Perceived teacher support; Emotional support, Autonomy granting, and Feedback quality).
***Lærerne dine**. Vi er interessert i å vite hvordan du opplever lærerne dine på skolen. Lærere i ulike fag er selvfølgelig litt forskjellig, men tenk på hvordan det vanligvis er. Det som beskriver den typiske opplevelsen av lærerne dine.*
*(**Your teachers.** We are interested to know how you perceive your teachers at school. Teachers in various subjects may be different but think of how it usually is. What characterizes the typical experience with your teachers).*

ES = Emotional support, AG = Autonomy granting, FQ = Feedback quality

1. ES	Jeg kan stole på lærerne mine (I can trust my teachers)
2. ES	Lærerne mine vil alltid hjelpe meg dersom jeg har problemer (My teachers will always help me if I have problems)
3. ES	Jeg føler at lærerne mine har tro på meg (I feel that my teachers have faith in me)
4. ES	Jeg føler at lærerne mine bryr seg om meg (I feel that my teachers care about me)
5. ES	Jeg føler at lærerne setter pris på meg (I feel that my teachers appreciate me)
6. AG	Jeg får være med å bestemme hvilke oppgaver jeg skal arbeide med (I get to be involved in deciding which learning tasks I will work on)
7. AG	Jeg får være med å bestemme hvordan jeg skal arbeide med oppgaver på skolen (I can participate in decisions regarding how I work with my learning tasks)
8. AG	Jeg føler at jeg har innflytelse/innvirkning på arbeidssituasjonen min på skolen (I feel I can influence my working situation at school)

	Tilbakemeldinger. *Med tilbakemeldinger mener vi både skriftlige og muntlige tilbakemeldinger. Det kan være tilbakemelding på arbeid og diskusjoner i timene, eller på innleverte oppgaver, prøver, framføringer osv. (**Feedback.** By feedback, we mean written or oral feedback. It can be feedback on work and discussions in class, or submitted work, tests, presentations etc.).*
9. FQ	Lærerne forteller meg hva som er bra med arbeidet jeg gjør (The teachers explain the qualities of my work)
10. FQ	Lærerne forteller meg hva som er de svake sidene ved arbeidet jeg gjør (The teachers explain the weaknesses of my work)
11. FQ	Tilbakemeldingene gjør det klart for meg hva som bør forbedres til neste gang (The feedback I receive helps me understand how I can improve next time)
12. FQ	Jeg får ofte tilbakemeldinger fra lærerne som jeg kan bruke for å bli bedre (I often get feedback from teachers that I can use to improve)
13. FQ	Etter en vurderingssituasjon gir lærerne alltid tilbakemelding på hvordan jeg bør jobbe for å gjøre det bedre neste gang (After an assessment, the teachers always give me feedback on how I should work to do it better next time)

Scale: Perceived mastery climate

Kulturen i klassen. *Nedenfor er det noen spørsmål om opplevelsen av kulturen i klassen din, og om arbeidet med fagene. Les påstandene nøye, og marker det svaralternativet som beskriver best hvordan du synes det er i din klasse. (***Culture in class***. Below are some questions about perceptions of your class. Please, read the statements thoroughly and mark the response that fits best with your experience of your class).*

I min klasse… (In my class…)	
1.	er egen utvikling/forbedring viktigere enn hvilke karakterer du får (individual progress is more important than grades)
2.	er det viktig å prøve så godt man kan (it is important to try as hard as you can).
3.	er hovedmålet å forstå lærestoffet, ikke bare pugge det (it is important to understand the material, not just memorizing).
4.	er det svært viktig å utforske og forstå nye ideer (it is very important to explore new concepts/ideas).
5.	...er det greit å gjøre feil, så lenge du lærer noe av det (mistakes are ok, as long as you are learning).

Scale: Loneliness among peers at school
Du og dine medelever. (You, and your peers).

1.	Jeg har ingen å snakke med i klassen (I have no one to talk to in class)
2.	Jeg blir gående mye for meg selv i friminuttene (I often spend the breaks by myself)
3.	Jeg har ingen på skolen som jeg kan være sammen med (I have no one to be together with at school)
4.	Jeg føler meg ensom på skolen (I feel lonely at school)
5.	Jeg har ingen venner i klassen (I have no friends in class)
6.	Jeg kommer ikke så godt overens med de andre elevene på skolen (I don't get along with the other students at school).

Scale: Emotional engagement
Motivasjon og innsats. (Motivation and efforts).

1.	I timene har jeg det bra (When I'm in class, I feel good)
2.	Når vi arbeider med noe i timene, er jeg interessert (When we work on something in class, I feel interested)
3.	Timene er kjekke (Class is fun)
4.	Jeg liker å lære nye ting i timene (I enjoy learning new things in class)
5.	Når vi arbeider med noe i timene, blir jeg engasjert (When we work on something in class, I get involved).

Scale: Academic boredom
Følelser knyttet til skolearbeidet. *Under er det noen påstander som handler om følelser knyttet til skolearbeidet.* (**Academic emotions.** *Below are some statements about academic emotions).*

1.	Jeg kjeder meg på skolen (I get bored at school)
2.	Skolearbeid er så kjedelig at jeg mister lysten til å lære (Because schoolwork is boring, I have no desire to learn)
3.	Når jeg gjør skolearbeid, begynner tankene mine fort å vandre fordi det er så kjedelig (While studying, I seem to drift off because it's so boring)
4.	Skolearbeid er kjedelig og ensformig (Schoolwork is dull and monotonous)

Note, these items (academic boredom) were originally mixed with items covering other academic emotions. Since they were not used in this research, they are not listed here.

Scale: Academic self-concept
Oppfatninger om å lære. (Beliefs about learning)

1.	Jeg lærer lett på skolen (I learn easily at school)
2. (reversed)	Skolearbeidet er ofte vanskelig for meg (Schoolwork is often hard for me)
3.	Jeg lærer lett i alle fag (I learn easily in all subjects at school)
4. (reversed)	Jeg trenger mye hjelp med skolearbeidet (I need a lot of help with schoolwork)

Scale: Achievement ambitions
Dine holdninger til skolen. (Your attitudes toward school).

1.	Det er viktig for meg å være flink på skolen (It is important to me to do well in school)
2.	Det er viktig for meg å få en god utdannelse (It is important to me to get a good education)
3.	Jeg er opptatt av å få gode karakterer (I am focusing a lot to get good grades)

Scale: Intentions to quit school
Tanker om videre skolegang. (Thoughts about further schooling).

1.	Jeg tenker ofte at jeg vil slutte på skolen (I often consider quitting school)
2.	Jeg har konkrete planer om å slutte på skolen (I have concrete plans to quit school)
3.	Jeg vurderer å slutte på skolen for å begynne å jobbe og tjene penger (I consider leaving school and finding a job instead)
4.	Jeg lurer på om det er noen vits i å fortsette på skolen (I wonder if there is any point in continuing school)
5.	Jeg føler at jeg kaster bort tida mi ved å gå på skolen (I really feel that I am wasting my time at school)

Appendix 5: Ethical approval

Maren Stabel Tvedt
Nasjonalt senter for læringsmijø og atferdsforskning Universitetet i Stavanger

4036 STAVANGER

Vår dato: 21.07.2016 Vår ref: 48974 / 3 / HJP Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 17.06.2016. Meldingen gjelder prosjektet:

48974	*Læringsmiljøets betydning for motivasjon, psykisk helse og fullføring av videregående skole*
Behandlingsansvarlig	*Universitetet i Stavanger, ved institusjonens øverste leder*
Daglig ansvarlig	*Maren Stabel Tvedt*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 31.12.2021, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Hanne Johansen-Pekovic

Kontaktperson: Hanne Johansen-Pekovic tlf: 55 58 31 18
Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

NSD – Norsk senter for forskningsdata AS Harald Hårfagres gate 29 Tel: +47-55 58 21 17 nsd@nsd.no Org.nr. 985 321 884
NSD – Norwegian Centre for Research Data NO-5007 Bergen, NORWAY Faks: +47-55 58 96 50 www.nsd.no

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 48974

FORMÅL
Formålet med prosjektet er å utvikle kunnskap om hvordan forhold ved læringsmiljøet i videregående skole kan stimulere til motivasjon, mental helse og evne til å fullføre opplæringen.

UTVALG OG DATAINNSAMLING
Prosjektet vil bestå av en pilotstudie og en hovedstudie.

Pilotstudiet skal inkludere 150 til 200 elever som vil gå på VG2 ved innsamlingstidspunktet, og være i alderen 17 til 18 år.
Hovedstudien skal inkludere 1000 - 1500 elever. Elevene vil bli spurt om å fylle ut spørreskjema ved tre anledninger: høsten de går i VG1, høst VG2 og vår VG2. Elevene vil være mellom 16 og 17 år ved oppstartstidspunkt av hovedstudien.

Datamaterialet skal samles inn ved elektroniske spørreskjema. I hovedstudien skal det i tillegg kobles registerdata fra database i opplæringsavdelingen i fylkeskommunen.

REKRUTTERING
Rekruttering vil skje ved at stipendiat Maren Stabel Tvedt tar kontakt med aktuelle skoler i Rogaland, som videreformidler informasjon om studien til elevene muntlig og skriftlig på skolens hjemmeside/læringsplattform. Personvernombudet forutsetter at taushetsplikten ikke er til hinder for rekruttering.

INFORMASJON OG SAMTYKKE
Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivene som skal gis til elevene er godt utformet.

SENSITIVE PERSONOPPLYSNINGER
Det behandles sensitive personopplysninger om elevenes psykiske helse.

SAMTYKKE FRA 16-ÅRINGER
Ved innsamling av sensitive personopplysninger der utvalget er mellom 16 og 18 år skal det vurderes hvorvidt foreldre også skal samtykke. Etter en helhetsvurdering av prosjektet er vi enige i din vurdering av at 16-åringene som deltar er selvstendig samtykkekompetente. Det er lagt vekt på at videregående skole ikke er et obligatorisk tilbud, og elevene som inngår i studien har tatt et selvstendig valg om å følge denne undervisningen. Videre er formålet med prosjektet godt forklart, og etter vår vurdering vil elevene ha forutsetningene for å forstå hva de samtykker til.

OPPLYSNINGER OM TREDJEPERSON
Det behandles enkelte opplysninger om tredjeperson. Det skal kun registreres opplysninger som er nødvendig for formålet med prosjektet. Opplysningene skal være av mindre omfang og ikke sensitive, og skal anonymiseres i publikasjon. Så fremt personvernulempen for tredjeperson reduseres på denne måten, kan prosjektleder unntas fra informasjonsplikten overfor tredjeperson, fordi det anses uforholdsmessig vanskelig å informere.

INFORMASJONSSIKKERHET
Personvernombudet legger til grunn at forsker etterfølger Universitetet i Stavanger sine interne rutiner for datasikkerhet.

SurveyXact er databehandler for prosjektet. Universitetet i Stavanger skal inngå skriftlig avtale med surveyxact om hvordan personopplysninger skal behandles, jf. personopplysningsloven § 15. For råd om hva databehandleravtalen bør inneholde, se Datatilsynets veileder: http://www.datatilsynet.no/Sikkerhet-internkontroll/Databehandleravtale/.

ANBEFALINGER OG VURDERINGER
I forbindelse med at du skal samle inn sensitive personopplysninger om psykisk helse bør du være forberedt på å håndtere eventuelle problemer som kan oppstå, både underveis og etter datainnsamling. For eksempel kan enkelte informanter ha behov for oppfølging, og forsker/student må kunne henvise vedkommende til riktig instans, som for eksempel helsesøster eller psykolog. Vi anbefaler derfor at du tar kontakt med de aktuelle skolene slik at det kan opprettes et tilbud som informantene kan benytte dersom de trenger dette. Videre bør dere opplyse om dette tilbudet enten i informasskrivet eller i spørreskjemaet.

PROSJEKTSLUTT OG ANONYMISERING
Forventet prosjektslutt er 31.12.2021. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)

Vi gjør oppmerksom på at også databehandler (SurveyXact) og Rogaland fylkeskommune må slette personopplysninger tilknyttet prosjektet i sine systemer. Dette inkluderer eventuelle logger og koblinger mellom IP-/epostadresser og besvarelser.