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Dropout intentions in secondary education: Student temperament and achievement motivation as antecedents

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Abstract

Introduction: As early school leaving and dropping out from education pose a challenge for later life adjustment, it is important to identify antecedent factors for the risk of school dropout to tailor individual support for adolescents. Consequently, this study examines the role of adolescents' motivational beliefs and behaviors (i.e., success expectations, planning, and task-avoidance) as well as their temperament (i.e., extraversion/surgency, negative affectivity, effortful control, and affiliativeness) in their dropout intentions in the first year of upper secondary education.

Methods: Participants were Finnish adolescents' ($n = 536$; 57% girls, mean age 12.39 at outset, standard deviation = 0.35) and their motivational beliefs and behaviors were measured in Grades 6 and 9. Their temperament was also measured in Grade 9. As for dropout intentions, they were measured in upper secondary education. The effects of gender, academic achievement, task value, and educational track were controlled for in the analyses.

Results: The results of latent growth modeling showed that, of motivational beliefs and behaviors, high success expectations and low task avoidance independently predicted lower dropout intentions. Success expectations in Grade 6 also mediated the effects of extraversion/surgency, negative affectivity and effortful control on subsequent school dropout intentions, whereas an increase in task avoidance in lower secondary school was a mediator between extraversion/surgency and dropout intentions.

Conclusions: Our study provides novel understanding about how temperament is linked with motivational beliefs and behaviors and what roles they together play in subsequent school dropout intentions. Supporting students with different temperaments and achievement motivations would be important to prevent adverse consequences for both the individual and society.

KEYWORDS

achievement motivation, adolescence, risk of school dropout, temperament

1 | INTRODUCTION

Education provides adolescents with a variety of opportunities for the future, whereas early school leaving (ESL) and dropping out from education pose severe challenges for later life adjustment (e.g., Boylan & Renzulli, 2017; Jimerson et al., 2002; Maynard et al., 2015; Rumberger, 1987). Discontinuing upper secondary education would leave the individual with only lower secondary education, which is associated with a higher risk of unemployment compared to other degree levels (OECD, 2020). School dropout can also have a negative effect on an individual's health and wellbeing (e.g., Griep

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et al., 2016; Ramsdal et al., 2018; Voßemer et al., 2018). A better understanding of school dropout prevention is therefore needed.

School dropout is defined as a discontinuity of education before graduation (e.g., Blondal & Adalbjarnardottir, 2009; Boylan & Renzulli, 2017; Neild et al., 2008). The ESL-indicator, an EU-wide dropout measure (European Commission, 2013), represents the amount of people without postlower secondary school degree among 18- to 24-year-olds. In 2017, the ESL was 8.2% in Finland (European Commission, 2018). In this study, we examine dropout risk at the beginning of upper secondary education. Students' intentions of dropping out or changing their education, which is the definition of dropout risk in this study, have been found to be a warning sign for later school dropout (Vasalampi et al., 2018).

Two key characteristics that may affect adolescents' functioning at school and staying in the educational path are students' motivation and their temperament. Motivation can be defined as the self-regulatory mechanism by which individuals can pursue goals, implement learning activities, and act on instructed behaviors (Casillas et al., 2012; Robbins et al., 2009). Previous studies have shown that motivational beliefs and behaviors play a significant role in learning (for a review, see Vu et al., 2021; Wigfield & Cambria, 2010) because they determine the extent to which students can use their existing skills and gain new ones (see also Hirvonen et al., 2020). In turn, temperament refers to early-appearing and relatively stable differences in individuals' reactions and behaviors that influence individual ways of focusing attention, regulating emotional and behavioral responses in different situations, and interpreting environmental information (Gartstein et al., 2016; Goldsmith et al., 1987; M. K. Rothbart, 2011; M. K. Rothbart et al., 2000). In essence, temperament describes individual differences in typical ways of acting, but does not determine individuals' actions nor motives or goals underlying various actions (Thomas & Chess, 1977). However, little seems to be known about the interplay of motivational beliefs and behavior and temperament in how adolescents navigate critical educational transitions. Consequently, this study aims to examine how adolescents' motivational beliefs and behaviors and temperament in basic education predict their dropout intentions in the first year of upper secondary education.

2 | MOTIVATIONAL BELIEFS AND BEHAVIORS AS ANTECEDENTS OF DROPOUT INTENTIONS

According to the process theory of achievement motivation (Kiuru et al., 2020; Norem & Cantor, 1986; Nurmi, 2013; Onatsu-Arvilommi & Nurmi, 2000), achievement motivation is a multiphase process. Previous experiences in similar learning situations are reflected in individuals' self-concept and self-efficacy, affecting their beliefs, values, and expectations in future tasks, and further influencing their choices, behaviors, and effort (Kiuru et al., 2020; Wigfield & Cambria, 2010). Individuals' typical ways of thinking and behaving in learning situations reflect their effort and interest toward the subject being learned, lead to the use of different achievement strategies, and manifest in different kinds of motivational behavior in challenging situations (e.g., Eccles et al., 1983; Norem & Cantor, 1986; Vu et al., 2021; Wigfield & Cambria, 2010; Wigfield & Eccles, 2000).

In this study, we focus on three types of motivational beliefs and behaviors in relation to learning: success expectations refer to positive self-beliefs, whereas task-oriented planning and task avoidance represent adaptive and maladaptive forms of motivational behavior, respectively (see also Hirvonen et al., 2020). These constructs were chosen because previous studies have shown that optimistic beliefs, such as success expectations, and adaptive behaviors reflecting a high level of effort, such as task-oriented planning, are beneficial for students' learning outcomes (e.g., Aunola et al., 2003; Hirvonen et al., 2010; Määttä et al., 2002). In contrast, maladaptive behaviors related to lack of effort and task-irrelevant activities, such as task avoidance, have proven to be harmful for the development of academic skills (e.g., Hirvonen et al., 2012; Määttä et al., 2002; Mägi et al., 2010). In the process theory of achievement motivation, success expectations, and task-related planning and avoidance behaviors are believed to mediate the effect of past learning experiences on subsequent academic outcomes as they guide, for example, students' choices and effort expenditure in relation to learning tasks (Hirvonen et al., 2020; Norem & Cantor, 1986; Nurmi, 2013; Onatsu-Arvilommi & Nurmi, 2000).

Success expectations—or efficacy beliefs (see also Bandura, 1997)—can be defined as individuals' prospective beliefs about how well they will perform in upcoming learning tasks (Wigfield & Eccles, 2000; see also Schunk & Pajares, 2009; Spinath & Steinmayr, 2008). Success expectations can be an attribute of either a positive or negative self-perpetuating cycle between past experiences and those in the future (Eccles et al., 1983; Onatsu-Arvilommi & Nurmi, 2000; Wigfield & Cambria, 2010). If similar learning situations have gone well in the past, individuals are more likely to expect success in the future as well. In turn, former negative experiences can lead to expectations of further failure. Success expectations typically lead to task-oriented behavior with the goal to manage the task (Kiuru et al., 2020; Nurmi, 2013; Vu et al., 2021), and failure expectations in turn can lead to anxiety and task avoidance, which are associated with poorer learning outcomes (Abramson et al., 1978; De Castilla et al., 2013; Georgiou et al., 2010; Miller, 1987).

Task-oriented planning is a self-regulative skill of executive functioning (Hughes et al., 2009; M. K. Rothbart & Bates, 2006; Sorel & Pennequin, 2008), which is characterized by the ability to control one's behavior to pursue goals

(Hayes-Roth & Hayes-Roth, 1979; Hirvonen et al., 2020; Schraw & Moshman, 1995). The time spent on planning and the number of goals set can be seen to reflect achievement motivation, and task-oriented planning has been seen as a way to increase motivation toward the task (Eilam & Aharon, 2003; Vu et al., 2021). Many previous studies have shown that task-oriented and self-regulated learning promotes better achievement outcomes (e.g., Casillas et al., 2012; Covington, 2000; Hirvonen et al., 2020; Pintrich & De Groot, 1990).

Task avoidance is the opposite of task-oriented behavior (Abramson et al., 1978; Diener & Dweck, 1978; Hirvonen et al., 2013; Onatsu-Arvilommi & Nurmi, 2000; Vu et al., 2021). When an individual is avoiding a task, task-irrelevant behavior such as disturbing others or finding other things to do is used as an intentional reason for an expected failure, that is, one behaves according to a self-handicapping strategy (Jones & Berglas, 1978; Midgley et al., 1996; Schwinger et al., 2014). Task avoidance may also arise when an individual experiences a lack of control over a situation's outcome and thus might give up on the task completely, which leads to a situation of passive avoidance and learned helplessness (Abramson et al., 1978). Previous studies (e.g., Hirvonen et al., 2010; Mägi et al., 2010; Robbins et al., 2006) have consistently shown that investing effort in the schoolwork promotes, whereas task-avoidant behaviors undermine students' academic achievement.

The process leading to school dropout has been suggested to be a cumulative detrimental cycle of disengagement from school in which lack of motivation and failure experiences play a central role (Christle et al., 2007; Henry et al., 2012). Previous research has shown that lack of confidence in own abilities and task-avoidant behaviors in learning situations are closely associated with school dropout intentions (Alivernini & Lucidi, 2011; Vasalampi et al., 2018) and actual dropout (Caprara et al., 2008; Fan & Wolters, 2014; Rumberger & Lim, 2008). Students' intentions of dropping out or changing their field of education, which were investigated in this study, have been found to be a risk factor for later school dropout (Vasalampi et al., 2018).

3 | TEMPERAMENT IN ADOLESCENCE

The developmental model of temperament proposed by Rothbart and her colleagues (M. K. Rothbart & Bates, 2006; M. Rothbart & Derryberry, 1981; M. K. Rothbart, 2011) is one of the most influential theories of temperament and aligns well with contemporary views on the topic (for reviews, see Shiner & DeYoung, 2013; Zentner & Bates, 2008). In the Rothbart's model temperament is defined as constitutionally rooted individual differences (a) in the reactivity to environmental and internal stimuli, and (b) in the neural and behavioral self-regulation processes modulating this reactivity (M. K. Rothbart & Bates, 2006; M. Rothbart & Derryberry, 1981; M. K. Rothbart, 2011).

In line with developmental model of temperament by Rothbart, three broad temperament dimensions have been found in middle childhood, adolescence, and adulthood (Ellis, 2002; Evans & Rothbart, 2007; Komsu et al., 2008; Putnam et al., 2001; M. K. Rothbart et al., 2001): surgency/extraversion, negative affectivity, and effortful control. *Surgency/extraversion* refers to a tendency for sensation-seeking and arousal of positive emotions in new or challenging situations and in social interactions (Evans & Rothbart, 2007; M. K. Rothbart, 2011). *Negative affectivity* encompasses a tendency to experience negative emotions like anger, disappointment, frustration, and fear, and it describes the intensity of these emotions as well as the speed of arousal and recovery from them. *Effortful control* in turn includes regulation of attention, inhibition, and activation, which regulate temperamental reactions. Later, a fourth temperament dimension, *affiliativeness*, which involves concern for others and the desire for closeness with others (independent of extraversion or shyness), has been suggested to be particularly important in adolescence (Ellis, 2002; Oldehinkel et al., 2004; Putnam et al., 2001). It has been reported that the aforementioned temperament dimensions significantly correlate with the widely studied Big Five personality dimensions with temperamental surgency/extraversion correlating with Big Five extraversion, negative affectivity with Big Five neuroticism, effortful control with Big Five conscientiousness, and affiliativeness with Big Five agreeableness (Evans & Rothbart, 2007; M. K. Rothbart, 2011; see also Shiner & DeYoung, 2013).

Although most research on temperament has focused on children, it remains a relevant topic also among adolescents (Thomas & Chess, 1977). Although temperament is a fairly stable quality (Bates et al., 2010; Shiner & DeYoung, 2013), the manifestation of temperament can be affected by maturation, puberty, and socialization (see Ellis, 2002). Influenced by puberty and different social stressors adolescents are increasingly prone to mood swings and diminished impulse control (Arnett, 1999; Denham et al., 2009) and also achievement motivation and school engagement has shown to decrease during adolescent years (Wang & Eccles, 2012). The maturation of adolescent temperament could be indicated by (normative) growth of temperament traits (e.g., Caspi et al., 2005; Putnam et al., 2001). For example, it has been found that toward the end of adolescence individuals' emotional stability and self-regulation increases and adolescents cope with the stressors of life in an increasingly more adaptive way (Capaldi & Rothbart, 1992; Caspi et al., 2005; Klimstra et al., 2009). The small increases in extraversion during adolescence can also be interpreted as maturation that should help adolescents behave in more mature ways and commit to adult social roles (Klimstra et al., 2009; Lodi-Smith & Roberts, 2007). Maturation of temperament during middle childhood and adolescence should also be reflected by increases in stability, as interindividual differences become more settled (e.g., Costa & McCrae, 1994; Klimstra et al., 2009; Kopala-Sibley et al., 2018).

4 | TEMPERAMENT AS AN ANTECEDENT OF MOTIVATION AND DROPOUT INTENTIONS

Although motivational beliefs and behaviors evolve in a continuous cycle building on students' previous experiences and being further reflected in their choices and effort in learning situations, it is possible that also adolescents' temperament plays a role in this process (see also De Feyter et al., 2012; Pekrun, 2017). The link between temperamental differences and motivation has been incorporated in some of the early temperament theories (for a review, see M. K. Rothbart & Hwang, 2005) as individual differences in arousability and emotional reactivity have been suggested to direct individuals' interest to stimulation and their tendencies to avoid or approach situations. For example, some individuals may be temperamentally more prone than others to feel distressed and to withdraw from overstimulating situations. In the academic context, this can mean some students showing a stronger tendency to give up when facing obstacles in their studies, to the extent of even considering dropping out of education. In addition, individual differences in temperament may also contribute to students' attention, emotion, and behavior regulation in the academic context (see Evans & Rothbart, 2007; M. K. Rothbart, 2011), further affecting their ability to persist with their short- and long-term goals in education. Temperament might affect school dropout also indirectly through an individual's motivation at school (e.g., Sankaran & Bui, 2001), personal preferences regarding ways of learning, learning strategies, and motivation to approach tasks (De Feyter et al., 2012; Goćłowska et al., 2017). Previous research has shown that temperament affects how students perceive and react to learning situations, the things they orient their attention to, and their ability to plan, initiate, and perform actions that are relevant for task completion (cf. M. K. Rothbart & Hwang, 2005). For example, there is some evidence to suggest that students with high effortful control are better in maintaining their motivation to learn and staying on task, whereas students with high negative affectivity may be prone to dwelling on negative feelings in learning situations resulting in pessimistic self-beliefs and avoidance behavior (e.g., Hirvonen et al., 2013; Hirvonen et al., 2016).

Decisions to dropout from school have been linked to personality traits such as high introversion and low conscientiousness and neuroticism (Migali & Zucchelli, 2017), which suggests that individual traits may influence educational decisions. Similarly, if students are temperamentally prone to fearfulness, they are also more likely to form pessimistic expectations about the future and avoid potentially challenging situations (Evans & Rothbart, 2007), which may also affect their academic goals. In fact, high negative affectivity or related personality trait neuroticism have been shown to be related to higher fear of failure and avoidance motivation (Komarraju & Karau, 2005), although the results about their role in school success have been inconclusive (Checa & Abundis-Gutierrez, 2017; De Feyter et al., 2012). High effortful control and conscientiousness (of which self-discipline and persistence are inherent parts; MacCann et al., 2009; Paunonen & Ashton, 2001), in turn, have consistently been found to predict staying in school and graduating (Duckworth & Carlson, 2013; Hoffmann et al., 2020), and to be positively associated with academic success and motivation (Checa & Abundis-Gutierrez, 2017; Checa et al., 2008; De Feyter et al., 2012; Duckworth & Carlson, 2013; Eisenberg et al., 2010; Jensen, 2015; Vedel, 2014), future educational attainment, and the ability to adjust to challenges and changes in life (Pulkkinen, 2012). Regarding surgency/extraversion, there is some indication that its effects are not necessarily uniformly positive for educational outcomes. For example, some studies have shown that high surgency/extraversion is related to higher likelihood of attendance problems and poorer reading and writing abilities (Hoffmann et al., 2020). As far as we know, no previous studies have examined the role of affiliativeness in adolescents' school dropout risk. In this study we aim to broaden understanding of the role of adolescents' motivational beliefs and behaviors in their subsequent school dropout intentions, and the possible indirect effects of temperament on school dropout risk through motivational beliefs and behaviors.

5 | RESEARCH QUESTIONS AND HYPOTHESES

This study proposed the following research questions and hypotheses (see Figure 1 for a schematic figure of the associations between adolescent temperament, motivational beliefs and behaviors, and school dropout intentions).

(RQ1) Do adolescents' motivational beliefs and behaviors (i.e., success expectations, task-oriented planning, task avoidance) and related changes from Grade 6 to 9 predict adolescents' dropout intentions in upper secondary education? H1: High task-oriented planning was expected to predict a lower level of school dropout intentions, whereas low success expectations and high task avoidance were expected to predict a higher level of school dropout intentions (see Alivernini & Lucidi, 2011; Fan & Wolters, 2014; Gubbels et al., 2019; Vasalampi et al., 2018).

(RQ2) To what extent does adolescent temperament (i.e., extraversion/surgency, negative affectivity, effortful control, affiliativeness) in Grade 6 of basic education predict dropout intentions in the first year of upper secondary education directly and indirectly through motivational beliefs and behaviors in Grades 6–9? H2a: High negative affectivity was expected to predict a higher level of school dropout intentions, whereas high effortful control was expected to predict a lower level of school dropout intentions (see Checa & Abundis-Gutierrez, 2017; Duckworth & Carlson, 2013; Hoffman et al., 2020). Due to scarce previous literature, no hypotheses were made for extraversion/surgency and affiliativeness. H2b: It was tentatively

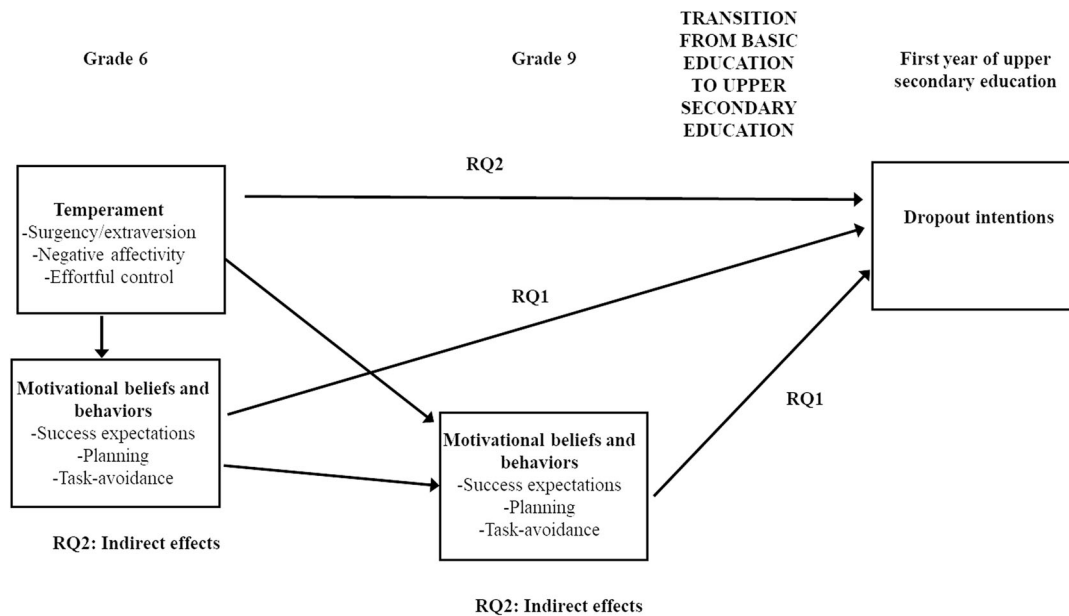


FIGURE 1 Schematic model for the interrelationships between temperament, motivational beliefs and behaviors, and dropout intentions

expected that especially high effortful control could decrease school dropout intentions through increased success expectations and planning and decreased task-avoidance (see Gołowska et al., 2017; Sankaran & Bui, 2001). It was also tentatively expected that high negative affectivity could increase school dropout intentions through decreased success expectations and planning and increased task-avoidance (see Gołowska et al., 2017; Sankaran & Bui, 2001).

Previous research has shown that being a boy (Lessard et al., 2005; Markussen et al., 2011) or having low task-values (Fan & Wolters, 2014) or low academic achievement (Markussen et al., 2011; Rumberger & Lim, 2008) are connected to higher school dropout risk. Hence, the effects of these variables were controlled for. In addition, we also controlled for the effect of students' educational track (i.e., vocational vs. academic track) as dropout rates tend to be higher in upper secondary vocational education than in upper secondary general education (Dæhlen, 2017).

6 | METHOD

6.1 | Participants and procedure

The present study is part of a broader longitudinal study conducted in central Finland following a community sample of adolescents through their transition from primary school to lower secondary school and further to upper secondary education. The adolescents were recruited from one large Finnish town (population ~135,000 inhabitants) and one middle-sized Finnish town (population ~20,000 inhabitants) in Central Finland. Both towns included semi-rural areas with smaller schools. The present study examines three measurement points: Grade 6 fall (2014) in primary school, Grade 9 fall (2017) in lower secondary school, and fall of the first year (2018) of upper secondary education (either senior high school or vocational education). The data were collected by two trained testers in classrooms during normal school hours. Written consent for participation was requested from parents, adolescents, and teachers. The procedures of the study are in accordance with the principles of the Helsinki Declaration on research with human subjects and the larger longitudinal study has been approved by the ethics committee of the University of Jyväskylä.

The sample of this study consisted of 768 adolescents from four upper secondary schools and 101 different upper secondary school classes for whom information on school dropout intentions after the transition was available (57% girls), with a mean age of 12.29 years (range 11.58–13.75, standard deviation[SD] = 0.35) at the outset. A total of 536 (70%) out of 768 adolescents filled in the questionnaire also in the sixth grade and a total of 716 (93%) out of 768 in the ninth grade. In all, 97% of the adolescents had Finnish as their mother tongue, 1% were bilingual (Finnish and some other language), and 2% of the adolescents spoke a language other than Finnish as their mother tongue. A total of 2% of adolescents' mothers were not educated beyond comprehensive school (i.e., nine years of basic education), 30% had completed upper secondary education, 39% had a bachelor's degree or a vocational college degree, and 29% had a master's degree or higher. The sample was fairly

representative of the Finnish general population, except for the fact that the mothers of the participants were somewhat more educated than women of the same age on average in Finland (Official Statistics of Finland, 2015).

6.2 | The Finnish educational system

In Finland, students first complete 9 years of compulsory basic education, which is divided into primary school (Grades 1–6) and lower secondary school (Grades 7–9). In primary and lower secondary school, all students follow the same curriculum and are taught at the same academic level. After completing 9 years of compulsory basic education, adolescents can choose from two upper secondary education options: an academic track or a vocational track (Ministry of Education and Culture, 2021). The academic track (i.e., upper secondary general education) provides general education, but it does not qualify students for any particular occupation. The vocational track (i.e., upper secondary vocational education) includes upper secondary qualifications and provides the basic skills required in the field. Before moving on to upper secondary education, a graduate of compulsory basic education may receive either voluntary additional basic education in the tenth grade or complete preparatory education for academic or vocational upper secondary education (Ministry of Education and Culture, 2021).

According to recent statistics, after completing compulsory basic education, most (93%) Finnish adolescents moved on to upper secondary education (Official Statistics of Finland OSF, 2019a). However, approximately 3% of adolescents in the academic track and 9% in the vocational track dropped out from their studies (Official Statistics of Finland OSF, 2019b). Approximately 15% of each age group completed only compulsory basic education (Official Statistics of Finland OSF, 2019c).

6.3 | Measures

6.3.1 | Temperament (Grade 6)

The adolescents evaluated their temperament using the Finnish version of the Early Adolescent Temperament Questionnaire—Revised (EATQ-R; Capaldi & Rothbart, 1992; Ellis, 2002; Ellis & Rothbart, 2001; for validity in the Finnish sample, see Kiuru et al., 2019). The Finnish version of EATQ-R consists of 71 statements assessed on a 5-point Likert scale (1 = almost never true; 5 = almost always true) measuring temperamental surgency/extraversion, negative affectivity, effortful control, and affiliativeness. Mean scores for surgency/extraversion ($\alpha = .73$), negative affectivity ($\alpha = .86$), effortful control ($\alpha = .79$), and affiliativeness ($\alpha = .82$) were calculated.

6.3.2 | Motivational beliefs and behaviors (Grades 6 and 9)

Adolescents rated their expectations and behaviors with respect to hypothetical learning situations in Grades 6 and 9 using a questionnaire version (CASI; Cartoon Attribution Strategy Inventory (Hirvonen et al., 2020; Määttä et al., 2002; Salmi et al., 2020) of the Cartoon Attribution Strategy test (CAST; Eronen et al., 1997; Nurmi et al., 1994). They were first asked the following: “At school you receive an assignment that you should finish. What goes through your mind?” Following the instructions, adolescents were asked to rate 10 statements on a 5-point Likert scale (1 = disagree; 5 = agree). The statements reflect four types of motivational beliefs and behaviors: success expectations (two items; e.g., “This will turn out fine”), failure expectations (two items; e.g., “I can't do this”), task-oriented planning (three items; e.g., “I need to make a good plan for how to do the task”), and task avoidance (three items; e.g., “I think I'll just think of something else to do”). Because of relatively high inter-item correlations between success and failure expectations ($r = -0.48$ to $r = -0.66$), they were used together to form one variable for measuring success expectations. Mean scores were calculated separately for Grade 6 and Grade 9 (success expectations $\alpha = .82$ in Grade 6 and $.87$ in Grade 9; task-oriented planning $\alpha = .68$ in Grade 6 and $.84$ in Grade 9; task avoidance $\alpha = .81$ in Grade 6 and $.86$ in Grade 9).

6.3.3 | Dropout intentions (first year of upper secondary education)

In the first year of upper secondary school, either academic or vocational, adolescents' intentions to dropout of school were measured with two items (e.g., “Have you considered changing your school or field of study and quitting the current one?”; see also Vasalampi et al., 2018). The items were rated on a 5-point scale ranging from 1 (not at all) to 5 (very often). The Cronbach's α reliability of this scale was $.79$ with the inter-item correlation of 0.66 ($p < .001$).

6.3.4 | Control variables

The controlled covariates in the statistical analyses consisted of students' gender (1 = girl, 2 = boy), task-value (mean score of four questions measuring attainment values in math and literacy adapted from Eccles et al., 1983; $\alpha = .85$), academic achievement (grade point average, range of scale 5–10), and educational track (0 = vocational track, 1 = academic track).

6.4 | Analysis strategy

Our first aim (RQ1) was to examine whether adolescents' motivational beliefs and behaviors in Grade 6 and related changes from Grade 6 to 9 predict adolescents' dropout intentions in upper secondary education. This research question was inspected using correlations and latent growth modeling (LGM). Parallel latent growth models, which estimate different growth components, such as initial level (intercept) and linear change (slope), from data, were conducted for adolescents' success expectations, planning, and task avoidance from Grade 6 to 9. Although the shape of growth cannot be estimated when there are only two time points (i.e., the shape of change is necessarily linear), two-wave growth curve models are still appropriate for estimating the amount of change between two time points (Duncan & Duncan, 2004). Adolescents' dropout intentions in upper secondary education were predicted both with the initial levels and changes from Grade 6 to 9 of motivational beliefs and behaviors (i.e., success expectations, planning, and task-avoidance).

Our second aim (RQ2) was to examine the extent to which adolescents' temperament in Grade 6 may directly versus indirectly through motivational behaviors and behaviors in Grades 6–9 predict their dropout intentions in upper secondary education. To answer this research question adolescent temperament (i.e., surgency/extraversion, negative affectivity, affiliativeness, and effortful control) variables were added as predictors of motivational beliefs and behaviors, and dropout intentions into the previous LGM. In addition, indirect effects and their 95% confidence intervals (CI) from adolescent temperament on subsequent dropout intentions through the levels and changes of motivational beliefs and behaviors were explored using a bootstrapping procedure (see also Hayes, 2017; MacKinnon et al., 2004).

The effects of adolescent gender, task-value, academic achievement, and educational track were controlled for in all the analyses. All the analyses were conducted using the Mplus statistical package (Version 8.4, Muthén & Muthén, 1998–2021) with the COMPLEX approach to account for the clustered nature of the data (school class level ICCs ranged from 0.01 to 0.17). In our sample, the proportion of nonresponses in the different variables ranged from 0% to 25% ($M = 14\%$, $SD = 10\%$). The parameters of the models were estimated using full-information maximum likelihood that allowed us to use all the information in the data with non-normality robust standard errors (Muthén & Muthén, 1998–2021).

7 | RESULTS

7.1 | Associations between motivational beliefs and behaviors and dropout intentions

Descriptive statistics and full correlation matrix are shown in Tables 1 and 2. Our first aim was to investigate the extent to which adolescents' motivational beliefs and behaviors in Grade 6 and related changes from Grade 6 to 9 predict adolescents' dropout intentions in the first year of upper secondary education. The effects of adolescent gender, academic achievement, task-value, and educational track were controlled for in the analyses. The results of LGM are shown in Figure 2. When controlling for the effects of covariates and the other motivational beliefs and behaviors, the results revealed that low success expectations in Grade 6 significantly predicted more frequent dropout intentions 4 years later in the first year of upper secondary education. Furthermore, a larger increase in adolescents' task avoidance from Grade 6 to 9 predicted more frequent dropout intentions in upper secondary education.

7.2 | Direct and indirect associations of temperament on dropout intentions

Our second aim was to investigate the extent to which adolescents' temperament in Grade 6 predicts their dropout intentions in upper secondary education, and the extent to which these associations are mediated through the initial levels and changes of motivational beliefs and behaviors from Grade 6 to Grade 9. The results of LGM regarding the direct effects of adolescent temperament on their motivational beliefs and behaviors and their subsequent school dropout intentions are shown in Figure 3. First, high surgency/extraversion predicted a higher initial level of success expectations and planning in Grade 6, but a decrease in success expectations and an increase in task-avoidance from Grade 6 to 9. Second, high negative affectivity predicted a lower initial level of success expectations and a higher initial level of planning in Grade 6, but a decrease in planning from Grade 6 to 9. Third, high effortful control predicted a substantially higher initial level of success expectations,

TABLE 1 Descriptive statistics of the observed variables

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Temperament					
Surgency/extraversion (Grade 6)	595	3.36	0.66	1.29	4.80
Negative affectivity (Grade 6)	595	2.74	0.53	1.04	4.63
Effortful control (Grade 6)	595	3.59	0.51	2.03	5.00
Affiliativeness (Grade 6)	595	3.42	0.59	1.13	5.00
Success expectations					
Grade 6	596	3.99	0.74	1.00	5.00
Grade 9	712	3.77	0.86	1.00	5.00
Task-oriented planning					
Grade 6	596	3.87	0.81	1.00	5.00
Grade 9	712	3.68	0.88	1.00	5.00
Task avoidance					
Grade 6	596	1.44	0.73	1.00	5.00
Grade 9	712	1.76	0.94	1.00	5.00
Dropout intentions (1st year of upper secondary education)	767	1.79	0.99	1.00	5.00

lower initial level of planning, and higher initial level of task avoidance. Affiliativeness had no unique associations with adolescent motivational beliefs and behaviors after accounting for the effects of other variables in the model. Furthermore, direct effects of any of the temperament dimensions on subsequent dropout intentions were nonsignificant after accounting for the effects of motivational variables and covariates.

Next, the indirect effects from temperament dimensions on subsequent dropout intentions through motivational beliefs and behaviors were estimated. The results showed, first, that the initial level of success expectations in Grade 6 significantly mediated the associations between surgency/extraversion (*Estimate of indirect effect* = -0.02 , standard errors [SE] = 0.01 , $p = .006$, 95% CI = $[-0.01$ to $-0.04]$), negative affectivity (*Estimate of indirect effect* = 0.02 , SE = 0.01 , $p = .011$, 95% CI = $[0.01$ to $0.04]$) and effortful control (*Estimate of indirect effect* = -0.07 , SE = 0.02 , $p < .001$, 95% CI = $[-0.03$ to $-0.12]$) with subsequent dropout intentions. Higher surgency, lower negative affectivity, and higher effortful control predicted higher success expectations, which further contributed to less frequent dropout intentions in upper secondary education. Second, the results for the indirect effects showed that the change in task avoidance from Grade 6 to 9 significantly mediated the association between surgency/extraversion and subsequent dropout intentions (*Estimate of indirect effect* = 0.02 , SE = 0.01 , $p = .031$, 95% CI = $[0.01$ – $0.03]$). High surgency/extraversion predicted a larger increase in task avoidance, which contributed to more frequent subsequent dropout intentions.

8 | DISCUSSION

This longitudinal study aimed to shed light on adolescents' temperament and motivational beliefs and behaviors in primary and lower secondary school as antecedents of dropout intentions in upper secondary education. As far as we know, our study is the first to investigate adolescents' motivational beliefs and behaviors as mediators in the associations between adolescents' temperament and subsequent school dropout intentions. The results showed, first, that adolescents' high success expectations, and low task avoidance independently predicted lower dropout intentions in upper secondary school, even after accounting for the effects of gender, academic achievement, task value, and educational track. Furthermore, success expectations in Grade 6 mediated the associations between all temperament dimensions and school dropout intentions, whereas an increase in task avoidance in lower secondary school served as a mediator between extraversion/surgency and dropout intentions.

8.1 | Associations of motivational beliefs and behaviors and dropout intentions

Our first assumption (H1) was that high task-oriented planning predicts a lower level of school dropout intentions, whereas low success expectations and high task avoidance were expected to predict a higher level of school dropout intentions

TABLE 2 Correlations between temperament dimensions, motivational beliefs, and behaviors, and dropout intentions ($N = 767$)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Surgency (Grade 6)	-														
2. Negative affectivity (Grade 6)	-0.30*	-													
3. Affiliativeness (Grade 6)	-0.05	0.27*	-												
4. Effortful control (Grade 6)	0.03	-0.13**	0.43*	-											
5. Success expectations (Grade 6)	0.18*	-0.18*	0.24*	0.53*	-										
6. Success expectations (Grade 9)	0.05	-0.15**	0.18*	0.36*	0.42*	-									
7. Planning (Grade 6)	0.05	0.11**	0.32*	0.39*	0.37*	0.18*	-								
8. Planning (Grade 9)	-0.07	0.03	0.23*	0.35*	0.23*	0.55*	0.32*	-							
9. Task avoidance (Grade 6)	0.07	-0.03	-0.24*	-0.43*	-0.50*	-0.21*	-0.35*	-0.23*	-						
10. Task avoidance (Grade 9)	0.15*	-0.01	-0.18*	-0.30*	-0.26*	-0.65*	-0.17*	-0.52*	0.35*	-					
11. Dropout intentions (1st grade of upper secondary education)	0.00	0.03	-0.06	-0.12**	-0.19*	-0.23*	-0.12**	-0.21*	0.13**	0.20*	-				
12. Gender ^a	0.15*	-0.29*	-0.29*	-0.07	0.02	0.04	-0.11**	-0.13**	0.22*	0.15**	0.08	-			
13. Academic achievement	-0.04	0.07	0.28*	0.35*	0.31*	0.21*	0.15*	0.26*	-0.28*	-0.22*	-0.22*	-0.21*	-		
14. Task value	-0.04	0.19*	0.31*	0.25*	0.27*	0.10***	0.37*	0.26*	-0.27*	-0.13**	-0.09***	-0.17*	0.22*	-	
15. Educational track ^b	-0.05	0.05	0.14**	0.16*	0.13**	0.28*	0.08***	0.29*	-0.19*	-0.35*	-0.10***	-0.20**	0.44*	0.16*	-

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

^a1 = girl, 2 = boy;

^b0 = vocational track, 1 = academic track.

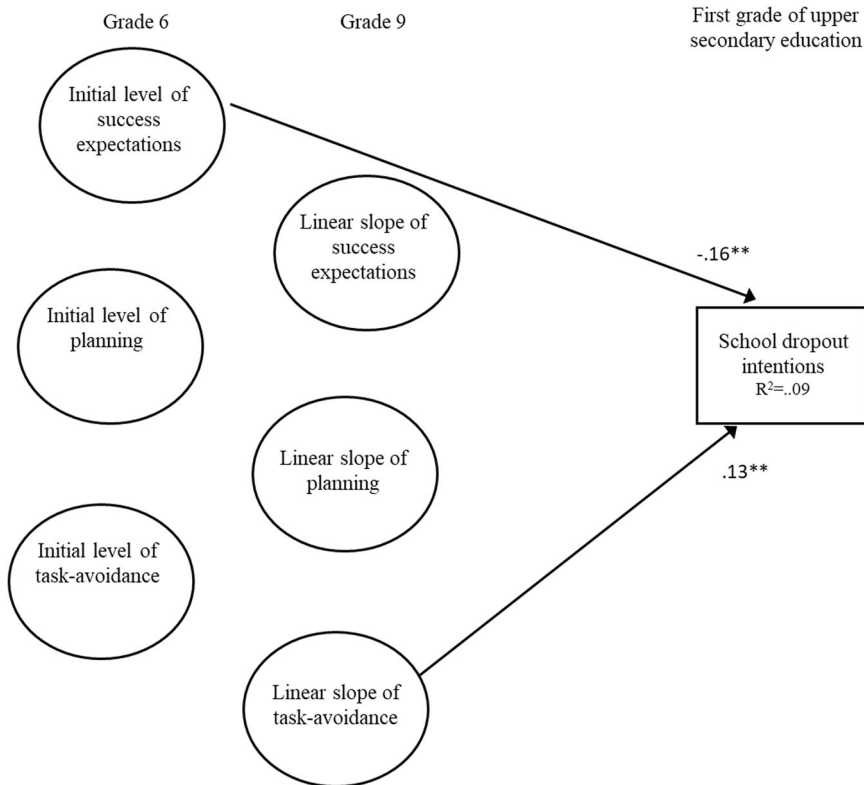


FIGURE 2 The role of adolescent motivational beliefs and behaviors in their school dropout intentions. Standardized estimates are presented. $^{**}p < .01$. Levels and slopes of motivational beliefs and behaviors were allowed to be correlated. The effects of adolescent gender, educational track, academic achievement, and task value were controlled for in all the analyses. Model fit: $\chi^2(4) = 12.51$, $p = .01$, RMSEA = 0.05, CFI = 0.99, SRMR = 0.02.

(see also Alivernini & Lucidi, 2011; Fan & Wolters, 2014; Gubbels et al., 2019; Vasalampi et al., 2018). In line with H1, the results revealed that the lower adolescents had assessed their success expectation in the sixth grade, the more frequently they considered dropping out of school in upper secondary school. Our results are this consistent with previous research, indicating a link between motivational beliefs and school dropout intentions (Alivernini & Lucidi, 2011; Vasalampi et al., 2018). Success expectations have been found to function in a self-predictive way (Onatsu-Arvilommi & Nurmi, 2000), in which case one's expectations of failure can actually contribute to failure in reality (Abramson et al., 1978; De Castella et al., 2013; Georgiou et al., 2010; Miller, 1978).

In addition, in line with H1, the more students' task avoidance increased from Grade 6 to 9, the more often they thought about dropping out in upper secondary school. To our knowledge, the relationship between changes in task avoidance and dropout intentions has not been studied before. In previous studies, however, task avoidance—that is, a behavioral indication of low motivation and engagement—has been found to be related to worse school performance (e.g., Georgiou et al., 2010; Kikas et al., 2009; Mägi et al., 2010; Schwinger et al., 2014). Therefore, it is logical that an increase in task avoidance may also increase the amount of dropout intentions. To complete education, it would be important to get adolescents to show task orientation, for example, by enabling them to accumulate experiences of success.

By contrast, against H1 there was no significant association between task-oriented planning and school dropout intentions. One explanation for this could be that task-oriented planning may be more task-specific and thus not so closely related to general intentions of dropping out of education completely.

8.2 | Direct and indirect associations between adolescents' temperament and school dropout intentions

The results for *effortful control* showed, in line with H2b (see also De Feyter et al., 2012), that adolescent effortful control in sixth grade had an indirect effect through higher success expectations on lower subsequent intentions of dropping out of school. Although our study is the first to report such indirect effects, previous research literature supports these results, as effortful control affects the management of individual temperamental reactions (M. K. Rothbart, 2011), and it has previously been found that effortful control predicts, for example, school performance (Checa & Abundis-Gutierrez, 2017; Checa et al., 2008; Eisenberg et al., 2010), lack of school problems, and school completion (Duckworth & Carlson, 2013; Hoffmann et al., 2020). Students with high effortful control possess self-regulation abilities that enable them to direct and maintain attention, plan and control their behavioral and affective responses, and inhibit inappropriate ones in the learning context

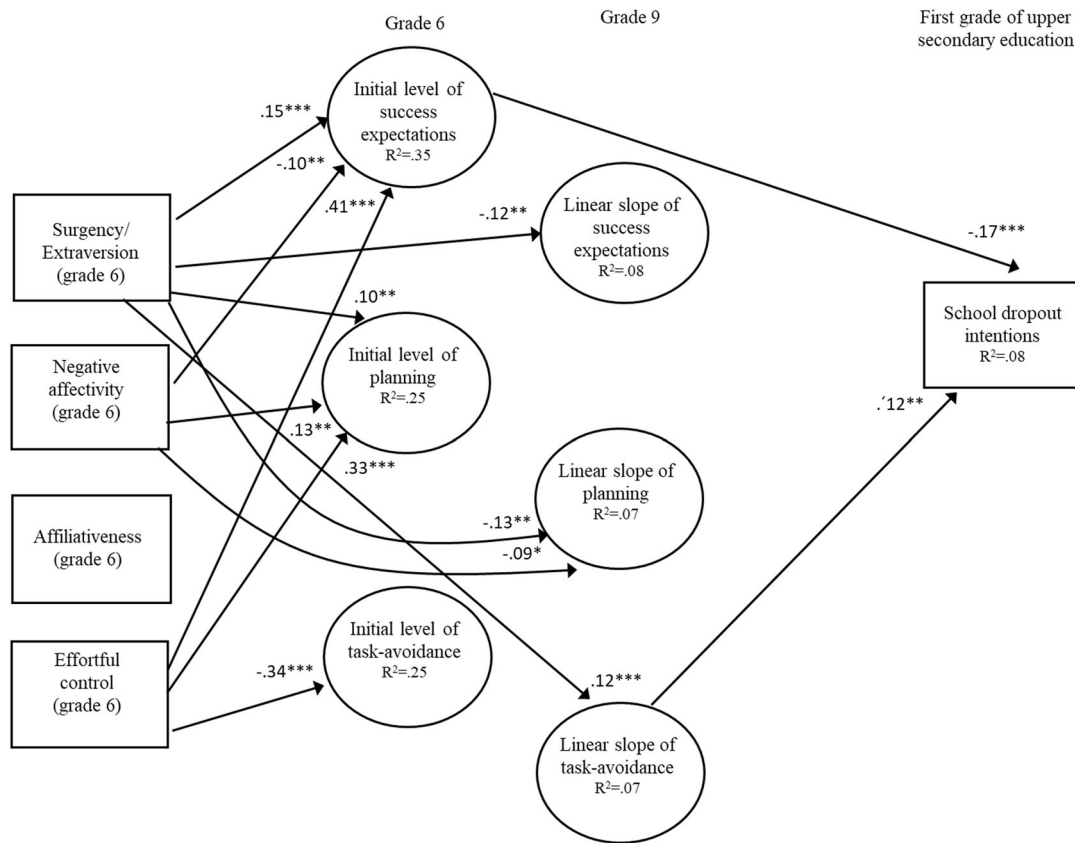


FIGURE 3 The direct effects of adolescent temperament on their motivational beliefs and behaviors and subsequent school dropout intentions. Standardized estimates are presented. *** $p < .001$; ** $p < .01$; * $p < .05$. Predictor variables were allowed to be correlated. The effects of adolescent gender, educational track, academic achievement, and task value were controlled for in all the analyses. Model fit: $\chi^2(21) = 27.24, p = .14, RMSEA = 0.02, CFI = 1.00, SRMR = 0.02$.

(M. K. Rothbart et al., 2001). Consequently, with these abilities the students have probably gained positive experiences of learning in previous learning situations, which is likely to help them maintain their motivation and positive expectations in subsequent learning tasks and in their chosen school path in more general.

Regarding negative affectivity, the results also supported H2b by showing that the effect of negative affectivity on subsequent dropout intentions was fully mediated through adolescents' success expectations. More specifically, high negative affectivity was related to lower success expectations, which in turn predicted higher dropout intentions. In previous research, negative affectivity, referring to a tendency to experience intense negative emotions and dwell on them, has been found to relate to poorer academic performance and school adjustment problems (Checa & Abundis-Gutierrez, 2017). Although previous research on the mediating effect of motivational factors in the association between temperament and ESL intentions has not been conducted, our result is in line with Richardson and Abraham's (2009) finding that the relationship between personality and school performance is mediated through achievement motivation. Because of their inclination for negatively loaded interpretations, students with high negative affectivity may be less prepared to overcome previous disappointments and negative experiences in learning situations, which is likely to lead to biased beliefs of subsequent success opportunities. In addition, success expectations have generally been seen to lead to task-oriented behavior (Kiuru et al., 2020; Nurmi, 2013; Wigfield & Cambria, 2010) and failure expectations to poorer learning outcomes in school (Abramson et al., 1978; De Castella et al., 2013; Georgiou et al., 2010; Miller, 1987).

In contrast to H2a, neither effortful control nor negative affectivity had unique direct effects on subsequent dropout intentions after accounting for the effects of adolescents' motivational beliefs and behavior and the control variables. Hence, our results suggest that the effects of these temperament dimensions on subsequent dropout intentions were fully mediated through success expectations and task avoidance. It is notable that, by definition, temperament describes individual differences in typical ways of acting and reacting but it does not deterministically define individuals' actions nor motives or goals underlying various actions (Thomas & Chess, 1977). Hence, it is understandable that instead of direct effects adolescent temperament contributes to subsequent dropout intentions indirectly through motivational beliefs and behaviors (see also De Feyter et al., 2012).

Because previous literature on this topic is scarce, no hypotheses were set for the effects of extraversion/surgency and affiliativeness. The results regarding the indirect effects of surgency/extraversion showed, first, that high surgency was related to higher success expectations, which in turn predicted lower dropout intentions. However, the link between extraversion/surgency and intentions to dropout of school was also mediated by an increase in task avoidance during lower secondary school. Thus, the more extraversion/surgency adolescents had in sixth grade, the more their task avoidance increased in lower secondary school and the more dropout intentions they had in upper secondary school. Although similar mediating effects have not, to our knowledge, been studied before, the result is partially in line with the research findings of Hirvonen et al. (2016), according to which extraversion/surgency predicted increasing task avoidance during their follow-up. In addition, Hoffmann et al. (2020) have shown that extraversion/surgency is positively related to school attendance failure. It is possible that students with high surgency/extraversion who are outgoing, enjoy intense stimuli, and feel comfortable in new situations, feel positive and confident about their own success in learning situations (i.e., high success expectations) but are less capable of channeling their enthusiasm towards the actual learning tasks (i.e., increasing task avoidance) in the school context (see also Furnham & Mosen, 2009; Poropat, 2009). Overall, our results suggest that surgency can have positive or negative effects on dropout, depending on whether it manifests in success expectations or increasing task avoidance. Effort should be made to maintain and support task-oriented activities—which are particularly important for students high in surgency—so that their school paths can continue uninterrupted. Affiliativeness, in turn, did not play a unique role in the frequency of adolescents' school dropout intentions. Examination of the role that affiliativeness plays in adolescents' achievement motivation and dropout intentions would benefit from further research. It would be worthwhile to investigate possible related intervening mechanisms, such as the sense of relatedness and belonging, as well as to assess quality of interpersonal relationships, such as those with peers, parents, and teachers.

8.3 | Limitations and future directions

There were also limitations to our study. First, although the sample of this study was relatively representative, the fact that the participants' maternal education was slightly higher than in the Finnish general population may have influenced participants' probability of dropping out. Second, it is notable that in the present study we focused only on dropout intentions, not on actual dropout. Although dropout intentions are known to be a risk factor for actual dropout (Vasalampi et al., 2018), they might also be related to thoughts of changing educational field while remaining in education. From the career identity development perspective, adolescents need to explore and consider different career options before they can commit to one and pursue their career in it (Luyckx et al., 2008; Marcia, 1966). In future studies it would also be important to examine actual dropout, as well as more rigorous sets of other outcomes, such as achievement or teacher-related student outcomes. Third, all the measures of this study were based on self-reports. In future studies it would be important to complement self-reports with other types of data (e.g., interviews, observations, register data). Fourth, our study included only one measurement point of adolescent temperament. Although interindividual differences in the core temperamental characteristics are moderately stable (Bates et al., 2010), it is notable that also changes in temperament occur as a result of maturation, puberty, and socialization (Ellis, 2002; Klimstra et al., 2012; Kopala-Sibley et al., 2018). Further studies are needed to shed further light on the stability and change of temperament during adolescence and related consequences in the academic context. Fifth, although a novel understanding of longitudinal associations between temperament, motivational beliefs and behaviors, and dropout intentions was obtained, the effect sizes, after controlling for gender and educational track, were relatively small. In future studies it would also be important to consider the role of interpersonal environment in adolescents' dropout intentions. Finally, our study was carried out in one particular cultural and social environment, and consequently the results would need to be replicated in other cultural and educational contexts.

8.4 | Conclusions

Our study provides novel understanding about the roles that temperament and motivational beliefs and behaviors together play in later school dropout intentions. The results showed that, of motivational beliefs and behaviors, especially high success expectations and low task avoidance predicted lower dropout intentions. Success expectations in Grade 6 also mediated the effects of extraversion/surgency, negative affectivity and effortful control on school dropout intentions, whereas an increase in task avoidance in lower secondary school served as a mediator between extraversion/surgency and dropout intentions. The results suggest that among other factors temperament and motivational beliefs and behaviors may play a role in the process of ESL. Supporting students with different temperaments and motivational beliefs and behaviors would be important to prevent adverse consequences for both the individual and society. Although no temperament can be considered less suitable in the academic context than others, certain temperamental characteristics may make students more susceptible to maladaptive reactions and decisions when they are facing the demands of upper secondary education. For example, students

with low effortful control may have difficulties in following goal-directed routines in their studies and persisting with learning tasks, and consequently they may need support with their self-regulation abilities in learning situations to achieve positive learning outcomes and build positive self-perceptions. In contrast, students with high negative affectivity could benefit from emotion regulation interventions and instruction on positive attribution styles because they may be more inclined to possess negative self-beliefs and to ruminate on past disappointments. It is important to realize that enabling positive learning experiences and developing self-regulatory skills are beneficial for all in terms of continuing education. Early actions matter in preventing the risk of ESL.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

This study was conducted in compliance with APA ethical standards. The procedures were in accordance with the principles of the Helsinki Declaration on research with human subjects. The research plan of the project was approved by the Human Sciences Ethics Committee of the University of Jyväskylä. Informed consent was obtained from all the participants of the study.

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