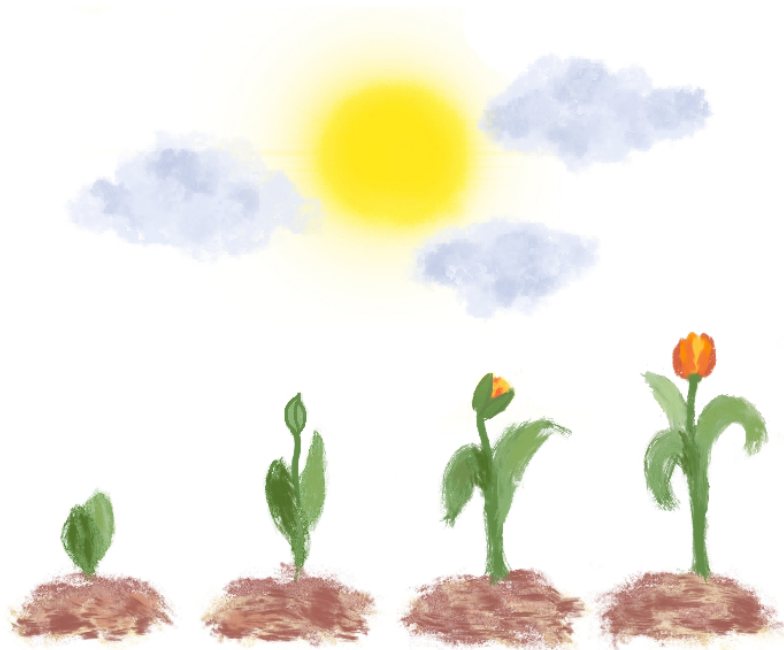


JYU DISSERTATIONS 785

Vilija Jaruseviciute

Children's and Adolescents' Adaptation During Educational Transitions

The Role of Temperament and Relationships
with Parents and Teachers



UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF EDUCATION AND
PSYCHOLOGY

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Esitetään Jyväskylän yliopiston kasvatustieteiden ja psykologian tiedekunnan suostumuksella
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ABSTRACT

Jaruseviciute, Vilija

Children's and Adolescents' Adaptation During Educational Transitions: The Role of Temperament and Relationships with Parents and Teachers

Jyväskylä: University of Jyväskylä, 2024, 75 p. + original articles

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The current dissertation examined the role of children's and adolescents' temperament (i.e., surgency, negative affectivity, and effortful control) and their relationships with parents and teachers on student adaptation during educational transitions. Study I ($n = 409$) focused on the transition from kindergarten to Grade 1, Study II ($n = 848$) focused on the transition from primary school to lower secondary school and Study III ($n = 901$) focused on the transition from lower secondary school to upper secondary education. The results of Study I revealed that the higher prosocial behavior Grade 1 children had the closer relationships they formed with their teachers, and the higher externalizing problems children had the more conflicts their parents and teachers perceived. In addition, children's temperamental surgency predicted relationships with teachers via lower prosocial behavior and higher externalizing problems. Study II showed that closeness with mothers and low conflicts with teachers promoted better adjustment before the transition, whereas closeness with teachers and low conflicts with mothers was beneficial across the transition. In addition, results uncovered two underlying mechanisms via which the quality of relationships with mothers and teachers act as a mediator and a moderator between temperament and adolescents' socioemotional functioning. Finally, Study III showed that although most adolescents were well-adjusted (65%) during the transition to upper secondary education, three smaller subgroups of adolescents were identified with different combinations of adjustment difficulties: moderate prosocial behavior and high externalizing problems across the transition (26%), decreasing prosocial behavior and increasing externalizing problems before the transition (7%), and decreasing prosocial behavior and increasing externalizing problems after the transition (2%). The dissertation revealed that students with different temperaments may adapt differently to educational transitions, thus support from parents and teachers is especially important. Higher temperamental effortful control and support from parents and teachers may facilitate students' adaptation during educational transitions. On the other hand, conflicts with parents and teachers, especially among students with higher temperamental negative affectivity, may result in difficulties in adapting.

Keywords: adaptation, educational transitions, temperament, parent-child relationship, teacher-child relationship

TIIVISTELMÄ (ABSTRACT IN FINNISH)

Jaruseviciute, Vilija

Lasten ja nuorten sopeutuminen koulutuksen siirtymävaiheissa: Temperamentin, vanhempien ja opettajien merkitys

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Tässä väitöskirjassa käsiteltiin lasten ja nuorten temperamentin sekä heidän vanhempiensa ja opettajiensa merkitystä koulu-sopeutumisessa kriittisissä koulu-siirtymävaiheissa. Osatutkimuksessa I ($n = 409$) tarkasteltiin siirtymää ensimmäiselle luokalle, osatutkimuksessa II ($n = 848$) siirtymää yläkouluun ja osatutkimuksessa III ($n = 901$) siirtymää toisen asteen koulutukseen. Osatutkimus I osoitti, että runsas prososiaalinen käyttäytyminen ensimmäisellä luokalla oli yhteydessä läheisempiin suhteisiin luokanopettajan kanssa, kun taas ulospäinsuuntautuvaa ongelmakäyttäytymistä osoittavilla lapsilla oli enemmän ristiriitoja vanhempien ja opettajien kanssa. Lisäksi lapsen temperamentti ennusti suhteita opettajiin lapsen käyttäytymisen kautta. Osatutkimuksen II tulokset osoittivat, että läheinen suhde äidin kanssa ja vähäiset ristiriidat opettajan kanssa edistivät parempaa sopeutumista ennen siirtymävaihetta. Toisaalta läheisyys opettajan kanssa ja vähäiset ristiriidat äidin kanssa tukivat nuorten sopeutumista koko siirtymävaiheen ajan. Tulokset tuottivat myös uutta tietoa siitä, kuinka nuoren äiti- ja opettajasuhteet toimivat välittävinä ja muuntavina tekijöinä nuoren temperamentin ja sosioemotionaalisen kehityksen välisissä yhteyksissä. Osatutkimuksen III tulokset osoittivat, että suurin osa nuorista sopeutui hyvin (64.9 %) toisen asteen koulutukseen. Lisäksi aineistosta löytyi kolme nuorten alaryhmää, joilla oli seuraavia sopeutumispulmia siirtymävaiheissa: (1) keskimääräinen prososiaalinen käyttäytyminen, sekä paljon ulospäin suuntautuvaa ongelmakäyttäytymistä (25.8 %), (2) vähenevä prososiaalinen käyttäytyminen, sekä ulospäin suuntautuvan ongelmakäyttäytymisen lisääntyminen ennen siirtymää (7.4 %) ja (3) prososiaalisen käyttäytymisen väheneminen, sekä ulospäin suuntautuvan ongelmakäyttäytymisen lisääntyminen siirtymän jälkeen (1.9 %). Väitöskirjan tulokset osoittivat, että temperamentiltaan erilaiset oppilaat voivat sopeutua eri tavoin koulutussiirtymiin, jolloin vanhempien ja opettajien tuki on erityisen tärkeää. Vahvempi tahdonalainen itsesäätely temperamenttipiirteinä, sekä läheiset suhteet vanhempien ja opettajien kanssa voivat sen sijaan ehkäistä sopeutumispulmia. Toisaalta ristiriidat vanhempien ja opettajien kanssa, sekä vahvempi negatiivinen affektiivisuus voivat johtaa sopeutumispulmiin.

Asiasanat: sopeutuminen, koulutussiirtymät, temperamentti, vanhempi-lapsi-suhde, opettaja-lapsi-suhde.

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1 INTRODUCTION

Even though most children and adolescents cope with educational transitions well, some may face adaptation difficulties (Eccles & Roeser, 2009). Educational transitions bring changes in academic demands, social networks, teaching approaches, and new rules to follow (Dockett & Perry, 2007). Each transition brings discontinuity in school belonging and can become challenging for some children and adolescents to cope with (Eccles & Roeser, 2009). In the current dissertation, three transitions were selected to cover all critical transitions that children and adolescents must face during compulsory education. First, the transition from kindergarten (one year before Grade 1) to primary school, which is the first educational transition that brings higher demands regarding self-regulatory abilities, the ability to work individually or in a group, and switch from play-like to academic work (Dockett & Perry, 2007). The second transition is from primary school to lower secondary school. This transition brings higher academic demands due to the changes from one class teacher to multiple subject teachers. This change also indicates an increase in subjects and busier schedules (Kiuru et al., 2016; Symonds, 2015). Finally, during the third transition from lower secondary school to upper secondary education, adolescents must face a decision regarding their future career prospects and choose an academic or vocational track (Eccles & Roeser, 2009; Vasalampi et al., 2010). Surprisingly, how children and adolescents adapt during these transitions is not that well investigated. Specifically, there is a lack of studies that would investigate both adaptive (i.e., prosocial behavior) and maladaptive (i.e., externalizing, and internalizing problems) functioning and their changes across these three transitions. Investigating the adaptation of students across different educational transitions may provide tools for promoting the successful beginning of a new educational level by minimizing the discontinuity of school belonging (Eccles & Roeser, 2009). Therefore, in the current dissertation, each of the three empirical studies focuses on a different educational transition and students' adaptation across the transition.

Because there is so little research investigating both adaptive and maladaptive functioning across school transitions, the current dissertation

focused on such adaptation indicators as prosocial behavior, externalizing, and internalizing problems. Prosocial behavior in the current dissertation was investigated as a part of adaptive functioning, whereas externalizing and internalizing problems were considered part of maladaptive functioning. Prosocial behavior is an intentional friendly behavior towards others, such as helping, sharing, or comforting (Eisenberg, 1982). In contrast, externalizing problems encompass antisocial behavior, such as impulsiveness, attention problems, aggression, hyperactivity, and conduct problems (Hinshaw, 1992; McMahan, 1994). Finally, internalizing problems are understood via depressive symptoms, social withdrawal, and negative emotional experiences (McMahon, 1994; Roeser et al., 1998). Investigating multiple indicators of adaptive and maladaptive functioning (i.e., prosocial behavior, externalizing, and internalizing problems) provides a better understanding of children's adaptation at school. Moreover, it is surprising that previous studies did not specifically concentrate on investigating these indicators across school transitions. The current dissertation aims to cover these limitations and, in addition, bring more knowledge about the individual patterns in adaptation across the transition from lower secondary school to upper secondary education by applying a person-oriented approach in one of the studies.

According to the bioecological approach (Bronfenbrenner & Morris, 2007), both individual and environmental factors play a crucial role in adaptation across transitions. Therefore, in the current dissertation individual characteristics (i.e., temperament) and interpersonal environments (i.e., relationships with parents and teachers) are investigated together to explain the underlying mechanisms that predict children's and adolescents' adaptation (i.e., prosocial behavior, externalizing problems, and internalizing problems) across three different educational transitions. In the current dissertation, temperament has been investigated as an individual factor that shapes the adaptation of children and adolescents across multiple educational transitions. The manifestation of different temperamental dimensions of surgency, negative affectivity, and effortful control may play a distinct role in shaping prosocial behavior, externalizing problems, and internalizing problems across the educational transitions (Deater-Deckard & Wang; 2012; Putnam, 2012; Rothbart et al., 2001; Rueda, 2012). Students with different temperamental characteristics may experience the transitions differently and may have distinct adaptation outcomes. However, research is scarce in investigating the role of three temperamental dimensions on prosocial behavior, externalizing, and internalizing problems across school transitions. In addition, the current dissertation is the first one to investigate the role of temperament on trajectories of prosocial behavior and externalizing problems across the transition to upper secondary education.

In addition to personal characteristics, the role of relationships with parents and teachers in the adaptation of children and adolescents was investigated. Support from parents and teachers is especially important during educational transitions (Waters et al., 2014; Vasalampi et al., 2018). The focus of the current dissertation was specifically on relationship closeness (i.e., warmth and trust)

and conflict (i.e., tension and negativity; Pianta, 1992; Pianta, 2001). Previous studies showed that close relationships with teachers and parents are related to higher prosocial behavior in children and adolescents (e.g., Nurmi et al., 2018; Padilla-Walker et al., 2016). In contrast, conflicts with parents and teachers are related to higher externalizing and internalizing problems (e.g., Klahr et al., 2011; Rudasill et al., 2010). However, none of the previous studies investigated the role of relationships with parents and teachers on the changes in socioemotional functioning across the transition from primary school to lower secondary school or on the trajectories of adjustment behaviors during the transition to upper secondary education. Investigating the role of relationship quality on changes and trajectories of adaptation is particularly important because it assists with identifying how close or conflicting relationships with parents and teachers relate to the development of student adaptation across transitions.

Both temperament and relationship quality with parents and teachers play a crucial role in the development of children's and adolescents' adaptation. In the current dissertation, not only direct effects but also mechanisms on how temperament and relationship quality interact to predict adaptation across educational transitions were investigated. Indirect and interaction effects uncover different underlying mechanisms on how temperament and relationships with parents and teachers predict student adaptation. A few studies investigated relationship quality as a mediator (Ezpeleta et al., 2019; Karreman et al., 2010; Rudasill et al., 2010) and another few as a moderator (Acar et al., 2020; Harvey et al., 2022; Karreman et al., 2010; Ramos et al., 2005) between temperament and adaptation. Research on such mechanisms is scarce and still little is known about whether temperament interacts with the quality of relationships to predict student adaptation (moderation) or temperament evokes the quality of relationships that in turn predicts student adaptation (mediation). To my knowledge, this dissertation includes studies that are the first ones to investigate the indirect effects of temperament and interaction effects between temperament and relationship quality on adaptation specifically across educational transitions. Increased understanding of different individual and environmental factors undermining and promoting successful educational transitions is especially important in promoting positive experiences at school because changes during transitions cause uncertainty and predict children's and adolescents' ability to adapt successfully (Kang et al., 2017).

To conclude, the current dissertation contributes to the previous research in the field of developmental and educational psychology by providing deeper knowledge on the importance of temperament and the quality of relationships in the adaptation of children and adolescents during multiple school transitions. The current dissertation suggests that teachers and parents should be aware of how sensitive educational transitions may be and how crucial their support is in promoting higher prosocial behaviors and preventing the occurrence of externalizing and internalizing problems.

1.1 Educational transitions

Most of their time since entering kindergarten, children and adolescents spend at school. Therefore, it is crucial to make sure that children and adolescents feel secure, have a sense of belonging, engage in successful interactions with others, and behave in an appropriate manner which helps them successfully engage in learning. However, the continuity of such experiences may be disrupted by educational transitions. From the time children enter kindergarten until they reach the final grade in upper secondary education, they face three major educational transitions: from kindergarten to primary school, from primary school to lower secondary school, and from lower secondary school to upper secondary education. Each of these transitions brings distinct challenges that children and adolescents must face. For example, changes in teachers, peers, classroom composition, and school buildings. In addition, each transition brings more responsibilities and higher academic demands (e.g., Dockett & Perry, 2007; Symonds, 2015). Previous evidence indicates some declines in motivation, academic achievement, and well-being, and an increase in behavior problems across educational transitions which can be detrimental to future learning (Eccles & Roeser, 2009; Eccles et al., 1993; Martínez et al., 2011). Therefore, investigating the mechanisms that may help children and adolescents cope and adapt to challenges brought about by educational transitions is especially important. However, to identify the challenges that each educational transition brings, we must investigate each of them individually.

1.1.1 Transition from kindergarten to primary school

The transition from kindergarten to primary school is the first major transition to the academic environment that children must face. Upon entering Grade 1, children are expected to follow certain rules and the teacher's directions as well as be able to persist in learning and have higher self-regulation abilities (Dockett & Perry, 2007; Kiuru et al., 2016; Merritt et al., 2012). For children to be ready for such school demands, they are expected to show appropriate levels in their executive functions, theory of mind, and delay of gratification (Caputi et al., 2012; McKinnon & Blair, 2018; Razza & Raymond, 2013). For example, first, children are expected to be able to work with other children in a group, which requires a higher level of theory of mind than in kindergarten. Children must show an ability to look from different perspectives, understand how others may feel, and be able to form and sustain social relationships (Caputi et al., 2012). Second, children are also expected to be able to work individually, concentrate their attention during the whole lesson, and work with lower adult supervision (Merritt et al., 2012), which requires executive functions, such as inhibitory control, working memory, and cognitive flexibility (Diamond, 2013). Finally, higher levels in both executive functions and delay of gratification become essential to learn certain rules about how to act in a classroom, what to do when

the bell rings, or how to contain oneself from shouting out the answers without a turn (Diamond, 2013; Dockett & Perry, 2007; Razza & Raymond, 2013).

In addition, when children move to primary school, teachers have more direct teaching approaches and instructions to follow, thus the academic demands on children increase (e.g., learning to read, write, count). Children switch from play-like activities to more academic tasks. In addition to changes in teaching approaches, teachers often change from kindergarten to primary school class teachers, thus causing a discontinuity of relationships between children and their teachers. During this transition, children often face changes in their teachers, classroom composition, and peers. Therefore, children also have higher social demands to adapt to primary school. Children are expected to build new relationships with other peers and be able to work with other classmates (Dockett & Perry, 2007; Kiuru et al., 2016; Merritt et al., 2012). These challenges and higher expectations may become difficult for some children to adapt to.

1.1.2 Transition from primary school to lower secondary school

Another major transition is when early adolescents move from primary school to lower secondary school. This transition may bring even more responsibilities for adolescents than the previous one (Hanewald, 2013; Palmu et al., 2017; Symonds, 2015). During primary school, children have one classroom teacher, yet when they switch to lower secondary school, their teacher switches to multiple subject teachers. This change also may lead to moving between classrooms and in some cases even buildings. Adolescents must adapt to different teaching styles and directions by different classroom teachers. Moreover, in primary school children spend most of their time with their classroom teacher. Thus, teachers know their students' needs well and can form closer relationships and offer a more supportive learning environment. When students switch to lower secondary school, they are assigned to one responsible subject teacher, who interacts with their students much less often. This discontinuity of relationship with teachers may interfere with students' sense of safety and support when they enter lower secondary school (Anderson et al., 2000; Hanewald, 2013; Symonds, 2015; Virtanen et al., 2020). Together with changes in teachers, adolescents may also face changes in their peers. Switching from primary to lower secondary school, some students may choose different institutions, which then leads to changes in classroom compositions. When children complete primary school, they also become the youngest students in the lower secondary school. This may force adolescents to renegotiate their position and peer status in the classroom and peer group (Anderson et al., 2000; Hanewald, 2013; Symonds, 2015; Virtanen et al., 2020). Nevertheless, when adolescents switch to lower secondary education, students choose or are assigned to new academic subjects, which increases academic demands, workload, and the busyness of the schedule. Adolescents are also expected to take more responsibility for their learning than in primary school. Their progress is being monitored more often and graded, which exposes them to constant assessment and comparisons with other peers. All these challenges brought by the transition from primary school to lower secondary school may

cause difficulties for some adolescents to successfully adjust (Symonds, 2015; Virtanen et al., 2020).

1.1.3 Transition from lower secondary school to upper secondary education

During the transition from lower secondary school to upper secondary education in most educational systems adolescents must choose whether they want to follow an academic or vocational track. Moving towards upper secondary education also indicates the end of high school and soon approaching work life. Therefore, the decision regarding the educational track may be especially challenging as it defines future career possibilities. The decision on an academic or vocational track largely depends on the academic achievement of adolescents. In many cases, upper general education requires students to have a high grade point average (GPA). Adolescents must therefore face challenges adjusting to high academic demands. In addition, the choice of educational track may change classroom composition even more than during the previous transitions when adolescents enter upper secondary education. Adolescents often need to shift to other and often bigger school buildings. There are fewer chances for adolescents to get to know their teachers and form relationships with them or acquire mentor-like relationships with them. Such change in peers and distance from teachers may be detrimental to adolescents' sense of belonging, motivation, and involvement in learning (Anderson et al., 2000; Eccles & Roeser, 2009; Vasalampi et al., 2010; Virtanen et al., 2022).

1.2 Adaptation during educational transitions

The stage-environment fit theory (Eccles & Roeser, 2009; Eccles et al., 1993) suggests that schools need to adjust according to the developmental needs of students. If the provided social context does not continue to motivate students, they may gradually disengage from school across the development. The theory posits that transition itself may not be the source of difficulties that students face. Rather these difficulties may occur due to the nature of the school and its inability to provide an environment that would be developmentally appropriate for students (Eccles & Roeser, 2009). Therefore, difficulties in adaptation during educational transitions may occur due to the classroom environment which does not comply with children's and adolescents' needs. These difficulties in adapting to educational transition may be identified by a lack of adaptive (i.e., low prosocial behavior) and higher maladaptive functioning (i.e., high externalizing and internalizing problems). Earlier studies have shown an overall decrease in externalizing and internalizing problems (Leve et al., 2005; Shi & Etekal, 2021) and an increase in prosocial behavior from childhood to adulthood (Eisenberg et al., 1983; Padilla-Walker et al., 2017). Children's executive functions develop gradually over time (Diamond, 2013), and so increases their ability to manage their behavior and emotions and adapt to school changes. However, during

adolescence, due to the pubertal and hormonal changes along with the immature prefrontal cortex, impulsivity and risk-taking activities become more apparent, and self-control declines (Leany, 2013; Ng-Knight et al., 2016). At this stage, youth may face challenges in successfully adapting to school changes, which may manifest as an increase in their externalizing problems (Petersen et al., 2015). Life changes, such as educational transitions or a transition to adolescence may interrupt the smooth development of student adaptation.

In the current dissertation, adaptation is understood via the adjustment behavior and socioemotional functioning of students (see FIGURE 1). Adjustment behaviors encompass observable behaviors such as prosocial behavior and a lack of externalizing problems (De Jong et al., 2018; Roorda et al., 2020; Nurmi et al., 2018). However, when internal experiences (i.e., internalizing problems) are investigated together with observable behaviors (i.e., prosocial behavior and externalizing problems), the term socioemotional functioning is used (Hirvonen et al., 2018).

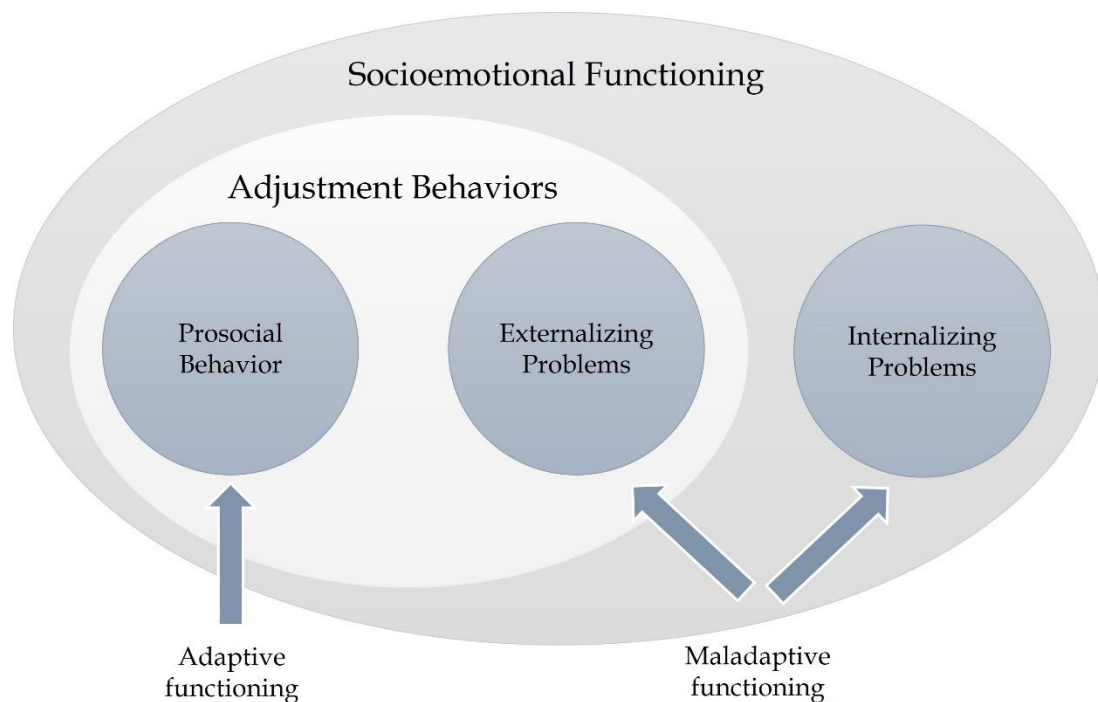


FIGURE 1 Theoretical conceptualization of adaptation constructs that were used in the dissertation.

Adjustment behaviors are understood as the outcomes of children’s and adolescents’ propensity to adjust their behavior to environmental changes (Kitayama et al., 2018). High prosocial behavior represents successful adjustment, whereas high externalizing problems represent difficulties in adjustment

behaviors across educational transitions (De Jong et al., 2018; Roorda et al., 2020; Nurmi et al., 2018).

Socioemotional functioning stems from a person's ability to interact with the closest environments (Denham et al., 2009; Hirvonen et al., 2018). When children and adolescents are able to comprehend their and others' emotions and interact with others in socially prescribed ways, they may exhibit adaptive socioemotional functioning, such as prosocial behavior. On the other hand, the inability to interact with others in socially appropriate ways or, for instance, social withdrawal may show maladaptive socioemotional functioning, which manifests via the externalizing and internalizing problems of students (Hirvonen et al., 2018).

1.2.1 Prosocial behavior

Prosocial behavior in the current dissertation represents an indicator of adaptive functioning across the educational transitions. Prosocial behavior is a socializing process manifested by intentional positive behavior for the benefit of others without any personal gain (Eisenberg, 1982; Rushton, 1982). Examples of such behavior may be helping others, sharing, comforting, or empathizing with others, and volunteering. Children and adolescents with high prosocial behavior are shown to demonstrate competence in interacting with others (Hirvonen et al., 2018). Higher prosocial behavior is associated with involvement in a broad variety of positive behaviors, which shows successful behavioral adaptation at school (Memmott-Elison et al., 2020). In addition, prosocial behavior is shown to be related to lower aggression, lower involvement in risky behaviors, and lower deviant peer affiliation (Carlo et al., 2014).

Different studies have shown competing results regarding changes in prosocial behavior across adolescence. Some studies showed a decline (e.g., Carlo et al., 2007), and others an increase in prosocial behavior (e.g., Padilla-Walker et al., 2017). However, all these studies focused on a broader range of ages. To better identify adaptation challenges across critical educational transitions, prosocial behavior (together with externalizing and internalizing problems) in the current dissertation was investigated in the context of three specific transitions. When facing educational transition, some adolescents might face stress that prevents them from concentrating on social relationships. Therefore, during this period of time a decrease in prosocial behavior may occur (Eccles & Roeser, 2009; Eccles et al., 1993).

1.2.2 Externalizing problems

Externalizing problems in the current dissertation represent one of the indicators of maladaptive functioning across the transitions (Hirvonen et al., 2018). Externalizing problems are conceptualized via the antisocial and disruptive behavior of children and adolescents (Hinshaw, 1992; McMahon, 1994). Such behavior may manifest via aggression, impulsivity, attention deficit problems, hyperactivity, and conduct problems (Hinshaw, 1992; McMahon, 1994;

Metsäpelto et al., 2015). Higher externalizing problems are associated with increased risky behaviors (Thompson et al., 2011), and lower academic achievement and motivation (Metsäpelto et al., 2017; Palmu et al., 2017; Weidman et al., 2015).

When facing educational transitions, children and adolescents may have difficulties facing new challenges, and acting out may become a way to cope. This may result in increases in externalizing problems across the transitions. Previous studies have shown that externalizing problems declined (Leve et al., 2005), whereas others showed that externalizing problems increased (Bos et al., 2018) across adolescence. However, research is still limited to focusing on specific educational transitions in identifying the changes of externalizing problems. Some studies found decreases in academic achievement (Benner, 2011; Benner et al., 2017), and school attendance (Benner and Wang, 2014) across the transition to upper secondary education. In addition, other studies found an increase in self-reported school problems (Martínez et al., 2011) during the transition to lower secondary school. Therefore, it is also expected to find increases in externalizing problems when facing challenges brought by educational transitions.

1.2.3 Internalizing problems

Internalizing problems represent another indicator of maladaptive socioemotional functioning (Hirvonen et al., 2018). Internalizing problems are understood as intensive negative emotional experiences (McMahon, 1994; Roeser et al., 1998). Such experiences may manifest as anxiety, depressive symptoms, or avoiding social interactions with others (McMahon, 1994; Roeser et al., 1998). In contrast to high externalizing problems, negative emotional experiences of adolescents with high internalizing problems are directed to themselves rather than others (i.e., high externalizing problems; Roeser et al., 1998). Therefore, adolescents with high internalizing problems may face difficulties in interacting with their peers and forming social relationships rather than acting out (Fanti & Henrich, 2010). These socializing difficulties may also result in lower academic achievement and motivation (Metsäpelto et al., 2017; Palmu et al., 2017; Weidman et al., 2015).

Previous studies have shown declines in achievement, well-being, and self-efficacy (Eccles & Roeser, 2011; Marušić et al., 2020) when facing transition to lower secondary school. When adolescents face uncertainty and stress while switching school levels, they might have a stronger sense of anxiety. The higher levels of anxiety and negative emotional experiences may indicate higher internalizing problems (McMahon, 1994; Roeser et al., 1998). Investigating educational transitions is therefore essential to find ways to prevent children and adolescents from experiencing increases in internalizing problems.

1.2.4 A person-oriented approach to adjustment behaviors

It is crucial to note that not all adolescents adjust to educational transitions the same way. Some may have more difficulties than others. The person-oriented approach is a tool to identify the heterogeneity in the developmental trajectories of adjustment behaviors and identify distinct groups of adolescents that require the most support due to the higher risk of adjustment difficulties (Laursen & Hoff, 2006; Lubke & Muthén, 2005; Tunkkari et al., 2022).

Because adolescents who are more prosocial may engage less in externalizing problems than their less prosocial peers (Memmott-Elison et al., 2020), investigating the combination of both adjustment behaviors may assist in drawing a broader picture of adolescents' adjustment across transitions. When adolescents have high prosocial behavior and low externalizing problems, they may show successful adjustment to the transition to upper secondary education. However, different adolescents may have different combinations of high or low adjustment behaviors. Therefore, it is important to find groups of adolescents who may or may not have adjustment difficulties. Previous studies are highly limited in examining the trajectories of both prosocial behaviors and externalizing problems together (Memmott-Elison et al., 2020). For this reason, one of the aims of this dissertation is to find distinct trajectories of adolescents in terms of their combined adjustment behaviors across the transition from lower secondary school to upper secondary education.

A handful of studies applied a person-oriented approach to adjustment behaviors. For instance, Shi et al. (2021) found four distinct trajectories in students' (grades 1 to 12) prosocial behavior: 11.9% had low and stable levels of prosocial behavior, 15.0% had high prosocial behavior which declined during later grades, 20.6% had moderate prosocial behavior which increased over time, and 52.5% had stable and high levels in prosocial behavior. In a cross-sectional study, Parviainen et al. (2020) focused on the beginning of upper secondary education and found four profiles of students who showed: internalizing symptoms (9.1%); externalizing symptoms (9.1%); comorbid symptoms (2.6%); or no symptoms (79.2%). Flynn et al. (2015) found that students in grades 4 to 12 showed either a low level (18.7%), a medium level (52.8%), or a high level of prosocial behavior (29.6%). Another study investigated trajectories of children's physical aggression and prosocial behavior and showed that most children (54.4%) had low-stable aggression and high-increasing prosocial behavior (Jambon et al., 2019). Two smaller groups had either high-declining aggression and moderate-increasing prosocial behavior (19.6%) or low-increasing aggression and moderate-stable prosocial behavior (19.3%). Finally, the smallest group (6.7%) had high-stable aggression and low-stable prosocial behavior (Jambon et al., 2019). Padilla-Walker et al. (2018) also investigated trajectories of both prosocial behavior and externalizing problems in terms of prosocial and problem behaviors of 12-, 15-, and 18-year-old adolescents. Results showed that most 12-year-olds (75%) were prosocial and had no problem behaviors, the second highest group (20%) had low levels of prosocial behavior, and moderate levels of aggression and delinquency, and the smallest group (5%) had low

prosocial behavior, moderate aggression, and high delinquency. In terms of 15-year-old adolescents, most were prosocial and had no problem behaviors (88%) and 12% of adolescents had low levels of prosocial behavior, moderate levels of aggression, and delinquency. Finally, in terms of 18-year-old adolescents, 61% were prosocial, and had no problem behaviors, 34% had low levels of prosocial behavior, moderate levels of aggression, and delinquency, and the smallest group (5%) had low prosocial behavior, high aggression, and moderate delinquency.

However, previous person-oriented studies are not without its limitations. First, none of these studies investigated adjustment behavior trajectories (i.e., prosocial behavior and externalizing problems) across the critical transition from lower secondary school to upper secondary education. Second, most studies used parent and teacher reports on adolescents' adjustment behaviors. Adolescents can well report about their adjustment behaviors, which brings another perspective and new insights into the development of adjustment behaviors across educational transitions. Finally, there were only a few attempts to investigate trajectories of both prosocial behavior and externalizing problems. Identifying more than one indicator of adjustment behavior can help uncover a broader picture of how well adolescents adjust to the changes brought about by educational transitions. Therefore, in the current dissertation, the trajectories of adolescents' perceived prosocial behavior and externalizing problems were investigated together across the transition from lower secondary school to upper secondary education.

1.3 Children's and adolescents' temperament and adaptation during educational transitions

An important individual factor that shapes children's and adolescents' adaptation during educational transitions is temperament. Children and adolescents differ from one another in terms of how they respond to environmental stimulation. Therefore, understanding the role of temperament is essential as it helps to identify individual differences in children's and adolescents' personalities that may predict the adaptation across transitions (Rothbart, 2007). Temperament is a set of personality traits that appears early in life and emerges in individual emotional and behavioral responses (Goldsmith et al., 1987; Shiner et al., 2012). Temperament is shaped by the complex interplay between biological and environmental factors (Shiner et al., 2012). It is seen as biologically rooted and relatively stable across life, yet environmental, and individual factors may also play a role in the manifestation of temperament (Putnam et al., 2001; Shiner et al., 2012). For example, maturation, socialization, and individual experiences can shape temperament (Putnam et al., 2001; Shiner et al., 2012). Temperament is shown to be a significant factor in predicting children's and adolescents' adaptation, and relationships with parents and

teachers (e.g., Bates et al., 2012; Deater-Deckard & Wang; 2012; Putnam, 2012; Rueda, 2012; Zentner, 2019). Previous studies, however, are limited in investigating the role of distinct temperamental dimensions in prosocial behavior and in externalizing as well as internalizing problems during educational transitions. In addition, none of the previous studies investigated the role of temperament in trajectories of adolescents' prosocial behavior and externalizing problems across the transition from lower secondary school to upper secondary education. Adaptation difficulties during transitions relate to lower achievement and motivation (e.g., Caprara et al., 2014; Metsäpelto et al., 2017; Palmu et al., 2017). Therefore, examining the associations between children's and adolescents' temperament and adaptation may help to identify children and adolescents who may be more susceptible to poor adaptation across educational transitions.

In the current dissertation, temperament is investigated as the basic dispositions of individual differences in the manifestation of activity, affectivity, attention, and self-regulation (Goldsmith et al., 1987; Rothbart et al., 2001; Shiner et al., 2012). Therefore, the focus of the current dissertation is on three major dimensions of temperament: surgency (extraversion), negative affectivity, and effortful control (Rothbart et al., 2001). These distinct dimensions play a unique part in children's and adolescents' adaptation across different educational transitions.

1.3.1 Surgency

Surgency/extraversion refers to the manifestation of positive emotionality, activeness, low shyness, and higher sensation-seeking tendencies (Rothbart et al., 2001; Rothbart, 2007). Previous studies showed that higher surgency predicted lower prosocial behaviors and internalizing problems, and higher externalizing problems (e.g., Harvey et al., 2022; Wang et al., 2016; Zentner, 2020). Children and adolescents with higher surgency are more outgoing, positive, and social (Rothbart et al., 2001; Rothbart, 2007), which could indicate that these children and adolescents would also be more prosocial and adapt well to the challenges that are brought about by educational transitions (Putnam, 2012). However, higher sensation-seeking tendencies may encourage children and adolescents to engage in risky behaviors that can develop into externalizing problems (Putnam, 2012; Tackett et al., 2012). In addition, high sensation-seeking might be viewed as unfavorable for new school demands and classroom expectations, thus children and adolescents are prevented from successfully adapting to educational transitions (Rothbart et al., 2001; Symonds, 2015). Nonetheless, the broader social circle that children and adolescents with higher surgency may create can decrease the chance of developing internalizing problems (Klein et al., 2012).

1.3.2 Negative affectivity

Negative affectivity refers to negative emotionality, discomfort, and challenges while dealing with negative feelings, and difficulty in recovering from negative experiences (Rothbart et al., 2001; Rothbart, 2007). A handful of previous studies

have found that higher negative affectivity predicted lower prosocial behavior and higher externalizing and internalizing problems (e.g., Lengua, 2006; Liew et al., 2019; Lunetti et al., 2022; Martin-Storey et al., 2017; Muris et al., 2007; Hirvonen et al., 2018; Zentner, 2020). Children and adolescents with higher negative affectivity may be more sensitive to negative environmental cues (Rothbart et al., 2001; Rothbart, 2007), which may bring difficulties in adapting to changes brought about by educational transition (Scrimin et al., 2019; Zentner, 2020). When children and adolescents with high negative affectivity face challenges brought about by educational transitions, they may experience increased fearfulness and difficulty to interact with others, which can predict lower prosocial behavior and higher internalizing problems (Deater-Deckard & Wang, 2012; Klein et al., 2012; Liew et al., 2019). In addition, Rende and Plomin (1992) found that experiencing stress at the beginning of primary school was more detrimental for children who had higher negative emotionality, which in turn predicted higher externalizing problems.

1.3.3 Effortful control

Effortful control defines the self-regulatory dimension of temperament (Rothbart et al., 2001). Children and adolescents who have higher effortful control can focus their attention, and successfully direct and control their behavior as well as emotions (Rothbart et al., 2001; Rothbart, 2007). These qualities may assist children and adolescents in adapting to changes and higher demands related to educational transitions (Rothbart et al., 2001; Symonds, 2015). Previous studies showed that higher effortful control is associated with higher prosocial behavior and lower externalizing, and internalizing problems (Lengua, 2006; Liew et al., 2019; Luengo Kanacri et al., 2013; Lunetti et al., 2022; Muris et al., 2007; Wang et al., 2016; Zentner, 2020). When children and adolescents have higher effortful control, the ability to regulate their behavior and emotions may become beneficial for better adaptation and socialization across educational transitions, which may relate to higher prosocial behavior and lower internalizing problems. However, when children and adolescents have low effortful control, the inability to manage behavior may manifest via externalizing problems, especially when facing educational transitions (Rothbart et al., 2001; Symonds, 2015).

1.4 Quality of relationships with parents and teachers and adaptation during educational transitions

Based on the bioecological approach (Bronfenbrenner, 1979), the current dissertation suggests that the successful adaptation of children and adolescents during educational transitions is shaped by their interaction with the closest environments, such as home and school. The attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1982) emphasizes the importance of significant attachment figures for the successful development of children. When children are

born, they form attachment relationships with their parents. As primary caregivers are the first attachment figures that remain generally stable in children's lives, the relationship between children and their parents is especially important. Mental representations of such relationships and attachment figures at home are later brought into interpreting other relationships and identifying their reliability and trustworthiness (Bowlby, 1982; Hamre & Pianta, 2001; Wentzel, 2009).

Representations of relationships with parents are further brought to such contexts as school (Ainsworth & Bowlby, 1991; Bowlby, 1982). Therefore, the experiences of primary attachments are brought to the school context where teachers become other significant attachment figures that shape the development of children (Bowlby, 1982; Hamre & Pianta, 2001). Depending on the primary experiences, children expect their interactions with teachers to be based on trust and warmth or rejection and disagreements (Hamre & Pianta, 2001; Wentzel, 2009). As children spend a significant amount of time at school, teachers may become important adults in shaping the development of children. However, relationships with teachers are more often interrupted, whereas relationships with parents are more consistent. The significant difference between relationships with parents and teachers across transitions is continuity (Virtanen et al., 2022). The relationships with teachers are often renegotiated due to the changes in classroom composition when children and adolescents switch to another school level. However, relationships with parents usually remain uninterrupted.

When children grow older, they become more independent from adults, but support from parents and teachers remains crucial across educational transitions (Symonds, 2015). Therefore, relationships with both parents and teachers play a significant role in children's adaptation to school as well as later educational transitions (Symonds, 2015). However, previous research is limited in investigating the role of relationships with both parents and teachers on the adaptation of children and adolescents across different school transitions. Therefore, in the current dissertation, relationships with parents and teachers in terms of closeness and conflict were investigated (Pianta, 1992; Pianta, 2001). Relationships with parents and teachers play a significant role in students' social, self-regulation, and task-oriented skills, which creates the basis for successful student adaptation (Pianta, 1997). Investigating the quality of relationships is especially important as it forms a sense of safe school and home environment for students. High closeness and low conflict at home and school may provide students with a sense of care and belonging which is crucial for successful adaptation to educational transitions (Grolnick et al., 2009; Hamre & Pianta, 2001). Closeness is understood as warm and trustworthy relationships with parents and teachers. In contrast, conflict refers to tension and disagreements between children or adolescents and their parents and teachers (Pianta, 2001).

1.4.1 Socialization effects of relationships with parents and teachers on adaptation

The sense of support and closeness with parents and teachers are important characteristics of the home and school context that foster children's and adolescents' successful development (Bowlby, 1982; Eccles & Roeser, 2009; Hamre & Pianta, 2001). If teachers feel close and care about their students, they may provide a safer environment and intellectual stimulation that encourage students to engage and persist in learning and have a stronger sense of school well-being (Eccles & Roeser, 2009; Wentzel, 2009). A similar pattern may apply to the relationships with parents. If parents care about their children's learning and approach them with closeness, trust, and emotional support, their children may feel more valued, connected, and motivated, which in turn can help them to adapt to challenges brought by educational transitions (Grolnick et al., 2009). In addition, when children and adolescents perceive warm and supportive relationships with their parents and teachers, they may experience a sense of belongingness in both school and home contexts that promotes successful adaptation during educational transitions (Ryan & Deci, 2000). On the other hand, tension between children or adolescents and their parents and teachers may become detrimental in adapting to educational transitions (Branje, 2018; Allison, 2000). Conflicts can be viewed as part of the natural development of autonomy, which increases in adolescence. However, poorly handled conflicts may become detrimental to children's and adolescents' adaptation across transitions (Branje, 2018; Branje et al., 2009). Therefore, the current dissertation focuses on the role of relationships with parents and teachers on children's and adolescents' adaptation across three distinct educational transitions.

Relationship quality with parents and teachers has been shown to predict the adaptation of children and adolescents. Previous studies found that close or affectionate relationships with parents and teachers promoted prosocial behavior (Carlo et al., 2010; Ferreira et al., 2016; Kiuru et al., 2016; Luengo Kanacri et al., 2020; Nurmi et al., 2018; Obsuth et al., 2017; Padilla-Walker et al., 2016; Padilla-Walker et al., 2017; Pakarinen et al., 2020; Zarra-Nezhad et al., 2014), whereas conflicts predicted externalizing and internalizing problems of children and adolescents (Allison, 2000; Klahr et al., 2011; Leve et al., 2005; Martin-Storey et al., 2017; Pakarinen et al., 2018; Piquart, 2017; Roorda & Koomen, 2021; Silver et al., 2010; Skalická et al., 2015). However, children and adolescents with different patterns of adaptation may be differently susceptible to the quality of relationships with parents and teachers. For example, Jambon et al. (2019) investigated trajectories of prosocial behavior and aggression in children ages 3 to 6. The study has shown that when mothers showed positive parenting, children had either low-stable aggression and high-increasing prosocial behavior (54.4%) or low-increasing aggression and moderate-stable prosocial behavior (19.3%). In addition, Shi et al. (2021) found that closeness and low conflicts with teachers predicted the trajectory of high and stable prosocial behavior (52.5%) of children and adolescents from Grade 1 to 12. Another study showed that when children and adolescents from Grades 1 to 12 had high conflicts with their

teachers they followed a pure-externalizing trajectory (18.6%), whereas children and adolescents with fewer conflicts followed a low-risk trajectory with fewer externalizing problems (22.8%; Shi et al., 2020).

Even though many previous studies investigated the role of relationship quality with parents and teachers for the adaptation of children and adolescents, there are a few limitations that the current dissertation aimed to uncover. First, there is still little evidence on the role of relationships with parents and teachers on adaptation across educational transitions (from kindergarten to primary school, from primary school to lower secondary school, and from lower secondary school to upper secondary education). Second, there is a lack of research that investigates to what extent relationships with parents and teachers predict the change in adaptation across transitions (i.e., from primary school to lower secondary school). Finally, none of the previous studies focused on the role of quality of relationships with parents and teachers in combined prosocial behavior and externalizing problems across educational transitions (specifically from lower secondary school to upper secondary education).

1.4.2 Evocative effects of children's adaptation on quality of relationships with parents and teachers

Quality of relationships with parents and teachers may act not only as an antecedent of adaptation but also as an outcome. Some teachers and parents may react to some children more positively than to others. For example, teachers and parents can feel closer and approach with positive attitudes those children who act in behaviorally appropriate ways and are friendly. On the other hand, if children act out or are disruptive, teachers and parents may react to such children by showing discontent and rejection (Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983; Wentzel, 2009). The evocative effect can be understood as a response by teachers and parents to children's characteristics, such as adjustment behaviors (FIGURE 2; Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983). Concerning the current dissertation, parents and teachers may accommodate their expression of close or conflicting relationships to the manifestation of children's behavior. Previous studies found that prosocial behavior predicted closeness with parents and teachers (Coulombe & Yates, 2018; Newton et al., 2014; Nurmi et al., 2018). On the other hand, externalizing problems predicted conflicts with teachers (Mejia & Hoglund, 2016; Skalická et al., 2015) and negative affective responses from mothers (Silinskas et al., 2015). Therefore, there is some previous evidence on the evocative effects of the quality of relationships with parents and teachers on children's adaptation.

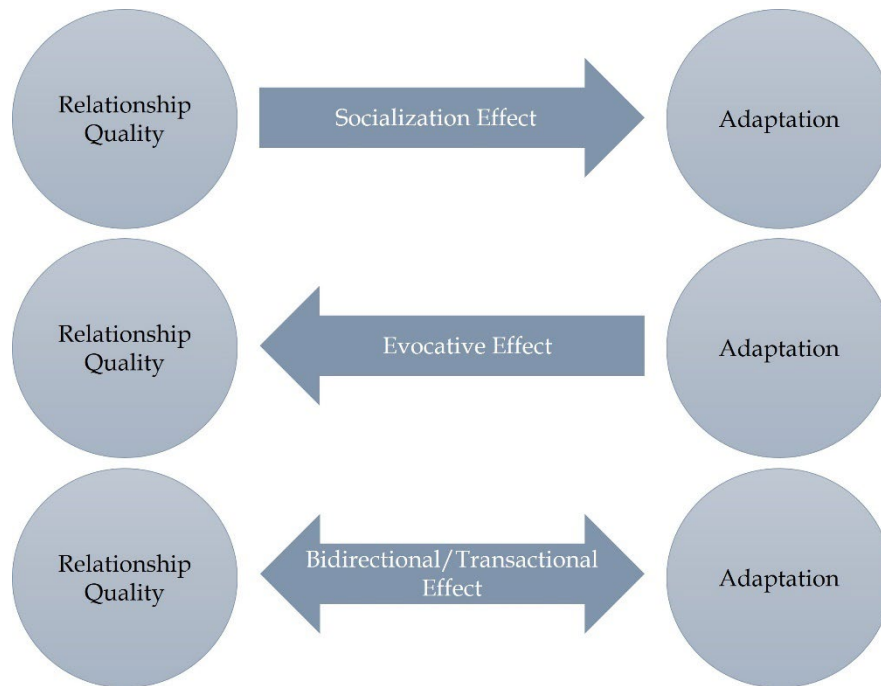


FIGURE 2 Associations between quality of relationships and adaptation.

The transactional model (FIGURE 2; Sameroff & Mackenzie, 2003) states that children’s characteristics have reciprocal associations with their social contexts. According to the theory, relationship quality predicts children’s adaptation to educational transitions, but the manifestation of children’s adaptive behaviors also predicts the relationship quality with their parents and teachers. The teacher’s positive affect (Nurmi et al., 2018), parental sensitivity (Newton et al., 2014), and a close teacher–student relationship (Wu & Zhang, 2022) have been previously reciprocally associated with children’s and adolescents’ prosocial behavior. In addition, conflicts with teachers (Skalicka et al., 2015) and mothers (Georgiou & Fanti, 2014) were reciprocally associated with children’s externalizing problems. Despite the evidence on reciprocal associations between relationship quality with parents and teachers and children’s adjustment behaviors, none of these studies focused on these dynamics across the transition from kindergarten to primary school.

1.5 Mechanisms by which temperament and quality of relationships predict student adaptation

Children’s and adolescents’ adaptation should be interpreted in the context of individual factors and environmental systems (Bronfenbrenner, 1979). Therefore, temperament and relationships with parents and teachers are investigated together in predicting children’s and adolescents’ adaptation across three distinct

educational transitions. In the current dissertation, the aim was to investigate two different mechanisms of how temperament interacts with the quality of relationships with teachers and parents to predict the adaptation of children and adolescents. First, the quality of relationships with parents and teachers was investigated as a mediator in the association between temperament and children's and adolescents' adaptation. Second, the quality of relationships with parents and teachers was investigated as a moderator in the association between temperament and children's and adolescents' adaptation.

1.5.1 Quality of relationships as a mediator

One of the mechanisms that was investigated in the current dissertation is the indirect effect of temperament on adaptation via relationship quality. This mechanism indicates that the manifestation of children's and adolescents' temperament evokes close or conflicting relationships with parents and teachers, which predicts the way children and adolescents adapt to educational transitions (FIGURE 3; Rutter, 1997; Scarr & McCartney, 1983).

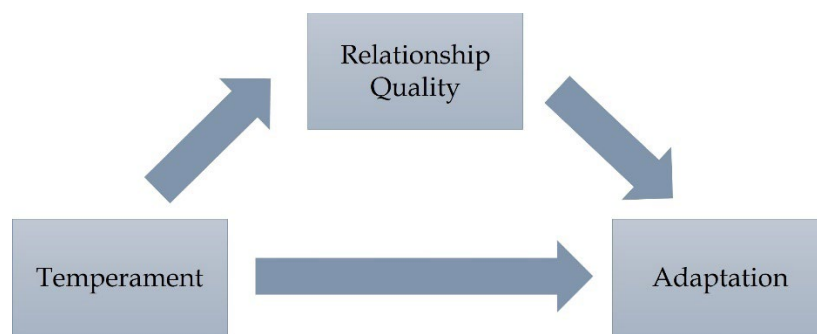


FIGURE 3 Relationship quality as a mediator.

For instance, even though adolescents with higher surgency are shown to have positive emotionality and are outgoing, they may also show higher sensation-seeking tendencies, which may encourage them to engage in risky activities. These activities may predict negative reactions from parents and teachers which can evolve into conflicts. In turn, conflicts with parents and teachers may encourage adolescents to resist and engage in more externalizing problems (Bates et al., 2012; Putnam, 2012). Moreover, higher negative affectivity increases the inability to cope with negative experiences and frustration, which can lead to higher tension between children or adolescents and their parents and teachers. The tension can evolve into conflicts and in turn increase the risk of higher externalizing and internalizing problems (Bates et al., 2012; Deater-Deckard & Wang, 2012). Finally, higher effortful control may allow children and adolescents to better focus their attention, and control their behavior and emotions, which are favorable characteristics for parents and teachers. Therefore, children and adolescents with high effortful control may form closer relationships with

parents and may become more prosocial (Bates et al., 2012; Rueda, 2012). Temperament is an important characteristic in developing social skills and forming relationships with others (Liew et al., 2019; Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983). Therefore, children and adolescents with higher effortful control may form closer relationships with parents and teachers and adapt better to educational transitions than those with higher negative affectivity and surgency (e.g., Hernandez et al., 2017; Liew et al., 2019). Educational transitions can be challenging periods of time for some children and adolescents. Therefore, parents and teachers should be aware of how they react to the manifestation of children's and adolescents' temperament to form closer relationships, avoid conflicts, and in turn, promote their adaptation to educational transitions.

Surprisingly, little research has been done to investigate the indirect effects of temperament on adaptation via the quality of relationships with parents and teachers (e.g., Ezpeleta et al., 2019; Rudasill et al., 2010). For example, Karreman et al. (2010) investigated parenting as a mediator between preschool children's temperament and their problem behavior. However, significant associations were not found. Another study showed that when 3-year-old children had low effortful control, their parents applied less positive parenting practices when children were 6 years old, thus children had higher affective problems when they were 7 years old (Ezpeleta et al., 2019). Finally, Rudasill et al. (2010) found that 4.5-year-old children with a temperament that manifested via higher activity, aggression, approach tendencies, and lower inhibitory control, had higher conflicts with their teachers in grades 4, 5, and 6, and in turn, engaged in more risky behaviors in Grade 6. However, none of these studies investigated the indirect effects of temperament on adaptation via relationship quality specifically across educational transitions. In addition, previous studies investigated parenting as a mediator, however, none investigated parent-child relationships. Finally, most of the outcomes that these studies were focusing on were externalizing problems. In the current dissertation, the focus was on the indirect effects of temperament on also prosocial behavior and internalizing problems.

1.5.2 Quality of relationships as a moderator

Another mechanism that was investigated in the current dissertation is the interaction of temperament and relationship quality in predicting children's and adolescents' adaptation. According to the diathesis-stress theory (Belsky & Pluess, 2009; Jolicoeur-Martineau, 2020), some children and adolescents may be more susceptible to challenges during educational transitions or the quality of relationships than others. Therefore, different manifestations of temperament may predict adolescents' adaptation across educational transitions depending on the quality of relationships with parents and teachers (see FIGURE 4).

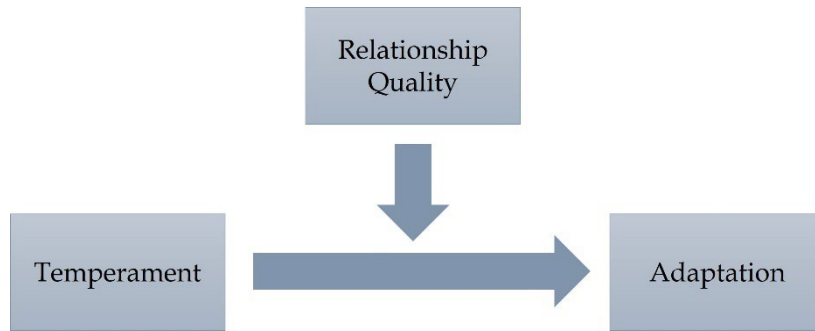


FIGURE 4 Relationship quality as a moderator.

For instance, adolescents' higher surgency, as manifested in higher sensation-seeking tendencies, may increase externalizing problems when they experience tension and conflicts with their parents and teachers (e.g., Acar et al., 2020; Tackett et al., 2012). Moreover, adolescents' higher negative affectivity, shown in a lower ability to cope with negative experiences brought about by educational transitions, may predict more externalizing and internalizing problems if they experience low support and conflicts from their parents and teachers (e.g., Deater-Deckard & Wang, 2012; Harvey et al., 2022; Klein et al., 2012;). Finally, adolescents' higher effortful control, as shown in a higher ability to control their behavior and emotions, may promote higher prosocial behaviors when they form closer relationships with their parents and teachers (e.g., Bates et al., 2012; Rueda, 2012).

Previous studies provide some evidence of relationship quality as a moderator between temperament and children's adaptation. For example, one study showed that close relationships with teachers promoted shy children's social competence (Acar et al., 2020). In addition, the same study found that conflicts with teachers strengthened less shy children's antisocial behavior. Harvey et al. (2022) showed that elementary school children with low surgency had fewer internalizing problems when they had close relationships with their teachers. Moreover, children with high negative affectivity had more internalizing problems when they had conflicting relationships with their teachers (Harvey et al., 2022). Another study showed that impulsive children had fewer externalizing problems when their fathers showed positive control (Karreman et al., 2010). Finally, elementary school children with higher negative affectivity engaged in externalizing behaviors when they experienced family conflicts (Ramos et al., 2005). Despite previous evidence on the quality of relationships as a moderator between temperament and children's adaptation, none of these studies investigated adolescents or these associations during educational transitions.

1.6 Aims of the empirical articles

The current dissertation consists of three articles that aim to investigate the role of temperament and relationships with parents and teachers on children's and adolescents' adaptation across different educational transitions. The objectives of the dissertation were to investigate: (1) student adaptation during educational transitions; (2) the role of student temperament on their adaptation during educational transitions; (3) the role of relationships with parents and teachers on student adaptation during educational transitions. Each of the three studies focused on different educational transitions: from kindergarten to primary school (Study I), from primary school to lower secondary school (Study II), and from lower secondary school to upper secondary education (Study III).

Study I focused on the bidirectional effects of the quality of teacher-child and parent-child relationships and child adjustment behaviors (i.e., prosocial behavior and externalizing problems) during Grade 1. In addition, the direct and indirect effects of children's temperament in these dynamics were investigated.

Study II focused on the role of adolescents' temperament and their relationships with mothers and teachers on the level of and change in socioemotional functioning (i.e., prosocial behavior, externalizing problems, and internalizing problems) across the transition from primary to lower secondary school. In addition, the study aimed to investigate the mediating and moderating role of relationship quality between adolescents' temperament and their socioemotional functioning across the transition to lower secondary school.

Study III applied a person-oriented approach to investigate the developmental trajectories of adolescents' adjustment behaviors (i.e., prosocial behavior and externalizing problems) during the transition from lower secondary school to upper secondary education. In addition, the role of adolescents' temperament and relationships with parents and teachers on distinct trajectories of adolescents' adjustment behaviors were investigated.

In all three studies, the effects of children's and adolescents' gender, academic achievement, and parental education were controlled for. Previous studies have shown that boys have more conflicts and more externalizing problems than girls do (Baker, 2006; Hamre & Pianta, 2001; Mattison et al., 2018; Rudasill et al., 2010). In addition, studies showed that the academic achievement of children and adolescents is linked to relationships with parents and teachers and their adaptation (Coulombe & Yates, 2018; Lippard et al., 2018; Metsäpelto et al., 2015; Pianta et al., 1997). Other studies have also shown that socioeconomic status (SES) is associated with relationship quality and adaptation of children and adolescents (Mattison et al., 2018; Pakarinen et al., 2018), thus parental education was also included as a control variable.

2 METHOD

2.1 Participants and procedure

The current dissertation is based on two longitudinal studies. *Study I* was a part of the longitudinal data collection in “Get involved! Transition to grade 1” (Silinskas & Raiziene, 2017–2018) and followed Lithuanian children, their parents, and teachers once in kindergarten and twice in Grade 1. The participants were selected from six Lithuanian-speaking schools. Consent was collected from the parents regarding their own and their children’s participation. The study protocol was approved by the Ethical Committee of the University of Jyväskylä (3 May 2017). *Studies II* and *III* were part of a longitudinal STAIRWAY study (Kiuru & Ahonen, 2014–2019), which followed Finnish adolescents two times in Grades 6 and 7, and then two times in Grade 9 and Grade 1 of upper secondary education. Participants were selected from 30 schools in Central Finland. The procedures followed the principles of the Helsinki Declaration on research with human subjects. Participants signed the written consent to participate in the study. The study was approved by the Human Sciences Ethics Committee of the University of Jyväskylä (12 February 2014).

Study I: Psychologists were trained to test children’s academic skills (229 in kindergarten [T0], 337 in Grade 1 fall [T1], 341 in Grade 1 spring [T2]; 53.8% girls and 46.2% boys). The mean age of the children at the end of kindergarten was 6.83 years ($SD = 0.30$). Parents (245 in kindergarten, 347 in Grade 1 fall, 323 in Grade 1 spring) answered about children’s temperament in kindergarten and their relationships with children in Grade 1. Primary school teachers (24 in Grade 1 fall, 25 in Grade 1 spring) answered about children’s prosocial behavior and externalizing problems, and about their relationships with children in Grade 1. Most children lived with both parents (80.4%), 10.6% lived with their mother, and 4.2% lived with their mother and stepfather. Most of the parents had a university degree (63% of mothers; 52.5% of fathers) or graduated from college or

polytechnic school (18.8% of mothers; 26.9% of fathers) and 12.1% of mothers and 15.3% of fathers had finished 12 or fewer grades.

Study II: Adolescents (835 in Grade 6 fall [T1], 826 in Grade 6 spring [T2], 800 in Grade 7 fall [T3], and 772 in Grade 7 spring [T4]; 53.9% girls and 46.1% boys) filled in questionnaires about their prosocial behavior, externalizing and internalizing problems two times in Grade 6 and two times in Grade 7. In addition, they answered about their temperament once in Grade 6. The mean age of adolescents in Grade 6 fall was 12.32 years ($SD = 0.36$). Mothers ($n = 631$) and teachers ($n = 56$) answered questionnaires about their relationship closeness and conflict with adolescents once in Grade 6. Most of the adolescents were living with both parents (74.4%) or alternately with their mother and their father (11.7%), 7.3% lived with their mother, 4.2% lived with their mother and stepfather, 0.8% lived with their father, 0.8% lived with their father and stepmother, and 0.7% lived with foster parents or someone else.

Study III: Adolescents (884 in Grade 9 fall [T1], 885 in Grade 9 spring [T2], 728 in Grade 1 of upper secondary education fall [T3], 684 in Grade 1 of upper secondary education spring [T4]; 55.9% girls and 44.1% boys) answered about their prosocial behavior and externalizing problems two times in Grade 9 and two times in Grade 1 of upper secondary education. In addition, adolescents answered about their relationship closeness and conflict with parents and teachers and their temperament once in Grade 9. The mean age of adolescents in Grade 9 fall was 15.3 years ($SD = 0.37$). Parents ($n = 626$) and teachers ($n = 295$) filled in questionnaires about their relationships with adolescents once in Grade 9. Most of the adolescents lived with both parents (69.0%) or alternately with their mother and father (10.6%), 8.8% lived with their mother, 7.0% lived with their mother and stepfather, 1.9% lived with their father, and 1.0% lived with their father and stepmother.

2.2 Education systems

In Lithuania, kindergarten education, or one year before primary school (Grade 1) became compulsory in 2016. Primary education consists of Grades 1 to 4. When children turn approximately 7 years old, that calendar year they may enter Grade 1 (LR Ministry of Education, Science, and Sports, 2023). Kindergarten education is a preparatory time for primary school, which is also intended to integrate children with different languages and from different socioeconomic backgrounds (Silinskas et al., 2023). Children practice how to react to other people's emotions, show capabilities to concentrate attention, or work with other children, and recognize why it is important to control anger towards others (LR Ministry of Education, Science, and Sports, 2023). During kindergarten children develop these competencies to prepare for Grade 1, when self-regulatory requirements become higher. In addition, children's kindergarten teachers change to class teachers when they enter Grade 1.

The Finnish educational system consists of one compulsory year of kindergarten and nine compulsory years of education including comprehensive school (primary school from Grade 1 to Grade 6 and lower secondary school from Grade 7 to Grade 9). Therefore, in Finland, the transition from primary to lower secondary education means a transition from Grade 6 to Grade 7. At the end of lower secondary school, in Grade 9, adolescents must choose an upper secondary general or vocational education track. In addition, adolescents may choose to attend one year of preparatory education (Grade 10; TUVVA education; in Finnish: *tutkintokoulutukseen valmistava koulutus*) to have additional support for their learning and have a chance to think about their future careers. In Study III adolescents from both academic and vocational tracks were included. The later choice marks the transition from lower secondary school to upper secondary education (see Figure 5; Finnish National Agency for Education, 2014; Ministry of Education and Culture, 2023).

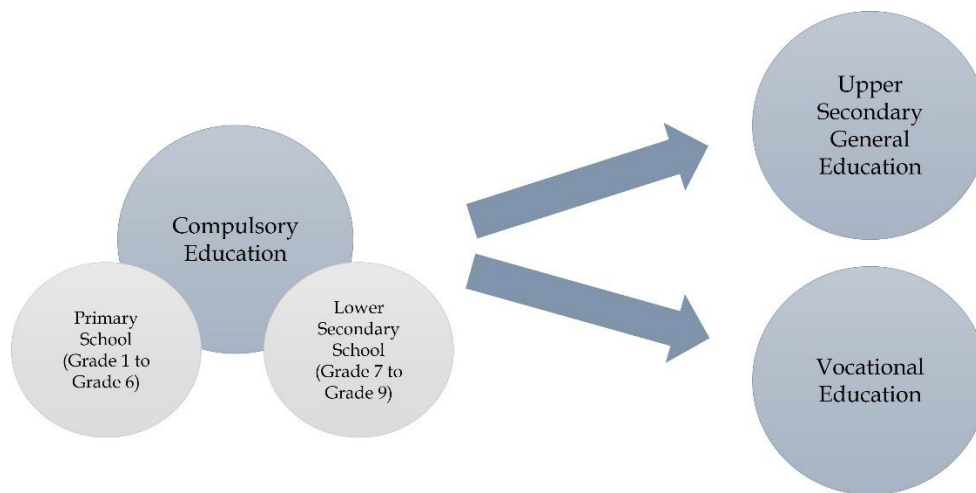


FIGURE 5 Educational system in Finland. Transition from lower secondary school to upper secondary education.

In both Lithuania and Finland, kindergarten is compulsory, and Grade 1 starts in the same calendar year that children turn 7 years old. Therefore, the transition from kindergarten to Grade 1 takes place at the same time in the two countries. However, the other two transitions do not match. Primary school in Lithuania takes place from Grade 1 to Grade 4, whereas in Finland it occurs from Grade 1 to Grade 6. This means that in Lithuania the transition from primary to lower secondary school takes place in Grade 4 and Grade 5, whereas in Finland it occurs in Grade 6 and Grade 7. In addition, lower secondary school in Lithuania extends from Grade 5 to Grade 10, whereas in Finland it is from Grade 7 to Grade 9. As a result, in Lithuania, the transition from lower to upper secondary education takes place in Grade 10 and Grade 11, whereas in Finland that transition happens in Grade 9 and Grade 1 of upper secondary education.

2.3 Measures

The measures, their reliabilities, and analysis methods are presented in Table 1. Data analyses were performed using Mplus Version 8.6 (Muthén & Muthén, 1998–2017) with full information maximum likelihood estimation (FIML) and robust standard errors (MLR). All the available data was included in analyses and missing data were assumed to be missing at random (MAR). More information about each instrument can be found in the original studies.

2.3.1 Adaptation

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used in all three studies to identify children's and adolescents' adaptation. In Study I, teacher reports were used two times in Grade 1, whereas, in Study II and III, adolescents answered about their adaptation at each of the four time points. Participants answered about their prosocial behavior, externalizing problems, and internalizing problems by rating each question on a 3-point Likert scale (from 1 = *not true* to 3 = *certainly true*). Externalizing problems were measured using the mean of hyperactivity and conduct problems scale items. Internalizing problems were measured by the emotional symptoms scale.

2.3.2 Temperament

In Study I, parents reported on children's temperament in kindergarten by answering the Children's Behavior Questionnaire-Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006; Rothbart et al., 2001) on a 7-point Likert scale (1 = *does not fit at all*, 7 = *fits very well*). In Study II and III, adolescents answered about their temperament in Grade 6 and Grade 9, respectively, by filling in the Early Adolescent Temperament Questionnaire-Revised EATQ-R (Capaldi & Rothbart, 1992; Ellis, 2002; Ellis & Rothbart, 2001) on 5-point Likert scale (1 = *almost never true*; 5 = *almost always true*). Both questionnaires included scales for surgency/extraversion, negative affectivity, and effortful control.

2.3.3 Relationships with parents

In all the studies parents reported about their relationship closeness and conflict with their children specifically in Grade 1, Grade 6, and Grade 9 using the short form of the Child-Parent Relationship Scale (CPRS; Driscoll & Pianta, 2011; Pianta, 1992). In addition to parent reports, in Study III adolescents also answered about their relationships with their fathers and mothers separately in Grade 9. Participants rated how close or conflicting relationships between parents and their children were on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree*).

2.3.4 Relationships with teachers

In all the studies teachers reported their relationship closeness and conflict with their students specifically in Grade 1, Grade 6, and Grade 9 using the short form of the Student-Teacher Relationship Scale (STRS; Pianta, 1992; Pianta, 2001). In addition to teacher reports, in Study III adolescents also answered about relationships with their teachers in Grade 9. Participants rated how close or conflicting relationships between teachers and their students were on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree*).

2.3.5 Control variables

Achievement: In Study I, the early literacy skills of kindergarten children were measured by averaging z scores of vocabulary (PPVT-R, Form L; Dunn & Dunn, 1981), phonological awareness, letter knowledge, reading, and spelling tasks (Gedutienė, 2008; Lerkkanen et al., 2006; Lerkkanen et al., 2006–2016). In Studies II and III, the grade point average (GPA) of adolescents was used.

Gender: Student gender in all studies was coded as 1 for girls and 2 for boys.

Parent education: The highest education in the family in Study I was measured on a scale from 1 to 5 (1 = *have finished 0–8 years*; 2 = *9–10 years*; 3 = *11–12 years*; 4 = *college or polytechnics*; 5 = *university*). Both father and mother education separately were used on a scale from 1 to 7 in Studies II and III (1 = *no vocational training*; 2 = *employment or vocational training courses*; 3 = *vocational training*; 4 = *college-level education*, 5 = *university of applied sciences*, 6 = *university or college*, 7 = *university postgraduate degree*).

TABLE 1 Participants, measures, and analyses used in the original studies.

| Study | Participants | Measures | Time points | Subscales | α | Analyses |
|--|--|---|----------------------|----------------------|--------------------|---|
| Study I | 409 children 403 parents | Child-parent relationship scale | T1, T2 | Closeness | .71, .73 | Cross-lagged model, mediation |
| | | | | Conflict | .80, .85 | |
| | Children's behavior questionnaire | T0 | Surgency | .75 | | |
| | | | Negative affectivity | .70 | | |
| | | | Effortful control | .75 | | |
| | 25 teachers | Student-teacher relationship scale | T1, T2 | Closeness | .74, .80 | |
| | | | | Conflict | .91, .94 | |
| Strengths and difficulties questionnaire | T1, T2 | Prosocial | .85, .89 | | | |
| | | Externalizing | .86, .88 | | | |
| | | Surgency | .73 | | | |
| Study II | 848 adolescents | Early adolescent temperament questionnaire | T1 | Negative affectivity | .86 | Latent growth models (LGM), mediation and moderation |
| | | | | Effortful control | .79 | |
| | | | | Prosocial | .65, .68, .70, .71 | |
| | Strengths and difficulties questionnaire | T1, T2, T3, T4 | Externalizing | .73, .73, .75, .81 | | |
| | | | Internalizing | .73, .73, .79, .80 | | |
| | | | Closeness | .77 | | |
| | 631 mothers | Child-parent relationship scale | T1 | Conflict | .84 | |
| Closeness | | | | .83 | | |
| 56 teachers | Student-teacher relationship scale | T2 | Conflict | .89 | | |

| Study | Participants | Measures | Time points | Subscales | α | Analyses |
|-------------|------------------------------------|--|----------------|----------------------|--------------------|-------------------------|
| Study III | 901 adolescents | Early adolescent temperament questionnaire | T2 | Surgency | .73 | Factor mixture analysis |
| | | | | Negative affectivity | .86 | |
| | | | | Effortful control | .79 | |
| | | Child-parent relationship scale | T1 | Mother closeness | .89 | |
| | | | | Father closeness | .88 | |
| | | | | Mother conflict | .87 | |
| | | | | Father conflict | .84 | |
| | | | | Closeness | .79 | |
| | | Student-teacher relationship scale | T1 | Conflict | .86 | |
| | | | | Prosocial | .71, .73, .73, .70 | |
| | | Strengths and difficulties questionnaire | T1, T2, T3, T4 | Externalizing | .79, .81, .79, .75 | |
| | | | | Closeness | .82 | |
| 626 parents | Child-parent relationship scale | T1 | Conflict | .87 | | |
| | | | Closeness | .86 | | |
| 81 teachers | Student-teacher relationship scale | T2 | Conflict | .88 | | |

3 OVERVIEW OF THE ORIGINAL STUDIES

3.1 Study I: Teacher- and parent-child relationships and children's adjustment behaviors in grade 1: The role of temperament

Study I aimed to investigate the bidirectional association between teacher-child and parent-child relationships and children's adjustment behaviors (in terms of prosocial behavior and externalizing problems) during Grade 1, and the role of children's temperament in these associations. First, the study examined to what extent teacher-child and parent-child relationships in Grade 1 fall predicted prosocial behavior and externalizing problems in Grade 1 spring. Second, the study examined to what extent prosocial behavior and externalizing problems in Grade 1 fall predicted teacher-child, and parent-child relationships in Grade 1 spring. Finally, the extent to which children's temperament (in terms of surgency, negative affectivity, and effortful control) directly and indirectly (via the relationships with parents and teachers) predicted prosocial behavior and externalizing problems and vice versa was investigated.

First, the results of the cross-lagged analyses in Study I did not show any significant effects of relationships with parents and teachers on either prosocial behavior or externalizing problems. However, three evocative effects were found. Children's prosocial behavior in Grade 1 fall predicted teacher-child closeness in Grade 1 spring. In addition, children's externalizing problems in Grade 1 fall predicted both parent-child and teacher-child conflicts in the Grade 1 spring. The results showed that the more prosocial children were, the closer relationships they had with their teachers, whereas the more externalizing problems children showed, the more conflicts with parents and teachers they had in Grade 1.

Second, regarding the direct effects of temperament, the results showed that the more temperamental surgency children had, the less prosocial they were and the more externalizing problems they had. When children had high negative affectivity, they were less prosocial and had less close relationships with their teachers and parents. In addition, children with higher negative affectivity had

higher conflicts with their parents in Grade 1 fall. Effortful control acted as the most favorable temperamental dimension for the quality of relationships with parents. The higher effortful control children manifested, the closer relationships with their parents they had in Grade 1 fall and spring, and less conflicts they had with their parents in Grade 1 fall.

Finally, the results showed two indirect effects of temperament on relationships with teachers via adjustment behaviors. First, temperamental surgency predicted relationship closeness with teachers via prosocial behavior. The results showed that the higher surgency children had, the less prosocial they were in Grade 1 fall and, in turn, the less close relationships they had with their teachers. Second, temperamental surgency predicted conflicts with teachers via externalizing problems. This result indicates that the higher surgency children manifested, the more externalizing problems they showed in Grade 1 fall, and in turn had more conflict with their teachers in Grade 1 spring.

The study showed that the behavior that children expressed at the beginning of Grade 1 evoked reactions from parents and teachers rather than the other way around. When children entered primary school with more prosocial behavior, teachers felt closer to such children later in Grade 1. However, if children expressed externalizing and more disruptive behavior as they entered primary school, it evoked more negative reactions from not only teachers but also parents, thus promoting higher conflicts with parents and teachers. Therefore, teachers and parents should be aware of the reactions and feelings that they have toward children's behavior to avoid conflicts with them. Moreover, parents and teachers reacted not only to the behavior of children but also to the expressions of their temperamental characteristics. For example, children who had higher effortful control may have better dealt with their negative emotions and were more positively perceived by their teachers and parents. In addition, temperament also predicted the way children behaved. Therefore, temperament is an important factor to identify as early as possible to be able to predict children's adjustment behaviors and prevent conflicts with parents and teachers in Grade 1.

3.2 Study II: Socioemotional functioning across the transition to lower secondary school: The role of temperament and relationships with mothers and teachers

Study II aimed to investigate the role of adolescents' temperament and relationships with mothers and teachers on adolescents' socioemotional functioning across the transition from primary school to lower secondary school. To achieve this aim the study first examined the extent to which adolescents' temperament (in terms of surgency, negative affectivity, and effortful control) predicted both the initial level of and change in adolescents' socioemotional functioning (in terms of prosocial behavior, externalizing, and internalizing

problems) during the transition. Second, the study examined the extent to which relationship closeness and conflict with mothers and teachers predicted the initial level of and the change in adolescents' socioemotional functioning across the transition. Finally, the study investigated two possible mechanisms via which adolescents' temperament and relationship quality with mothers and teachers predicted socioemotional functioning. One of the investigated mechanisms was the indirect effect of adolescents' temperament on the level of and change in socioemotional functioning via the relationships with mothers and teachers. Another mechanism was the interaction between temperament and relationships with mothers and teachers in predicting the level of and change in socioemotional functioning of adolescents across the transition to lower secondary school.

The results of latent growth model (LGM) analyses showed that the prosocial behavior decreased and externalizing and internalizing problems increased across the transition from primary to lower secondary school. First, regarding temperament, adolescents with higher effortful control had a higher initial level of prosocial behavior and a lower initial level of externalizing and internalizing problems. In addition, adolescents with higher surgency had a higher initial level, but also a higher decrease in prosocial behavior, while higher surgency also predicted a lower level of internalizing problems, but a higher increase in internalizing and externalizing problems. Negative affectivity did not predict either level or change in prosocial behavior. However, adolescents with higher negative affectivity had more externalizing and internalizing problems before the transition (at the initial level), but a lower increase in internalizing and externalizing problems across the transition.

Second, regarding the relationships with mothers and teachers, close relationships with mothers predicted a higher initial level of prosocial behavior, whereas close relationships with teachers predicted a lower decrease in prosocial behavior across the transition. In addition, adolescents who had more conflicts with their mothers had a higher increase in externalizing problems, whereas adolescents who had more conflicts with teachers had lower initial level of externalizing problems. Conflicts with mothers and teachers did not significantly predict internalizing problems.

Third, the mediational analyses revealed that the higher effortful control of adolescents predicted a higher level of prosocial behavior via the closeness with mothers. In addition, when adolescents had low effortful control, they had more conflicts with teachers and, in turn, more externalizing problems before the transition. Lower effortful control also predicted a higher increase in externalizing problems via the conflicts with mothers. Regarding temperamental surgency, the higher the surgency adolescents expressed, the more conflicts with teachers they had and, in turn, the higher level of externalizing problems they showed. Higher surgency also predicted a higher increase in externalizing problems via the higher conflicts with their mothers. Finally, higher negative affectivity predicted a higher increase in externalizing problems via the conflicts with mothers.

Finally, the moderation analyses showed that when closeness with mothers was low, the higher adolescents' surgency predicted higher prosocial behavior. There were no such associations found when closeness with mothers was high. In addition, when adolescents had high conflicts with their teachers, the higher adolescents' negative affectivity predicted a higher initial level of but lower increase in externalizing problems. When adolescents had low conflicts with their teachers, there was a weaker association between negative affectivity and the initial level of externalizing problems. Moreover, when adolescents had high conflicts with their mothers, the higher the negative affectivity they had then the more externalizing problems they showed at the initial level. When adolescents had low conflicts with their mothers, the same association was slightly stronger. Regarding the change in externalizing problems, when conflicts with mothers were low, the higher the negative affectivity adolescents had then the lower the increase in externalizing problems they showed.

The results of Study II indicated that close relationships with teachers and low conflicts with mothers can promote successful socioemotional functioning of adolescents across the transition. On the other hand, maintaining close relationships with mothers and avoiding conflicts with teachers can be especially important before the transition. Moreover, the results showed that indirect and interaction effects covered different underlying mechanisms in predicting prosocial behavior and externalizing problems. Some adolescents who had high surgency or high negative affectivity may have been more susceptible to decreases in prosocial behavior and increases in externalizing and internalizing problems across the transition. Therefore, identifying adolescents' temperament can be crucial in predicting their socioemotional functioning across the transition from primary school to lower secondary school.

3.3 Study III: Trajectories of adolescents' adjustment behaviors across the transition to upper secondary education: The role of individual and environmental factors

The study aimed to investigate the role of adolescents' temperament and their quality of relationships with parents and teachers on trajectories of adolescents' adjustment behaviors (i.e., prosocial behavior and externalizing problems) during the transition from lower secondary school to upper secondary education. First, the study applied a person-oriented approach to identify combined developmental trajectories of adolescents' prosocial behavior and externalizing problems across the transition. Second, the study investigated the differences in these trajectories based on adolescents' temperament (i.e., surgency, negative affectivity, and effortful control) and their quality of relationships with parents and teachers (i.e., closeness and conflict).

The results from factor mixture analysis (FMA) first showed that adolescents fell into four distinct trajectories in terms of their adjustment

behaviors. Most adolescents had high prosocial behavior and low externalizing problems across the transition (64.9%). The second-highest group had moderate prosocial behavior and high externalizing problems (25.8%). The remaining two groups had either decreasing prosocial behavior and increasing externalizing problems before the transition (7.4%) or decreasing prosocial behavior and increasing externalizing problems after the transition (1.9%).

Second, in terms of temperament, the highest negative affectivity and the lowest effortful control were found among those adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems*. The second lowest effortful control was identified in adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition*. The highest effortful control was observed among adolescents who followed the trajectory of either *high prosocial behavior and low externalizing problems* or *decreasing prosocial behavior and increasing externalizing problems after the transition*. No significant differences between trajectories were found in terms of temperamental surgency.

In terms of adolescent reports on the quality of relationships with parents and teachers, the adolescents who perceived the lowest closeness and most conflicts with their mothers, fathers, and teachers followed the trajectory of *moderate prosocial behavior and high externalizing problems*. Adolescents who perceived the highest closeness and lowest conflicts with their mothers, fathers, and teachers followed the trajectory of either *high prosocial behavior and low externalizing problems* or *decreasing prosocial behavior and increasing externalizing problems after the transition*. The second-highest closeness and second-lowest conflicts were perceived by adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition*.

In terms of parent and teacher reports on the quality of relationships with adolescents, no significant differences between distinct trajectories were found in terms of relationship closeness. However, parents perceived the lowest number of conflicts with adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition*. In addition, both parents and teachers perceived more conflicts with adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems* than the trajectory of *high prosocial behavior and low externalizing problems across transition*.

The findings revealed that even though most adolescents adjusted to the transition from lower secondary school to upper secondary education well, some adolescents faced adjustment difficulties. Some adolescents had difficulties across the transition, some before, and some after. Adolescents who had the lowest negative affectivity and highest effortful control had the best adjustment outcomes. Therefore, teachers and parents should be aware that getting to know adolescents and their temperament may help them predict how well they will adjust across the transition. In addition, it is important to note that close relationships and a low number of conflicts with parents and teachers may prevent adolescents from engaging in low prosocial behavior and high externalizing problems throughout the transition.

4 DISCUSSION

Educational transitions bring uncertainty and challenges in academic, behavioral, and social demands (Dockett & Perry, 2007). When changes brought about by educational transitions do not fit students' expectations and their developmental needs, they might face adaptation difficulties (Eccles & Roeser, 2009; Eccles et al., 1993). However, different students may have different expectations and needs, and adapt to educational transitions differently. Therefore, student adaptation in the current dissertation was investigated in the light of both individual and environmental factors that may shape their ability to successfully adapt (Bronfenbrenner, 1979). The current dissertation synthesized three studies that were the first to investigate the role of student temperament and their relationships with parents and teachers in the adjustment behaviors and socioemotional functioning of students during three educational transitions, each in a separate study. The current dissertation showed decreases in prosocial behavior and increases in externalizing and internalizing problems across the educational transitions during adolescence. This finding indicates that some students face challenges across transitions, therefore it is crucial to identify how their individual characteristics and support from parents and teachers may contribute to their adaptation. The current dissertation contributed to previous research by introducing new and distinct perspectives on how student temperament and relationships with parents and teachers were associated with student adaptation: bidirectionally in Grade 1 (Study I), predicting changes in adaptation during the transition to lower secondary school (Study II), and predicting developmental trajectories of adaptation during the transition to upper secondary education (Study III). In addition to introducing these different perspectives, there were some similarities found in each study.

First, the dissertation showed that students with different temperamental characteristics may show different susceptibility to educational transitions. For instance, students who had a higher ability to control their behavior and emotions were able to adapt more successfully to educational transitions shown by higher prosocial behavior and lower externalizing and internalizing problems than those who had lower effortful control. These results coincide with previous

studies (e.g., Lengua, 2006; Luengo Kanacri et al., 2013; Lunetti et al., 2022; Muris et al., 2007; Wang et al., 2016; Zentner, 2020). Adolescents who have higher effortful control are shown to better regulate their behavior and concentrate their attention and then engage less in externalizing problems. In addition, such adolescents may better regulate their emotional responses and socialize with others, thus showing higher prosocial behavior and lower internalizing problems (Rothbart, 2007; Rothbart et al., 2001).

On the other hand, regarding temperamental negative affectivity, students who showed a higher inability to manage their negative emotions had poorer adaptation outcomes (i.e., low prosocial behavior, and high externalizing and internalizing problems). Adolescents with higher negative affectivity can be more sensitive to environmental changes, may dwell on their negative emotions, and become more anxious, thus avoiding interaction with others and showing more withdrawal from social interactions or instances of acting out (Deater-Deckard & Wang, 2012; Klein et al., 2012; Liew et al., 2019). Therefore, such students may display low prosocial behavior as well as high externalizing and internalizing problems (e.g., Lunetti et al., 2022; Rothbart et al., 2001, 2011; Scrimin et al., 2019; Zentner, 2020).

Regarding temperamental surgency, the results were not that straightforward. On the one hand, higher surgency predicted lower prosocial behavior and higher externalizing and internalizing problems during transitions. Children and adolescents with high surgency can be more active and have higher sensation-seeking tendencies, which may bring more difficulties to adjust to the stricter structure when entering a new school environment (e.g., Harvey et al., 2022; Wang et al., 2016; Rothbart et al., 2001; Zentner, 2020). Students with higher surgency may seem more distracted and may behave more impulsively, thus showing less concern and less prosociality towards others and more externalizing and internalizing problems. On the other hand, students with high surgency may also have high positive emotionality and low shyness (Rothbart et al., 2001) and engage more in social interactions, therefore predicting higher initial levels of prosocial behavior and lower initial levels of internalizing problems, which was shown in Study II.

Second, the successful development of adolescents is also shaped by their closest environments, such as home and school (Bronfenbrenner, 1979). Adolescents become more independent from parents and teachers, yet support from these parties remains significant, especially during critical educational transitions (Symonds, 2015). The current dissertation confirmed the importance of support from parents and teachers. On average, the results showed that close relationships with parents and teachers were beneficial for successful adaptation across transitions (i.e., high prosocial behavior, and low externalizing and internalizing problems). In contrast, conflicts with parents and teachers predicted less prosocial behavior and more externalizing and internalizing problems across transitions.

Besides these general findings, each study brought additional novel results to the previous findings. For instance, Study I was the first study to investigate

the bidirectional associations between adjustment behaviors and the quality of relationships with both parents and teachers in Grade 1. Study II was the first to investigate the initial levels and changes in socioemotional functioning across the transition to lower secondary school and the different mechanisms via which temperament and quality of relationships shape students' socioemotional functioning. Finally, Study III was the first study to investigate distinct developmental trajectories of adjustment behaviors across the transition to upper secondary education.

4.1 Student adaptation during educational transitions

The results of Study II and Study III showed that educational transitions may become challenging for some adolescents. Both studies showed some decreases in adolescents' prosocial behavior and increases in their externalizing problems across the transitions to lower secondary school and upper secondary education. In addition, Study II also showed an increase in adolescents' internalizing problems across the transition to lower secondary school. To my knowledge, these were the first studies to investigate the changes in adolescents' prosocial behavior as well as their externalizing and internalizing problems across the transitions to lower secondary school and upper secondary education. The results confirmed previous findings on decreases in adolescent adaptation across the educational transitions (Eccles & Roeser, 2011; Martínez et al., 2011; Marušić et al., 2020). The findings of Study II and Study III align with the stage-environment fit theory (Eccles & Roeser, 2009; Eccles et al., 1993), which posits that students may face difficulties across the transitions if their developmental needs are not met. Therefore, even though Study I did not investigate the changes in children's adaptation, decreases in prosocial behavior and increases in externalizing problems could also be expected during the transition from kindergarten to Grade 1.

The decrease in student adaptation may occur due to the changes in a school environment that do not align with their expectations and needs (Eccles & Roeser, 2009; Eccles et al., 1993). For instance, during the transition to Grade 1, children must follow stricter rules and show better self-regulatory skills, they switch from play-like activities to more academic tasks, and they must show better group work skills (Dockett & Perry, 2007; Merritt et al., 2012). During the transition to lower secondary school adolescents face more responsibilities and more academic demands due to the changes in classroom teachers to multiple subject teachers which also indicates a bigger workload (Symonds, 2015; Virtanen et al., 2020). Finally, during the transition to upper secondary education adolescents must face the decision on which vocational or academic path to follow (Eccles & Roeser, 2009; Vasalampi et al., 2010; Virtanen et al., 2022). Besides these transition-specific challenges, all transitions bring higher academic demands, different school compositions, changes in peers, and discontinuity in the relationship with teachers. Such sudden changes in a school environment and

demands may not comply with adolescents' expectations and the need for relatedness (Ryan & Deci, 2000), thus adaptation difficulties may emerge across the educational transitions (Eccles & Roeser, 2009).

4.2 The evocative effects of adjustment behaviors on the quality of relationships with parents and teachers in Grade 1

Study I brings novel findings to the previous research by investigating bidirectional effects between the quality of relationships and children's adjustment behaviors in Grade 1. The results of Study I showed, first, that children's behavior in Grade 1 evoked reactions from parents and teachers rather than that parents' and teachers' reactions predicted children's behavior. In particular, when children showed more prosocial behavior upon entering Grade 1, their primary school teachers felt more closeness with them at the end of Grade 1. In contrast, if children showed externalizing problems upon entering Grade 1, their teachers and parents reported more conflicts with these children at the end of Grade 1. These findings coincide with the previous studies which showed that children's adjustment behaviors can evoke responses from their closest environments (e.g., Newton et al., 2014; Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983; Silinskas et al., 2015). This is an important finding that shows that the behavior brought to primary school may become an important factor in shaping social relationships. When children enter Grade 1, they may be expected to be able to follow the class rules, be able to regulate their behavior and attention, for example, concentrate on a task and sit still for a certain amount of time, and work with other children (Dockett & Perry, 2007; Kiuru et al., 2016; Merritt et al., 2012). If children are more prosocial, they may be more friendly than their less prosocial peers and can work with other children in the classroom, which indicates better adaptation to primary school and aligns with the class teacher's expectations. Thus, teachers may feel more trust and warmth towards children with higher prosocial behavior and may form closer teacher-child relationships (e.g., Nurmi et al., 2018). On the other hand, children with more externalizing problems may be more disruptive in a classroom and may show aggression, low self-regulation, and higher resistance to completing school tasks than do their peers who show lower externalizing problems (Hinshaw, 1992; McMahan, 1994; Metsäpelto et al., 2015). These characteristics can increase teacher dissatisfaction and higher disagreements, thus predicting higher teacher-child conflicts. Such difficulties for children with higher externalizing problems and tension at school can also be reflected in their relationships with their parents. Parents also expect children to be able to effectively function upon transitioning to primary school (Dockett & Perry, 2007), and so children's disruptive behavior may also promote higher parent-child conflicts.

The second novel perspective of Study I is how it examines the role of temperament in the associations between the quality of relationships and

children's adjustment behaviors in Grade 1. In line with the previous studies (e.g., Karreman et al., 2009; Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983) and the evocative theorists (Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983), the results of Study I showed that parents and teachers may also react to children's temperament. For instance, higher negative affectivity predicted less close relationships with parents and teachers and more conflicts with parents. These results are in line with the previous studies (i.e., Acar et al., 2018; Rudasill et al., 2010) which showed that children who dwell on their negative emotions and are more irritable may form less close relationships with parents and teachers and may engage in more conflicts with them than do the children who can successfully cope with their negative emotions. One of the possible explanations is that fearful and irritable children may struggle to successfully interact with others and form warm relationships (Rothbart et al., 2001; Rothbart, 2007). As a result, it becomes difficult to bond with their parents and teachers, which is reflected in less close relationships with them. If a child is more irritable, it may create more tension between them and their parents, and then evolve into conflict situations (Acar et al., 2018; Rothbart et al., 2001; Rothbart, 2007). In addition, children's higher effortful control predicted closeness and lower conflicts with parents. One of the possible reasons is that parents may have high expectations of their children's self-regulatory abilities, such as the ability to focus their attention and behavior (Rothbart et al., 2001; Rothbart, 2007). Study I suggested that children with higher effortful control were able to better focus their attention and regulate their behavior, which in the eyes of parents may have indicated a successful school start and promoted close parent-child relationships. In contrast, lower effortful control indicated lower self-regulatory abilities, which may have not met the expectations of their parents and in turn provoked conflicts.

Third, in addition to the direct effects of children's temperament on their adjustment behaviors in Grade 1, the results showed the indirect effects of surgency on the quality of relationships with teachers via the children's adjustment behaviors. When children showed higher surgency, they were more distracted and showed less concern towards being prosocial, therefore teachers felt more distance and less closeness towards such children. In addition, children with higher surgency showed more disruptive behavior that manifested in externalizing problems, and in turn, teachers felt more alienated by such behavior and reacted towards children with conflicts. These are important findings that add novelty to the limited research on the indirect effects of temperament on the quality of relationships. Some previous studies (Ezpeleta et al., 2019; Karreman et al., 2010; Rudasill et al., 2010) investigated the indirect effects of temperament on adjustment behaviors via the relationships with parents and teachers. However, to my knowledge, this is the first study that investigated and found the indirect effects of temperament on the quality of relationships via the adjustment behaviors in Grade 1.

Finally, Study I (in contrast to Studies II and III) did not show significant socialization effects of relationship quality with parents and teachers on children's adjustment behaviors. These results contradict previous findings on

such associations (e.g., Ferreira et al., 2016; Leve et al., 2005; Pakarinen et al., 2020; Silver et al., 2010; Skalická et al., 2015). However, the importance of relationships with parents and teachers should not be ignored. According to the attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1982), children first develop attachment relationships with primary caregivers and when they enter school, the representations of such relationships are reflected in the relationships with teachers. Therefore, parents and teachers are important attachment figures that shape the development of children. Insignificant associations between teacher-child relationships and children's adjustment behaviors may have occurred due to the discontinuity of relationships (Virtanen et al., 2022). When children enter Grade 1, they switch from kindergarten teachers to primary school class teachers. At the beginning of Grade 1, children still renegotiate their relationships with teachers, thus they may not be well-identified yet. Regarding parents, the relationships with their children remain mostly stable. When children enter Grade 1, parents may have high expectations of their children's successful adjustment and try to remain supportive (Dockett & Perry, 2007). Therefore, they may avoid conflicts with their children upon entering school. However, if children show higher externalizing problems at the beginning of Grade 1, parents may feel more frustrated and may engage in conflicts with their children later in Grade 1.

4.3 The indirect vs. interaction effects on the level of and change in socioemotional functioning during the transition to lower secondary school

First, besides the expected and parallel findings to Study I and III, Study II showed some surprising or distinct results. For instance, higher surgency predicted more prosocial behavior and fewer internalizing problems at the initial level, but higher surgency also predicted a higher decrease in prosocial behavior and a higher increase in internalizing problems across the transition. These results partially contradict previous studies which indicated that adolescents who had high surgency engaged less in prosocial behaviors and internalizing problems (Wang et al., 2016; Zentner, 2020; Zentner & Shiner, 2012). However, based on Anttila et al. (2022), it is possible to assume that adolescents with high surgency may have both adaptive and maladaptive outcomes of socioemotional functioning. The results indicate that before transition adolescents with higher surgency can benefit from their positive emotionality, lower shyness, and outgoing nature (Rothbart et al., 2001; Rothbart, 2007). Such adolescents are perceived as pleasant and nice to be around. Therefore, adolescents with higher surgency may engage in more social situations and feel less left out, which may be reflected in their higher prosocial behavior and lower internalizing problems. However, when adolescents face an educational transition, which brings new academic demands and a higher workload, their higher sensation-seeking

tendencies and activeness may be viewed by others as disruptive or impulsive. When adolescents are viewed as disruptive, they may perceive distance from others and difficulties in socializing, which may reflect lower prosocial behaviors or higher internalizing and externalizing problems. Another surprising result in Study II showed that the higher negative affectivity predicted a lower increase in internalizing and externalizing problems across the transition to lower secondary school. These findings contradict the previous studies (Lunetti et al., 2022; Rothbart et al., 2001, 2011; Scrimin et al., 2019; Zentner, 2020) and should be replicated and investigated further in future studies. The results may indicate that adolescents who had higher negative affectivity already had high enough levels in their externalizing and internalizing problems before the transition, therefore leaving no space to increase. These results should be interpreted carefully, because even though adolescents with high negative affectivity showed lower increases in their externalizing and internalizing problems, they may still face difficulties in their socioemotional functioning.

The second interesting finding in Study II is the distinct role of relationships with parents and teachers during the transition to lower secondary school. Close relationships with mothers predicted higher prosocial behavior before the transition, whereas close relationships with teachers predicted a lower decrease in prosocial behavior across the transition. The results indicated that before the transition, parents played a significant role in adolescents' prosocial behavior. As relationships with parents are usually not interrupted, the same level of prosocial behavior may have remained across the transition without showing any changes. When adolescents enter lower secondary education, their teacher changes. Relationships with new teachers are renegotiated and may be based on previous experiences in primary school (Virtanen et al., 2022). The closeness that adolescents had with their primary school teachers may assist them in resisting drops in their prosocial behavior across the transition. Regarding externalizing problems, the results of Study II showed converse findings. Conflicts with mothers predicted a higher increase in externalizing problems across the transition, whereas conflicts with teachers were detrimental to higher externalizing problems before the transition. Previous studies showed a positive association between conflicts with parents and teachers and adolescents' externalizing problems (e.g., Klahr et al., 2011; Pakarinen et al., 2018; Roorda & Koomen, 2021). Before the transition, conflicts with teachers showed by tension and disagreements may provoke adolescents' disruptive behaviors (Rothbart, 2007; Rothbart et al., 2001). When adolescents switched to lower secondary school, their teachers changed and they had to renegotiate their relationships with them (Virtanen et al., 2022). The only stable relationship they were left with was with their parents. If adolescents did not feel supported even by their parents, which was reflected in higher parent-adolescent conflict, they were even more susceptible to the transition and showed higher increases in their externalizing problems.

Finally, the most novel findings of Study II were the underlying mechanisms of how temperament and quality of relationships contribute to the

socioemotional functioning of adolescents. To my knowledge, Study II was the first study that investigated both indirect and interaction effects in predicting socioemotional functioning across the transition to lower secondary school. First, regarding surgency, when prosocial behavior was an outcome, low closeness with mothers only strengthened the association between high surgency and a high level of prosocial behavior. This surprising finding may indicate that outgoing adolescents try to show their autonomy from their mothers, thus showing lower closeness with them. Even so, outgoing adolescents with high positive emotionality may still perceive themselves as friendly and more prosocial than their peers. Another explanation may lay in different perceptions of surgency by mothers and peers (Anttila et al., 2022). Higher sensation-seeking and spontaneous actions may seem disruptive for mothers, but when taken together with an outgoing nature, it can be perceived positively by peers. Therefore, even though adolescents had less close relationships with parents, the adolescents with higher surgency were perceived as prosocial by others. However, when predicting externalizing problems, higher surgency predicted more externalizing problems via the conflicts with mothers and teachers. These findings are in line with Rudasill et al. (2010), who found that the difficult temperament of adolescents predicted their risky behavior via conflicts with teachers. When adolescents with higher surgency are perceived as disruptive and reckless, they may engage in more disagreements and conflicts with parents and teachers, which may predict their higher externalizing problems.

Regarding negative affectivity, the results showed more interaction effects. Adolescents with higher negative affectivity had higher externalizing problems when they had conflicts with their mothers and teachers before the transition. These findings coincide with previous research (Ramos et al., 2005) and indicate that irritable adolescents who dwell on their negative emotions may be even more susceptible to acting out when they experience tension and disagreements with their mothers and teachers (Belsky & Pluess, 2009). Surprisingly, the results also showed that adolescents with high negative affectivity had a lower increase in their externalizing problems when they had conflicts with their mothers and teachers. These results may indicate that adolescents who had both high negative affectivity and conflicts with their mother or teachers had high externalizing problems already before the transition, leaving no place for externalizing problems to increase across the transition. Therefore, instead of increased externalizing problems, these adolescents showed drops in such behavior across the transition. In addition to many interaction effects, one indirect path was found. Higher negative affectivity of adolescents predicted a higher increase in their externalizing problems via the conflicts with their mothers. The findings are in line with previous research (Ezpeleta et al., 2019), and indicate that adolescents who dwell on their negative emotions and are more irritable may have more disagreements with their mothers and, in turn, their externalizing problems may increase during the transition. In general, despite the unexpected findings, it is important to note that adolescents with higher negative affectivity may face

challenges to successfully adapt to transitions, especially if they also have more conflicts with their parents and teachers.

Finally, regarding effortful control, the results provided only support for indirect effects. When adolescents had high effortful control, they formed closer relationships with their mothers and were more prosocial before the transition. Adolescents who can successfully regulate their emotions and behavior may be perceived more favorably by their mothers and can socialize, thus forming close relationships, and in turn are more prosocial (Bates et al., 2012; Rueda, 2012). In contrast, when adolescents had low effortful control, they had more conflicts with their teachers and mothers, and in turn, had more externalizing problems before the transition and a higher increase in externalizing problems across the transition respectively. Adolescents who are less able to control their behavior may be perceived as disruptive by their teachers and mothers, which may provoke conflicts with them and, in turn, adolescents may engage in more externalizing problems (Bates et al., 2012; Rueda, 2012). These results on the mechanisms by which temperament and quality of relationships interact to predict the socioemotional functioning of adolescents align with the bioecological approach (Bronfenbrenner, 1979). Both individual and environmental factors play a significant role in shaping adolescents' socioemotional functioning across the transition from primary school to lower secondary school.

4.4 The trajectories of adjustment behaviors during the transition to upper secondary education

The first and the most novel finding of Study III was four distinct trajectories in terms of adolescents' prosocial behavior and externalizing problems. To my knowledge, Study III is the first study that investigated the developmental trajectories of adolescents' adjustment behaviors across the transition from lower secondary school to upper secondary education. In line with the previous studies (e.g., Jambon et al., 2019; Shi et al., 2021), most adolescents adjusted well to the transition. These adolescents showed high prosocial behavior and low externalizing problems across the transition (Group 2, 64.9%). However, following the previous findings (e.g., Benner et al., 2017; Shi et al., 2021), the study showed smaller groups of adolescents who faced adjustment difficulties at different times across the transition. The second largest group of adolescents had moderate prosocial behavior and high externalizing problems (Group 1, 25.8%) across the transition. The remaining two groups of adolescents had either some adjustment difficulties before or after the transition. Some adolescents (Group 3, 7.4%) followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition*, and the remaining (Group 4, 1.9%) adolescents followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition*. These are important findings that showed

that even though most adolescents adjusted well to the challenges brought about by the transition to upper secondary school, there were still some groups of adolescents who were more sensitive to such changes.

Second, the role of temperament and quality of relationships with parents and teachers on each distinct trajectory was investigated. The bioecological approach (Bronfenbrenner, 1979) posits that adolescents' development should be interpreted in the light of their personal characteristics and closest environments, such as home and school. Regarding temperament, only effortful control and negative affectivity were shown to be associated with the distinct trajectories of adolescents across the transition. In particular, adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems* had the highest negative affectivity. Adolescents with higher negative affectivity may be more irritable and may face difficulties coping with their negative experiences and dwell on their negative emotions (Rothbart et al., 2001; Rothbart, 2007). Such adolescents may be more susceptible to the changes and uncertainty brought about by the educational transition. Therefore, higher negative affectivity may become detrimental to adolescents' adjustment shown by lower prosocial behavior and higher externalizing problems across the transition.

On the other hand, adolescents with higher effortful control dealt with educational transitions more successfully. Such adolescents were more likely to follow the trajectory of *high prosocial behavior and low externalizing problems* across the transition, which is also in line with the previous research (e.g., Olson et al., 2017). Adolescents who were able to better manage their emotional experiences and behavior showed better adjustment outcomes. Such adolescents may put more effort into social relationships and have good behavioral and emotional management skills which helps to read well the social cues. Therefore, adolescents with higher effortful control may engage more in prosocial behavior and may appear less disruptive. In addition, their higher effortful control may assist them in keeping such behavior stable across the transition, thus showing successful adjustment. An interesting finding is that even adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition* had high levels of effortful control. This finding indicates that even adolescents who can cope well with their emotions may have adjustment difficulties after the transition. Educational transition can bring additional challenges. Therefore, parents and teachers should note that even those adolescents who seem well-adjusted can benefit from their support. When adolescents had a bit lower effortful control they followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition*. Such adolescents, who had some challenges managing their emotions and behavior showed adjustment difficulties before the transition; however, they adjusted well after the transition. The adolescents with the lowest effortful control followed the trajectory of *moderate prosocial behavior and high externalizing problems* across the transition. Such adolescents were not able to cope either before or after the transition. Therefore, they may have shown less interest in being prosocial and engaged in more externalizing problems across the transition.

Finally, the differences between distinct trajectories in adolescents' adjustment behaviors in terms of relationships with parents and teachers were found. In the current study, both perceptions of adolescents and perceptions of their parents and teachers were investigated. First, those adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems* perceived the least close and the most conflicting relationships with mothers, fathers, and teachers before the transition. The transition to upper secondary education brings higher academic demands or environmental changes that can become difficult to adjust to (e.g., Symonds, 2015). Therefore, those adolescents who feel more tension rather than warmth from parents and teachers may lack a safe home and school environment (Eccles & Roeser, 2009; Grolnick et al., 2009; Wentzel, 2009). When the environment does not comply with adolescents' need for support and warmth, they may face difficulties in adjusting to the educational transition shown by lower prosocial behavior and high externalizing problems (Eccles et al., 1993). In addition, parents also perceived most conflicts with adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems*. One contemplation is that when adolescents sense that their parents feel tension towards them, they may not feel safe to express their worries regarding transition and then face adjustment challenges (Grolnick et al., 2009). Another possible explanation for this finding is that some parents may take their adolescents' outbursts personally rather than as an expression of distress. Therefore, parents may react with more unresolved conflicts which may interfere with adolescents' effective perspective-taking and socialization skills (Branje, 2018; Branje et al., 2009). If conflicts are not resolved successfully, adolescents lack such skills and continue to engage in less prosocial behavior and more externalizing problems. In addition to adolescent and parent reports, teachers also reported high conflicts with adolescents who followed the trajectory of *moderate prosocial behavior and high externalizing problems* but only than with those adolescents who showed no difficulties across the transition. If teachers perceive higher conflicts, they may feel more distant from some adolescents. Such adolescents may pick up on the sense that teachers feel tension around them. Therefore, some adolescents can perceive a lack of security at school which prevents them from engaging in successful interactions with others and becomes detrimental to their adjustment behaviors (e.g., Eccles & Roeser, 2009; Shi et al., 2021; Wentzel, 2009). The results from each reporter showed that conflicts between adolescents and their parents and teachers can be detrimental to adolescents' adjustment behaviors across the transition to upper secondary education.

When adolescents perceived the second lowest closeness and second highest conflict with their mothers, fathers, and teachers, they more likely followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition*. Parents perceived more conflicts with such adolescents than those who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition*. The results of the current study may indicate that when some adolescents have a few conflicts with their

parents and teachers, they may face adjustment challenges before the transition. However, if these conflicts are successfully resolved within time, adolescents continue engaging in higher prosocial behavior and lower externalizing problems after the transition (Branje, 2018; Branje et al., 2009). Teachers did not perceive differences in their conflict with adolescents who had difficulties before the transition from adolescents who later followed the other three trajectories. The results indicate that teachers' perceptions about conflicts with adolescents may have relatively stable longitudinal effects. The higher or lower level of tension and negativity perceived by the teacher may be translated into adolescents' perceptions about their ability to adjust before and after the transition.

Adolescents who either adjusted successfully across the transition or had difficulties after the transition perceived the closest and least conflicting relationships with their parents and teachers. This result is in line with the previous studies which showed that positive parenting and warmth with teachers predicted high prosocial behavior and low externalizing problem trajectories (e.g., Jambon et al., 2019; Shi et al., 2021). However, some adolescents who perceived support from parents and teachers still had some difficulties adjusting after the transition. Surprisingly, parents also reported that they had the least conflicts with those adolescents who had some difficulties after the transition. One of the possible explanations is that a small group of adolescents had changes in their quality of relationships with their parents. Another explanation is that upper secondary education did not exactly fit some adolescents' needs (Eccles et al., 1993). Even though such adolescents had support from their parents, they may have a lack of support from their new teachers, new peers, or higher academic demands. Such additional factors in explaining declines in adolescents' adjustment after the transition should be explored further. Teachers reported fewer conflicts with those adolescents who had successful adjustment across the transition than those adolescents who had adjustment difficulties across the transition. When teachers perceived lower conflicts, adolescents may have felt more at ease in the classroom. Adolescents had a stronger sense of a secure atmosphere to interact with others in a prosocial manner and avoid being disruptive, thus showing lower externalizing problems (e.g., Shi et al., 2021).

4.5 Limitations and future directions

The current dissertation possessed a few limitations, which fall into six categories. First, all the dissertation studies investigated the associations between students' adaptation, their temperament, and relationships with parents and teachers across educational transitions. However, each study focused on different samples and different mechanisms of such associations. Some findings are therefore challenging to compare with one another as they bring distinct novelty to the previous findings. For example, Study I produced novel results regarding the

evocative effects of adaptation on the quality of relationships with parents and teachers during Grade 1. Study II investigated two different mechanisms (mediated and moderated) in which temperament and quality of relationships predict changes in adaptation during the transition to lower secondary school. The quality of relationships with parents and teachers was investigated both as a moderator and a mediator in the association between adolescents' temperament and their socioemotional functioning. These findings should encourage future research to take a closer look into these mechanisms to draw a stronger conclusion about which mechanism has stronger support. Study III revealed distinct trajectories of adolescents' adaptation during the transition to upper secondary education. These different types of analyses were not applied consistently to all the studies, therefore comparisons on such study-specific mechanisms could not be made.

Second, even though each study applied longitudinal designs, the directionality of associations should be interpreted with caution. The direction of effects can only be determined by applying the experimental research design. Third, some dimensions of temperament (e.g., effortful control) may not be completely stable, because of children's interaction with the environment and their maturation. Future studies could address this issue and investigate the stability of temperament and its role in relationships with parents and teachers and student adaptation. Fourth, in terms of interpersonal relationships, only relationships with parents and teachers were investigated in all three studies. Future studies could benefit from investigating the role of other types of interpersonal relationships (e.g., peers, siblings, grandparents) in the adaptation of children and adolescents across educational transitions.

Fifth, although the current dissertation utilized data from multiple respondents, each study encountered common-method bias issues. However, results remained robust even after controlling for gender, parent education, and achievement. In Study I, teachers rated both their relationships with children and children's adjustment behaviors. In addition, parents rated both their relationships with their children and children's temperament. Future studies could benefit from observational data or children's reports on their relationships with parents and teachers or their behavior to avoid common-method bias. In addition, Studies II and III had only adolescent reports on both their temperament and their socioemotional functioning, therefore these associations could have been affected by the common method bias as well. To mitigate the common-method bias, in addition to adolescent reports, parent and teacher reports on their close and conflicting relationships with adolescents were investigated as well. In addition, only a small sample of home classroom teachers reported on their relationships with their class students. However, adolescent reports were also considered either as a part of an additional analysis (Study II) or as a part of the main analysis (Study III) to make sure that the results remain robust.

Sixth, we did not account for the bidirectionality between different adaptation indicators during educational transitions. Therefore, future studies

could benefit from examining the developmental cascades of adaptation indicators by investigating the accumulative effects from one domain of adaptation to the other (Masten et al., 2005). Seventh, other developmental dimensions might have also played a role in the associations between study variables. For instance, early behavior regulation (Suchodoletz et al., 2009) or the ability to delay gratification (Razza & Raymond, 2013) was shown to predict better school readiness. In addition, higher executive functions were shown to predict closer and less conflicting relationships with teachers (McKinnon & Blair, 2018), and the theory of mind predicted prosocial behavior and closer relationships with peers (Caputi et al., 2012). Finally, even though the dissertation included two cultural contexts (Lithuanian and Finnish), comparisons cannot be made based on the results. The transitions were not investigated simultaneously in both cultural contexts and the transitions to primary school and upper secondary education take place at different times.

4.6 Practical implications

The current dissertation suggests that each educational transition during comprehensive school can become challenging to adapt to. When a new school environment does not fit student expectations, they may develop poor adaptation outcomes, which manifest as low prosocial behavior and high externalizing and internalizing problems. To identify students who may be more susceptible to such changes, it is first important to recognize their temperament. For instance, the results showed that children and adolescents with higher effortful control can face the transition well, but adolescents with higher surgency or negative affectivity were more susceptible to lower prosocial behavior and higher externalizing and internalizing problems. Any student regardless of their temperament may require support from parents and teachers during educational transitions. Some might benefit more, however, from close relationships or might be more sensitive to conflicts. For instance, students with high negative affectivity may already be anxious and face difficulties dealing with their negative emotions during educational transitions, therefore conflicts with parents and teachers can even strengthen the susceptibility of such adolescents to adaptation difficulties. In addition, students with high surgency are pleasant and outgoing, therefore they may show high prosocial behavior. However, when facing challenging educational transitions, they may seem more reckless and show higher sensation-seeking tendencies, thus such students may become more sensitive to conflicts with parents and teachers. For this reason, it is important to show more support and understanding toward such students by providing a safe environment to adapt to transition challenges. In addition, students with high effortful control may seem focused and able to cope with their negative experiences across transitions. Even students with high effortful control, however, may require encouragement from parents and teachers to adapt well to a new school environment.

The results of the dissertation showed that student temperament is a crucial factor that plays a role in their adaptation to educational transitions. In addition, student temperament was also shown to predict relationships with teachers and parents, which later predicted student adaptation. Parents and teachers should note that the conflicts with their children and adolescents who seem more reckless or irritable can even strengthen their susceptibility to developing higher externalizing problems. Programs directed toward understanding children's and adolescents' temperamental characteristics should therefore be encouraged. Parents should be informed of such possibilities to engage in programs that help them to better understand their children and adolescents as well. If both parents and teachers are aware of children's temperament, they have better tools to provide them with optimal support.

It is important to note that maintaining close relationships and avoiding conflicts with parents and teachers can help children and adolescents to better adapt to the challenges brought about by the transitions. Even though adolescents try to show their autonomy and rely more on their friends, relationships with teachers and parents remain important factors in shaping both children's and adolescents' adaptation across educational transitions. It is crucial to provide adolescents with a safe space to be able to successfully face the academic and social demands that the transition brings. A safe home and school environment without tension may align with students' need for belonging and continuity and accelerate a successful transition.

Moreover, more emphasis on school curriculum should be put on strengthening the relationships between teachers and students, especially after the school transitions when students face changes in their teachers. Schools could organize more informal gatherings with new teachers to minimize the discontinuity in closeness with teachers. This action can be useful in promoting prosocial behavior and minimizing the risk of externalizing problems when facing educational transitions. Thus, policymakers should put more effort into developing guidelines while funding and encouraging schools to implement programs on promoting prosocial behavior and decreasing externalizing and internalizing problems across educational transitions.

4.7 Conclusions

The results of the current dissertation in general suggest that support from parents and teachers can promote the successful adaptation of students with different temperamental characteristics to a new school environment. Students with some temperamental characteristics may be more susceptible to educational transitions and relationships with parents and teachers than others. For instance, students with higher negative affectivity may be more sensitive to conflicts with parents and teachers than their peers are. However, regardless of temperament, each can benefit from close relationships with parents and teachers. Even students who show high effortful control may require additional encouragement

and support. In addition to general findings, the most distinct finding first was the evocative effects of children's adjustment behaviors on relationships with parents and teachers. Both parents and teachers react to the behavior that children bring to primary school. The second distinct finding was two mechanisms on how temperament and quality of relationships predict the socioemotional functioning of adolescents across the transition to lower secondary school. For instance, effortful control had an indirect effect on the socioemotional functioning of adolescents via the quality of relationships with parents and teachers. On the other hand, negative affectivity was shown to interact with the quality of relationships to predict socioemotional functioning. Finally, the third distinct finding was the identification of the subgroups of adolescents who showed differences in the patterns of their adjustment behaviors during the transition to upper secondary education. Most adolescents adjusted well, yet some had difficulties during the transition, some before, and some after. Therefore, promoting a safe atmosphere at home and school is crucial for the successful adaptation of students to educational transitions.

YHTEENVETO (SUMMARY)

Lasten ja nuorten sopeutuminen koulutuksen siirtymävaiheissa: Temperamentin, vanhempien ja opettajien merkitys

Koulusiirtymät tuovat mukanaan useita muutoksia lasten ja nuorten akateemisiin ja sosiaalisiin vaatimuksiin. Oppilaiden yksilöllisillä ominaisuuksilla, sekä heidän vanhempiansa ja opettajiensa antamalla tuella on merkitystä heidän kykynsä sopeutua koulutussiirtymien aiheuttamiin muutoksiin. Tässä väitöskirjassa tutkittiin lasten ja nuorten temperamentin-, sekä heidän vanhempi- ja opettajasuhteidensa merkitystä sopeutumiseen kriittisten koulusiirtymien aikana. Väitöskirja koostuu kolmesta osatutkimuksesta, joissa tarkasteltiin kolmea erilaista koulutussiirtymää. Osatutkimus I ($n = 409$) toteutettiin osana laajempaa "Get involved!" - pitkittäistutkimusta, jossa tarkasteltiin siirtymistä esiopetuksesta ensimmäiselle luokalle. Osatutkimukset II ($n = 848$) ja III ($n = 901$) toteutettiin osana laajempaa TIKAPUU-pitkittäistutkimusta. Osatutkimuksessa II tarkasteltiin siirtymää alakoulusta yläkouluun ja osatutkimuksessa III tarkasteltiin siirtymävaihetta yläkoulusta toisen asteen koulutukseen.

Osatutkimus I tuotti uutta tietoa lasten vanhempi- ja opettajasuhteiden ja lasten käyttäytymisen välisistä kaksisuuntaisista yhteyksistä ensimmäisellä luokalla. Tulokset osoittivat, että lasten käyttäytyminen ennakoivat tulevia suhteita vanhempiin ja opettajiin. Mitä enemmän lapsilla oli prososiaalista käytöstä ensimmäisen luokan alussa, sitä läheisemmät suhteet opettajiin heillä oli ensimmäisen luokan lopussa. Puolestaan mitä enemmän lapsilla oli ulospäinsuuntautuvaa ongelmakäyttäytymistä ensimmäisen luokan alussa, sitä enemmän heillä oli konflikteja vanhempiensa ja opettajiensa kanssa sen lopussa. Lisäksi lasten ulospäinsuuntautuneisuus ennusti tulevia suhteita opettajiin prososiaalisen käyttäytymisen, tai ulospäin suuntautuvan ongelmakäyttäytymisen kautta.

Osatutkimus II osoitti, että äideillä ja opettajilla oli erilainen rooli nuorten sosioemotionaalisisessa kehityksessä siirtymävaiheessa yläkouluun. Läheisyys äidin kanssa ja vähäiset ristiriidat opettajien kanssa edistivät parempaa sopeutumista ennen siirtymävaihetta, kun taas läheisyys opettajien kanssa ja vähäiset ristiriidat äidin kanssa tukivat sopeutumista koko siirtymävaiheen ajan. Lisäksi tutkimuksessa tutkittiin kahta erilaista taustalla vaikuttavaa mekanismia siitä, miten temperamentti, sekä suhteiden laatu äidin ja opettajien kanssa vaikuttavat nuoren sosioemotionaaliseen kehitykseen. Ensinnäkin tutkimuksessa selvitettiin, ennakoiko nuorten temperamentti hänen sosioemotionaalista kehitystään äiti-, ja opettajasuhteiden laadun kautta. Tulokset osoittivat, että esimerkiksi vahvempi tahdonalainen itsesääntely ennusti nuorten sosioemotionaalista toimintaa lähimpien vanhempi-, ja opettajasuhteiden, sekä vähäisempien ristiriitatilanteiden kautta. Vahvempi ulospäinsuuntautuneisuus myös ennusti nuorten ulospäinsuuntautuvaa ongelmakäyttäytymistä korkeamman vanhempi-, ja opettajasuhteen konfliktien määrän kautta. Toiseksi tutkimuksessa selvitettiin, onko temperamentilla ja äiti- ja opettajasuhteiden laadulla yhdysvaikutusta nuorten

sosioemotionaaliseen kehitykseen. Tulokset osoittivat, että vahvempi ulospäin suuntautuneisuus ennusti korkeampaa prososiaalista käyttäytymistä, kun läheisyys äitien kanssa oli vähäistä. Lisäksi nuorilla, joilla oli vahvempi negatiivinen affektiivisuus ja konflikteja äitinsä kanssa, havaittiin enemmän ulospäin suuntautuvaa ongelmakäyttäytymistä. Osatutkimus II osoitti, että vanhemman ja opettajan tuki temperamentiltaan erilaisille oppilaille on erityisen tärkeää koulu-siirtymien aikana.

Osatutkimus III osoitti sen sijaan, että suurimmalla osalla hyvin sopeutuneista nuorista (64.9 %) oli paljon prososiaalista käyttäytymistä ja vähän ulospäin suuntautuvaa ongelmakäyttäytymistä toisen asteen koulutuksen siirtymävaiheessa. Aineistosta löytyi myös kolme pienempää nuorten alaryhmää, joilla oli eri tavoin ilmeneviä ja ajoittuvia sopeutumispulmia siirtymävaiheessa. Ensimmäisen alaryhmän nuorilla ilmeni kohtalaista prososiaalista käyttäytymistä ja paljon ulkoista ongelmakäyttäytymistä koko siirtymävaiheen ajan (25.8 %). Toisen alaryhmän nuorilla prososiaalisen käyttäytymisen määrä väheni ja ulkoinen ongelmakäyttäytyminen lisääntyi ennen siirtymävaihetta (7.4 %). Kolmannella alaryhmällä prososiaalisen käyttäytymisen määrä väheni ja ulkoinen ongelmakäyttäytyminen lisääntyi siirtymävaiheen jälkeen (1.9 %). Läheisyys ja vähäiset konfliktit vanhempien ja opettajien kanssa osoittautuivat keskeisiksi suojaaviksi tekijöiksi nuorten onnistuneelle siirtymälle toisen asteen koulutukseen. Sen sijaan nuoret, joilla oli alhainen tahdonalainen itsesäätely ja korkea negatiivinen affektiivisuus, olivat muita nuoria herkempiä kokemaan sopeutumispulmia uudessa kouluympäristössä.

Tämän väitöskirjan tulokset osoittivat, että vanhempien ja opettajien tuki voi edistää temperamentiltaan erilaisten oppilaiden sopeutumista kouluun siirtymien aikana. Tulokset osoittivat, että kahden koulutussiirtymän aikana prososiaalinen käyttäytyminen nuoruusiässä keskimäärin väheni ja ulospäin suuntautuva ongelmakäyttäytyminen lisääntyi. Tämä havainto osoittaa, että koulutussiirtymät voivat olla joillekin nuorille vaikeita sopeutua. Esimerkiksi oppilaat, joilla on vahvempi negatiivinen affektiivisuus, voivat olla herkempiä konflikteille vanhempien ja opettajien kanssa, sekä herkempiä kohtaamaan haasteita sopeutuessaan koulutuksen muutoksiin. Kuitenkin jopa opiskelijat, joilla on korkea tahdonalainen itsesäätely, saattavat tarvita lisätukea kohdatessaan uuden koulu-ympäristön. Siksi vanhempien ja opettajien tulee huomioida, että läheisten sosiaalisten suhteiden edistäminen on ratkaisevan tärkeää oppilaiden onnistuneelle sopeutumiselle koulutuksen siirtymävaiheissa.

REFERENCES

- Acar, I. H., Kutaka, T. S., Rudasill, K. M., Torquati, J. C., Coplan, R. J., & Yıldız, S. (2020). Examining the roles of child temperament and teacher-child relationships as predictors of Turkish children's social competence and antisocial behavior. *Current Psychology, 39*(6), 2231–2245. <https://doi.org/10.1007/s12144-018-9901-z>
- Ainsworth, M. S., & Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist, 46*(4), 333–341. <https://doi.org/10.1037/0003-066X.46.4.333>
- Allison, B. N. (2000). Parent-adolescent conflict in early adolescence: Precursor to adolescent adjustment and behavior problems. *Journal of Family and Consumer Sciences, 92*(5), 53–56.
- Anderson, L. W., Jacobs, J., Schramm, S., & Splittgerber, F. (2000). School transitions: Beginning of the end or a new beginning? *International Journal of Educational Research, 33*(4), 325–339.
- Baker, J. A. (2006). Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology, 44*(3), 211–229. <https://doi.org/10.1016/j.jsp.2006.02.002>
- Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2012). Temperament and parenting in developmental perspective. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 425–441). The Guilford Press.
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: differential susceptibility to environmental influences. *Psychological Bulletin, 135*(6), 885–908. <https://doi.org/10.1037/a0017376>
- Benner, A. D. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review, 23*(3), 299–328. <https://doi.org/10.1007/s10648-011-9152-0>
- Benner, A. D., Boyle, A. E., & Bakhtiari, F. (2017). Understanding students' transition to high school: Demographic variation and the role of supportive relationships. *Journal of Youth and Adolescence, 46*(10), 2129–2142. <https://doi.org/10.1007/s10964-017-0716-2>
- Benner, A. D., & Wang, Y. (2014). Shifting attendance trajectories from middle to high school: Influences of school transitions and changing school contexts. *Developmental Psychology, 50*(4), 1288–1301. <https://doi.org/10.1037/a0035366>
- Bos, M. G. N., Wierenga, L. M., Blankenstein, N. E., Schreuders, E., Tamnes, C. K., & Crone, E. A. (2018). Longitudinal structural brain development and externalizing behavior in adolescence. *Journal of Child Psychology and Psychiatry, 59*(10), 1061–1072. <https://doi.org/10.1111/jcpp.12972>
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry, 52*(4), 664–678. <https://doi.org/10.1111/j.1939-0025.1982.tb01456.x>

- Branje, S. (2018). Development of parent–adolescent relationships: Conflict interactions as a mechanism of change. *Child Development Perspectives*, 12(3), 171–176. <https://doi.org/10.1111/cdep.12278>
- Branje, S. J. T., van Doorn, M., van der Valk, I., & Meeus, W. (2009). Parent–adolescent conflicts, conflict resolution types, and adolescent adjustment. *Journal of Applied Developmental Psychology*, 30(2), 195–204. <https://doi.org/10.1016/j.appdev.2008.12.004>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. US: Harvard University Press.
- Bronfenbrenner, U., & Morris, P. A. (2007). The bioecological model of human development. *Handbook of Child Psychology*, 1, 793–828. <https://doi.org/10.1002/9780470147658.chpsy0114>
- Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an early adolescent temperament measure. *The Journal of Early Adolescence*, 12(2), 153–173. <https://doi.org/10.1177/0272431692012002002>
- Caprara, G. V., Kanacri, B. P. L., Gerbino, M., Zuffianò, A., Alessandri, G., Vecchio, G., Caprara, E., Pastorelli, C., & Bridglall, B. (2014). Positive effects of promoting prosocial behavior in early adolescence. *International Journal of Behavioral Development*, 38(4), 386–396. <https://doi.org/10.1177/0165025414531464>
- Caputi, M., Lecce, S., Pagnin, A., & Banerjee, R. (2012). Longitudinal effects of theory of mind on later peer relations: The role of prosocial behavior. *Developmental Psychology*, 48(1), 257–270. <https://doi.org/10.1037/a0025402>
- Carlo, G., Crockett, L. J., Randall, B. A., & Roesch, S. C. (2007). A latent growth curve analysis of prosocial behavior among rural adolescents. *Journal of Research on Adolescence*, 17(2), 301–324. <https://doi.org/10.1111/j.1532-7795.2007.00524.x>
- Carlo, G., Mestre, M. V., McGinley, M. M., Tur-Porcar, A., Samper, P., & Opal, D. (2014). The protective role of prosocial behaviors on antisocial behaviors: The mediating effects of deviant peer affiliation. *Journal of Adolescence*, 37(4), 359–366. <https://doi.org/10.1016/j.adolescence.2014.02.009>
- Carlo, G., Mestre, M. V., Samper, P., Tur, A., & Armenta, B. E. (2010). The longitudinal relations among dimensions of parenting styles, sympathy, prosocial moral reasoning, and prosocial behaviors. *International Journal of Behavioral Development*, 35(2), 116–124. <https://doi.org/10.1177/0165025410375921>
- Coulombe, B. R., & Yates, T. M. (2018). Prosocial pathways to positive adaptation: The mediating role of teacher–child closeness. *Journal of Applied Developmental Psychology*, 58, 9–17. <https://doi.org/10.1016/j.appdev.2018.08.003>
- Deater-Deckard, K., & Wang, Z. (2012). Anger and irritability. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 124–144). The Guilford Press.

- Denham, S. A., Wyatt, T. M., Bassett, H. H., Echeverria, D., & Knox, S. S. (2009). Assessing social-emotional development in children from a longitudinal perspective. *Journal of Epidemiology & Community Health*, 63 (Supplement 1), 37-52. <https://doi.org/10.1136/jech.2007.070797>
- De Jong, E. M., Koomen, H. M., Jellesma, F. C., & Roorda, D. L. (2018). Teacher and child perceptions of relationship quality and ethnic minority children's behavioral adjustment in upper elementary school: A cross-lagged approach. *Journal of School Psychology*, 70, 27-43. <https://doi.org/10.1016/j.jsp.2018.06.003>
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64(1), 135-168. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Dockett, S., & Perry, B. (2007). Children's transition to school: Changing expectations. In A.-W. Dunlop & H. Fabian (Eds.), *Informing transitions in the early years* (pp. 92-104). London: Open University Press.
- Driscoll, K., & Pianta, R. (2011). Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *Journal of Early Childhood and Infant Psychology*, 7, 1-24.
- Dunn, L. M., & Dunn, L. M. (1981). *Peabody picture vocabulary test – revised*. American Guidance Service.
- 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: Individual bases of adolescent development* (pp. 404-434). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470479193.adlpsy001013>
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*, 21(1), 225-241. <https://doi.org/10.1111/j.1532-7795.2010.00725.x>
- 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>
- Eisenberg, N. (1982). *The development of prosocial behavior* (pp. 3-11). Academic Press, Inc.
- Eisenberg, N., Lennon, R., & Roth, K. (1983). Prosocial development: A longitudinal study. *Developmental Psychology*, 19(6), 846-855. <https://doi.org/10.1037//0012-1649.19.6.846>
- Ellis, L. K. (2002). *Individual differences and adolescent psychosocial development* (Publication No. 3061943) [Doctoral dissertation, University of Oregon]. ProQuest Dissertations and Theses Global.
- Ellis, L. K., & Rothbart, M. K. (2001, April). *Revision of the early adolescent temperament questionnaire* [Poster presentation]. 2001 Biennial Meeting of the Society for Research in Child Development, Minneapolis, Minnesota.
- Ezpeleta, L., Penelo, E., Osa, N., Navarro, J. B., & Trepato, E. (2019). Irritability and parenting practices as mediational variables between temperament

- and affective, anxiety, and oppositional defiant problems. *Aggressive Behavior*, 45(5), 550–560. <https://doi.org/10.1002/ab.21850>
- Fanti, K. A., & Henrich, C. C. (2010). Trajectories of pure and co-occurring internalizing and externalizing problems from age 2 to age 12: Findings from the National Institute of Child Health and Human Development Study of Early Child Care. *Developmental Psychology*, 46(5), 1159–1175. <https://doi.org/10.1037/a0020659>
- Ferreira, T., Cadima, J., Matias, M., Vieira, J. M., Leal, T., & Matos, P. M. (2016). Preschool children's prosocial behavior: The role of mother-child, father-child and teacher-child relationships. *Journal of Child and Family Studies*, 25(6), 1829–1839. <https://doi.org/10.1007/s10826-016-0369-x>
- Finnish National Agency for Education (2014). *National core curriculum for basic education*. Ministry of Education and Culture. <https://www.oph.fi/en/education-and-qualifications/national-core-curriculum-basic-education>.
- Flynn, E., Ehrenreich, S. E., Beron, K. J., & Underwood, M. K. (2015). Prosocial behavior: Long-term trajectories and psychosocial outcomes. *Social Development*, 24(3), 462–482. <https://doi.org/10.1111/sode.12100>
- Gedutienė, R. (2008). *Besiformuojančio raštingumo komponentų ir šeimos veiksnių sąveika pereinant iš priešmokyklinio į mokyklinį amžių* [The associations between emerging literacy components and family factors in the transition from preschool to primary school] (Doctoral dissertation). Vilnius University.
- Georgiou, S. N., & Fanti, K. A. (2014). Transactional associations between mother-child conflict and child externalising and internalising problems. *Educational Psychology*, 34(2), 133–153. <https://doi.org/10.1080/01443410.2013.785055>
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., Hinde, R. A., & McCall, R. B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, 58(2), 505–529. <https://doi.org/10.2307/1130527>
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38, 581–586.
- Grolnick, W. S., Friendly, R. W., & Bellas, V. M. (2009). Parenting and children's motivation at school. In K. R. Wentzel & A. Wigfield (Eds.). *Handbook of motivation at school* (pp. 279–300). Routledge.
- 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://doi.org/10.1111/1467-8624.00301>
- Hanewald, R. (2013). Transition between primary and secondary school: Why it is important and how it can be supported. *Australian Journal of Teacher Education*, 38(1).
- Harvey, E., Lemelin, J. P., & Déry, M. (2022). Student-teacher relationship quality moderates longitudinal associations between child temperament

- and behavior problems. *Journal of School Psychology, 91*, 178–194.
<https://doi.org/10.1016/j.jsp.2022.01.007>
- Hernández, M. M., Valiente, C., Eisenberg, N., Berger, R. H., Spinrad, T. L., VanSchyndel, S. K., Silva, K. M., Southworth, J., & Thompson, M. S. (2017). Elementary students' effortful control and academic achievement: The mediating role of teacher–student relationship quality. *Early Childhood Research Quarterly, 40*, 98–109.
<https://doi.org/10.1016/j.ecresq.2016.10.004>
- Hirvonen, R., Väänänen, J., Aunola, K., Ahonen, T., & Kiuru, N. (2018). Adolescents' and mothers' temperament types and their roles in early adolescents' socioemotional functioning. *International Journal of Behavioral Development, 42*(5), 453–463. <https://doi.org/10.1177/0165025417729223>
- Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*(1), 127–155.
<https://doi.org/10.1037/0033-2909.111.1.127>
- Jambon, M., Madigan, S., Plamondon, A., & Jenkins, J. (2019). Developmental trajectories of physical aggression and prosocial behavior in early childhood: Family antecedents and psychological correlates. *Developmental Psychology, 55*(6), 1211–1225. <https://doi.org/10.1037/dev0000714>
- Jolicoeur-Martineau, A., Belsky, J., Szekely, E., Widaman, K., Pluess, M., Greenwood, C., & Wazana, A. (2020). Distinguishing differential susceptibility, diathesis-stress, and vantage sensitivity: Beyond the single gene and environment model. *Development and Psychopathology, 32*(1), 73–83. <https://doi.org/10.1017/S0954579418001438>
- Kang, J., Horn, E. M., & Palmer, S. (2017). Influences of family involvement in kindergarten transition activities on children's early school adjustment. *Early Childhood Education Journal, 45*(6), 789–800.
<https://doi.org/10.1007/s10643-016-0828-4>
- Karreman, A., de Haas, S., van Tuijl, C., van Aken, M. A. G., & Deković, M. (2010). Relations among temperament, parenting and problem behavior in young children. *Infant Behavior and Development, 33*(1), 39–49.
<https://doi.org/10.1016/j.infbeh.2009.10.008>
- Kitayama, S., Park, J., Miyamoto, Y., Date, H., Boylan, J. M., Markus, H. R., Karasawa, M., Kawakami, N., Coe, C. L., Love, G. D., & Ryff, C. D. (2018). Behavioral adjustment moderates the link between neuroticism and biological health risk: A U.S.–Japan comparison study. *Personality and Social Psychology Bulletin, 44*(6), 809–822.
<https://doi.org/10.1177/0146167217748603>
- Kiuru, N., & Ahonen, T. (2014–2019). *Tikapuu* [The stairway study–From primary school to upper secondary education.]. Jyväskylä: University of Jyväskylä.
- Kiuru, N., Laursen, B., Aunola, K., Zhang, X., Lerkkanen, M.-K., Leskinen, E., Tolvanen, A., Nurmi, J.-E. (2016). Positive teacher affect and maternal support facilitate adjustment after the transition to first grade. *Merrill-*

- Palmer Quarterly, 62(2), 158–178.
<https://doi.org/10.13110/merrpalmquar1982.62.2.0158>
- Klahr, A. M., Rueter, M. A., McGue, M., Iacono, W. G., & Alexandra Burt, S. (2011). The relationship between parent-child conflict and adolescent antisocial behavior: Confirming shared environmental mediation. *Journal of Abnormal Child Psychology*, 39(5), 683–694.
<https://doi.org/10.1007/s10802-011-9505-7>
- Klein, D. N., Dyson, M. W., Kujawa, A. J., & Kotov, R. (2012). Temperament and internalizing disorders. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 541–561). The Guilford Press.
- Laursen, B. P., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly*, 52(3), 377–389.
<https://doi.org/10.1353/mpq.2006.0029>
- Leany, B. D. (2013). Brain development and health implications in adolescents. In W. O'Donohue, L. Benuto, & L. Woodward Tolle (Eds.), *Handbook of adolescent health psychology* (pp. 235–244). New York, NY: Springer New York.
https://doi.org/10.1007/978-1-4614-6633-8_17
- Lengua, L. J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(5), 819–832.
<https://doi.org/10.1037/0012-1649.42.5.819>
- Lerkkanen, M.-K., Niemi, P., Poikkeus, A.-M., Poskiparta, M., Siekkinen, M., & Nurmi, J.-E. (2006–2016). *Alkuportaati* [The first steps study]. University of Jyväskylä.
- Lerkkanen, M.-K., Poikkeus, A.-M., & Ketonen, R. (2006). *ARMI – Lukuja kirjoitustaidon arviointimateriaali 1. luokalle* [ARMI – A tool for assessing reading and writing skills in first grade]. WSOY.
- Leve, L. D., Kim, H. K., & Pears, K. C. (2005). Childhood temperament and family environment as predictors of internalizing and externalizing trajectories from ages 5 to 17. *Journal of Abnormal Child Psychology*, 33(5), 505–520.
<https://doi.org/10.1007/s10802-005-6734-7>
- Liew, J., Valiente, C., Hernández, M. M., & Abrera, D. (2019). Self-regulation and reactivity, school-based relationships, and school engagement and achievement. In D. Whitebread, V. Grau, K. Kumpulainen, M. M. McClelland, N. E. Perry, & D. Pino-Pasternak (Eds.), *SAGE handbook of developmental psychology & early childhood education* (pp. 42–62). SAGE Publications, Inc.
<https://doi.org/10.4135/9781526470393.n3>
- Lippard, C. N., La Paro, K. M., Rouse, H. L., & Crosby, D. A. (2018). A closer look at teacher-child relationships and classroom emotional context in preschool. *Child & Youth Care Forum*, 47(1), 1–21.
<https://doi.org/10.1007/s10566-017-9414-1>
- LR Ministry of Education, Science, and Sports (2023, November 18). *Education*.
https://smsm.lrv.lt/en/sector-activities/education_1
- Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods*, 10(1), 21–39.
<https://doi.org/10.1037/1082-989X.10.1.21>

- Luengo Kanacri, B. P., Pastorelli, C., Eisenberg, N., Zuffianò, A., & Caprara, G. V. (2013). The development of prosociality from adolescence to early adulthood: The role of effortful control. *Journal of Personality, 81*(3), 302–312. <https://doi.org/10.1111/jopy.12001>
- Luengo Kanacri, B. P., Pastorelli, C., Thartori, E., Lunetti, C., Di Giunta, L., Bacchini, D., & Lansford, J. E. (2020). Longitudinal relations among maternal self-efficacy, maternal warmth, and early adolescents' prosocial behavior. *Parenting, 21*(1), 24–46. <https://doi.org/10.1080/15295192.2020.1777791>
- Lunetti, C., Iselin, A.-M. R., Di Giunta, L., Lansford, J. E., Eisenberg, N., Pastorelli, C., Bacchini, D., Uribe Tirado, L. M., Thartori, E., Basili, E., Fiasconaro, I., Favini, A., Gerbino, M., Cirimele, F., Remondi, C., Skinner, A. T., & Rothenberg, W. A. (2022). Development of internalizing symptoms during adolescence in three countries: The role of temperament and parenting behaviors. *European Child & Adolescent Psychiatry, 31*, 947–957. <https://doi.org/10.1007/s00787-021-01725-6>
- McKinnon, R. D., & Blair, C. (2018). Does early executive function predict teacher–child relationships from kindergarten to second grade? *Developmental Psychology, 54*(11), 2053–2066. <https://doi.org/10.1037/dev0000584>
- Martínez, R. S., Aricak, O. T., Graves, M. N., Peters-Myszak, J., & Nellis, L. (2011). Changes in perceived social support and socioemotional adjustment across the elementary to junior high school transition. *Journal of Youth and Adolescence, 40*(5), 519–530. <https://doi.org/10.1007/s10964-010-9572-z>
- Martin-Storey, A., Temcheff, C., Dery, M., Poirier, M., Verlaan, P., & Lemelin, J.-P. (2017). Trajectories of internalizing problems during the transition to adolescence in children with and without conduct problems. *International Journal of Behavioral Development, 42*(5), 464–473. <https://doi.org/10.1177/0165025417730681>
- Marušić, I., Jagodić, G. K., Erceg, I., & Šabić, J. (2020). Longitudinal study of individual, environmental and contextual factors predicting adaptation to the transition to lower secondary education. *Learning and Individual Differences, 83*–84. <https://doi.org/10.1016/j.lindif.2020.101946>
- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., Boelcke-Stennes, K., & Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology, 41*(5), 733–746. <https://doi.org/10.1037/0012-1649.41.5.733>
- Mattison, A., Raffaele Mendez, L. M., Dedrick, R., Dickinson, S., Wingate, E., & Hanks, C. (2018). Early elementary teacher ratings of behavior as predictors of grade retention: Race, gender, and socioeconomic status as potential moderators. *Psychology in the Schools, 55*(10), 1171–1187. <https://doi.org/10.1002/pits.22192>

- McMahon, R. J. (1994). Diagnosis, assessment, and treatment of externalizing problems in children: The role of longitudinal data. *Journal of Consulting and Clinical Psychology, 62*(5), 901–917. <https://doi.org/10.1037/0022-006x.62.5.901>
- Merritt, E. G., Wanless, S. B., Rimm-Kaufman, S. E., Cameron, C., & Peugh, J. L. (2012). The contribution of teachers' emotional support to children's social behaviors and self-regulatory skills in first grade. *School Psychology Review, 41*(2), 141–159. <https://doi.org/10.1080/02796015.2012.12087517>
- Mejia, T. M., & Hoglund, W. L. G. (2016). Do children's adjustment problems contribute to teacher–child relationship quality? Support for a child-driven model. *Early Childhood Research Quarterly, 34*, 13–26. <https://doi.org/10.1016/j.ecresq.2015.08.003>
- Memmott-Elison, M. K., Holmgren, H. G., Padilla-Walker, L. M., & Hawkins, A. J. (2020). Associations between prosocial behavior, externalizing behaviors, and internalizing symptoms during adolescence: A meta-analysis. *Journal of Adolescence, 80*(1), 98–114. <https://doi.org/10.1016/j.adolescence.2020.01.012>
- Metsäpelto, R.-L., Pakarinen, E., Kiuru, N., Poikkeus, A.-M., Lerkkanen, M.-K., & Nurmi, J.-E. (2015). Developmental dynamics between children's externalizing problems, task-avoidant behavior, and academic performance in early school years: A 4-year follow-up. *Journal of Educational Psychology, 107*(1), 246–257. <https://doi.org/10.1037/a0037389>
- Metsäpelto, R.-L., Taskinen, P., Kracke, B., Silinskas, G., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2017). Changes in achievement values from primary to lower secondary school among students with and without externalizing problems. *Learning and Individual Differences, 58*, 75–82. <https://doi.org/10.1016/j.lindif.2017.08.002>
- Ministry of Education and Culture (2023). *Suomen koulutusjärjestelmä [Finnish Educational System]*. <https://minedu.fi/koulutusjarjestelma>
- Muris, P., Meesters, C., & Blijlevens, P. (2007). Self-reported reactive and regulative temperament in early adolescence: Relations to internalizing and externalizing problem behavior and “Big Three” personality factors. *Journal of Adolescence, 30*(6), 1035–1049. <https://doi.org/10.1016/j.adolescence.2007.03.003>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Author.
- Newton, E. K., Laible, D., Carlo, G., Steele, J. S., & McGinley, M. (2014). Do sensitive parents foster kind children, or vice versa? Bidirectional influences between children's prosocial behavior and parental sensitivity. *Developmental Psychology, 50*(6), 1808–1816. <https://doi.org/10.1037/a0036495>
- Ng-Knight, T., Shelton, K. H., Riglin, L., McManus, I. C., Frederickson, N., & Rice, F. (2016). A longitudinal study of self-control at the transition to secondary school: Considering the role of pubertal status and parenting.

- Journal of Adolescence*, 50(1), 44–55.
<https://doi.org/10.1016/j.adolescence.2016.04.006>
- 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>
- Nurmi, J. E., Silinskas, G., Kiuru, N., Pakarinen, E., Turunen, T., Siekkinen, M., Tolvanen, A., Poikkeus, A. M., & Lerkkanen, M. K. (2018). A child's psychological adjustment impacts teachers' instructional support and affective response. *European Journal of Psychology of Education*, 33(4), 629–648. <https://doi.org/10.1007/s10212-017-0337-x>
- Obsuth, I., Murray, A. L., Malti, T., Sulger, P., Ribeaud, D., & Eisner, M. (2017). A non-bipartite propensity score analysis of the effects of teacher–student relationships on adolescent problem and prosocial behavior. *Journal of Youth and Adolescence*, 46(8), 1661–1687. <https://doi.org/10.1007/s10964-016-0534-y>
- Padilla-Walker, L. M., Carlo, G., & Memmott-Elison, M. K. (2017). Longitudinal change in adolescents' prosocial behavior toward strangers, friends, and family. *Journal of Research on Adolescence*, 28(3), 698–710.
<https://doi.org/10.1111/jora.12362>
- Padilla-Walker, L. M., Memmott-Elison, M. K., & Coyne, S. M. (2018). Associations between prosocial and problem behavior from early to late adolescence. *Journal of Youth and Adolescence*, 47(5), 961–975.
<https://doi.org/10.1007/s10964-017-0736-y>
- Padilla-Walker, L. M., Nielson, M. G., & Day, R. D. (2016). The role of parental warmth and hostility on adolescents' prosocial behavior toward multiple targets. *Journal of Family Psychology*, 30(3), 331–340.
<https://doi.org/10.1037/fam0000157>
- Pakarinen, E., Lerkkanen, M.-K., & von Suchodoletz, A. (2020). Teacher emotional support in relation to social competence in preschool classrooms. *International Journal of Research & Method in Education*, 43(4), 444–460. <https://doi.org/10.1080/1743727x.2020.1791815>
- Pakarinen, E., Silinskas, G., Hamre, B. K., Metsäpelto, R.-L., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2018). Cross-lagged associations between problem behaviors and teacher-student relationships in early adolescence. *The Journal of Early Adolescence*, 38(8), 1100–1141.
<https://doi.org/10.1177/0272431617714328>
- Palmu, I. R., Närhi, V. M., & Savolainen, H. K. (2017). Externalizing behaviour and academic performance – the cross-lagged relationship during school transition. *Emotional and Behavioural Difficulties*, 23(2), 111–126.
<https://doi.org/10.1080/13632752.2017.1376968>
- 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>

- Petersen, I. T., Bates, J. E., Dodge, K. A., Lansford, J. E., & Pettit, G. S. (2015). Describing and predicting developmental profiles of externalizing problems from childhood to adulthood. *Development and Psychopathology*, 27(3), 791–818. <https://doi.org/10.1017/s0954579414000789>
- Pianta, R. C. (1992). *Student–Teacher Relationship Scale – Short Form*. University of Virginia.
- Pianta, R. C. (2001). *Student–Teacher Relationship Scale–Short Form*. Lutz, FL: Psychological Assessment Resources, Inc.
- Pianta, R. C. (1997). Adult–child relationship processes and early schooling. *Early Education and Development*, 8(1), 11–26. https://doi.org/10.1207/s15566935eed0801_2
- Pianta, R. C., Nimetz, S. L., & Bennett, E. (1997). Mother–child relationships, teacher–child relationships, and school outcomes in preschool and kindergarten. *Early Childhood Research Quarterly*, 12(3), 263–280. [https://doi.org/10.1016/s0885-2006\(97\)90003-x](https://doi.org/10.1016/s0885-2006(97)90003-x)
- Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental psychology*, 53(5), 873–932. <https://doi.org/10.1037/dev0000295>
- Putnam, S. P., (2012). Positive emotionality. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 105–123). The Guilford Press.
- Putnam, S. P., Ellis, L. K., & Rothbart, M. K. (2001). The structure of temperament from infancy through adolescence. In A. Elias & A. Angleitner (Eds.), *Advances in research on temperament* (pp. 165–182). Lengerich, Germany: Pabst Science.
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children’s Behavior Questionnaire. *Journal of Personality Assessment*, 87(1), 102–112. https://doi.org/10.1207/s15327752jpa8701_09
- Ramos, M. C., Guerin, D. W., Gottfried, A. W., Bathurst, K., & Oliver, P. H. (2005). Family conflict and children’s behavior problems: The moderating role of child temperament. *Structural Equation Modeling*, 12(2), 278–298. https://doi.org/10.1207/s15328007sem1202_6
- Razza, R. A., & Raymond, K. (2012). Associations among maternal behavior, delay of gratification, and school readiness across the early childhood years. *Social Development*, 22(1), 180–196. <https://doi.org/10.1111/j.1467-9507.2012.00665.x>
- Rende, R. D., & Plomin, R. (1992). Relations between first grade stress, temperament, and behavior problems. *Journal of Applied Developmental Psychology*, 13(4), 435–446. [https://doi.org/10.1016/0193-3973\(92\)90011-6](https://doi.org/10.1016/0193-3973(92)90011-6)
- 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. <https://doi.org/10.1037/0003-066x.55.1.68>
- Roeser, R. W., Eccles, J. S., & Strobel, K. R. (1998). Linking the study of schooling and mental health: Selected issues and empirical illustrations at the level

- of the individual. *Educational Psychologist*, 33(4), 153–176.
https://doi.org/10.1207/s15326985ep3304_2
- Roorda, D. L., & Koomen, H. M. (2021). Student–teacher relationships and students’ externalizing and internalizing behaviors: A cross-lagged study in secondary education. *Child Development*, 92(1), 174–188.
<https://doi.org/10.1111/cdev.13394>
- Roorda, D. L., Zee, M., & Koomen, H. M. Y. (2020). Don’t forget student-teacher dependency! A meta-analysis on associations with students’ school adjustment and the moderating role of student and teacher characteristics. *Attachment & Human Development*, 23(5), 490–503.
<https://doi.org/10.1080/14616734.2020.1751987>
- Rothbart, M. K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, 16(4), 207–212.
<https://doi.org/https://doi.org/10.1111/j.1467-8721.2007.00505.x>
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The children’s behavior questionnaire. *Child Development*, 72(5), 1394–1408.
<https://doi.org/10.1111/1467-8624.00355>
- Rudasill, K. M., Reio, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student–teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology*, 48(5), 389–412. <https://doi.org/10.1016/j.jsp.2010.05.001>
- Rueda, M. R. (2012). Effortful control. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 145–167). The Guilford Press.
- Rushton, J. P. (1982). Social learning theory and the development of prosocial behavior. In N. Eisenberg (Eds.), *The development of prosocial behavior* (pp. 86–95). Academic Press, Inc.
- Rutter, M. L. (1997). Nature–nurture integration: The example of antisocial behavior. *American Psychologist*, 52(4), 390–398.
<https://doi.org/10.1037/0003-066x.52.4.390>
- Sameroff, A. J., & Mackenzie, M. J. (2003). Research strategies for capturing transactional models of development: The limits of the possible. *Development and Psychopathology*, 15(3), 613–640.
<https://doi.org/10.1017/S0954579403000312>
- Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype → environment effects. *Child Development*, 54(2), 424–435. <https://doi.org/10.2307/1129703>
- Scrimin, S., Moscardino, U., Finos, L., & Mason, L. (2019). Effects of psychophysiological reactivity to a school-related stressor and temperament on early adolescents’ academic performance. *The Journal of Early Adolescence*, 39(6), 904–931.
<https://doi.org/10.1177/0272431618797008>
- Shi, Q., & Ettekal, I. (2021). Co-occurring trajectories of internalizing and externalizing problems from grades 1 to 12: Longitudinal associations with teacher-child relationship quality and academic performance. *Journal*

- of *Educational Psychology*, 113(4), 808–829.
<https://doi.org/10.1037/edu0000525>
- Shi, Q., Ettekal, I., Deutz, M. H. F., & Woltering, S. (2020). Trajectories of pure and co-occurring internalizing and externalizing problems from early childhood to adolescence: Associations with early childhood individual and contextual antecedents. *Developmental Psychology*, 56(10), 1906–1918.
<https://doi.org/10.1037/dev0001095>
- Shi, Q., Ettekal, I., Liew, J., & Woltering, S. (2021). Predicting differentiated developmental trajectories of prosocial behavior: A 12-year longitudinal study of children facing early risks and vulnerabilities. *International Journal of Behavioral Development*, 45(4), 327–336.
<https://doi.org/10.1177/0165025420935630>
- Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives*, 6(4), 436–444.
<https://doi.org/10.1111/j.1750-8606.2012.00254.x>
- Symonds, J. (2015). *Understanding school transition: What happens to children and how to help them* (1st ed.). Routledge.
<https://doi.org/10.4324/9781315714387>
- Silinskas, G., Dietrich, J., Pakarinen, E., Kiuru, N., Aunola, K., Lerkkanen, M.-K., Hirvonen, R., Muotka, J., & Nurmi, J.-E. (2015). Children evoke similar affective and instructional responses from their teachers and mothers. *International Journal of Behavioral Development*, 39(5), 432–444.
<https://doi.org/10.1177/0165025415593648>
- Silinskas, G., Gedutiene, R., Torppa, M., & Raiziene, S. (2024). Simple view of reading across the transition from kindergarten to grade 1 in a transparent orthography. *Scientific Studies of Reading*, 28(1), 60–78.
<https://doi.org/10.1080/10888438.2023.2220848>
- Silinskas, G., & Raiziene, S. (2017–2018). *Get involved! Transition to grade 1*. Jyväskylä: University of Jyväskylä.
- Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2010). The impact of parents, child care providers, teachers, and peers on early externalizing trajectories. *Journal of School Psychology*, 48(6), 555–583.
<https://doi.org/10.1016/j.jsp.2010.08.003>
- Skalická, V., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher conflict, children’s social skills and externalizing behavior. *International Journal of Behavioral Development*, 39(5), 413–425.
<https://doi.org/10.1177/0165025415584187>
- Tackett, J. L., Martel, M. M., & Kushner, S. C. (2012). Temperament, externalizing disorders, and attention-deficit/hyperactivity disorder. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 562–580). The Guilford Press.
- Tunkkari, M., Aunola, K., Hirvonen, R., Silinskas, G., & Kiuru, N. (2022). A person-oriented approach to maternal homework involvement during the

- transition to lower secondary school. *Learning and Individual Differences*, 97, 102164. <https://doi.org/10.1016/j.lindif.2022.102164>
- 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., Kiuru, N., Lerkkanen, M.-K., & Poikkeus, A.-M. (2020). The role of perceived social support as a contributor to the successful transition from primary to lower secondary school. *Scandinavian Journal of Educational Research*, 64(7), 967–983. <https://doi.org/10.1080/00313831.2019.1639816>
- Virtanen, T., Vasalampi, K., Lerkkanen, M.-K., Pelkonen, J., & Poikkeus, A.-M. (2022). Stability of social support during school transitions: Associations with truancy and not completing upper secondary education in normative time. *Learning and Instruction*, 82, 101663. <https://doi.org/10.1016/j.learninstruc.2022.101663>
- Von Suchodoletz, A., Trommsdorff, G., Heikamp, T., Wieber, F., & Gollwitzer, P. M. (2009). Transition to school: The role of kindergarten children's behavior regulation. *Learning and Individual Differences*, 19(4), 561–566. <https://doi.org/10.1016/j.lindif.2009.07.006>
- Wang, F. L., Eisenberg, N., Valiente, C., & Spinrad, T. L. (2016). Role of temperament in early adolescent pure and co-occurring internalizing and externalizing problems using a bifactor model: Moderation by parenting and gender. *Development and Psychopathology*, 28(4pt2), 1487–1504. <https://doi.org/10.1017/s0954579415001224>
- Waters, S., Lester, L., & Cross, D. (2014). How does support from peers compare with support from adults as students transition to secondary school? *Journal of Adolescent Health*, 54(5), 543–549. <https://doi.org/10.1016/j.jadohealth.2013.10.012>
- Weidman, A. C., Augustine, A. A., Murayama, K., & Elliot, A. J. (2015). Internalizing symptomatology and academic achievement: Bi-directional prospective relations in adolescence. *Journal of Research in Personality*, 58, 106–114. <https://doi.org/10.1016/j.jrp.2015.07.005>
- Wentzel, K. R. (2009). Students' relationships with teachers as motivational contexts. In K. R. Wentzel & A. Wigfield (Eds.). *Handbook of motivation at school* (pp. 301–322). Routledge.
- Wu, G., & Zhang, L. (2022). Longitudinal Associations between teacher-student relationships and prosocial behavior in adolescence: The mediating role of basic need satisfaction. *International Journal of Environmental Research and Public Health*, 19(22), 14840. <https://doi.org/10.3390/ijerph192214840>
- Zarra - Nezhad, M., Kiuru, N., Aunola, K., Zarra - Nezhad, M., Ahonen, T., Poikkeus, A., Lerkkanen, M., & Nurmi, J. (2014). Social withdrawal in children moderates the association between parenting styles and the

children's own socioemotional development. *Journal of Child Psychology and Psychiatry*, 55(11), 1260–1269. <https://doi.org/10.1111/jcpp.12251>

Zentner, M. (2020). Identifying child temperament risk factors from 2 to 8 years of age: Validation of a brief temperament screening tool in the US, Europe, and China. *European Child & Adolescent Psychiatry*, 29(5), 665–678. <https://doi.org/10.1007/s00787-019-01379-5>



ORIGINAL PAPERS

I

TEACHER- AND PARENT-CHILD RELATIONSHIPS AND CHILDREN'S ADJUSTMENT BEHAVIORS IN GRADE 1: THE ROLE OF TEMPERAMENT

by

Vilija Jaruseviciute, Noona Kiuru, & Gintautas Silinskas, 2022

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Teacher- and Parent-Child Relationships and Children's Adjustment Behaviors in Grade 1: The Role of Temperament

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Abstract

This study aimed at investigating the reciprocal longitudinal associations between teacher- and parent-child relationships and children's adjustment behaviors during Grade 1, and the role of the child's temperament in this interplay. The longitudinal study followed Lithuanian children (229 in kindergarten [T0], 337 at the beginning of Grade 1 [T1], 341 at the end of Grade 1 [T2]), their parents, and their Grade 1 teachers ($n = 24$). The parents and teachers reported on the quality of their relationship with the children during Grade 1. In addition, parents reported on the children's temperament in kindergarten, and the teachers reported on the children's adjustment behaviors during Grade 1. The results showed evocative effects of children's adjustment behaviors at the beginning of Grade 1 on the relationship quality at the end of Grade 1. In particular, prosocial behavior positively predicted teacher-child closeness, and high externalizing problems positively predicted teacher-child and parent-child conflict. In addition, we identified two indirect paths from children's temperamental surgency to closeness with teachers via prosocial behavior and to conflicts with teachers via externalizing problems. The results of the present study suggest that children's characteristics, such as temperament and adjustment behaviors, predict particularly teachers' and, to some extent, parents' perceptions of their relationship quality with the child at the beginning of children's school career.

Keywords: teacher-child relationship, parent-child relationship, externalizing problems, prosocial behavior, temperament

Teacher- and Parent-Child Relationships and Children's Adjustment Behaviors in Grade 1: The Role of Temperament

At the beginning of primary school (Grade 1), children may face not only academic but also adjustment challenges, as they must adapt to a new learning environment and learn to behave in an expected manner at school (Dockett & Perry, 2007). At this stage, support from teachers and parents is crucial to ensure the successful adjustment of children (Kiuru et al., 2016; Pianta & Stuhlman, 2004). One of the indicators of successful adjustment is prosocial behavior, which has been shown to support academic learning and success in social relationships (Coulombe & Yates, 2018; Nurmi et al., 2018). On the other hand, children's externalizing problems can lead to lower task persistence, interest, and academic achievement (Hinshaw, 1992; Metsäpelto et al., 2015). Research has shown that close relationships with teachers and parents can promote children's prosocial behavior (Nurmi et al., 2018; Padilla-Walker et al., 2016), whereas frequent conflicts are associated with externalizing problems (e.g., Acar et al., 2019; Skalická et al., 2015). On the other hand, children's adjustment behaviors can have evocative effects on the reactions of parents and teachers (Coulombe & Yates, 2018; Mejia & Hoglund, 2016; Silinskas et al., 2015). However, most previous studies have focused on children's negative adjustment outcomes such as externalizing (e.g., Mejia & Hoglund, 2016), and less attention has been paid to positive adjustment outcomes such as prosocial behavior (e.g., Coulombe & Yates, 2018). Moreover, little is known about the reciprocal dynamics between parent- and teacher-child relationships and children's adjustment behavior after the critical transition to school (Grade 1). Finally, as far as we know, no previous studies have considered the role of child temperament in the reciprocal dynamics between teacher- and parent-child relationships and children's adjustment behaviors. Consequently, the present study investigated the bidirectional effects of the quality of both teacher- and parent-child relationships and prosocial behavior and externalizing problems during Grade 1 as well as the direct and indirect roles that child temperament plays in these dynamics.

Teacher- and Parent-Child Relationships and Children's Adjustment Behaviors at the Beginning of Their School Career

During the transition to primary school, children face changes in their surroundings, social network, and teaching approaches, as well as new academic and social demands (Kiuru et al., 2016; Dockett & Perry, 2007). These multiple changes can lead to stress and adjustment problems among some children, also affecting their subsequent academic performance (Rende & Plomin, 1992). Thus, to foster positive experiences at the beginning of the school career it is important to increase our understanding of the factors that contribute to the adjustment of children. Most previous studies have concentrated on either the positive or negative aspects of children's adjustment (e.g., Coulombe & Yates, 2018; Nurmi et al., 2018; Pakarinen et al., 2018; Skalicka et al., 2015). Therefore, we considered both prosocial behavior and externalizing problems as indicators of adjustment. Prosocial behavior is a socializing process that encompasses intentional positive behavior, such as being able to control one's behavior, helping, sharing, and comforting or empathizing to increase the well-being

of another person (Eisenberg, 1982; Rushton, 1982). Externalizing problems, in turn, encompass antisocial and disruptive childhood behavior that manifests through impulsiveness, attention problems, aggressive behavior, hyperactivity, and conduct problems (Hinshaw, 1992; McMahon, 1994).

Relationships with others can either promote or become detrimental to the adjustment of children at the beginning of school. According to attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1982), relationships with significant others are crucial for the survival and healthy development of humans. The first attachment relationships are formed with parents, and when children enter educational settings, teachers also influence children's experiences at school (Bowlby, 1982; Hamre & Pianta, 2001). In this study, we examined both closeness and conflict in children's relationships with their parents and teachers (Pianta, 1992a; Pianta, 1992b; Pianta, 2001). Closeness encompasses warm and trustful relationships, while conflict encompasses tension and negativity between children and their parents and teachers. Parents actively observe children at home and teachers observe children in the classroom and can well identify the relationship quality with them. Therefore, the measurements of teacher- and parent-child relationships utilized were based on the perceptions of teachers and parents (Hamre & Pianta, 2001). Previous studies showed that warm and supportive relationships with teachers (Nurmi et al., 2018; Pakarinen et al., 2020) and parents (Ferreira et al., 2016; Kiuru et al., 2016; Padilla-Walker et al., 2016) promote prosocial behavior. Meanwhile, conflictual relationships with teachers and parents have been shown to predict children's externalizing problems (Leve et al., 2005; Silver et al., 2010; Skalická et al., 2015).

However, children's adjustment behaviors may also evoke close or conflicting relationships with parents and teachers. According to the transactional model (Sameroff & Mackenzie, 2003), there is a bidirectional link between children and their social context. The theory indicates that relationships with parents and teachers predict changes in children's behavior, while the reactions from parents and teachers are dependent on children's adjustment behaviors as well. Previous studies have shown that children's prosocial behavior predicts the positive and close relationships with teachers and parents (Coulombe & Yates, 2018; Newton et al., 2014; Nurmi et al., 2018), whereas children's externalizing problems have been found to predict the higher negative affect of teachers and mothers (Silinskas et al., 2015), conflicts with teachers (Mejia & Hoglund, 2016; Skalická et al., 2015) and overreactive parenting (Awada & Shelleby, 2021). Previous studies have also shown the bidirectional effects between the teacher's positive affect and the prosocial behavior of children (Nurmi et al., 2018), teacher-student conflict and externalizing problems (Skalicka et al., 2015), parental sensitivity and the prosocial behavior of children (Newton et al., 2014), and mother-child conflict and externalizing problems of 7 to 9-year-old children (Georgiou & Fanti, 2014). However, to the best of our knowledge, none of the previous bidirectional studies focused on children during the critical transition to school.

The Role of Temperament in the Interplay between Relationship Quality and Adjustment Behaviors

The relationship quality between children and their teachers and parents, as well as children's adjustment behaviors, are also shaped by children's individual characteristics, such as temperament (Gusdorf et al., 2011; Hernandez et al., 2017; Liew et al., 2019; Nurmi, 2012; Rudasill & Rimm-Kaufman, 2009). Temperament is typically understood as basic dispositions of individual differences in the expression of activity, affectivity, attention, and self-regulation, which are shaped by the interplay between biological and environmental factors (Goldsmith et al., 1987; Shiner et al., 2012). Even though temperament emerges early in life and is relatively stable, also maturation, socialization, and various experiences of situations play a role in the manifestation of temperament (Putnam et al., 2001; Shiner et al., 2012). Some temperament traits, especially self-regulative aspects of temperament become more stable only later in childhood (Posner & Rothbart, 2007). According to Rothbart et al. (2001), there are three major dimensions of temperament: extraversion (surgency), negative affectivity, and effortful control. Extraversion/surgency has been defined as positive emotionality, activeness, and impulsivity (Rothbart et al., 2001). Negative affectivity encompasses discomfort, negative emotionality, sensitivity to negative feelings, and difficulty in recovering from negative experiences. Effortful control refers to self-regulation, the ability to focus attention, and constructively direct behavior and emotions (Rothbart et al., 2001).

Temperament affects the way children behave (Harvey et al., 2022; Liew et al., 2019; Rothbart et al., 2001; Shiner et al., 2012). For instance, negative affectivity increases the fearfulness of children to interact with people, which can negatively affect prosocial behavior. In addition, higher effortful control can prevent children from externalizing problems (Liew et al., 2019). Moreover, higher surgency has been found to predict higher externalizing problems during school entry (Harvey et al., 2022). Hirvonen et al. (2018) have found among adolescents that low effortful control and high negative affectivity are more detrimental characteristics than surgency for adolescents' socioemotional development. Moreover, low effortful control has been found to predict children's increased behavioral problems (Kim et al., 2013). In turn, high experienced stress in Grade 1 has been found to increase the risk of externalizing problems for children who score high in negative emotionality and activity, and those who are low in sociability (Rende & Plomin, 1992). Apart from these exceptions, previous literature on the topic is scarce.

Child temperament also contributes to their social skills, which are critical for the formation of relationships with teachers and parents (Liew et al., 2019; Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983). For instance, children with higher self-regulation (i.e., effortful control) are received more positively by their teachers than children with higher reactivity (i.e., surgency and negative affectivity), thereby forming closer teacher-child relationships (Hernandez et al., 2017; Liew et al., 2019). Rudasill and Rimm-Kaufman (2009) have found that the lower effortful control of children predicted conflict with teachers, while stronger effortful control predicted close relationships with teachers. Rudasill et al. (2010) have also shown the effect of children's higher temperamental activity, aggression, approach, and lower inhibitory

control on conflicts with teachers. In addition, children's higher negative affectivity and surgency were linked to higher conflicts with parents and teachers and less close relationships with parents (Acar et al., 2018). Moreover, children with higher effortful control were closer to their teachers and engaged in fewer conflicts with them (Acar et al., 2018). Lengua and Kovacs (2005) have also found that temperament in terms of fearfulness and positive emotionality in middle childhood predicted higher maternal acceptance and irritability predicted more inconsistent discipline from parents. As the beginning of primary school can be a sensitive period, the manifestation of temperamental characteristics can either help (e.g., effortful control) or act as an unfavorable characteristic (e.g., negative affectivity) for the adjustment of children. Therefore, close relationships and absence of conflict with parents and teachers can be crucial in order to promote prosocial behavior and hinder externalizing problems, especially for those who might be more temperamentally susceptible to maladjustment.

Finally, the indirect effects of temperament on relationship quality through adjustment behaviors and of temperament on adjustment behaviors through relationship quality could also be presumed (see also Ezpeleta et al., 2019; Karreman et al., 2010; Rudasill et al., 2010). Among the handful of available studies, the results are nevertheless inconclusive. In one study Karreman et al. (2010) did not find any significant indirect effects of temperament on preschoolers' problem behavior through parenting. In another study, Ezpeleta et al. (2019) found that the lower effortful control of children (age 3) predicted higher affective problems (age 7) through less positive parenting practices (age 6). Similarly, Rudasill et al. (2010) have found that temperament (i.e., higher activity, aggression, approach, and lower inhibitory control) of 4.5-year-old children predicted the risky behavior of adolescents in Grade 6 through increased conflicts with teachers in Grades 4, 5, and 6. Nevertheless, previous research concerned either very young children or adolescents. Thus, there is a lack of research that analyzes how temperament indirectly evokes relationship quality and adjustment behaviors at the beginning of school, Grade 1.

Research Questions

The following research questions were examined (see Figure 1):

1. To what extent does the quality of teacher- and parent-child relationships (i.e., closeness and conflict) predict children's adjustment behaviors (i.e., prosocial behavior and externalizing problems) in Grade 1? We expected that high teacher- and parent-child closeness would predict children's higher prosocial behavior in Grade 1 (Hypothesis 1a). Moreover, we hypothesized that a high degree of teacher- and parent-child conflict would predict higher externalizing problems in Grade 1 (Hypothesis 1b).

2. To what extent do children's prosocial behavior and externalizing problems predict the quality of teacher- and parent-child relationships in Grade 1? We expected that a high degree of prosocial behavior would predict higher teacher- and parent-child closeness in Grade 1 (Hypothesis 2a). Moreover, we expected that a high degree of externalizing problems would predict higher teacher- and parent-child conflict in Grade 1 (Hypothesis 2b).

3. To what extent do children’s temperament (i.e., surgency/extraversion, negative affectivity, and effortful control) directly and indirectly predict children’s adjustment behaviors through the quality of teacher- and parent-child relationships? To what extent do children’s temperament directly and indirectly through adjustment behaviors predict the quality of teacher- and parent-child relationships? We expected that high surgency, high negative affectivity, and low effortful control in children would directly and indirectly through conflicting and less close relationships with parents and teachers predict higher externalizing problems and lower prosocial behavior (Hypothesis 3a). It was also expected that high surgency, high negative affectivity, and low effortful control would directly and indirectly through more externalizing problems and less prosocial behavior of children evoke higher conflicts and lower closeness with teachers and parents (Hypothesis 3b).

Previous research has shown that boys engage in more conflicts and externalizing behaviors than girls do (Baker, 2006; Hamre & Pianta, 2001). In addition, the relationship quality and adjustment behaviors of children relate to children’s early literacy skills (Lippard et al., 2018; Pianta et al., 1997) and the parents’ education (Mattison et al., 2018; Pakarinen et al., 2018). Consequently, the effects of children’s gender, early literacy skills, and the highest level of parent education were controlled for.

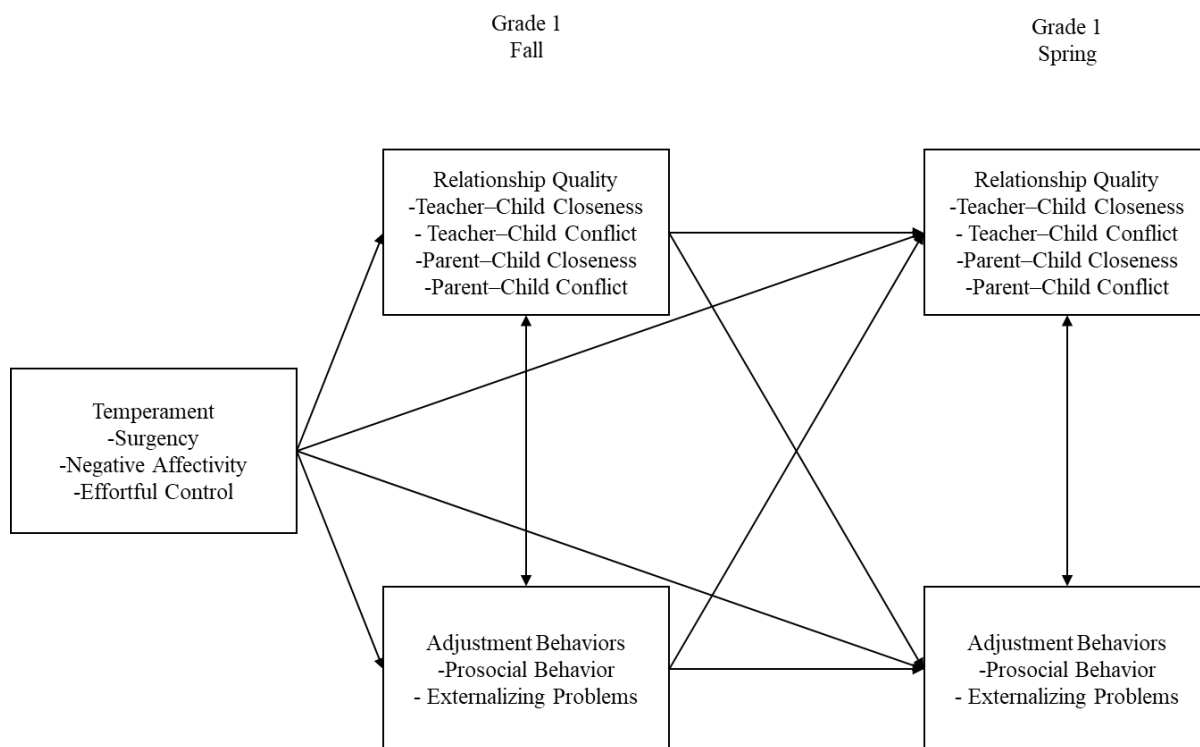


FIGURE 1 Theoretical model of longitudinal associations between relationship quality, adjustment behaviors, and temperament of children across grade 1.

Method

Participants and Procedures

The current study is based on longitudinal data (Silinskas & Raiziene, 2017–2018) that followed Lithuanian children during three time points across the transition from kindergarten to primary school. The participants were children (229 in kindergarten [T0], 337 at the beginning of Grade 1 [T1], 341 at the end of Grade 1 [T2]), their parents (245 in kindergarten [T0], 347 at the beginning of Grade 1 [T1], 323 at the end of Grade 1 [T2]) and Grade 1 teachers (24 at the beginning of Grade 1 [T1], 25 at the end of Grade 1 [T2]). Each teacher reported about their classroom children ($M = 14$ [1, 21]). The study protocol was approved by the Ethical Committee of the University of Jyväskylä (3.5.2017).

The study included participants from six schools in Lithuania that were selected according to the distribution of urban and rural localities: 65% urban and 35% rural. Each school was contacted and informed about the goals of the data collection. Meetings were organized at the schools to introduce the study and its procedures to the school administration, school psychologists, and teachers. School psychologists were introduced to the instructions and were trained to perform the children's tests. Consent to participate in the data collection process was collected from the parents regarding their own and their children's participation.

In the current study, the children (53.8% girls and 46.2% boys), their parents, and their Grade 1 teachers across the time points (kindergarten, T0; the beginning of Grade 1, T1; end of Grade 1, T2) participated. Kindergarten education is compulsory in Lithuania since 2016. Primary education lasts from Grade 1 to Grade 4 and begins when children are around seven years old. The mean age of the children in our sample at the end of kindergarten was 6.83 years ($SD = 0.30$). The majority of children lived together with both of their parents (80.4%), 10.6% lived only with their mother, 4.2% lived with their mother and stepfather, and the remaining children lived either with only their father, father and stepmother, guardian, grandparent, or other. It was mostly the mothers who answered the questionnaires: 92.2%, 91.1%, and 88.7% at T0, T1, and T2, respectively. Most of the parents had a university degree (63% of mothers and 52.5% of fathers) or graduated from college or polytechnic school (18.8% of mothers and 26.9% of fathers); 12.1% of mothers and 15.3% of fathers had finished 12 or fewer grades. All children attended Lithuanian-speaking schools. Most of them spoke Lithuanian at home, except for 2% of the children who spoke only Russian, and 1% who spoke only Polish at home.

Measures

The psychometric properties of all study variables are presented in Table 1.

Teacher-Child Relationship (T1, T2). The primary school teachers answered questions about the perceived quality of their relationship with each child individually, both in Grade 1 Fall (T1) and Grade 1 Spring (T2). The teachers rated 15 items on a five-point Likert scale (1 = *Completely disagree*; 5 = *Completely agree*) of the short form of the Student-Teacher Relationship Scale (STRS; Pianta, 1992a; Pianta,

2001). The scale consists of two subscales: Closeness (8 items; e.g., “I share an affectionate, warm relationship with this child”) and Conflict (7 items; e.g., “This child easily becomes angry with me”). The Cronbach’s α in Grade 1 Fall was as follows: closeness .74, conflict .91; in Grade 1 Spring: closeness .80, conflict .94.

Parent-Child Relationship (T1, T2). The parents answered questions about the perceived close or conflicting relationships with their children both in Grade 1 Fall (T1) and Grade 1 Spring (T2). The parents rated 15 items on a five-point Likert scale (1 = *Completely disagree*; 5 = *Completely agree*) of the short form of the Child-Parent Relationship Scale (CPRS; Pianta, 1992b). The scale consists of two subscales: Closeness (8 items; e.g., “If upset, my child will seek comfort from me”) and Conflict (7 items; e.g., “My child and I always seem to be struggling with each other”). The Cronbach’s α for each in Grade 1 Fall was as follows: closeness .71, conflict .80; in Grade 1 Spring: closeness .73, conflict .85.

Adjustment Behaviors (T1, T2). The teachers answered the Lithuanian version of the Strengths and Difficulties Questionnaire (SDQ-Lit; Goodman, 1997; for psychometric properties and validity in the Lithuanian sample, see Gintilienė et al., 2004) in Grade 1 Fall (T1) and Grade 1 Spring (T2). The teachers rated each question on a 3-point Likert scale (from 1 = *Not True* to 3 = *Certainly True*). Externalizing problems were measured by 10 items: 5 items from the hyperactivity scale (e.g., “Constantly fidgeting or squirming”) and 5 items from the conduct problems scale (e.g., “Often fights with other children or bullies them”). Prosocial behavior was measured by 5 items, such as “Shares readily with other children (treats, toys, pencils, etc.)”. To estimate the externalizing problems of the children, the mean score of the standardized hyperactivity and conduct problems scales was calculated. In Grade 1 Fall, the Cronbach’s α for each was as follows: hyperactivity scale .84 and conduct problems scale .72 (externalizing problems .86), prosocial behavior scale .85. In Grade 1 Spring, these were: hyperactivity scale .85 and conduct problems scale .77 (externalizing problems .88), prosocial behavior scale .89.

Child Temperament (T0). The parents reported on their children’s temperament in kindergarten (T0) and at the beginning of Grade 1 (for children who joined the study in T1) by filling in the Children’s Behavior Questionnaire-Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006; Rothbart et al., 2001; for psychometric properties and validity in the Lithuanian sample, see Breidokienė & Jusienė, 2014). The scale includes 36 items that were rated on a scale from 1 to 7 (1 = *Does not fit at all*, 7 = *Fits me very well*). The questionnaire includes three scales, each representing a different dimension of temperament: surgency/extraversion (e.g., “Seems always in a big hurry to get from one place to another”), negative affectivity (e.g., “Tends to become sad if the family’s plans don’t work out”), and effortful control (e.g., “Is good at following instructions”). The Cronbach’s α for the temperament scales were as follows: surgency/extraversion scale .75, negative affectivity scale .70, effortful control scale .75.

Control Variables (T0). The effects of three control variables, measured in kindergarten (T0), were controlled for (gender, highest parent education, and early literacy skills). *Gender* was coded as 1 (for girls) or 2 (for boys). The parents reported on the *education* of both fathers and mothers, and the higher of the two was chosen for further analysis (1 = *have finished 0–8 years*; 2 = *9–10 years*; 3 = *11–12 years*, 4 = *college or*

polytechnics, 5 = *university*). To measure *early literacy skills* in kindergarten, the children completed vocabulary, phonological awareness, letter knowledge, reading, and spelling tasks. The tests were adapted from the First Steps Study (Lerkkanen et al., 2006–2016), the ARMI test battery (Lerkkanen et al., 2006), and the doctoral dissertation of Gedutienė (2008). During the *vocabulary* test (PPVT-R, Form L; Dunn & Dunn, 1981), school psychologists presented 30 words that children had to recognize in pictures (4 pictures for each word). *Phonological awareness* included phoneme identification (identification of the first phoneme of 12 words) and phoneme deletion (deletion of the first phoneme of 12 words). To measure *letter knowledge*, the children were presented with all 32 letters from the Lithuanian alphabet. The *reading* test included 16 words that children were asked to read within 45 seconds in total. During the *spelling* test, psychologists asked children to write down eight words. For all the tests, children received one point if they pointed to or pronounced the correct answer aloud. The only exception was the spelling test, where the words were scored from 0 to 4 (e.g., 0 – incorrectly spelled word; 4 – correctly spelled word). The final score of the early literacy skills was calculated by averaging the standardized scores (*z* scores) of all the tests.

TABLE 1 Descriptive Statistics of Study Variables.

| | <i>n</i> | <i>M</i> | <i>SD</i> | <i>Potential range</i> | <i>Actual range</i> | <i>Skewness</i> |
|-----------------------------------|----------|----------|-----------|------------------------|---------------------|-----------------|
| Teacher-child closeness T1 | 342 | 3.97 | 0.54 | 1-5 | 2-5 | -0.38 |
| Teacher-child closeness T2 | 335 | 3.84 | 0.60 | 1-5 | 2-5 | -0.56 |
| Teacher-child conflict T1 | 342 | 1.57 | 0.70 | 1-5 | 1-4.71 | 1.62 |
| Teacher-child conflict T2 | 335 | 1.64 | 0.78 | 1-5 | 1-4.71 | 1.47 |
| Parent-child closeness T1 | 341 | 4.28 | 0.45 | 1-5 | 2.88-5 | -0.53 |
| Parent-child closeness T2 | 323 | 4.22 | 0.47 | 1-5 | 2.75-5 | -0.39 |
| Parent-child conflict T1 | 341 | 2.45 | 0.73 | 1-5 | 1-5 | 0.60 |
| Parent-child conflict T2 | 321 | 2.51 | 0.75 | 1-5 | 1-5 | 0.54 |
| SDQ prosocial behavior T1 | 342 | 2.53 | 0.47 | 1-3 | 1-3 | -0.76 |
| SDQ prosocial behavior T2 | 341 | 2.48 | 0.52 | 1-3 | 1-3 | -0.73 |
| <i>Externalizing problems</i> | | | | | | |
| SDQ hyperactivity T1 | 342 | 1.64 | 0.58 | 1-3 | 1-3 | 0.69 |
| SDQ hyperactivity T2 | 341 | 1.65 | 0.58 | 1-3 | 1-3 | 0.64 |
| SDQ conduct problems T1 | 342 | 1.20 | 0.32 | 1-3 | 1-2.6 | 1.91 |
| SDQ conduct problems T2 | 341 | 1.22 | 0.35 | 1-3 | 1-2.6 | 1.87 |
| <i>Temperament</i> | | | | | | |
| Surgency | 403 | 4.21 | 0.88 | 1-7 | 1.83-7 | 0.04 |
| Negative affectivity | 403 | 4.34 | 0.82 | 1-7 | 1.25-7 | -0.04 |
| Effortful control | 403 | 5.36 | 0.75 | 1-7 | 2.5-7 | -0.56 |
| <i>Covariates</i> | | | | | | |
| Vocabulary T0 | 229 | 18.03 | 3.93 | 0-30 | 7-26 | -0.46 |
| Letter knowledge T0 | 229 | 26.92 | 7.31 | 0-32 | 1-32 | -2.07 |
| Initial phoneme identification T0 | 229 | 9.99 | 3.04 | 0-12 | 0-12 | -2.30 |
| Initial phoneme deletion T0 | 229 | 3.53 | 4.67 | 0-12 | 0-12 | 0.77 |
| Reading T0 | 229 | 6.71 | 5.94 | 0-16 | 0-16 | 0.32 |
| Writing T0 | 229 | 18.66 | 10.24 | 0-32 | 0-32 | -0.54 |
| Gender | 409 | 1.46 | 0.50 | 1-2 | 1-2 | 0.15 |
| Highest education in a family | 400 | 4.61 | 0.72 | 1-5 | 1-5 | -1.96 |

Note. T0 = Kindergarten; T1 = Grade 1 Fall; T2 = Grade 1 Spring.

Data Analysis Strategy

This study was not preregistered. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study. We included all the available data in the current study, and the sample sizes of each variable (n) are presented in Table 1. The percentage of missing data of the main study variables ranged from 1.5% to 21.5% ($M = 13.8\%$, $SD = 6.9\%$). In all the analyses, we used full information maximum likelihood estimation (FIML) with robust standard errors (MLR). Teachers mostly rated more than one child from their classrooms ($M = 14.12$, $SD = 5.94$, ranging from 1 to 21), therefore the nested nature of the data within classrooms was considered. For this reason, the intra-class correlations (ICC) were estimated for the main study variables. The range of ICCs varied from .002 to .327 ($.05 < p < .001$). Due to some significant ICCs, the COMPLEX approach was applied to the study analyses.

To answer the research questions about the interplay between relationship quality, adjustment behaviors, and temperament, cross-lagged path models in Mplus Version 8.6 (Muthén & Muthén, 1998-2017) were constructed. The chosen method used all available data when estimating associations. Two separate models were estimated (1) for relationship closeness and children's prosocial behavior across Grade 1, and (2) for the relationship conflict and children's externalizing problems across Grade 1. In both models, temperament was added to predict relationship quality and adjustment behaviors in Grade 1 fall and spring. Control variables (i.e., early literacy skills, gender, and the highest parent education) were controlled for by estimating direct paths from them to all variables presented in both models. The non-significant paths were trimmed from the final models.

In addition, the indirect effects of temperament on prosocial behavior at the end of Grade 1 through relationship closeness at the beginning of Grade 1, and the indirect effect of temperament on relationship closeness at the end of Grade 1 through prosocial behavior at the beginning of Grade 1, were calculated. The same procedure was applied in the model of conflict and externalizing problems. The materials and analysis code for this study are available by emailing the corresponding author.

Five model-fit statistics: chi-square test of model fit, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and standardized root mean square residual (SRMR). For a good model fit, we expected to find the p value for the chi-square test to be higher than 0.05, RMSEA smaller than 0.06, CFI and TLI higher than 0.95, and SRMR lower than 0.08 (Hu & Bentler, 1999).

TABLE 2 Correlations between Observed Variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------|
| 1. Teacher-child closeness T1 | — | | | | | | | | | | | | | | | | |
| 2. Teacher-child closeness T2 | .553** | — | | | | | | | | | | | | | | | |
| 3. Teacher-child conflict T1 | -.420** | -.403** | — | | | | | | | | | | | | | | |
| 4. Teacher-child conflict T2 | -.195** | -.476** | .727** | — | | | | | | | | | | | | | |
| 5. Parent-child closeness T1 | .104 | .112* | -.155** | -.101 | — | | | | | | | | | | | | |
| 6. Parent-child closeness T2 | .064 | .172** | -.093 | -.129* | .634** | — | | | | | | | | | | | |
| 7. Parent-child conflict T1 | -.005 | -.126* | .133* | .132* | -.385** | -.320** | — | | | | | | | | | | |
| 8. Parent-child conflict T2 | -.028 | -.096 | .133* | .113* | -.342** | -.385** | .747** | — | | | | | | | | | |
| 9. SDQ prosocial behavior T1 | .625** | .455** | -.441** | -.245** | .192** | .128* | -.114* | -.106 | — | | | | | | | | |
| 10. SDQ prosocial behavior T2 | .523** | .652** | -.479** | -.455** | .174** | .173** | -.166** | -.109 | .739** | — | | | | | | | |
| 11. SDQ externalizing problems T1 | -.272** | -.394** | .697** | .573** | -.214** | -.097 | .230** | .191** | -.499** | -.512** | — | | | | | | |
| 12. SDQ externalizing problems T2 | -.268** | -.498** | .587** | .707** | -.210** | -.222** | .251** | .217** | -.486** | -.651** | .762** | — | | | | | |
| 13. Temperament (Surgency) | .006 | .006 | .130* | .107 | -.006 | -.018 | .041 | .117* | -.122* | -.135* | .285** | .266** | — | | | | |
| 14. Temperament (Negative affectivity) | -.136* | -.128* | .137* | .045 | -.073 | -.074 | .392** | .295** | -.104 | -.095 | .086 | .083 | -.140** | — | | | |
| 15. Temperament (Effortful control) | .078 | .169** | -.072 | -.102 | .349** | .332** | -.164** | -.232** | .136* | .170** | -.215** | -.233** | -.212** | .048 | — | | |
| 16. Early literacy skills | .214** | .201** | -.304** | -.251** | .013 | -.026 | -.037 | .021 | .213** | .212** | -.336** | -.315** | -.008 | -.048 | .003 | — | |
| 17. Gender | -.231** | -.258** | .231** | .234** | -.101 | -.036 | .003 | -.05 | -.250** | -.338** | .282** | .345** | .117* | -.017 | -.235** | -.210** | — |
| 18. Highest education in a family | .201** | .110* | -.153** | -.092 | .028 | -.063 | -.101 | -.097 | .172** | .178** | -.154** | -.253** | -.045 | -.137** | -.046 | .385** | -.06 |

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

Results

Cross-lagged Longitudinal Associations between Children's Adjustment Behaviors and Relationship Quality with Parents and Teachers

The descriptive statistics are presented in Table 1, and correlations are presented in Table 2. To answer our research questions, two models were built: (1) for relationship closeness and prosocial behavior, and (2) for relationship conflict and externalizing problems. In both models, first temperament and then control variables were entered to predict all study variables. First, the relationship closeness and prosocial behavior model showed a good model fit, $\chi^2[40] = 39.556$, $p = 0.490$, $CFI = 1.000$, $TLI = 1.000$, $RMSEA = 0.000$, $SRMR = 0.047$ (see Figure 2). The results showed the stability of relationship closeness and prosocial behavior across Grade 1. Out of the estimated cross-lagged paths, prosocial behavior at the beginning of Grade 1 predicted teacher-child closeness at the end of Grade 1: The more prosocial behavior the children showed, the closer relationships with teachers they had. Other cross-lagged effects were not significant.

Second, the relationship conflict and externalizing model showed a good fit to the data as well, $\chi^2[41] = 49.244$, $p = 0.177$, $CFI = 0.985$, $TLI = 0.976$, $RMSEA = 0.030$, $SRMR = 0.060$ (see Figure 3). The results showed the stability of relationship conflict and externalizing problems across Grade 1. Two cross-lagged paths were significant. The evocative effects of externalizing problems at the beginning of Grade 1 on teacher-child conflict and parent-child conflict at the end of Grade 1 were found: The more externalizing problems children had the more both teachers and parents perceived a conflicting relationship with the children. None of the other cross-lagged paths were significant.

The Indirect and Direct Effects of Temperament on Children's Adjustment Behaviors and Teacher- and Parent-Child Relationships

To answer the third research question, direct and indirect effects of children's temperament on the relationship quality and children's adjustment behaviors were estimated. First, the results showed that the higher surgency predicted lower prosocial behavior in Grade 1 Fall. Higher negative affectivity predicted less close teacher-child and parent-child relationships and less prosocial behavior in children at the beginning of Grade 1 (see Figure 2). In addition, higher effortful control of children predicted closer parent-child relationships in both the fall and spring of Grade 1. In addition to direct effects, one indirect effect was found from surgency to teacher-child closeness. The results indicate that the higher surgency children had, the less prosocial behavior they expressed in Grade 1 Fall and the less close relationships they formed with their teachers in Grade 1 Spring ($\beta = -.024$, $SE = .012$, $p = .042$).

Second, for relationship conflict and externalizing model results showed that the higher surgency in children predicted more externalizing problems at the beginning of Grade 1 (see Figure 3). In addition, higher negative affectivity predicted more conflicting parent-child relationships at the beginning of Grade 1, and higher effortful control in children predicted less conflicting parent-child relationships at the beginning of Grade 1. In terms of indirect effects, one of the indirect paths was

statistically significant: The higher the children’s temperamental surgency was, the higher externalizing problems they had at the beginning of Grade 1, and the more conflicts with teachers children had at the end of Grade 1 ($\beta = .038, SE = .018, p = .028$).

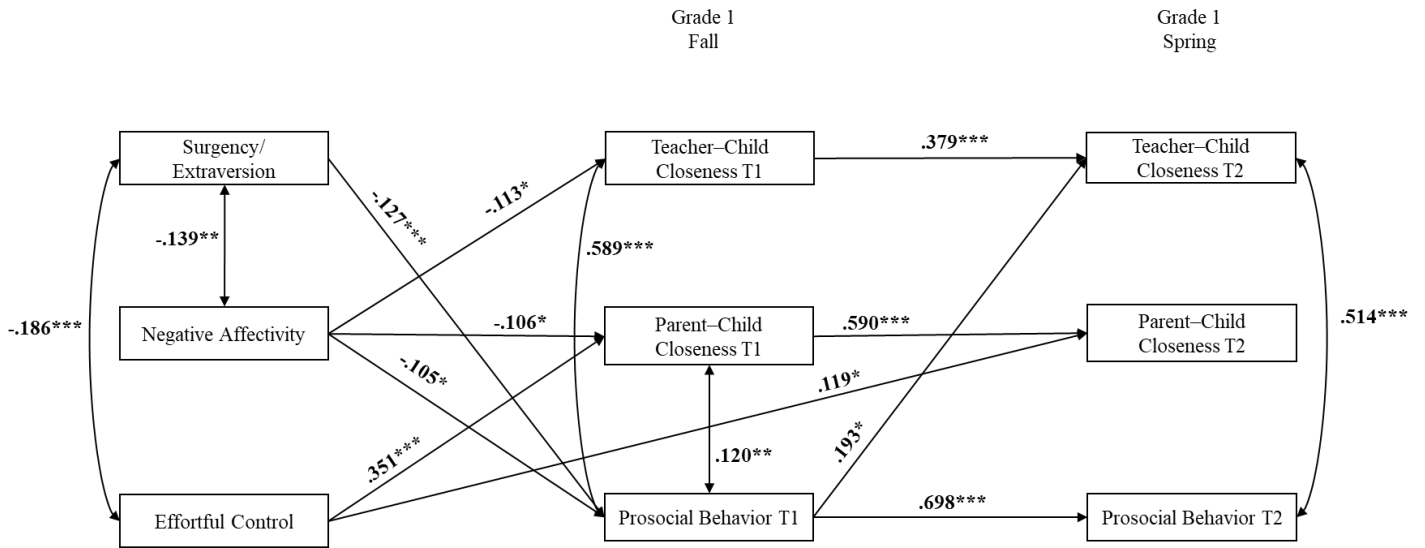


FIGURE 2 Longitudinal Associations of Temperament Dimensions, Teacher- and Parent-Child Closeness, and Prosocial Behavior across Grade 1.

Note. The effects of covariates were included in the analysis. Covariates were allowed to predict all the variables. The effects of temperament on both T1 and T2 were included in the model. * $p < .05$, ** $p < .01$, *** $p < .001$.

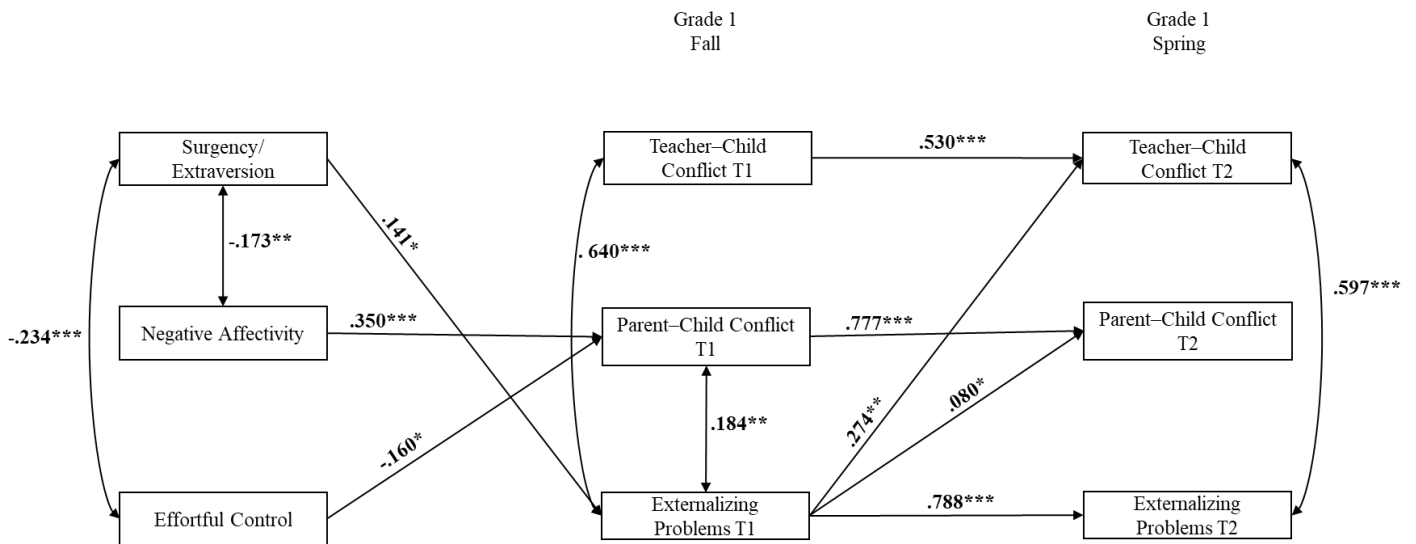


FIGURE 3 Longitudinal Associations of Temperament Dimensions, Teacher- and Parent-Child Conflict, and Externalizing Problems across Grade 1.

Note. The effects of covariates were included in the analysis. Covariates were allowed to predict all the variables. The effects of temperament on both T1 and T2 were included in the model. * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

This study broadens our understanding of the reciprocal effects of adjustment behaviors on relationship quality during the critical transition to school, as well as the role of temperament in this interplay. First, the results revealed evocative effects of adjustment behaviors on the relationship quality. In particular, prosocial behavior at the beginning of Grade 1 evoked increased teacher–child closeness during Grade 1, whereas externalizing problems at the beginning of Grade 1 evoked increased teacher–child and parent–child conflict during Grade 1. Second, we found two indirect effects of children’s higher surgency on their lower closeness with teachers through less prosocial behavior and children’s higher surgency on their conflicts with teachers via the higher externalizing problems.

Children’s Adjustment Behaviors and their Relationship Quality with Parents and Teachers

In contrast to our Hypotheses 1a and 1b (see also Kiuru et al., 2016; Silver et al., 2010), our study did not find any effects of teacher–child or parent–child relationship on any of the subsequent adjustment behaviors during Grade 1. In the current study, we measured teacher–child relationship quality at the beginning of primary school. Hence, one possible explanation for the lacking effect of teacher–child relationships on children’s subsequent adjustment behaviors is that the quality of relationships with new teachers was not well defined yet at the beginning of Grade 1. In addition, both parents and teachers tend to rate their conflicts with children as lower than average, which might not become a strong predictor for children’s externalizing later in Grade 1.

The second research question investigated the effects of children’s adjustment behaviors on their relationship quality with parents and teachers. In line with our expectations (Hypothesis 2) and previous studies (e.g., Coulombe & Yates, 2018; Mejia & Hoglund, 2016; Newton et al., 2014), we found that prosocial behavior evoked teacher–child closeness, whereas externalizing behavior evoked the relationship conflict with both teachers and parents. As expected, the positive adjustment behaviors of children evoked positive responses from teachers (Nurmi, 2012; Rutter, 1997, Scarr & McCartney, 1983). One possible explanation for this result is that the children’s prosocial behaviors have increased teachers’ positive affect towards the children, which was expressed through teaching and expressions of warmth (Nurmi et al., 2018). This, in turn, led to closer relationships between children and their teachers. On the other hand, children with externalizing problems avoid completing tasks, have lower self-regulatory abilities, and display lower academic performance (Metsäpelto et al., 2015), which can trigger teachers’ negative perceptions of a child and increase teacher–child conflicts. Children with externalizing problems can also show higher levels of aggressive and disruptive behavior in classroom situations (Hinshaw, 1992; McMahan, 1994) and also at home which can cause conflicting relationships with both teachers and parents (Georgiou & Fanti, 2014; Mejia & Hoglund, 2016).

In contrast to our Hypotheses 2 and previous studies (Newton et al., 2014; Silinskas et al., 2015), we did not find an evocative effect of the teacher-rated prosocial behavior on parent-child closeness. One possible explanation is that closeness between parents and children is somewhat stable no matter which level of prosociality their children have. Overall, our results suggest children's externalizing problems evoke stronger reactions than prosocial behavior from both parents and teachers. These are interesting findings, which confirm that adjustment behaviors of children evoke reactions from interpersonal environments (e.g., Newton et al., 2014; Nurmi, 2012; Silinskas et al., 2015). Attachment theory (Ainsworth & Bowlby, 1991; Bowlby, 1982) emphasizes the importance of relationships with parents and teachers. Our study, however, confirmed that at the start of schooling (Grade 1) the behavioral characteristics that children bring to their new environment (school) may have a greater effect on their relationships with parents and teachers than the other way around.

The Role of Temperament in Relationship Quality and Adjustment Behaviors

First, in line with Hypothesis 3a, the results indicated further that the high temperamental surgency of children predicted lower prosocial behavior and higher externalizing problems in Grade 1 Fall. These results are in line with the previous studies that have shown that temperament affects the way children behave (e.g., Karreman et al., 2009; Nurmi, 2012). The more impulsive children with higher temperamental surgency were shown to engage in more externalizing behaviors (Harvey et al., 2022; Karreman et al., 2009). Therefore, the current results showed that children, who were more temperamentally active and impulsive engaged in more disruptive behaviors and were less concerned about controlling their behavior or helping others. Even though contrary to the previous studies (e.g., Liew et al., 2019; Rudasill et al., 2010), we did not find the direct effects of surgency on relationship quality, we did find two indirect effects on relationships with teachers via adjustment behaviors. This finding is in line with our Hypothesis 3b and adds additional value to the previous research, as only a few studies have analyzed the indirect effects of temperament on relationship quality and adjustment behaviors (Ezpeleta et al., 2019; Karreman et al., 2010; Rudasill et al., 2010). Rudasill et al. (2010) found an indirect effect of difficult temperament on the risky behavior of adolescents as manifested through conflicts with teachers. However, in the current study, we found that the lower surgency children had, the more engaged in prosocial behavior towards others they were, and teachers felt more affectionate towards them. In contrast, the higher surgency children had, the more disruptive behaviors they expressed which lead to more conflicting situations with teachers at school.

Second, in line with Hypothesis 3b, the lower the negative affectivity children expressed, the closer relationship with teachers and parents and fewer conflicts with parents they had in Grade 1 fall. Possibly, the negative affectivity of these children encourages parents to use psychological or behavioral control (Laukkanen et al., 2014), which can lead to greater resistance and less close and more conflicting situations between parents and their children. Results indicate that both parents and teachers felt less closeness with the children if they required more attention by their negative

emotionality and irritability. In addition, higher negative affectivity predicted lower prosocial behavior in Grade 1 Fall. These results are in line with Hypothesis 3a and the previous studies (Laible et al., 2014; Rende & Plomin, 1992), which suggest that children with higher negative affectivity, emotionality, or activity can be more overwhelmed by their negative emotions and personal distress. For this reason, it becomes harder to concentrate on cooperation and social skills, which leads to low prosocial behavior at school (Laible et al., 2014; Liew et al., 2019). However, to our surprise, negative affectivity did not predict externalizing problems. This finding indicates that temperamental activity and impulsivity are more detrimental to externalizing problems than negative emotionality.

Finally, in line with our expectations (Hypothesis 3b), the higher effortful control children had, the closer relationships in Grade 1 Fall and spring and fewer conflicts with their parents in Grade 1 Fall were reported. These results are in line with the theory of the evocative effect, which states that children's individual characteristics evoke reactions from parents (Nurmi, 2012; Rutter, 1997; Scarr & McCartney, 1983). However, the results surprisingly contradicted the previous research concerning the role of effortful control on the teacher-child relationship (e.g., Hernandez et al., 2017; Liew et al., 2019; Rudasill & Rimm-Kaufman, 2009). Children who had higher or lower effortful control evoked more reactions from parents than from teachers. These results can indicate that teachers recognize that children are still learning to regulate their behavior, which does not lead to conflicts at school entry. However, as the beginning of primary school can bring a lot of changes and challenges (Dockett & Perry, 2007), some parents have higher expectations of how their children should behave and how much effort they should put into their learning. Therefore, children who had higher temperamental effortful control were able to better focus their attention and regulate their behavior and emotions, which had led to better learning and meeting the expectations of parents. In contrast, lower self-regulation and attention do not meet the expected behavior, which can lead to more conflicts with parents. In addition, in contrary to the previous studies (Gusdorf et al., 2011; Hirvonen et al., 2018; Karreman et al., 2009) and our expectations (Hypothesis 3a), the effortful control did not predict the adjustment behaviors of children at the beginning of Grade 1. Negative affectivity and surgency in the current study were more detrimental for the adjustment of children in Grade 1 than low effortful control. Children with more reactive types of temperament were found to be more sensitive to the changes after the transition, which, in turn, affected their behavior.

Limitations and Practical Applications

The current study is not without its limitations. First, despite the cross-lagged longitudinal design, our results should be interpreted carefully, as only experimental studies can determine the direction of effects. Second, the teacher-student relationship and adjustment behaviors of the children were rated only by their teachers, which may have influenced the related associations due to the common method bias. This means that reports from children themselves or observational data could be important for future research to better understand the associations between teacher-child relationships and adjustment behaviors. The behavior of children at school can be

different from that at home. In addition, children's reports on relationship quality with parents and teachers could add additional value in analyzing the interplay between relationship quality and adjustment behaviors. Third, even though our longitudinal study utilized data from multiple respondents (i.e., parents, teachers, and children), common method bias might have also affected the associations between parent-child relationships and temperament as both constructs were measured by parents. Fourth, it is possible that some aspects of temperament, such as effortful control, can change due to the environment that children are exposed to. For this reason, more extensive research could address the issue of temperamental stability and its links to relationships with parents and teachers and adjustment behaviors. Finally, future studies could benefit from applying the person-oriented approach to the data to more extensively investigate the interplay of the individual interpersonal contexts in the child's adjustment in Grade 1.

Aside from these limitations, the current study adds understanding about the interplay between relationship quality with parents and teachers, children's adjustment behaviors, and the role of child temperament in these associations. Based on our results, it is important to acknowledge that the experiences that children bring to Grade 1 and the adjustment behaviors that are formed throughout the critical transition to primary school are very important for the development of relationship quality between children and their teachers and parents across Grade 1. Thus, to avoid conflicting situations at the beginning of primary school, Grade 1 teachers, as well as parents, should be aware of how children's behavior affects their feelings towards children.

Not only children's adjustment behavior but also their temperament may relate to the experiences they will undergo across Grade 1. In particular, as we know that children with higher surgency can engage in more externalizing problems and that higher surgency and negative affectivity can lead to lower prosocial behavior at the beginning of Grade 1, it is important to consider interventions already in kindergarten, especially targeted for children with higher surgency and negative affectivity, to promote more prosocial behavior and reduce externalizing problems upon school entrance in Grade 1. Moreover, the indirect effects of surgency on the teacher-child relationship through adjustment behaviors show that acknowledging the individual temperament of children is important due to its role in the adjustment of children at the beginning of Grade 1. If children develop more externalizing problems and engage in less prosocial behavior, they evoke negative reactions from teachers that lead to less close or conflicting relationships. It, therefore, becomes important to identify children with a temperament that can be more detrimental to the manifestation of externalizing problems, so as to provide successful adjustment in Grade 1 and avoid conflicts with teachers at the end of Grade 1.

Conclusion

The results of the current study suggest that children's adjustment behaviors have an evocative effect on relationship quality with teachers and parents. In particular, if children express more prosocial behavior at the beginning of Grade 1, they develop closer relationships with teachers. On the contrary, if children engage in more

externalizing problems at the beginning of Grade 1, they have more conflicts with not only teachers but also parents at the end of Grade 1. Moreover, teachers and parents should be aware that children with higher surgency have a higher risk of developing externalizing problems and less prosocial behavior while children with higher negative affectivity are at risk of less close and more conflicting relationships with parents and lower prosocial behavior. On the other hand, temperamental effortful control only promotes closer relationships and lessens conflicts with parents. Consequently, parents and educators should be informed about the manifestations of child temperamental and behavioral characteristics and the effects those may have on their relationship quality.

References

- Acar, I. H., Torquati, J. C., Encinger, A., & Colgrove, A. (2018). The role of child temperament on low-income preschool children's relationships with their parents and teachers. *Infant and Child Development, 27*(1), 1–17. <https://doi.org/10.1002/icd.2045>
- Acar, I. H., Uçuş, Ş., & Yıldız, S. (2019). Parenting and Turkish children's behaviour problems: the moderating role of qualities of parent-child relationship. *Early Child Development and Care, 189*(7), 1072–1085. <https://doi.org/10.1080/03004430.2017.1365362>
- Ainsworth, M. S., & Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist, 46*(4), 333–341. <https://doi.org/10.1037/0003-066X.46.4.333>
- Awada, S. R., & Shelleby, E. C. (2021). Bidirectional associations between child conduct problems and parenting practices in early childhood. *Journal of Child and Family Studies, 30*(11), 2705–2717. <https://doi.org/10.1007/s10826-021-02104-0>
- Baker, J. A. (2006). Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology, 44*(3), 211–229. <https://doi.org/10.1016/j.jsp.2006.02.002>
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry, 52*(4), 664–678. <https://doi.org/10.1111/j.1939-0025.1982.tb01456.x>
- Breidokienė, R., & Jusienė, R. (2014). Vaiko temperamento ir motinos elgesio su vaiku strategijų reikšmė keturmečių gebėjimams atidėti malonumą [Child's temperament and maternal coping with child's negative emotions related to four-year-old children's delay of gratification]. *Psichologija, 49*, 100–114. <https://doi.org/10.15388/psichol.2014.49.3691>
- Coulombe, B. R., & Yates, T. M. (2018). Prosocial pathways to positive adaptation: The mediating role of teacher-child closeness. *Journal of Applied Developmental Psychology, 58*, 9–17. <https://doi.org/10.1016/j.appdev.2018.08.003>
- Dockett, S., & Perry, B. (2007). Children's transition to school: Changing expectations. In A.-W. Dunlop & H. Fabian (Eds.), *Informing transitions in the early years* (pp. 92–104). London: Open University Press.
- Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test – Revised*. Circle Pines, MN: American Guidance Service.
- Eisenberg, N. (1982). *The development of prosocial behavior* (pp. 3–11). Academic Press, Inc.
- Ezpeleta, L., Penelo, E., Osa, N., Navarro, J. B., & Trepát, E. (2019). Irritability and parenting practices as mediational variables between temperament and affective, anxiety, and oppositional defiant problems. *Aggressive Behavior, 45*(5), 550–560. <https://doi.org/10.1002/ab.21850>
- Ferreira, T., Cadima, J., Matias, M., Vieira, J. M., Leal, T., & Matos, P. M. (2016). Preschool children's prosocial behavior: The role of mother-child, father-child and teacher-child relationships. *Journal of Child and Family Studies, 25*(6), 1829–1839. <https://doi.org/10.1007/s10826-016-0369-x>

- Gedutienė R. (2008) *Besiformuojančio raštingumo komponentų ir šeimos veiksnių sąveika pereinant iš priešmokyklinio į mokyklinį amžių* [The associations between emerging literacy components and family factors in the transition from preschool to primary school] (Doctoral dissertation). Vilnius University, Vilnius, Lithuania.
- Georgiou, S. N., & Fanti, K. A. (2014). Transactional associations between mother-child conflict and child externalising and internalising problems. *Educational Psychology, 34*(2), 133–153. <https://doi.org/10.1080/01443410.2013.785055>
- Gintilienė, G., Girdzijauskienė, S., Černiauskaitė, D., Lesinskienė, S., Povilaitis, R., & Pūras, D. (2004). Lietuviškas SDQ – standartizuotas mokyklinio amžiaus vaikų „galių ir sunkumų klausimynas“ [A standardized Lithuanian version of strengths and difficulties questionnaire (SDQ) for school-aged children]. *Psichologija, 29*, 88–105. <https://doi.org/10.15388/psichol.2004.4355>
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., Hinde, R. A., McCall, R. B. (1987). Roundtable: What Is Temperament? Four Approaches. *Child Development, 58*(2), 505–529. <https://doi.org/10.2307/1130527>
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry, 38*, 581–586.
- Gusdorf, L. M. A., Karreman, A., van Aken, M. A. G., Deković, M., & van Tuijl, C. (2011). The structure of effortful control in preschoolers and its relation to externalizing problems. *British Journal of Developmental Psychology, 29*(3), 612–634. <https://doi.org/10.1348/026151010x526542>
- 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://doi.org/10.1111/1467-8624.00301>
- Harvey, E., Lemelin, J. P., & Déry, M. (2022). Student-teacher relationship quality moderates longitudinal associations between child temperament and behavior problems. *Journal of school psychology, 91*, 178–194. <https://doi.org/10.1016/j.jsp.2022.01.007>
- Hernández, M. M., Valiente, C., Eisenberg, N., Berger, R. H., Spinrad, T. L., VanSchyndel, S. K., Silva, K. M., Southworth, J., & Thompson, M. S. (2017). Elementary students' effortful control and academic achievement: The mediating role of teacher-student relationship quality. *Early Childhood Research Quarterly, 40*, 98–109. <https://doi.org/10.1016/j.ecresq.2016.10.004>
- Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*(1), 127–155. <https://doi.org/10.1037/0033-2909.111.1.127>
- Hirvonen, R., Väänänen, J., Aunola, K., Ahonen, T., & Kiuru, N. (2018). Adolescents' and mothers' temperament types and their roles in early adolescents' socioemotional functioning. *International Journal of Behavioral Development, 42*(5), 453–463. <https://doi.org/10.1177/0165025417729223>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>

- Karreman, A., de Haas, S., van Tuijl, C., van Aken, M. A. G., & Deković, M. (2010). Relations among temperament, parenting and problem behavior in young children. *Infant Behavior and Development*, 33(1), 39–49. <https://doi.org/10.1016/j.infbeh.2009.10.008>
- Karreman, A., van Tuijl, C., van Aken, M. A. G., & Deković, M. (2009). Predicting Young Children's Externalizing Problems: Interactions among Effortful Control, Parenting, and Child Gender. *Merrill-Palmer Quarterly*, 55(2), 111–134. <https://doi.org/10.1353/mpq.0.0020>
- Kim, S., Nordling, J. K., Yoon, J. E., Boldt, L. J., & Kochanska, G. (2013). Effortful control in "Hot" and "Cool" tasks differentially predicts children's behavior problems and academic performance. *Journal of Abnormal Child Psychology*, 41(1), 43–56. <https://doi.org/10.1007/s10802-012-9661-4>
- Kiuru, N., Laursen, B., Aunola, K., Zhang, X., Lerkkanen, M.-K., Leskinen, E., Tolvanen, A., Nurmi, J.-E. (2016). Positive teacher affect and maternal support facilitate adjustment after the transition to first grade. *Merrill-Palmer Quarterly*, 62(2), 158–178. <https://doi.org/10.13110/merrpalmquar1982.62.2.0158>
- Laible, D., Carlo, G., Murphy, T., Augustine, M., & Roesch, S. (2014). Predicting children's prosocial and co-operative behavior from their temperamental profiles: A person-centered approach. *Social Development*, 23(4), 734–752. <https://doi.org/10.1111/sode.12072>
- Laukkanen, J., Ojansuu, U., Tolvanen, A., Alatupa, S., & Aunola, K. (2014). Child's difficult temperament and mothers' parenting styles. *Journal of Child and Family Studies*, 23(2), 312–323. <https://doi.org/10.1007/s10826-013-9747-9>
- Lengua, L. J., & Kovacs, E. A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Journal of Applied Developmental Psychology*, 26(1), 21–38. <https://doi.org/10.1016/j.appdev.2004.10.001>
- Lerkkanen, M.-K., Niemi, P., Poikkeus, A.-M., Poskiparta, M., Siekkinen, M., & Nurmi, J.-E. (2006–2016). *Alkuportaati [The first steps study]*. Jyväskylä: University of Jyväskylä.
- Lerkkanen, M.-K., Poikkeus, A.-M., & Ketonen, R. (2006). *ARMI – Luku- ja kirjoitustaidon arviointimateriaali 1. luokalle. [ARMI – A tool for assessing reading and writing skills in first grade]*. Helsinki: WSOY.
- Leve, L. D., Kim, H. K., & Pears, K. C. (2005). Childhood temperament and family environment as predictors of internalizing and externalizing trajectories from ages 5 to 17. *Journal of Abnormal Child Psychology*, 33(5), 505–520. <https://doi.org/10.1007/s10802-005-6734-7>
- Liew, J., Valiente, C., Hernández, M. M., & Abrera, D. (2019). *Self-regulation and reactivity, school-based relationships, and school engagement and achievement*. In D. Whitebread, V. Grau, K. Kumpulainen, M. M. McClelland, N. E. Perry, & D. Pino-Pasternak (Eds.), *SAGE Handbook of Developmental Psychology & Early Childhood Education* (pp. 42–62). SAGE Publications, Inc. <https://doi.org/10.4135/9781526470393.n3>
- Lippard, C. N., La Paro, K. M., Rouse, H. L., & Crosby, D. A. (2018). A closer look at teacher–child relationships and classroom emotional context in preschool.

- Child & Youth Care Forum*, 47(1), 1–21. <https://doi.org/10.1007/s10566-017-9414-1>
- Mattison, A., Raffaele Mendez, L. M., Dedrick, R., Dickinson, S., Wingate, E., & Hanks, C. (2018). Early elementary teacher ratings of behavior as predictors of grade retention: Race, gender, and socioeconomic status as potential moderators. *Psychology in the Schools*, 55(10), 1171–1187. <https://doi.org/10.1002/pits.22192>
- McMahon, R. J. (1994). Diagnosis, assessment, and treatment of externalizing problems in children: The role of longitudinal data. *Journal of Consulting and Clinical Psychology*, 62(5), 901–917. <https://doi.org/10.1037/0022-006x.62.5.901>
- Mejia, T. M., & Hoglund, W. L. G. (2016). Do children's adjustment problems contribute to teacher–child relationship quality? Support for a child-driven model. *Early Childhood Research Quarterly*, 34, 13–26. <https://doi.org/10.1016/j.ecresq.2015.08.003>
- Metsäpelto, R.-L., Pakarinen, E., Kiuru, N., Poikkeus, A.-M., Lerkkanen, M.-K., & Nurmi, J.-E. (2015). Developmental dynamics between children's externalizing problems, task-avoidant behavior, and academic performance in early school years: A 4-year follow-up. *Journal of Educational Psychology*, 107(1), 246–257. <https://doi.org/10.1037/a0037389>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Author.
- Newton, E. K., Laible, D., Carlo, G., Steele, J. S., & McGinley, M. (2014). Do sensitive parents foster kind children, or vice versa? Bidirectional influences between children's prosocial behavior and parental sensitivity. *Developmental Psychology*, 50(6), 1808–1816. <https://doi.org/10.1037/a0036495>
- 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>
- Nurmi, J. E., Silinskas, G., Kiuru, N., Pakarinen, E., Turunen, T., Siekkinen, M., Tolvanen, A., Poikkeus, A. M., & Lerkkanen, M. K. (2018). A child's psychological adjustment impacts teachers' instructional support and affective response. *European Journal of Psychology of Education*, 33(4), 629–648. <https://doi.org/10.1007/s10212-017-0337-x>
- Padilla-Walker, L. M., Nielson, M. G., & Day, R. D. (2016). The role of parental warmth and hostility on adolescents' prosocial behavior toward multiple targets. *Journal of Family Psychology*, 30(3), 331–340. <https://doi.org/10.1037/fam0000157>
- Pakarinen, E., Lerkkanen, M.-K., & von Suchodoletz, A. (2020). Teacher emotional support in relation to social competence in preschool classrooms. *International Journal of Research & Method in Education*, 43(4), 444–460. <https://doi.org/10.1080/1743727x.2020.1791815>
- Pakarinen, E., Silinskas, G., Hamre, B. K., Metsäpelto, R.-L., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2018). Cross-lagged associations between problem behaviors and teacher-student relationships in early adolescence. *The*

- Journal of Early Adolescence*, 38(8), 1100–1141.
<https://doi.org/10.1177/0272431617714328>
- Pianta, R. C. (1992a). *Student-Teacher Relationship Scale – Short Form*. The University of Virginia.
- Pianta, R. C. (1992b). *Child-Teacher Relationship Scale – Short Form*. The University of Virginia.
- Pianta, R. C. (2001). *Student-Teacher Relationship Scale–Short Form*. Lutz, FL: Psychological Assessment Resources, Inc.
- Pianta, R. C., Nimetz, S. L., & Bennett, E. (1997). Mother-child relationships, teacher-child relationships, and school outcomes in preschool and kindergarten. *Early Childhood Research Quarterly*, 12(3), 263–280. [https://doi.org/10.1016/s0885-2006\(97\)90003-x](https://doi.org/10.1016/s0885-2006(97)90003-x)
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School psychology review*, 33(3), 444–458. <https://doi.org/10.1080/02796015.2004.12086261>
- Posner, M. I., & Rothbart, M. K. (2007). Research on attention networks as a model for the integration of psychological science. *Annual Review of Psychology*, 58, 1–23. <https://doi.org/10.1146/annurev.psych.58.110405.085516>
- Putnam, S. P., Ellis, L. K., & Rothbart, M. K. (2001). *The structure of temperament from infancy through adolescence*. In A. Teoksessa Elias & A. Angleitner (Eds.), *Advances in research on temperament* (pp. 165–182). Lengerich, Germany: Pabst Science.
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the children's behavior questionnaire. *Journal of Personality Assessment*, 87(1), 102–112. https://doi.org/10.1207/s15327752jpa8701_09
- Rende, R. D., & Plomin, R. (1992). Relations between first grade stress, temperament, and behavior problems. *Journal of Applied Developmental Psychology*, 13(4), 435–446. [https://doi.org/10.1016/0193-3973\(92\)90011-6](https://doi.org/10.1016/0193-3973(92)90011-6)
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The children's behavior questionnaire. *Child Development*, 72(5), 1394–1408. <https://doi.org/10.1111/1467-8624.00355>
- Rudasill, K. M., Reio, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student-teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology*, 48(5), 389–412. <https://doi.org/10.1016/j.jsp.2010.05.001>
- Rudasill, K. M., & Rimm-Kaufman, S. E. (2009). Teacher-child relationship quality: The roles of child temperament and teacher-child interactions. *Early Childhood Research Quarterly*, 24(2), 107–120. <https://doi.org/10.1016/j.ecresq.2008.12.003>
- Rushton, J. P. (1982). Social learning theory and the development of prosocial behavior. In N. Eisenberg (Eds.), *The development of prosocial behavior* (pp. 86–95). Academic Press, Inc.
- Rutter, M. L. (1997). Nature-nurture integration: The example of antisocial behavior. *American Psychologist*, 52(4), 390–398. <https://doi.org/10.1037/0003-066x.52.4.390>

- Sameroff, A. J., & Mackenzie, M. J. (2003). Research strategies for capturing transactional models of development: The limits of the possible. *Development and Psychopathology*, 15(3), 613–640.
<https://doi.org/10.1017/S0954579403000312>
- Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype --> environment effects. *Child Development*, 54(2), 424–435.
<https://doi.org/10.2307/1129703>
- Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives*, 6(4), 436–444. <https://doi.org/10.1111/j.1750-8606.2012.00254.x>
- Silinskas, G., Dietrich, J., Pakarinen, E., Kiuru, N., Aunola, K., Lerkkanen, M.-K., Hirvonen, R., Muotka, J., & Nurmi, J.-E. (2015). Children evoke similar affective and instructional responses from their teachers and mothers. *International Journal of Behavioral Development*, 39(5), 432–444.
<https://doi.org/10.1177/0165025415593648>
- Silinskas, G., & Raiziene, S. (2017–2018). “Get involved!” study [“Įsitrauk!”]. Jyväskylä: University of Jyväskylä.
- Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2010). The impact of parents, child care providers, teachers, and peers on early externalizing trajectories. *Journal of School Psychology*, 48(6), 555–583.
<https://doi.org/10.1016/j.jsp.2010.08.003>
- Skalická, V., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher conflict, children’s social skills and externalizing behavior. *International Journal of Behavioral Development*, 39(5), 413–425.
<https://doi.org/10.1177/0165025415584187>



II

SOCIOEMOTIONAL FUNCTIONING ACROSS THE TRANSITION TO LOWER SECONDARY SCHOOL: THE ROLE OF TEMPERAMENT AND RELATIONSHIPS WITH MOTHERS AND TEACHERS

by

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Socioemotional functioning across the transition to lower secondary school: The role of temperament and relationships with mothers and teachers

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Abstract

This Finnish longitudinal study investigated the role of relationships with mothers ($n = 631$) and teachers ($n = 56$), and adolescents' ($n = 848$; 53.9% girls, 46.1% boys) temperament in the development of the adolescents' socioemotional functioning during the transition to lower secondary school (Grade 6 to Grade 7; age in Grade 6: $M = 12.32$, $SD = 0.36$). The results showed that mother–adolescent closeness predicted a higher level and teacher–adolescent closeness predicted a smaller decrease in prosocial behavior. Teacher–adolescent conflict predicted a higher level, and mother–adolescent conflict predicted an increase in externalizing problems. Only temperament predicted internalizing problems. In addition, relationship quality both mediated and moderated some of the associations between temperament and socioemotional functioning.

KEY WORDS

externalizing problems, internalizing problems, mother–adolescent relationship, prosocial behavior, teacher–adolescent relationship, temperament

INTRODUCTION

During the transition to lower secondary school, adolescents face increased academic demands and changes in social relationships, which can be reflected in their adjustment to a new educational environment (Symonds, 2015). The personal characteristics of adolescents together with supportive home and school environments interact in shaping the successful socioemotional functioning of adolescents (Bronfenbrenner, 1979; see also Carlo et al., 2010; Roorda & Koomen, 2021). For instance, adolescents' temperament can predict their socioemotional functioning (e.g., Hirvonen et al., 2018; Wang et al., 2016), which may become especially important when adolescents switch from primary to lower secondary school. However, there is a lack of research on the mechanisms of how adolescents' temperament and relationships with parents and teachers intertwine to predict their socioemotional functioning. Relationship quality with both parents and teachers might mediate (e.g., Ezpeleta et al., 2019; Rudasill et al., 2010) or moderate the

links between temperament and socioemotional functioning (Leve et al., 2005). Consequently, this study aimed to investigate the role of temperament and relationship quality with mothers and teachers in the socioemotional functioning of adolescents during the transition from primary school to lower secondary school. The current study contributes to previous research by investigating multiple mechanisms that contribute to the development of socioemotional functioning across the transition.

Socioemotional functioning across the transition to lower secondary school

The transition from primary school to lower secondary school brings even more responsibilities and independence for adolescents than the previous academic transitions, which may become challenging to adjust to (Palmu et al., 2017; Symonds, 2015). Adolescents must adjust to new teaching styles, new academic subjects, increasing academic

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demands, a busier schedule, new peers, and multiple classrooms. In addition, when adolescents move from primary school to lower secondary school, their teachers change from one classroom teacher to multiple subject teachers. On top of the academic changes, adolescents face pubertal changes. These multiple changes during the transition are stressful for some adolescents (Symonds, 2015) and may be linked to their socioemotional functioning (i.e., prosocial behavior, externalizing problems, and internalizing problems). Socioemotional functioning is substantially connected to environmental factors and the ability to interact with others (Denham et al., 2009; Hirvonen et al., 2018). One factor of socioemotional functioning is the prosociality of adolescents. Prosocial behavior refers to intentionally positive behavior towards others, such as helping, sharing, comforting, or empathizing (Eisenberg, 1982; Rushton, 1982). Prosocial behavior is shown to be related to lower aggression, involvement in risky behaviors, and deviant peer affiliation (Carlo et al., 2014). In contrast, externalizing and internalizing problems represent maladaptive socioemotional functioning (see also Hirvonen et al., 2018). Externalizing problems refer to a broad category of disruptive behaviors, such as aggressiveness, oppositional behavior, conduct problems, hyperactivity, and attention deficit problems (McMahon, 1994; Metsäpelto et al., 2017). Internalizing problems refer to self-directed negative emotional experiences, such as anxiety, depression, or social avoidance (McMahon, 1994; Roeser et al., 1998). Early adolescents with higher externalizing problems are at risk of having increased risky behaviors (Thompson et al., 2011), whereas early adolescents with internalizing problems are more at risk of having difficulties socializing with their peers (Fanti & Henrich, 2010), which can also add to the decrease in adolescents' achievement and motivation (Metsäpelto et al., 2017; Palmu et al., 2017; Weidman et al., 2015). Changes brought about by the critical transition to lower secondary school can reinforce the poor socioemotional functioning of adolescents; therefore, it is crucial to focus on mitigating externalizing and internalizing problems and encourage prosocial behaviors of adolescents throughout the transition.

Previous studies have shown different patterns in changes in socioemotional functioning across adolescence. Some studies have found a decline (Carlo et al., 2007) and others an increase in prosocial behavior (Padilla-Walker et al., 2017). In addition, declines in externalizing (Leve et al., 2005) and internalizing problems (Martin-Storey et al., 2018) and increases in externalizing (Bos et al., 2018) and internalizing problems (Leve et al., 2005) were found across adolescence as well. However, these studies concentrated on a wider range of ages, but not specifically on the transition to lower secondary school. Even though studies have shown an increase in self-reported school problems (Martínez et al., 2011), and declines in achievement, well-being, and self-efficacy (Eccles & Roeser, 2011; Marušić et al., 2020) during the transition to lower secondary school, only a handful of studies have investigated changes in adolescents' socioemotional functioning across this transition.

Adolescents' temperament and socioemotional functioning

Personal characteristics, such as temperament, may play a role in the socioemotional functioning of early adolescents across the transition to lower secondary school (e.g., Hirvonen et al., 2018; Muris et al., 2007; Wang et al., 2016). Temperament refers to relatively stable individual differences in activity, affectivity, attention, and self-regulation, which are determined by complex interactions between biological and environmental factors (Goldsmith et al., 1987; Shiner et al., 2012). In the present study, we focus on three major dimensions of adolescent temperament: surgency (extraversion), negative affectivity, and effortful control (Rothbart et al., 2001). Each of the temperamental dimensions plays a significant role in shaping adolescents' socioemotional functioning across the transition to lower secondary school.

Surgency includes positive emotionality, activeness, sensation-seeking, and low shyness (Rothbart, 2007; Rothbart et al., 2001). Higher surgency has been associated with lower prosocial behaviors and internalizing problems, and higher externalizing problems (Wang et al., 2016; Zentner, 2020; Zentner & Shiner, 2012). Adolescents with higher surgency or extraversion are more outgoing and have more positive affectivity, which could be seen as a favorable quality for prosocial behaviors. In addition, adolescents, who have higher positive emotionality, can create a broader social circle while gaining more social support that can prevent adolescents from developing internalizing problems (Zentner & Shiner, 2012). However, higher sensation-seeking tendencies and seeking rewards associated with higher surgency might also predict more risky behaviors and even externalizing problems for some individuals (Zentner & Shiner, 2012). Hence, high surgency might hamper successful adaptation to the new school context after the transition to lower secondary school when more disciplined behavior is expected and irresponsible behavior can be viewed as unfavorable in the classroom (Rothbart et al., 2001; Symonds, 2015).

Negative affectivity encompasses discomfort, negative emotionality, and difficulty in dealing with negative emotions and experiences (Rothbart, 2007; Rothbart et al., 2001). Previous studies have shown that negative affectivity is related to higher externalizing and internalizing problems and lower prosocial behavior (Hirvonen et al., 2018; Lengua, 2006; Lunetti et al., 2022; Martin-Storey et al., 2018; Muris et al., 2007; Zentner, 2020). Adolescents with high negative affectivity can have challenges adjusting to changes brought on by educational transition due to their higher sensitivity to negative environmental cues and their higher vulnerability to experience and dwell on intense negative feelings when, for example, confronted with disappointments (Rothbart et al., 2001; Scrimin et al., 2019; Zentner, 2020).

Effortful control is a self-regulatory dimension of temperament that includes the ability to focus one's attention and control and regulate behavior and emotions (Rothbart, 2007; Rothbart et al., 2001). Effortful control has been associated with higher prosocial behaviors toward others (Luengo

Kanacri et al., 2013; Zentner, 2020) and negatively associated with externalizing and internalizing problems in early adolescence (Lengua, 2006; Lunetti et al., 2022; Muris et al., 2007; Wang et al., 2016). Due to their ability to regulate their emotions and behavior, adolescents with high effortful control can better adapt to new school demands, such as busier schedules and more effort-requiring academic demands, and they can effectively socialize with their peers. Therefore, adolescents with higher effortful control may avoid difficulties during the transition (Rothbart et al., 2001; Symonds, 2015).

However, as far as we know no previous studies have investigated the role of temperament in externalizing and internalizing problems, and prosocial behavior specifically during the transition to lower secondary school. Poor socioemotional functioning during this critical transition can have detrimental consequences on adolescents' achievement and motivation (Caprara et al., 2014; Metsäpelto et al., 2017; Palmu et al., 2017). Therefore, it is important to investigate personal characteristics that may contribute to successful adjustment during the transition to lower secondary school.

Relationship quality with parents and teachers and socioemotional functioning

Close relationships with parents and teachers are crucial for the well-being of adolescents who are facing educational transitions (Symonds, 2015). According to the ecological approach (Bronfenbrenner, 1979), the successful development of humans depends on interactions with the environments they are surrounded by, such as home and school. Even though early adolescents become increasingly independent from adults and enjoy spending time with their peers, support from parents and teachers remains important, especially during critical educational transitions (Symonds, 2015). However, the roles of parents and teachers across the transition to lower secondary school differ in terms of the continuity of these relationships (Virtanen et al., 2020). The relationships with parents are typically not interrupted across the transition, whereas relationships with teachers are renegotiated when adolescents switch from one primary school teacher to multiple secondary school subject teachers. In the present study, the relationship quality with mothers and teachers in primary school was measured by two dimensions: closeness and conflict (Pianta, 1992a, 1992b, 2001). Closeness refers to the degree of support, warmth, and trustworthiness between adolescents and their parents and teachers, whereas conflict defines a degree of tense and conflictual interactions, and disagreements between adolescents and their parents and teachers (Pianta, 2001; Verschueren, 2015; see also Kiuru et al., 2020).

Research has shown that warmth and close relationships with parents and teachers predict higher prosocial behavior (Carlo et al., 2010; Luengo Kanacri et al., 2020; Obsuth et al., 2017; Padilla-Walker et al., 2017). The closer relationships adolescents have with parents and teachers before the

transition, the more belongingness and connection they feel with them and in turn the more they develop positive behavioral outcomes across the transition (Ryan & Deci, 2000). On the other hand, low parental warmth and conflicts with parents and teachers can predict externalizing and internalizing problems (Allison, 2000; Klahr et al., 2011; Martin-Storey et al., 2018; Pakarinen et al., 2018; Pinguart, 2017; Roorda & Koomen, 2021). During early adolescence, conflicts with adults might increase, which can be seen as part of the normal development of autonomy. When they are handled well, conflicts can even contribute to solving issues and help adolescents learn to look through different perspectives (Branje, 2018; Branje et al., 2009). However, intense, or poorly handled conflicts with parents and teachers before the transition can be negatively linked to the socioemotional functioning of adolescents across the transition (Allison, 2000; Branje, 2018). Therefore, we have investigated the role of pretransitional relationship closeness and conflict with both mothers and teachers in socioemotional functioning (i.e., prosocial, externalizing, and internalizing) among early adolescents during the critical transition to lower secondary school.

Associations between temperament and socioemotional functioning: Relationship quality as a mediator or a moderator

The development of adolescents' behavior should be interpreted in its interaction with the closest environmental systems (Bronfenbrenner, 1979). Therefore, both personal characteristics and environments should be considered when examining the socioemotional functioning of adolescents across critical educational transitions. In the current study, we investigated two possible mechanisms via which adolescents' temperament and relationships with mothers and teachers predict socioemotional functioning across the transition.

First, temperament may predict the socioemotional functioning of adolescents across the transition via the reactions of parents and teachers toward their temperamental characteristics (Rutter, 1997; Scarr & McCartney, 1983). For example, higher approach tendencies of adolescents with higher surgency might provoke more impulsive behavior and conflicting situations with parents and teachers, which might, in turn, develop into more externalizing problems (Zentner & Shiner, 2012). In addition, if adolescents have higher negative affectivity, their higher anger and frustration might encourage parents and teachers to use harsher discipline, which can relate to more conflicts and higher externalizing and internalizing problems (Zentner & Shiner, 2012). Finally, if adolescents have higher effortful control, they are more capable to manage their emotions and frustration during the transition, which helps to promote closer relationships with parents and teachers and in turn prosocial behavior (Zentner & Shiner, 2012). However, to our knowledge, only a few studies have investigated the indirect effects

of temperament on socioemotional functioning via relationship quality (e.g., Ezpeleta et al., 2019; Rudasill et al., 2010). Karreman et al. (2010) did not find a significant mediation of parenting between temperament and the problem behavior of preschool children. In contrast, another study showed that lower levels of positive parenting practices mediated the relationship between low temperamental effortful control and the affective problems of 3- to 7-year-old children (Ezpeleta et al., 2019). In addition, Rudasill et al. (2010) found that conflicts with teachers mediated the relationship between difficult temperament and the risky behavior of early adolescents. However, previous studies that investigated the indirect effects of temperament on socioemotional functioning via relationship quality have overlooked parent-adolescent relationships, internalizing problems, and prosocial behaviors in these associations across the transition to lower secondary school.

Second, temperament may interact with the relationship quality with parents and teachers to shape adolescents' socioemotional functioning across the transition. Differential susceptibility theory (Belsky & Pluess, 2009; Jolicoeur-Martineau et al., 2020) suggests that some people are more sensitive to different environmental effects, such as critical educational transitions, than are others. Temperament might, therefore, predict adolescents' socioemotional functioning differently depending on the support they receive from their teachers and parents during the transition from primary to lower secondary school. For example, conflicting relationships with parents and teachers may encourage adolescents who are less shy and have higher tendencies to approach risks, to engage in more externalizing problems (Acar et al., 2020; Zentner & Shiner, 2012). In addition, conflicting relationships may strengthen the discomfort of adolescents who have difficulties in dealing with their negative emotions brought on by educational transition, which may predict internalizing problems (Harvey et al., 2022; Zentner & Shiner, 2012). On the other hand, when adolescents have high effortful control together with close relationships with parents and teachers, they have a stronger base to engage in effective social interactions with others, which can promote the prosocial behavior of adolescents (Zentner & Shiner, 2012). Ramos et al. (2005) found that family conflict predicted externalizing problems in elementary school only for children with negative affectivity and slow adaptability. In addition, Acar et al. (2020) showed that shy children had a higher social competence when they had a close relationship with teachers, whereas less shy children engaged in more antisocial behaviors when they had more conflicts with their teachers (Acar et al., 2020). Harvey et al. (2022) found that high levels of closeness with teachers acted as a protective factor in the relationship between low surgency and internalizing problems, whereas high levels of conflict acted as a risk factor in the relationship between high negative affectivity and internalizing problems of elementary school children. Finally, Karreman et al. (2010) found that fathers' positive control acted as a moderator

between impulsivity and externalizing problems. Despite some previous evidence on interactions between relationship quality and temperament predicting child socioemotional functioning, little is known about the interaction of temperament with parent and teacher relationship quality to predict changes in the socioemotional functioning of early adolescents (Leve et al., 2005).

The present study

To investigate the role of relationship quality with mothers and teachers and adolescent temperament in socioemotional functioning across the transition to lower secondary school (i.e., from Grade 6 to Grade 7), three research questions were examined:

1. To what extent does adolescent temperament (i.e., surgency, negative affectivity, and effortful control) predict the levels of and changes in their socioemotional functioning (prosocial, externalizing, and internalizing)? It was expected that higher surgency would predict more externalizing problems and less prosocial behavior and fewer internalizing problems in adolescents (Hypothesis 1a). In addition, it was expected that higher negative affectivity would predict more externalizing and internalizing problems and less prosocial behavior (Hypothesis 1b). Finally, it was hypothesized that higher effortful control would predict more prosocial behavior and fewer externalizing and internalizing problems (Hypothesis 1c; e.g., Muris et al., 2007; Wang et al., 2016; Zentner & Shiner, 2012).
2. To what extent does relationship quality in terms of closeness and conflict in the relationships with mothers and teachers at the end of primary school predict the level of and change in adolescents' socioemotional functioning during the transition? It was expected that close relationships with mothers and teachers would positively predict the prosocial behavior of early adolescents (Hypothesis 2a) and that conflicts with mothers and teachers would positively predict adolescents' externalizing and internalizing problems (Hypothesis 2b; e.g., Carlo et al., 2010; Roorda & Koomen, 2021).
3. To what extent are the effects of adolescent temperament on subsequent socioemotional functioning (a) mediated through relationship quality with mothers and teachers or (b) moderated by the relationship quality with mothers and teachers? We investigated which hypotheses, mediation or moderation based, received the most support.
 - a. First, regarding mediation, it was expected that higher surgency and negative affectivity, and lower effortful control would predict a higher initial level of and an increase in externalizing problems via the higher relationship conflict (Hypothesis 3a-1). In addition, it was expected that lower surgency and effortful control and higher negative affectivity would predict a higher initial level of and an increase in internalizing problems

via relationship conflict (Hypothesis 3a-2). Finally, it was expected that lower surgency and negative affectivity and higher effortful control would predict a higher initial level of and a lower decrease in prosocial behavior via closer relationships (Hypothesis 3a-3; e.g., Ezpeleta et al., 2019; Rudasill et al., 2010; Zentner & Shiner, 2012).

- b. Second, regarding the moderation hypothesis, relationships with mothers and teachers were expected to moderate the association between adolescent temperament and their socioemotional functioning. More specifically, we expected to find that high surgency, high negative affectivity, and low effortful control combined with high relationship conflicts would contribute to a higher initial level of and an increase in externalizing problems (Hypothesis 3b-1). In addition, we expected to find that low surgency and effortful control, and high negative affectivity, combined with high relationship conflicts would contribute to a higher initial level of and increase in internalizing problems (Hypothesis 3b-2). Finally, we expected to find that low surgency, low negative affectivity, and high effortful control combined with high relationship closeness would contribute to a higher initial level of and a lower decrease in prosocial behavior (Hypothesis 3b-3; e.g., Acar et al., 2020; Karreman et al., 2010; Zentner & Shiner, 2012).

Due to the associations of relationship quality and socioemotional functioning with achievement and parents' education, the control variables of GPA, as well as the mother's and father's education, were included in the final analyses (Hinshaw, 1992; Martin-Storey et al., 2018; Pakarinen et al., 2018). In addition, boys tend to get involved in more conflicts and externalizing problems than girls do (Baker, 2006; Hamre & Pianta, 2001), thus we also added adolescent gender as a control variable.

METHODS

Participants

The research data were collected during a broader longitudinal study following a community sample of Finnish adolescents across the transition from primary school to lower secondary school. The data were collected at four time points (Grade 6 fall, Grade 6 spring, Grade 7 fall, and Grade 7 spring). In total, 848 adolescents (835 at T1, 826 at T2, 800 at T3, and 772 at T4; 53.9% girls and 46.1% boys) answered questions about their socioemotional functioning and their temperament, while 631 mothers and 56 teachers answered about the mother-adolescent and teacher-adolescent relationship quality, respectively. The mean age of adolescents at the beginning of Grade 6 was 12.32 years ($SD = 0.36$). The vast majority of the adolescents were living with both parents (74.4%) or alternately with their mother and their father (11.7%), 7.3% lived with

only their mother, 4.2% lived with their mother and stepfather, 0.8% lived with only their father, and 0.8% lived with their father and stepmother. The remaining 0.7% lived with foster parents or somebody else. The procedures followed the principles of the Helsinki Declaration on research with human subjects. Written consent to participate was collected from participants, and the research plan of the project was approved by the Human Sciences Ethics Committee of the local university.

In the Finnish educational system, primary school lasts from Grade 1 to Grade 6 and lower secondary school begins in Grade 7 and continues up to Grade 9. Therefore, the transition from primary to lower secondary school takes place between Grades 6 and 7. The transition to lower secondary school brings changes in increased academic demands, and an increased number of classmates and teachers, which often requires shifting between school buildings. Primary school students have the same classroom teacher throughout primary school including the whole of Grade 6. However, when they enter lower secondary school in Grade 7, their teachers change from classroom teachers to subject teachers (Finnish National Agency for Education, 2014).

Measures

Temperament (Grade 6 fall)

Early adolescents answered questions about their temperament using the Finnish version of the Early Adolescent Temperament Questionnaire—Revised EATQ-R (Capaldi & Rothbart, 1992; Ellis, 2002; Ellis & Rothbart, 2001). The questionnaire includes 65 statements, which adolescents rated on a five-point Likert scale (1 = almost never true; 5 = almost always true). After a pilot study, six statements (e.g., “I get irritated if I am criticized”; “I finish what I start”) drawn from similar subscales of the EATQ-R parent-report form were added to improve the reliability of some of the scales. The resulting 71 statements measured temperamental surgency/extraversion, negative affectivity, effortful control, and affiliativeness. The affiliativeness scale was not used in the present study. The mean scores for effortful control ($\alpha = .79$), negative affectivity ($\alpha = .86$), and surgency/extraversion ($\alpha = .73$) were calculated. For the validity of the measure in the Finnish sample, see Kiuru et al. (2019).

Mother-adolescent relationship (Grade 6 fall)

The mothers were asked to rate their experienced closeness (5 items; e.g., “If upset, my child will seek comfort from me”) and conflict (5 items; e.g., “My child easily becomes angry at me”) with their adolescent using the 10 items of the short form of the Child-Parent Relationship Scale (CPRS; Driscoll & Pianta, 2011; Pianta, 1992b; see

also Kiuru et al., 2020; Mauno et al., 2018). The mothers answered the questions on a five-point Likert scale (1 = not true at all; 5 = completely true). Cronbach's α for closeness was .77 and for conflict, it was .84.

Teacher–adolescent relationship (Grade 6 spring)

The teachers reported the perceived quality of their relationship with 312 adolescents individually in Grade 6 spring (T2) using the short form of the Student–Teacher Relationship Scale (STRS; Pianta, 1992a; Pianta, 2001). The scale consists of 10 items rated on a five-point Likert scale (1 = Completely disagree; 5 = Completely agree) and includes two subscales: closeness (5 items; e.g., “I have a warm and close relationship with this student”) and conflict (5 items; e.g., “This student gets mad at me easily”). Cronbach's α for closeness was .83, and for conflict, it was .89.

In addition to the teacher-reported quality of their relationships with adolescents, we included youth-report for the additional analyses. Adolescents ($n = 837$) reported on their relationships with class teachers in Grade 6 fall (T1), using the same Student–Teacher Relationship Scale (STRS; Pianta, 1992a; Pianta, 2001). The scale consists of 11 items rated on a five-point Likert scale (1 = Completely disagree; 5 = Completely agree) and includes 5 closeness items (e.g., “I have a warm and close relationship with my teacher”) and 6 conflict items (e.g., “I am often angry at my teacher”). Cronbach's α for closeness was .82, and for conflict, it was .76.

Socioemotional functioning (Grade 6 fall, Grade 6 spring, Grade 7 fall, Grade 7 spring)

The early adolescents reported their socioemotional functioning using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) on a scale from 0 to 2 (0 = Not true; 2 = Certainly true), two times in Grade 6 and two times in Grade 7. Adolescents' prosocial behavior was measured with five items (e.g., “I am kind to younger children”), externalizing problems were measured using the scales for hyperactivity/inattention (five items, e.g., “I am restless, I cannot sit still for long”) and conduct problems (five items; e.g., “I fight a lot. I can make other people do what I want”), and to measure internalizing problems we used the emotional symptoms scale (e.g., “I have many fears, I get scared easily”); see also Goodman et al., 2010; Metsäpelto et al., 2017). Mean scores of prosocial behavior and internalizing problems were calculated separately for all four time points. The composite score for externalizing problems was formed as a mean score of the hyperactivity/inattention and conduct problems scales separately for all four time points. The Cronbach's alpha reliability was .65 in Grade 6 fall, .68 in Grade 6 spring, .70 in Grade 7 fall, and .71 in Grade 7 spring for prosocial behavior; .73 in Grade 6

fall, .73 in Grade 6 spring, .75 in Grade 7 fall, .81 in Grade 7 spring for externalizing problems; and .73 in Grade 6 fall, .73 in Grade 6 spring, .79 in Grade 7 fall, and .80 in Grade 7 spring for internalizing problems.

Control variables

The adolescents' gender was coded as 1 (for girls) or 2 (for boys). The grade point average was acquired from the school registers in the Grade 6 fall. In Finnish schools, grades range from 4 to 10, with 5 being the lowest passing grade and 10 the highest passing grade. Both fathers and mothers reported their education level from 1 to 7 (1 = No vocational training; 2 = Employment or vocational training courses; 3 = Vocational training; 4 = General upper secondary education; 5 = University of Applied Sciences, 6 = University or college, 7 = University postgraduate degree). The education levels of mothers and fathers were added separately as control variables.

Data analysis strategy

Data analysis was performed using Mplus Version 8.4 statistical package (Muthén & Muthén, 1998–2017). All the available data were included in the analyses. The missing data of the main study variables ranged from 1.1% to 63.2% ($M = 12.5\%$, $SD = 18.8\%$). Full information maximum likelihood estimation (FIML) with robust standard errors (MLR) was applied. Teachers rated more than one adolescent from their classrooms ($M = 14.77$, $SD = 5.51$, ranging from 2 to 25); thus, nestedness of the data within the classrooms was considered. The intra-class correlations (ICCs) were estimated for the main study variables. The range of ICCs varied from 0.000 to 0.201 ($.05 < p < .01$). Some significant ICCs have shown that adolescents were nested within classrooms, thus the COMPLEX approach was applied.

The models were built in a few steps. First, the latent growth models (LGM) with four measurement points were built separately for prosocial behavior, externalizing problems, and internalizing problems. To answer the first and the second research questions, three temperamental dimensions (i.e., surgency or extraversion, negative affectivity, effortful control) were added as predictors of level and slope to all three LGM models. Furthermore, mother and teacher relationship closeness was added together with temperamental dimensions to predict the level of and change in prosocial behavior (Model for prosocial behavior), and mother and teacher relationship conflict was added together with temperamental dimensions to predict the level of and change in externalizing problems (Model for externalizing problems), and internalizing problems (Model for internalizing problems). To answer the third research question, (a) indirect paths were calculated from temperament on socioemotional functioning via the relationship quality, and (b) interaction terms were added

to all three models to investigate the moderating effect of the relationship quality (with both mothers and teachers) on the associations between each temperamental dimension and socioemotional functioning. One-tailed significance testing was used for hypothesized associations. For the indirect effects, a bootstrapping procedure was used with 95% confidence intervals (MacKinnon et al., 2004). Gender, GPA, and parental education were included as control variables in the models. They were specified to predict the intercepts and slopes of the socioemotional functioning and to covary with the dimensions of relationship quality and temperament.

As additional analyses, we used adolescent report of teacher–adolescent relationship (T1) instead of teacher report (T2) in all three models for prosocial behavior, externalizing problems, and internalizing problems. The additional analyses were computed because teachers filled in the questionnaires only for a subsample at the end of Grade 6. For consistency and to avoid common method bias we used mother and teacher reports on their perceived relationships with adolescents in the main analyses. However, to rationalize the validity of the results we report an adolescent report of teacher–adolescent relationships in the additional analyses with much fewer missing data (1.3% instead of 63.2%).

Five model-fit statistics were considered: chi-square test of model fit, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and standardized root mean square residual (SRMR). For a good model fit, the p -value for the chi-square test was expected to be higher than .05, RMSEA smaller than .06, CFI and TLI higher than .95, and SRMR lower than .08 (Hu & Bentler, 1999).

RESULTS

Descriptive statistics are presented in Table 1. Results from zero-order correlations (Table 2) showed that prosocial behavior was positively associated with effortful control and negatively associated with negative affectivity at all time points. In addition, at all time points, prosocial behavior was positively associated with mother–adolescent closeness, and prosocial behavior after the transition was positively associated with teacher–adolescent closeness. Externalizing problems at all time points were negatively associated with effortful control and positively associated with negative affectivity, and externalizing problems after the transition were positively associated with surgency. In addition, externalizing problems across the transition were positively associated with mother– and teacher–adolescent conflict. Internalizing problems were negatively associated with effortful control and surgency, and positively associated with negative affectivity at all time points. Finally, internalizing problems were positively associated with mother–adolescent conflict at times 2, 3, and 4, and with teacher–adolescent conflict at Time 2.

Latent growth models for prosocial behavior, externalizing problems, and internalizing problems

First, latent growth models (LGM) were built for prosocial behavior, externalizing problems, and internalizing problems separately. The loadings for socioemotional functioning at all four time points were set to 1 for the level factor and were set to 0, 1, 2, and 3 for the slope factor. The linear growth models fitted well for prosocial behavior ($\chi^2[5]=5.792$, $p=.327$, CFI=0.999, TLI=0.999, RMSEA=0.014, SRMR=0.023), externalizing problems ($\chi^2[5]=30.337$, $p<.001$, CFI=0.970, TLI=0.964, RMSEA=0.078, SRMR=0.032), and internalizing problems ($\chi^2[5]=71.908$, $p<.001$, CFI=0.950, TLI=0.940, RMSEA=0.126, SRMR=0.059). The estimation of the results of latent growth models is shown in Table 3. The mean level results showed that adolescents' prosocial behavior decreased (linear mean trend = -0.019 , $p<.001$) and externalizing problems (linear mean trend = 0.008 , $p=.047$) and internalizing problems (linear mean trend = 0.024 , $p<.001$) increased during the transition to lower secondary school. There was also statistically significant variation in both the initial level and the growth component of prosocial behavior, externalizing problems, and internalizing problems (see Table 3).

The direct effects of temperament and relationship quality on socioemotional functioning

To investigate the first two research questions about the direct effects of adolescent temperament and relationship quality with parents and teachers on socioemotional functioning, the predictors were added to the latent growth models described above. In the model for prosocial behavior, relationship closeness with mothers and teachers and temperament in terms of surgency, negative affectivity, and effortful control were included as predictors of level and slope in the LGM of prosocial behavior (Figure 1, Model fit: $\chi^2[23]=34.945$, $p=.053$, CFI=0.992, TLI=0.986, RMSEA=0.025, SRMR=0.017). Similarly, in the models for externalizing problems and internalizing problems, variables of relationship conflict and temperament were included as predictors of level and slope in the LGM of externalizing problems (Figure 2, Model fit: $\chi^2[23]=75.384$, $p<.001$, CFI=0.972, TLI=0.948, RMSEA=0.052, SRMR=0.018) and internalizing problems (Figure 3, Model fit: $\chi^2[23]=102.562$, $p<.001$, CFI=0.955, TLI=0.917, RMSEA=0.064, SRMR=0.023).

Model for prosocial behavior

The results of the model for prosocial behavior (Figure 1) showed that effortful control positively predicted the level

TABLE 1 Descriptive statistics.

| Variables | <i>n</i> | <i>M</i> | <i>SD</i> | Potential range | Actual range | Skewness |
|---------------------------------|----------|----------|-----------|-----------------|--------------|----------|
| Mother–adolescent closeness T1 | 631 | 4.27 | 0.56 | 1–5 | 2–5 | –0.85 |
| Teacher–adolescent closeness T2 | 312 | 3.44 | 0.78 | 1–5 | 1–5 | –0.48 |
| Mother–adolescent conflict T1 | 631 | 2.14 | 0.83 | 1–5 | 1–4.8 | 0.75 |
| Teacher–adolescent conflict T2 | 312 | 1.62 | 0.85 | 1–5 | 1–4.8 | 1.53 |
| Prosocial behavior T1 | 835 | 1.48 | 0.36 | 0–2 | 0–2 | –0.53 |
| Prosocial behavior T2 | 826 | 1.45 | 0.37 | 0–2 | 0–2 | –0.41 |
| Prosocial behavior T3 | 800 | 1.45 | 0.38 | 0–2 | 0.2–2 | –0.40 |
| Prosocial behavior T4 | 772 | 1.43 | 0.39 | 0–2 | 0–2 | –0.36 |
| Externalizing problems T1 | 835 | 0.42 | 0.29 | 0–2 | 0–1.8 | 0.95 |
| Externalizing problems T2 | 826 | 0.41 | 0.29 | 0–2 | 0–1.8 | 0.91 |
| Externalizing problems T3 | 800 | 0.40 | 0.29 | 0–2 | 0–1.67 | 0.93 |
| Externalizing problems T4 | 772 | 0.45 | 0.34 | 0–2 | 0–1.6 | 0.76 |
| Internalizing problems T1 | 835 | 0.46 | 0.42 | 0–2 | 0–2 | 1.06 |
| Internalizing problems T2 | 826 | 0.44 | 0.42 | 0–2 | 0–2 | 1.18 |
| Internalizing problems T3 | 800 | 0.44 | 0.44 | 0–2 | 0–2 | 1.11 |
| Internalizing problems T4 | 772 | 0.55 | 0.49 | 0–2 | 0–2 | 0.79 |
| Effortful control T1 | 839 | 3.55 | 0.53 | 1–5 | 2.02–5 | 0.01 |
| Surgency T1 | 839 | 3.23 | 0.56 | 1–5 | 1.17–4.62 | –0.25 |
| Negative affectivity T1 | 839 | 2.39 | 0.53 | 1–5 | 1.06–4.06 | 0.17 |
| Gender (1 = Girl; 2 = Boy) | 848 | 1.46 | 0.50 | 1–2 | 1–2 | 0.16 |
| Grade point average (GPA) | 694 | 8.25 | 0.66 | 1–10 | 5.75–9.83 | –0.50 |
| Mother's education | 686 | 4.34 | 1.37 | 1–7 | 1–7 | –0.02 |
| Father's education | 671 | 3.96 | 1.45 | 1–7 | 1–7 | 0.32 |

Note: T1 = Grade 6 fall; T2 = Grade 6 spring; T3 = Grade 7 fall; T4 = Grade 7 spring.

(but not the slope) of prosocial behavior, while surgency positively predicted the level of prosocial behavior and negatively predicted the change in it. The higher effortful control and surgency manifested in adolescents, the more prosocial behavior they exhibited. Moreover, the higher the surgency adolescents perceived, the more decrease in prosocial behavior was reported to take place from Time 1 to Time 4. There were no significant effects found between negative affectivity and socioemotional functioning (both level and slope).

Regarding relationship quality, mother–adolescent closeness at Grade 6 positively predicted the level (but not the slope) of prosocial behavior: The higher closeness with their children mothers reported, the more prosocial behavior manifested in adolescents. In addition, teacher–adolescent closeness in Grade 6 positively predicted the rate of change in (but not the level of) prosocial behavior across the transition to lower secondary school: The closer relationships with adolescents' teachers reported, the less decrease in prosocial behavior was reported.

Model for externalizing problems

The results of the model (Figure 2) for externalizing problems showed that effortful control negatively predicted the level (but not the slope) of externalizing problems, which

indicated that the more effortful control adolescents reported, the fewer externalizing problems they expressed. Moreover, surgency positively predicted the rate of change (but not the level) in externalizing problems: The more temperamental surgency manifested in adolescents, the more externalizing problems increased from Time 1 to Time 4. Finally, negative affectivity positively predicted the level of and negatively predicted the change in externalizing problems. The higher the negative affectivity adolescents reported the more externalizing problems they perceived. Moreover, the higher negative affectivity they manifested, the less externalizing problems increased across the transition to lower secondary school.

Regarding relationship quality, mother–adolescent conflict positively predicted the range of change in (but not the level of) externalizing problems across the transition to lower secondary school, which indicates that the more conflict with their children mothers reported, the more adolescents' externalizing problems increased. In addition, teacher–adolescent conflict positively predicted the level of externalizing problems. The more conflicts teachers reported the higher externalizing problems adolescents demonstrated. One significant path from teacher–adolescent conflict to the change in externalizing problems was not interpreted due to the suppression or multicollinearity effect.

TABLE 2 Correlations between observed variables.

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
|---|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|-------|-------|---|
| 1. Mother-adolescent relationship closeness T1 | — | | | | | | | | | | | | | | | | | | | | | | |
| 2. Teacher-adolescent relationship closeness T2 | .15* | — | | | | | | | | | | | | | | | | | | | | | |
| 3. Mother-adolescent relationship conflict T1 | -.21** | .05 | — | | | | | | | | | | | | | | | | | | | | |
| 4. Teacher-adolescent relationship conflict T2 | -.05 | .06 | .29** | — | | | | | | | | | | | | | | | | | | | |
| 5. Prosocial behavior T1 | .16** | .06 | -.08* | -.13* | — | | | | | | | | | | | | | | | | | | |
| 6. Prosocial behavior T2 | .12** | .10 | -.09* | -.16** | .57** | — | | | | | | | | | | | | | | | | | |
| 7. Prosocial behavior T3 | .21** | .18** | -.08 | -.25** | .54** | .58** | — | | | | | | | | | | | | | | | | |
| 8. Prosocial behavior T4 | .15** | .15* | -.04 | -.18** | .50** | .51** | .60** | — | | | | | | | | | | | | | | | |
| 9. Externalizing problems T1 | -.12** | -.01 | .19** | .40** | -.36** | -.31** | -.35** | -.27** | — | | | | | | | | | | | | | | |
| 10. Externalizing problems T2 | -.07 | -.02 | .18** | .35** | -.30** | -.35** | -.33** | -.27** | .66** | — | | | | | | | | | | | | | |
| 11. Externalizing problems T3 | -.12** | -.08 | .23** | .29** | -.30** | -.31** | -.42** | -.33** | .60** | .67** | — | | | | | | | | | | | | |
| 12. Externalizing problems T4 | -.12** | -.08 | .19** | .24** | -.27** | -.27** | -.32** | -.45** | .50** | .54** | .66** | — | | | | | | | | | | | |
| 13. Internalizing problems T1 | .05 | -.02 | .07 | .08 | -.04 | -.09* | -.04 | -.02 | .45** | .34** | .27** | .19** | — | | | | | | | | | | |
| 14. Internalizing problems T2 | .03 | -.04 | .10* | .16** | -.07* | -.09* | -.04 | -.01 | .34** | .43** | .34** | .22** | .64** | — | | | | | | | | | |
| 15. Internalizing problems T3 | .03 | -.07 | .12** | .07 | -.08* | -.09* | -.06 | -.04 | .31** | .31** | .44** | .29** | .58** | .71** | — | | | | | | | | |
| 16. Internalizing problems T4 | .00 | -.07 | .09* | .04 | -.14** | -.13** | -.08* | -.10** | .27** | .28** | .35** | .49** | .49** | .56** | .67** | — | | | | | | | |
| 17. Effortful control T1 | .14** | .05 | -.21** | -.28** | .38** | .35** | .35** | .30** | -.54** | -.53** | -.48** | -.42** | -.25** | -.25** | -.21** | -.22** | — | | | | | | |
| 18. Surgency T1 | -.05 | .03 | .12** | .12* | .05 | .04 | -.04 | -.07 | -.01 | .01 | .11** | .10** | -.37** | -.32** | -.26** | -.23** | .00 | — | | | | | |
| 19. Negative affectivity T1 | -.06 | .03 | .13** | .09 | -.16** | -.15** | -.16** | -.09* | .44** | .34** | .29** | .22** | .50** | .44** | .41** | .28** | -.37** | -.31** | — | | | | |
| 20. Gender (1 = Girl; 2 = Boy) | -.14** | -.04 | -.02 | .25** | -.25** | -.21** | -.33** | -.38** | .16** | .14** | .20** | .25** | -.20** | -.20** | -.20** | -.16** | -.07 | .31** | -.09* | — | | | |
| 21. Grade point average (GPA) | .07 | .07 | -.21** | -.46** | .20** | .17** | .24** | .20** | -.37** | -.34** | -.34** | -.39** | -.11** | -.06 | -.05 | -.10** | .31** | -.09* | -.04 | -.27** | — | | |
| 22. Mother's education | .09* | .13* | -.05 | -.07 | .09* | .02 | .13** | .13** | -.11** | -.07 | -.11** | -.13** | -.04 | -.08 | -.09* | -.10* | .10** | .07 | -.04 | -.02 | .36** | — | |
| 23. Father's education | .08* | .03 | .06 | -.09 | .07 | .03 | .10* | .10* | -.08* | -.09* | -.07 | -.12** | -.00 | -.04 | -.02 | -.04 | .09* | .03 | .01 | -.01 | .29** | .45** | — |

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

TABLE 3 Parameter estimates of latent growth models for prosocial behavior, externalizing problems, and internalizing problems.

| Growth parameters | Prosocial behavior | Externalizing problems | Internalizing problems |
|-------------------------------|-------------------------|-------------------------|-------------------------|
| | Estimate (SE) | Estimate (SE) | Estimate (SE) |
| Means | | | |
| Intercept | 1.48*** (0.02) | 0.41*** (0.01) | 0.43*** (0.02) |
| Slope | -0.02*** (0.01) | 0.01* (0.00) | 0.02*** (0.01) |
| Variances | | | |
| Intercept | 0.08*** (0.01) | 0.06*** (0.01) | 0.12*** (0.01) |
| Slope | 0.00** (0.00) | 0.00*** (0.00) | 0.01*** (0.00) |
| Covariance (intercept, slope) | -0.00, $p = .13$ (0.00) | -0.00, $p = .20$ (0.00) | -0.00, $p = .27$ (0.00) |
| Residual variance | | | |
| Time 1 | 0.05*** (0.01) | 0.03*** (0.01) | 0.07*** (0.01) |
| Time 2 | 0.06*** (0.01) | 0.03*** (0.00) | 0.06*** (0.01) |
| Time 3 | 0.06*** (0.00) | 0.03*** (0.00) | 0.05*** (0.00) |
| Time 4 | 0.06*** (0.01) | 0.05*** (0.01) | 0.09*** (0.01) |

Note: Unstandardized estimates are presented in the table. Standard errors are presented in parentheses.

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

Model for internalizing problems

The results of the model (Figure 3) for internalizing problems showed that effortful control negatively predicted the level (but not the slope) of internalizing problems, which indicated that the more effortful control adolescents reported, the fewer internalizing problems they had. In addition, surgency negatively predicted the initial level and positively predicted the rate of change in internalizing problems. The results indicate that the more temperamental surgency manifested in adolescents, the less internalizing problems they had before the transition, however, they had a higher increase in their internalizing problems from Time 1 to Time 4. Finally, negative affectivity positively predicted the level of and negatively predicted the change in internalizing problems. The higher the negative affectivity adolescents reported, the more internalizing problems they had. On the other hand, the higher negative affectivity adolescents had, the less internalizing problems increased across the transition to lower secondary school. Regarding relationship quality, we did not find significant associations between relationship quality and the level or slope of internalizing problems across the transition.

Relationship quality with mothers and teachers as mediators

To answer the third research question about the possible indirect effects of temperament on socioemotional functioning via relationship quality, the following indirect effects were included in the above-mentioned models. The indirect effects included paths from each temperamental dimension separately on a level of prosocial behavior via the relationships with mothers and teachers, and the indirect

effect of temperamental dimensions separately on change in prosocial behavior via the relationships with mothers and teachers. Similar model specifications were made in the externalizing and internalizing models. Thirty-six (12 for each model) indirect effects were estimated. The relationship closeness and prosocial behavior model fit was $\chi^2[23] = 34.945$, $p = .0527$, CFI = 0.992, TLI = 0.981, RMSEA = 0.025, SRMR = 0.017, the relationship conflict and externalizing problems model fit was $\chi^2[23] = 75.384$, $p = .001$, CFI = 0.974, TLI = 0.937, RMSEA = 0.052, SRMR = 0.018, and the relationship conflict and internalizing problems model fit was $\chi^2[23] = 102.562$, $p < .001$, CFI = 0.959, TLI = 0.898, RMSEA = 0.064, SRMR = 0.023.

Model for prosocial behavior

We found only one indirect effect from effortful control on the level of prosocial behavior (but not the slope) via mother-adolescent closeness (Table 4). The higher effortful control adolescents manifested, the closer relationships with their mothers, and in turn, the more prosocial behaviors they showed. No significant indirect effects were found from surgency and negative affectivity on the level and change of prosocial behavior.

Model for externalizing problems

We found five significant indirect effects (see Table 4). First, the effortful control negatively predicted the level (but not the slope) of externalizing problems via teacher-adolescent conflict and the change in (but not the level of) externalizing problems via mother-adolescent conflict. The higher effortful control adolescents reported,

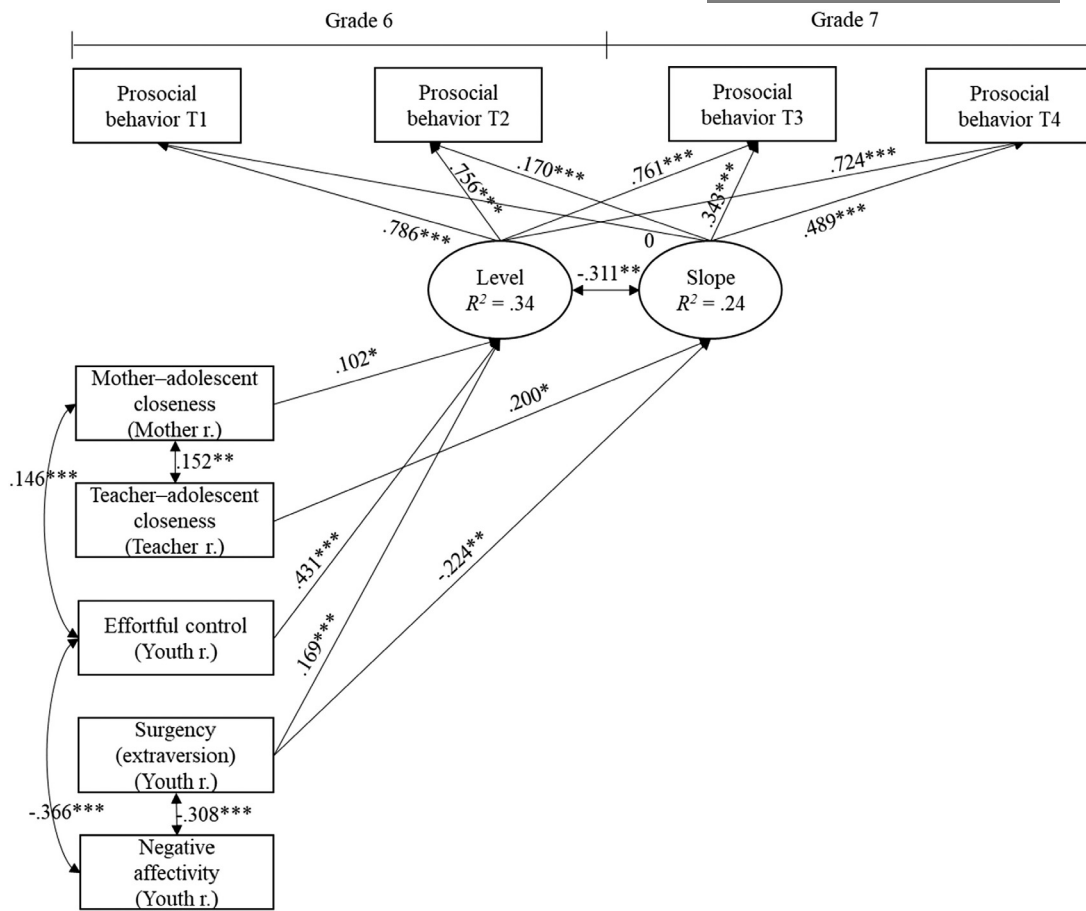


FIGURE 1 The effects of relationship closeness and temperament on the level of and change in early adolescents' prosocial behavior. The effects of covariates were included in the analysis. * $p < .05$, ** $p < .01$, *** $p < .001$.

the fewer conflicts with teachers they had, and the fewer externalizing problems manifested. Moreover, the higher effortful control adolescents had, the fewer conflicts mothers perceived with them, and the less externalizing problems increased. In addition, results have shown that temperamental surgency positively predicted the level (but not the slope) of externalizing problems via teacher-adolescent conflict and positively predicted the change in (but not the level of) externalizing problems via mother-adolescent conflict. The results indicate that the higher temperamental surgency adolescents had, the more conflicts teachers perceived, and the more externalizing problems adolescents had. Moreover, the higher level of surgency manifested, the more conflicting relationships adolescents had with their mothers and the more externalizing problems increased. Regarding negative affectivity, only one indirect effect was found on the change in (but not the level of) externalizing problems via the mother-adolescent conflict. The higher temperamental negative affectivity adolescents had, the more conflicts

mothers reported, and the higher increase in externalizing problems adolescents showed across the transition.

Model for internalizing problems

We did not find significant indirect effects of adolescents' temperament on internalizing problems (level and slope) via the relationship quality.

Relationship quality as a moderator

To answer the third research question about relationship quality with parents and teachers as possible moderators in the association between adolescent temperament and subsequent socioemotional functioning, six interaction terms were included in the prosocial model, six interaction terms in the model of externalizing problems, and six interaction terms in the model of internalizing problems. That

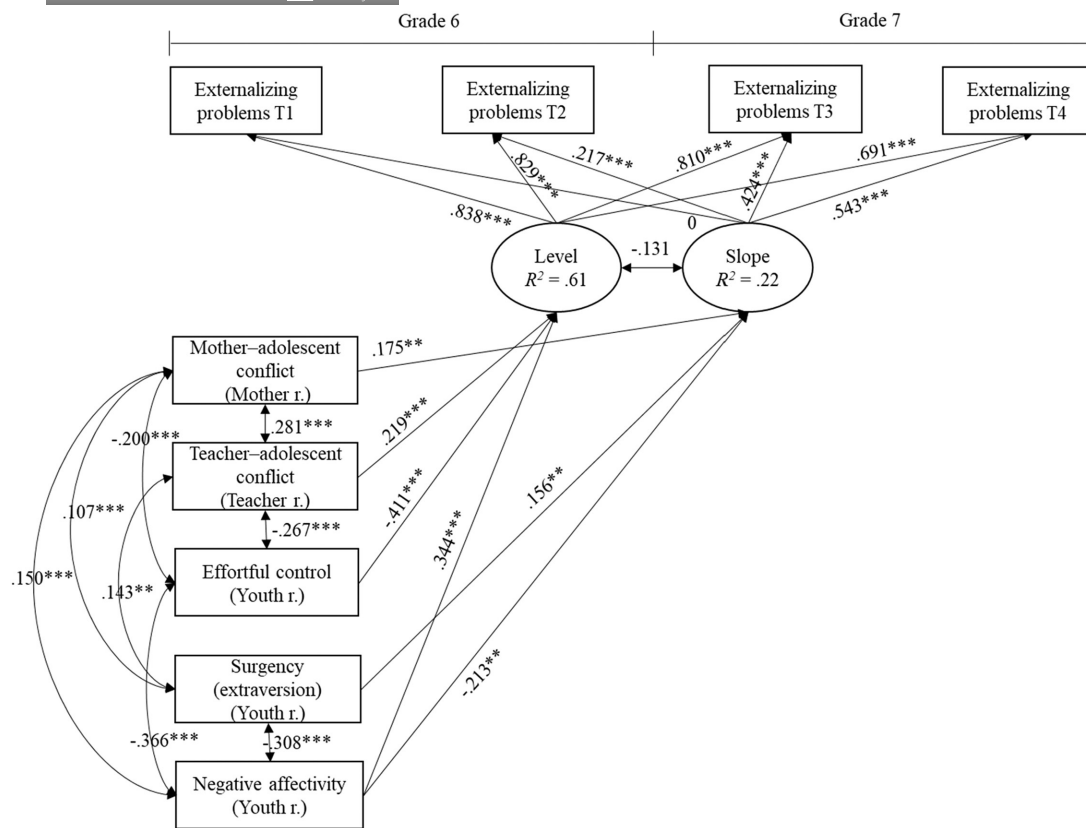


FIGURE 2 The effects of relationship conflict and temperament on the level of and change in adolescents' externalizing problems. The effects of covariates were included in the analysis. * $p < .05$, ** $p < .01$, *** $p < .001$.

is, mother and teacher relationship conflicts with each temperamental dimension separately were included in the models of the externalizing and internalizing problems, and mother and teacher relationship closeness with each temperamental dimension separately was included in the prosocial behavior model. All the respective main effects were also included in the models. The relationship closeness and prosocial behavior model fit was $\chi^2[35] = 64.153$, $p = .002$, CFI = 0.982, TLI = 0.967, RMSEA = 0.031, SRMR = 0.016, relationship conflict and externalizing problems model fit was $\chi^2[35] = 86.640$, $p = .001$, CFI = 0.974, TLI = 0.951, RMSEA = 0.042, SRMR = 0.014, and relationship conflict and internalizing problems model fit was $\chi^2[35] = 111.367$, $p < .001$, CFI = 0.955, TLI = 0.915, RMSEA = 0.051, SRMR = 0.018.

Model for prosocial behavior

The results showed that the interaction term mother-adolescent closeness \times surgency predicted the level (but not the slope) of prosocial behavior (see Figure 4; $\beta = -.114$, $p = .003$). When mother-adolescent closeness was low,

high adolescent surgency predicted higher prosocial behavior, whereas when maternal closeness was high adolescent surgency was unrelated to prosocial behavior (see Figure 4). Neither effortful control nor negative affectivity together with relationship quality predicted prosocial behavior.

Model for externalizing problems

The results showed that teacher-adolescent conflict \times negative affectivity interaction predicted both the level of and change in externalizing problems ($\beta = .145$, $p = .002$; $\beta = -.234$, $p = .009$; see Figures 5 and 6). When teacher-adolescent conflict was high, high negative affectivity predicted higher initial levels but a lower slope (increase) in externalizing problems. In turn, when teacher-adolescent conflict was low, the association between negative affectivity and the initial externalizing problems was weaker and there was no association between negative affectivity and change of externalizing problems. Finally, the mother-adolescent conflict \times negative affectivity interaction predicted the level of and change in externalizing problems

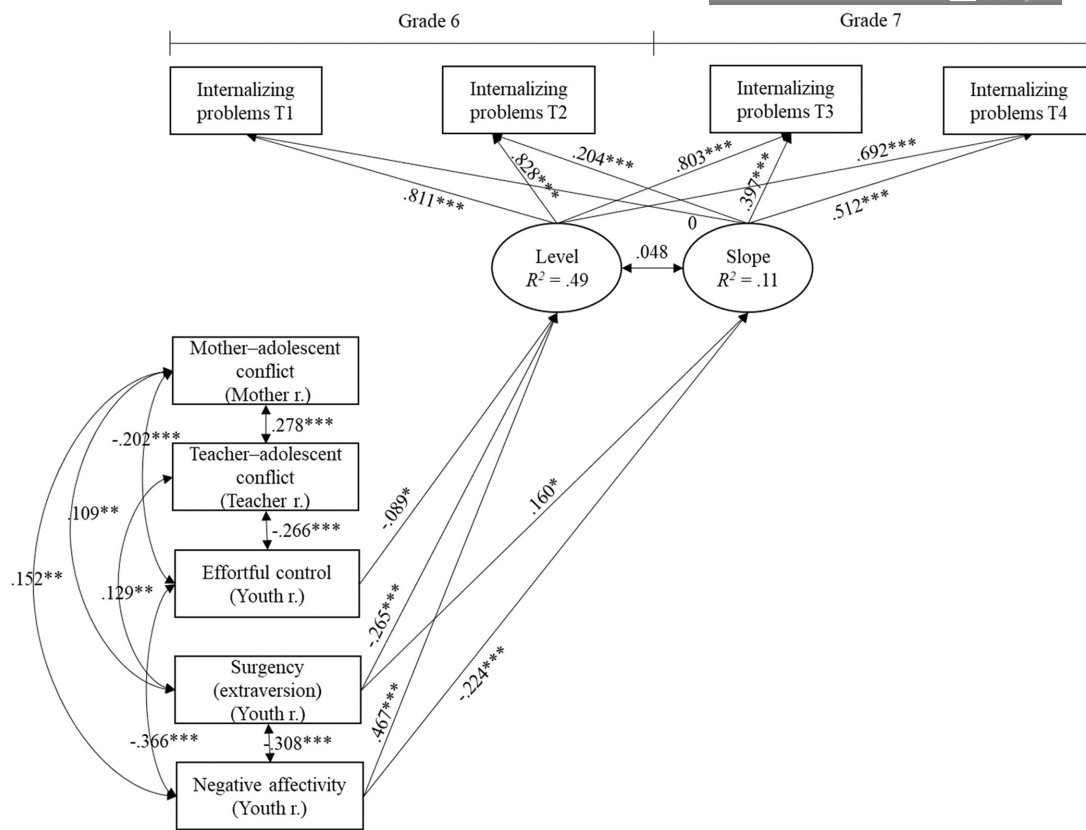


FIGURE 3 The effects of relationship conflict and temperament on the level of and change in adolescents' internalizing problems. The effects of covariates were included in the analysis. * $p < .05$, ** $p < .01$, *** $p < .001$.

TABLE 4 The indirect effects of temperament on level of and change in socioemotional functioning.

| Effect | Estimate of total effect | Estimate of indirect effect | SE | 95% CI | |
|---|--------------------------|-----------------------------|------|--------|-------|
| | | | | LL | UL |
| Prosocial behavior | | | | | |
| Effortful control → Mother-adolescent closeness → Level | 0.445 | 0.014 | .009 | .002 | .036 |
| Externalizing problems | | | | | |
| Effortful control → Teacher-adolescent conflict → Level | -0.466 | -0.055 | .024 | -.111 | -.018 |
| Effortful control → Mother-adolescent conflict → Slope | -.027 | -0.026 | .014 | -.062 | -.006 |
| Surgency → Teacher-adolescent conflict → Level | 0.057 | 0.035 | .017 | .010 | .077 |
| Surgency → Mother-adolescent conflict → Slope | 0.183 | 0.027 | .014 | .006 | .061 |
| Negative affectivity → Mother-adolescent conflict → Slope | -0.188 | 0.025 | .016 | .005 | .072 |

Note: The effects of covariates were included in the analysis. Standardized estimates are reported in the table.

($\beta = -.109$, $p = .015$; $\beta = .243$, $p = .007$; see Figures 7 and 8). When mother-adolescent conflict was high, higher negative affectivity predicted a higher initial level of externalizing problems. When mother-adolescent conflict was

low, the same prediction was true but to a slightly higher degree. Moreover, when the mother-adolescent conflict was low, high negative affectivity predicted a lower increase in externalizing problems.

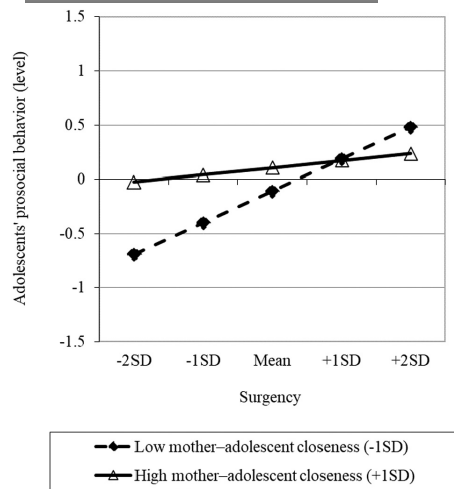


FIGURE 4 Mother-adolescent closeness as a moderator between surgency and the level of adolescents' prosocial behavior.

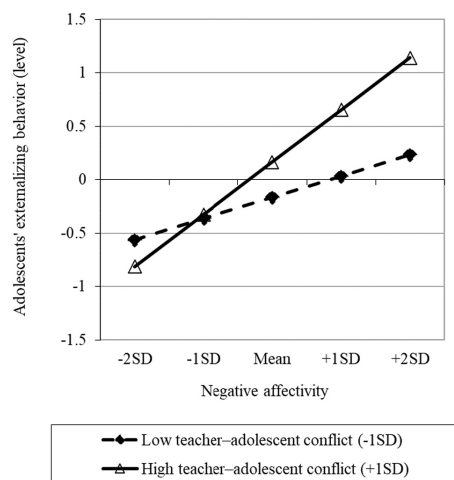


FIGURE 5 Teacher-adolescent conflict as a moderator between negative affectivity and the level of adolescents' externalizing problems.

Model for internalizing problems

We did not find significant effects of interactions between temperament and relationship quality on internalizing problems (level and slope).

Additional analyses

For the additional analyses, we investigated the adolescent report of teacher-adolescent relationship in all three models. The results closely resembled the results of the models with teacher-reported teacher-adolescent relationship with few exceptions.

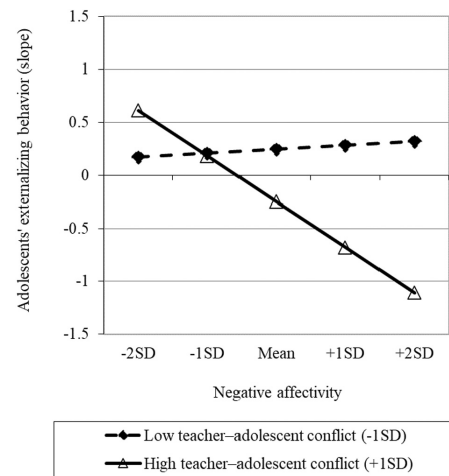


FIGURE 6 Teacher-adolescent conflict as a moderator between negative affectivity and the change in adolescents' externalizing problems.

Model for prosocial behavior

Same as in the main model (with teacher-reported closeness), mother-adolescent closeness predicted the level of prosocial behavior ($\beta = .093, p = .030$), effortful control predicted the level ($\beta = .396, p < .001$), and surgency predicted the level ($\beta = .177, p < .001$) and slope ($\beta = -.208, p = .002$) of prosocial behavior. The only difference was that teacher-reported closeness with adolescents (in the main model) predicted the slope, whereas adolescent-reported closeness with teachers (in the additional model) predicted the level of prosocial behavior ($\beta = .146, p < .001$).

Model for externalizing problems

All the significant paths from the main model (teacher-reported conflict) remained significant in the additional model (adolescent-reported conflict). Mother-adolescent conflict predicted the slope of externalizing problems ($\beta = .116, p = .046$), teacher-adolescent conflict predicted the level of externalizing problems ($\beta = .122, p = .001$), effortful control predicted the level ($\beta = -.414, p < .001$), surgency predicted slope ($\beta = .135, p = .010$), and negative affectivity predicted both the level ($\beta = .318, p < .001$) and slope ($\beta = -.238, p < .001$) of externalizing problems.

Model for internalizing problems

All the significant paths remained significant after adding adolescent-reported teacher-adolescent conflict instead of teacher-reported teacher-adolescent conflict. Effortful control negatively predicted the level of internalizing problems ($\beta = -.084, p = .029$), surgency negatively predicted the level ($\beta = -.273, p < .001$), and positively predicted the slope

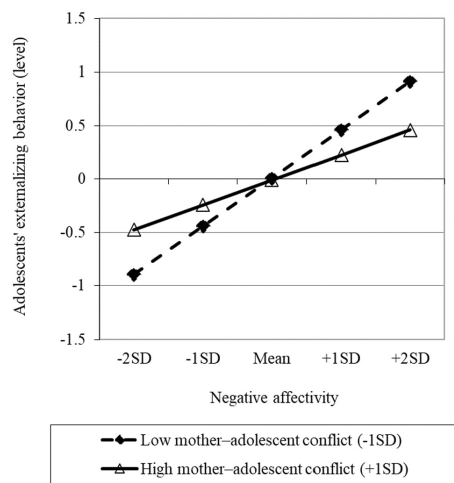


FIGURE 7 Mother-adolescent conflict as a moderator between negative affectivity and the level of adolescents' externalizing problems.

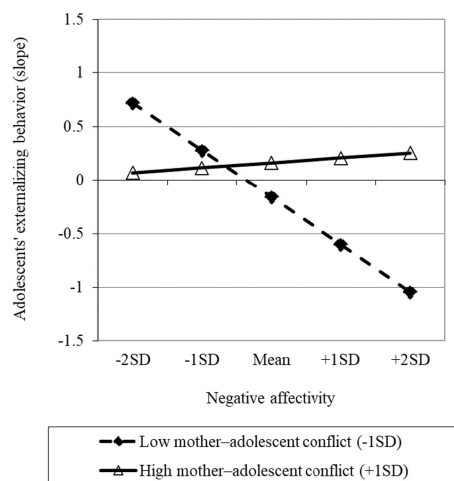


FIGURE 8 Mother-adolescent conflict as a moderator between negative affectivity and the slope of adolescents' externalizing problems.

($\beta = .144$, $p = .024$), and negative affectivity positively predicted the level ($\beta = .447$, $p < .001$) and negatively predicted the slope ($\beta = -.254$, $p < .001$) in internalizing problems.

DISCUSSION

This longitudinal study expands our knowledge on the role of adolescents' temperament and their relationship quality with mothers and teachers on their socioemotional functioning across the transition to lower secondary school. In addition, this is one of the few studies that investigated the mediation and moderation of the relationship quality in the association

between adolescents' temperament and socioemotional functioning across the transition. First, results showed that each temperamental dimension (i.e., surgency, negative affectivity, and effortful control) had an individual contribution to the socioemotional functioning of adolescents. Second, close relationships with mothers and low conflicts with teachers predicted more successful socioemotional functioning in adolescents before the transition (i.e., higher prosocial behavior and lower externalizing problems), whereas close relationships with teachers and low conflicts with mothers predicted more successful socioemotional functioning across the transition. In addition to the direct effects, we also found indirect effects of temperament and interaction effects of temperament and relationship quality on socioemotional functioning.

Temperament and socioemotional functioning of adolescents

The first research question was set to investigate the role of three temperamental dimensions on the level of and change in prosocial behavior, externalizing, and internalizing problems of adolescents. The descriptive findings for latent growth models were in line with many previous studies regarding educational transition (Eccles & Roeser, 2011; Martínez et al., 2011; Marušić et al., 2020), indicating that adolescents' prosocial behavior decreased, and externalizing and internalizing problems increased across the critical educational transition to lower secondary school. Furthermore, the results revealed that adolescent temperament played a role in their socioemotional functioning during this transition.

First, as expected, higher surgency predicted a higher decrease in prosocial behavior, an increase in externalizing problems, and a lower initial level in internalizing problems (Hypothesis 1a). However, adolescents with higher temperamental surgency were more prosocial before the transition and had a higher increase in internalizing problems across the transition. Albeit previous studies associated higher surgency with fewer prosocial behaviors and internalizing problems, and more externalizing problems (Wang et al., 2016; Zentner, 2020; Zentner & Shiner, 2012), there are indications that higher surgency can have both positive and negative outcomes (Anttila et al., 2022). For example, before the transition, extrovert students might be more outgoing, less shy, and more confident in social interactions, which can encourage them to actively engage in prosocial behaviors. In addition, higher positive emotionality before the transition, which is one of the characteristics of high surgency (Rothbart, 2007; Rothbart et al., 2001), may lessen internalizing problems. However, when adolescents with higher surgency are facing stressful life events, such as the educational transition to lower secondary school, their enthusiasm, and higher sensation-seeking, might manifest and be perceived differently, for example, as impulsivity or disruptive behavior. If adolescents are perceived as disruptive, they may also have difficulties socializing, which may relate to higher

internalizing and externalizing problems. This change in manifestation and perception of surgency after the transition can explain a further decrease in prosocial behaviors and an increase in externalizing and internalizing problems.

Second, the results for negative affectivity partly supported our hypotheses. As expected, higher temperamental negative affectivity predicted a higher initial level of externalizing and internalizing problems (Hypothesis 1b). The results comply with the previous studies which showed that adolescents with higher negative affectivity experience more negative emotions and frustration, which is linked to externalizing and internalizing problems (Lunetti et al., 2022; Rothbart et al., 2001, 2011; Scrimin et al., 2019; Zentner, 2020). For example, when adolescents with high negative affectivity face educational transition, their negative emotionality may rise, which can make them more susceptible to internalizing problems (Lunetti et al., 2022). In addition, to our surprise, we have found that higher negative affectivity also predicted a lower increase in externalizing and internalizing problems. This finding contradicts the previous studies which have shown positive associations between negative affectivity and externalizing and internalizing problems (Martin-Storey et al., 2018; Muris et al., 2007; Wang et al., 2016). This finding might indicate that some adolescents, with higher negative affectivity, already had high levels of externalizing and internalizing problems before the transition, leaving no space for these problems to increase. Hence, these findings should be carefully interpreted, because even though results showed a lower increase in externalizing and internalizing, it can still imply that adolescents with temperamental negative affectivity might have difficulties in their socioemotional functioning across the transition. Contrary to our expectations and previous studies (Hirvonen et al., 2018; Zentner, 2020), negative affectivity neither predicted the initial level nor the change in prosocial behaviors (Hypothesis 1b). In the current study, adolescents' intense negative feelings and difficulty in dealing with negative emotions were related only to the indicators of poor socioemotional functioning (i.e., externalizing, and internalizing problems).

Finally, as expected (Hypothesis 1c), and in line with the previous studies, adolescents who were able to better focus attention and control their behavior and emotions, engaged in more prosocial behaviors and fewer externalizing and internalizing problems (Luengo Kanacri et al., 2013; Lunetti et al., 2022; Muris et al., 2007; Wang et al., 2016). For example, adolescents who have higher effortful control can inhibit their inappropriate behavior, which minimizes the appearance of externalizing problems. In addition, the ability to maintain attention and regulate emotions may foster empathy in adolescents, which can be beneficial for higher prosocial behaviors. Finally, adolescents with higher effortful control can ruminate less on their negative emotions, which may relate to lower internalizing problems.

To conclude, the results indicate that surgency is a stronger predictor of prosocial behavior, whereas negative affectivity

is more detrimental in terms of disruptive behaviors, such as externalizing problems or internalizing problems. However, surgency also predicted lower internalizing problems before the transition and a higher increase in internalizing problems across the transition. In this specific sample, temperamental effortful control was not as determinant across the transition as surgency or negative affectivity. Nevertheless, adolescents who had higher effortful control had the best socioemotional functioning before the transition due to higher levels of prosocial behavior and lower levels of externalizing and internalizing problems.

Relationship quality and socioemotional functioning of adolescents

The second research question was set to investigate the role of relationship quality with mothers and teachers on the level of and change in socioemotional functioning of adolescents across the transition to lower secondary school. In line with Hypothesis 2a, the results indicated that adolescents benefited from close relationships with mothers (in Grade 6) before the transition. However, close relationships with teachers were more beneficial during the transition to higher prosocial behaviors. One of the possible explanations is that experiences in primary school are brought to lower secondary school (Bronfenbrenner, 1979). Before the transition, parents are important figures in shaping adolescents' prosociality towards others. However, school experiences of close relationships with primary school teachers are brought to the secondary school, which becomes a crucial part of adolescents' prosocial behaviors across the transition.

In contrast, conflicts with mothers in Grade 6 were detrimental to the increase in adolescents' externalizing problems during the transition, while conflicts with teachers were detrimental to higher externalizing problems only before the transition. These findings coincide with the ecological approach (Bronfenbrenner, 1979), which concerns the social connections between both the home and school environments. Before the transition, in primary school, the tension between teachers and adolescents can provoke disruptive behaviors of adolescents. After the transition, adolescents renegotiate their relationships with other subject teachers and in times of changes brought by transition, the only constant relationship remains with parents (Virtanen et al., 2020). Thus, conflicts with mothers might add to the perceived lack of support, which becomes especially detrimental to adolescents' externalizing problems.

Contrary to our expectations (Hypothesis 2b) and previous studies (e.g., Martin-Storey et al., 2018; Pakarinen et al., 2018), the results showed no significant associations between relationship conflict and internalizing problems. The study indicates that in this specific sample only personal characteristics, but not conflicts with parents and teachers played a role in shaping internalizing problems across the transition to lower secondary school. One possible explanation could be that adolescents who are more socially

their mothers, their higher negative affectivity was slightly weaker in predicting more externalizing problems before the transition. Conflicts with mothers strengthened the susceptibility of adolescents with higher negative affectivity to externalizing problems.

In addition to expected moderations, the results also showed some surprising findings. When teacher–adolescent conflict was high and mother–adolescent conflict was low, higher negative affectivity predicted a lower increase in externalizing problems across the transition. These unexpected associations might have occurred due to the already high rates of externalizing problems of adolescents who had not only higher negative affectivity but also high conflicts with teachers. In line with differential susceptibility theory (Belsky & Pluess, 2009), the results of the current study indicate that adolescents with higher negative affectivity were more susceptible to conflicts with mothers and teachers across the transitions than those who had higher surgency or lower effortful control.

To conclude, we generally found more significant indirect effects (6) than interaction effects (5). However, the results of the current study have revealed that both indirect and interaction effects covered different underlying mechanisms in predicting socioemotional functioning across the transition. For example, regarding negative affectivity, more support was found for the interaction effects between negative affectivity and conflicts with mothers and teachers in predicting externalizing problems. Regarding surgency, when predicting positive adjustment outcomes, surgency interacted with mother–adolescent closeness in predicting prosocial behavior. However, when predicting negative adjustment outcomes, surgency predicted externalizing problems via the relationship conflict between mothers and teachers. Finally, results for the effortful control provide more support for the mediation hypotheses, due to only indirect effects on socioemotional functioning. The results of the current study provided support for both a moderating and mediating role of relationship quality in the association between adolescents' temperament and socioemotional functioning. These findings are an important step in the current state of research in the field and should encourage further studies to have a closer look into these mechanisms.

Limitations

The current study has several limitations. First, even though we used longitudinal data, the direction of associations should be interpreted carefully, especially when predicting the initial levels of socioemotional functioning. Second, mothers and teachers can well identify their relationship quality with adolescents, and we aimed to use their reports to avoid common method bias when investigating associations between relationship quality and adolescent-reported socioemotional functioning. We also conducted additional analyses that included an adolescent report on their

relationships with teachers. However, the current study could also benefit from adolescents' reports on their perceived relationship quality with parents. Third, in our main analyses, teacher reports on teacher–adolescent relationship were collected from a rather small sample of teachers at T2; thus, we had a large amount of missing data. In addition, we predicted the socioemotional functioning at T1 by teacher–adolescent relationship at T2. To mitigate this limitation, we conducted additional analyses that included the adolescent reports on teacher–adolescent relationship at T1 with much fewer missing data. This way, we also investigated the role of teacher–adolescent relationship at T1 on the socioemotional functioning of adolescents starting from T1, but there were no substantial differences in the results. Fourth, when interpreting the associations between relationship conflict and externalizing problems, it is important to keep in mind a possible overlap. Externalizing problems include such qualities as anger, aggressiveness, and temper, which can also manifest in conflicting situations. Fifth, due to the adolescent reports on both temperament and socioemotional functioning, common-method bias could have affected the associations between temperamental types and initial level and changes in prosocial behavior, externalizing, and internalizing problems. Finally, we used four subscales of SDQ in our study, therefore future studies could benefit from also investigating the role of adolescents' temperament and relationship quality on peer problems across the transition from primary to lower secondary school.

Practical applications

The current study has several practical applications. First, the results imply that avoiding conflicts with adolescents and providing them with a supportive environment can help promote their socioemotional functioning at school. Especially important is closeness with teachers and avoiding conflicts with parents before the transition. Adolescents face stressful life changes at school during the transition. Stressful situations at home, caused by conflicts with parents, can prevent adolescents from having a safe space, which might increase adolescents' externalizing problems during the transition. In addition, close relationships with teachers before the transition can help adolescents successfully face the transition and develop successful socioemotional functioning.

Second, results have shown that adolescents with higher surgency or negative affectivity can be more susceptible to externalizing problems than are those with higher effortful control, especially when facing the transition to lower secondary school. Parents and teachers should note that their negative reactions towards adolescents can even strengthen the possibility of adolescents with higher surgency and negative affectivity developing externalizing problems. Therefore, stronger education or even intervention programs for parents and teachers about the differences between temperament types and its role in their reactions towards adolescents and later socioemotional functioning

could be beneficial. Negative reactions toward adolescents' temperamental expressions can be detrimental to their socioemotional functioning across the transition. Therefore, a collaboration between parents and teachers should be encouraged to provide a positive environment across the transition to lower secondary school, especially for adolescents that are more temperamentally susceptible to conflicts during the critical educational transition to lower secondary school. Observing adolescents' temperament can be especially important in identifying those adolescents who have the risk to develop internalizing problems before or during the transition.

Policy makers can be encouraged to put more emphasis in the curriculum on strengthening the relationships between teachers and adolescents, especially after the transition when one classroom teacher is exchanged for multiple subject teachers. Adolescents could benefit from more informal gatherings with not only class but also subject teachers. This could help to provide a stronger sense of continuity in closeness not only with parents but also with teachers across the transition to lower secondary school and might promote prosocial behaviors and lessen the risk of externalizing problems.

CONCLUSIONS

The current study showed that adolescents' personal characteristics, such as temperament, and support from mothers and teachers, predict their socioemotional functioning across the transition to lower secondary school. It is especially important to note that when adolescents have close relationships with teachers and avoid conflicts with their mothers, they maintain more successful socioemotional functioning across the transition. Some adolescents with higher surgency and negative affectivity can be more susceptible to changes across the transition. Therefore, it is important to raise the awareness of parents and teachers that the personal characteristics of adolescents and the way parents and teachers react to these characteristics can be detrimental to adolescents' socioemotional functioning at school.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

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REFERENCES

- Acar, I. H., Kutaka, T. S., Rudasill, K. M., Torquati, J. C., Coplan, R. J., & Yildiz, S. (2020). Examining the roles of child temperament and teacher-child relationships as predictors of Turkish children's social competence and antisocial behavior. *Current Psychology*, 39(6), 2231–2245. <https://doi.org/10.1007/s12144-018-9901-z>
- Allison, B. N. (2000). Parent-adolescent conflict in early adolescence: Precursor to adolescent adjustment and behavior problems. *Journal of Family and Consumer Sciences*, 92(5), 53–56.
- Anttila, S., Lindfors, H., Hirvonen, R., Määttä, S., & Kiuru, N. (2022). Dropout intentions in upper secondary education: Student temperament and achievement motivation as antecedents. *Journal of Adolescence*, 95, 248–263. <https://doi.org/10.1002/jad.12110>
- Baker, J. A. (2006). Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology*, 44(3), 211–229. <https://doi.org/10.1016/j.jsp.2006.02.002>
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135(6), 885–908. <https://doi.org/10.1037/a0017376>
- Bos, M. G. N., Wierenga, L. M., Blankenstein, N. E., Schreuders, E., Tamnes, C. K., & Crone, E. A. (2018). Longitudinal structural brain development and externalizing behavior in adolescence. *Journal of Child Psychology and Psychiatry*, 59(10), 1061–1072. <https://doi.org/10.1111/jcpp.12972>
- Branje, S. (2018). Development of parent-adolescent relationships: Conflict interactions as a mechanism of change. *Child Development Perspectives*, 12(3), 171–176. <https://doi.org/10.1111/cdep.12278>
- Branje, S. J. T., van Doorn, M., van der Valk, I., & Meeus, W. (2009). Parent-adolescent conflicts, conflict resolution types, and adolescent adjustment. *Journal of Applied Developmental Psychology*, 30(2), 195–204. <https://doi.org/10.1016/j.appdev.2008.12.004>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an early adolescent temperament measure. *The Journal of Early Adolescence*, 12(2), 153–173. <https://doi.org/10.1177/0272431692012002002>
- Caprara, G. V., Kanacri, B. P. L., Gerbino, M., Zuffianò, A., Alessandri, G., Vecchio, G., Caprara, E., Pastorelli, C., & Bridglall, B. (2014). Positive effects of promoting prosocial behavior in early adolescence. *International Journal of Behavioral Development*, 38(4), 386–396. <https://doi.org/10.1177/0165025414531464>
- Carlo, G., Crockett, L. J., Randall, B. A., & Roesch, S. C. (2007). A latent growth curve analysis of prosocial behavior among rural adolescents. *Journal of Research on Adolescence*, 17(2), 301–324. <https://doi.org/10.1111/j.1532-7795.2007.00524.x>
- Carlo, G., Mestre, M. V., McGinley, M. M., Tur-Porcar, A., Samper, P., & Opal, D. (2014). The protective role of prosocial behaviors on antisocial behaviors: The mediating effects of deviant peer affiliation. *Journal of Adolescence*, 37(4), 359–366. <https://doi.org/10.1016/j.adolescence.2014.02.009>
- Carlo, G., Mestre, M. V., Samper, P., Tur, A., & Armenta, B. E. (2010). The longitudinal relations among dimensions of parenting styles, sympathy, prosocial moral reasoning, and prosocial behaviors. *International Journal of Behavioral Development*, 35(2), 116–124. <https://doi.org/10.1177/0165025410375921>
- Denham, S. A., Wyatt, T. M., Bassett, H. H., Echeverria, D., & Knox, S. S. (2009). Assessing social-emotional development in children from a longitudinal perspective. *Journal of Epidemiology & Community*

- Health, 63(Supplement 1), i37–i52. <https://doi.org/10.1136/jech.2007.070797>
- Driscoll, K., & Pianta, R. (2011). Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *Journal of Early Childhood and Infant Psychology*, 7, 1–24.
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*, 21(1), 225–241. <https://doi.org/10.1111/j.1532-7795.2010.00725.x>
- Eisenberg, N. (1982). *The development of prosocial behavior* (pp. 3–11). Academic Press, Inc.
- Ellis, L. K. (2002). Individual differences and adolescent psychosocial development. (Publication No. 3061943) [Doctoral dissertation, University of Oregon]. ProQuest Dissertations and Theses Global.
- Ellis, L. K., & Rothbart, M. K. (2001, April). *Revision of the early adolescent temperament questionnaire*. [Poster presentation]. 2001 biennial meeting of the Society for Research in Child Development, Minneapolis, Minnesota.
- Ezpeleta, L., Penelo, E., Osa, N., Navarro, J. B., & Trepat, E. (2019). Irritability and parenting practices as mediational variables between temperament and affective, anxiety, and oppositional defiant problems. *Aggressive Behavior*, 45(5), 550–560. <https://doi.org/10.1002/ab.21850>
- Fanti, K. A., & Henrich, C. C. (2010). Trajectories of pure and co-occurring internalizing and externalizing problems from age 2 to age 12: Findings from the National Institute of Child Health and Human Development Study of Early Child Care. *Developmental Psychology*, 46(5), 1159–1175. <https://doi.org/10.1037/a0020659>
- Finnish National Agency for Education. (2014). National core curriculum for basic education. <https://www.oph.fi/en/education-and-qualifications/national-core-curriculum-basic-education>
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., Hinde, R. A., & McCall, R. B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, 58(2), 505–529. <https://doi.org/10.2307/1130527>
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38, 581–586.
- Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British parents, teachers and children. *Journal of Abnormal Child Psychology*, 38(8), 1179–1191. <https://doi.org/10.1007/s10802-010-9434-x>
- 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://doi.org/10.1111/1467-8624.00301>
- Harvey, E., Lemelin, J. P., & Déry, M. (2022). Student-teacher relationship quality moderates longitudinal associations between child temperament and behavior problems. *Journal of School Psychology*, 91, 178–194. <https://doi.org/10.1016/j.jsp.2022.01.007>
- Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin*, 111(1), 127–155. <https://doi.org/10.1037/0033-2909.111.1.127>
- Hirvonen, R., Väänänen, J., Aunola, K., Ahonen, T., & Kiuru, N. (2018). Adolescents' and mothers' temperament types and their roles in early adolescents' socioemotional functioning. *International Journal of Behavioral Development*, 42(5), 453–463. <https://doi.org/10.1177/0165025417729223>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705199909540118>
- Jolicoeur-Martineau, A., Belsky, J., Szekely, E., Widaman, K., Pluess, M., Greenwood, C., & Wazana, A. (2020). Distinguishing differential susceptibility, diathesis-stress, and vantage sensitivity: Beyond the single gene and environment model. *Development and Psychopathology*, 32(1), 73–83. <https://doi.org/10.1017/S0954579418001438>
- Karremans, A., de Haas, S., van Tuijl, C., van Aken, M. A. G., & Deković, M. (2010). Relations among temperament, parenting and problem behavior in young children. *Infant Behavior and Development*, 33(1), 39–49. <https://doi.org/10.1016/j.infbeh.2009.10.008>
- Kiuru, N., Hirvonen, R., & Ahonen, T. (2019). Assessing temperament among Finnish early adolescents and their parents: Psychometric properties of the short forms of the temperament questionnaires. *Merrill-Palmer Quarterly*, 65(3), 294–328. <https://doi.org/10.13110/merrpalmquar1982.65.3.0294>
- Kiuru, N., Wang, M.-T., Salmela-Aro, K., Kannas, L., Ahonen, T., & Hirvonen, R. (2020). Associations between adolescents' interpersonal relationships, school well-being, and academic achievement during educational transitions. *Journal of Youth and Adolescence*, 49(5), 1057–1072. <https://doi.org/10.1007/s10964-019-01184-y>
- Klahr, A. M., Rueter, M. A., McGue, M., Iacono, W. G., & Alexandra Burt, S. (2011). The relationship between parent-child conflict and adolescent antisocial behavior: Confirming shared environmental mediation. *Journal of Abnormal Child Psychology*, 39(5), 683–694. <https://doi.org/10.1007/s10802-011-9505-7>
- Lengua, L. J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(5), 819–832. <https://doi.org/10.1037/012-1649.42.5.819>
- Leve, L. D., Kim, H. K., & Pears, K. C. (2005). Childhood temperament and family environment as predictors of internalizing and externalizing trajectories from ages 5 to 17. *Journal of Abnormal Child Psychology*, 33(5), 505–520. <https://doi.org/10.1007/s10802-005-6734-7>
- Luengo Kanacri, B. P., Pastorelli, C., Eisenberg, N., Zuffianò, A., & Caprara, G. V. (2013). The development of prosociality from adolescence to early adulthood: The role of effortful control. *Journal of Personality*, 81(3), 302–312. <https://doi.org/10.1111/jopy.12001>
- Luengo Kanacri, B. P., Pastorelli, C., Thartori, E., Lunetti, C., Di Giunta, L., Bacchini, D., & Lansford, J. E. (2020). Longitudinal relations among maternal self-efficacy, maternal warmth, and early adolescents' prosocial behavior. *Parenting*, 21(1), 24–46. <https://doi.org/10.1080/15295192.2020.1777791>
- Lunetti, C., Iselin, A.-M. R., Di Giunta, L., Lansford, J. E., Eisenberg, N., Pastorelli, C., Bacchini, D., Uribe Tirado, L. M., Thartori, E., Basili, E., Fiasconaro, I., Favini, A., Gerbino, M., Cirimele, F., Remondi, C., Skinner, A. T., & Rothenberg, W. A. (2022). Development of internalizing symptoms during adolescence in three countries: The role of temperament and parenting behaviors. *European Child & Adolescent Psychiatry*, 31, 947–957. <https://doi.org/10.1007/s00787-021-01725-6>
- 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, 99–128. https://doi.org/10.1207/s15327906mbr3901_4
- Martinez, R. S., Aricak, O. T., Graves, M. N., Peters-Myszak, J., & Nellis, L. (2011). Changes in perceived social support and socioemotional adjustment across the elementary to junior high school transition. *Journal of Youth and Adolescence*, 40(5), 519–530. <https://doi.org/10.1007/s10964-010-9572-z>
- Martin-Storey, A., Temcheff, C., Dery, M., Poirier, M., Verlaan, P., & Lemelin, J.-P. (2018). Trajectories of internalizing problems during the transition to adolescence in children with and without conduct problems. *International Journal of Behavioral Development*, 42(5), 464–473. <https://doi.org/10.1177/0165025417730681>
- Marušić, I., Jagodić, G. K., Erceg, I., & Šabić, J. (2020). Longitudinal study of individual, environmental and contextual factors predicting adaptation to the transition to lower secondary education. *Learning and Individual Differences*, 83–84, 101946. <https://doi.org/10.1016/j.lindif.2020.101946>
- Mauno, S., Hirvonen, R., & Kiuru, N. (2018). Children's life satisfaction: The roles of mothers' work engagement and recovery from work. *Journal of Happiness Studies*, 19, 1379–1393. <https://doi.org/10.1007/s10902-017-9878-6>
- McMahon, R. J. (1994). Diagnosis, assessment, and treatment of externalizing problems in children: The role of longitudinal data. *Journal of Consulting and Clinical Psychology*, 62(5), 901–917. <https://doi.org/10.1037/0022-006x.62.5.901>

- Metsäpelto, R.-L., Taskinen, P., Kracke, B., Silinskas, G., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2017). Changes in achievement values from primary to lower secondary school among students with and without externalizing problems. *Learning and Individual Differences, 58*, 75–82. <https://doi.org/10.1016/j.lindif.2017.08.002>
- Muris, P., Meesters, C., & Blijlevens, P. (2007). Self-reported reactive and regulative temperament in early adolescence: Relations to internalizing and externalizing problem behavior and “Big Three” personality factors. *Journal of Adolescence, 30*(6), 1035–1049. <https://doi.org/10.1016/j.adolescence.2007.03.003>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Author.
- Obsuth, I., Murray, A. L., Malti, T., Sulger, P., Ribeaud, D., & Eisner, M. (2017). A non-bipartite propensity score analysis of the effects of teacher–student relationships on adolescent problem and prosocial behavior. *Journal of Youth and Adolescence, 46*(8), 1661–1687. <https://doi.org/10.1007/s10964-016-0534-y>
- Padilla-Walker, L. M., Carlo, G., & Memmott-Elison, M. K. (2017). Longitudinal change in adolescents' prosocial behavior toward strangers, friends, and family. *Journal of Research on Adolescence, 28*(3), 698–710. <https://doi.org/10.1111/jora.12362>
- Pakarinen, E., Silinskas, G., Hamre, B. K., Metsäpelto, R.-L., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2018). Cross-lagged associations between problem behaviors and teacher–student relationships in early adolescence. *The Journal of Early Adolescence, 38*(8), 1100–1141. <https://doi.org/10.1177/0272431617714328>
- Palmu, I. R., Närhi, V. M., & Savolainen, H. K. (2017). Externalizing behaviour and academic performance—The cross-lagged relationship during school transition. *Emotional and Behavioural Difficulties, 23*(2), 111–126. <https://doi.org/10.1080/13632752.2017.1376968>
- Pianta, R. C. (1992a). *Student–teacher relationship scale—Short form*. University of Virginia.
- Pianta, R. C. (1992b). *Child–teacher relationship scale—Short form*. University of Virginia.
- Pianta, R. C. (2001). *Student–teacher relationship scale—Short form*. Psychological Assessment Resources, Inc.
- Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology, 53*(5), 873–932. <https://doi.org/10.1037/dev0000295>
- Ramos, M. C., Guerin, D. W., Gottfried, A. W., Bathurst, K., & Oliver, P. H. (2005). Family conflict and children's behavior problems: The moderating role of child temperament. *Structural Equation Modeling, 12*(2), 278–298. https://doi.org/10.1207/s15328007sem1202_6
- Roeser, R. W., Eccles, J. S., & Strobrel, K. R. (1998). Linking the study of schooling and mental health: Selected issues and empirical illustrations at the level of the individual. *Educational Psychologist, 33*(4), 153–176. https://doi.org/10.1207/s15326985ep3304_2
- Roorda, D. L., & Koomen, H. M. (2021). Student–teacher relationships and students' externalizing and internalizing behaviors: A cross-lagged study in secondary education. *Child Development, 92*(1), 174–188. <https://doi.org/10.1111/cdev.13394>
- Rothbart, M. K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science, 16*(4), 207–212. <https://doi.org/10.1111/j.1467-8721.2007.00505.x>
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The children's behavior questionnaire. *Child Development, 72*(5), 1394–1408. <https://doi.org/10.1111/1467-8624.00355>
- Rudasill, K. M., Reio, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student–teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology, 48*(5), 389–412. <https://doi.org/10.1016/j.jsp.2010.05.001>
- Rushton, J. P. (1982). Social learning theory and the development of prosocial behavior. In N. Eisenberg (Ed.), *The development of prosocial behavior* (pp. 86–95). Academic Press, Inc.
- Rutter, M. L. (1997). Nature–nurture integration: The example of anti-social behavior. *American Psychologist, 52*(4), 390–398. <https://doi.org/10.1037/0003-066x.52.4.390>
- 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. <https://doi.org/10.1037/0003-066x.55.1.68>
- Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype–Environment effects. *Child Development, 54*(2), 424–435. <https://doi.org/10.2307/1129703>
- Scrimin, S., Moscardino, U., Finos, L., & Mason, L. (2019). Effects of psychophysiological reactivity to a school-related stressor and temperament on early adolescents' academic performance. *The Journal of Early Adolescence, 39*(6), 904–931. <https://doi.org/10.1177/0272431618797008>
- Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives, 6*(4), 436–444. <https://doi.org/10.1111/j.1750-8606.2012.00254.x>
- Symonds, J. (2015). *Understanding school transition: What happens to children and how to help them* (1st ed.). Routledge. <https://doi.org/10.4324/9781315714387>
- Thompson, R., Tabone, J. K., Litrownik, A. J., Briggs, E. C., Hussey, J. M., English, D. J., & Dubowitz, H. (2011). Early adolescent risk behavior outcomes of childhood externalizing behavioral trajectories. *The Journal of Early Adolescence, 31*(2), 234–257. <https://doi.org/10.1177/0272431609361203>
- Virtanen, T. E., Vasalampi, K., Kiuru, N., Lerkkanen, M.-K., & Poikkeus, A.-M. (2020). The role of perceived social support as a contributor to the successful transition from primary to lower secondary school. *Scandinavian Journal of Educational Research, 64*(7), 967–983. <https://doi.org/10.1080/00313831.2019.1639816>
- Verschuere, K. (2015). Middle childhood teacher–child relationships: Insights from an attachment perspective and remaining challenges. In G. Bosmans & K. A. Kerns (Eds.), *Attachment in middle childhood: Theoretical advances and new directions in an emerging field* (Vol. 148, pp. 77–91). New directions for child and adolescent development.
- Wang, F. L., Eisenberg, N., Valiente, C., & Spinrad, T. L. (2016). Role of temperament in early adolescent pure and co-occurring internalizing and externalizing problems using a bifactor model: Moderation by parenting and gender. *Development and Psychopathology, 28*(4pt2), 1487–1504. <https://doi.org/10.1017/s0954579415001224>
- Weidman, A. C., Augustine, A. A., Murayama, K., & Elliot, A. J. (2015). Internalizing symptomatology and academic achievement: Bidirectional prospective relations in adolescence. *Journal of Research in Personality, 58*, 106–114. <https://doi.org/10.1016/j.jrp.2015.07.005>
- Zentner, M. (2020). Identifying child temperament risk factors from 2 to 8 years of age: Validation of a brief temperament screening tool in the US, Europe, and China. *European Child & Adolescent Psychiatry, 29*(5), 665–678. <https://doi.org/10.1007/s00787-019-01379-5>
- Zentner, M., & Shiner, R. L. (2012). *Handbook of temperament*. The Guilford Press.

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III

TRAJECTORIES OF ADOLESCENTS' ADJUSTMENT BEHAVIORS ACROSS THE TRANSITION TO UPPER SECONDARY EDUCATION: THE ROLE OF INDIVIDUAL AND ENVIRONMENTAL FACTORS

by

Vilija Jaruseviciute, Gintautas Silinskas, Joonas Muotka, & Noona Kiuru,
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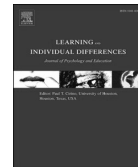
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Trajectories of adolescents' adjustment behaviors across the transition to upper secondary education: The role of individual and environmental factors[☆]

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ABSTRACT

This longitudinal study examined the developmental trajectories of 901 Finnish adolescents' ($M = 15.3$ at T1, $SD = 0.37$) adjustment behaviors (prosocial behavior and externalizing problems) across the transition to upper secondary education. The role of adolescents' temperament and relationship with parents and teachers were investigated. Four trajectories of adjustment behaviors were distinguished: *moderate prosocial and high externalizing before the transition* (25.8%), *high prosocial and low externalizing* (64.9%), *decreasing prosocial and increasing externalizing after the transition* (1.9%), and *decreasing prosocial and increasing externalizing after the transition* (7.4%). Adolescents' higher negative affectivity, lower effortful control, and less close and conflicting relationship with parents and teachers are positively associated with the trajectory of *moderate prosocial behavior and high externalizing problems*. In contrast, high effortful control, high closeness, and low conflict are positively associated with the trajectories of *high prosocial and low externalizing problems* as well as *decreasing prosocial and increasing externalizing after the transition*.

Educational relevance statement

The current study brings new knowledge regarding distinct groups of adolescents who follow different trajectories of adjustment behaviors during the transition from lower to upper secondary education. A person-oriented approach distinguished four distinct groups of adolescents in terms of their prosocial behavior and externalizing problems. Most adolescents showed no adjustment difficulties across the transition. However, three distinct groups showed some challenges: some adolescents had moderate prosocial behavior and high externalizing problems throughout the transition, some had difficulties right before it, and others right after it. The results suggest that parents and teachers may help adolescents with different temperamental characteristics to successfully face the challenges of the transition by avoiding conflict and maintaining closeness with them through warm and trustful relationship.

1. Introduction

The transition from basic to upper secondary education is challenging for many adolescents due to their decision to follow either academic or vocational path along with increased academic demands and responsibility for their learning (Aunola et al., 2018; Virtanen et al., 2022). During this transition, adolescents may also face challenges in their adjustment behaviors. The present study focused on two student behaviors which indicate the outcomes of successful (i.e., high prosocial behavior and low externalizing problems) and poor (i.e., low prosocial behavior and high externalizing problems) adjustment across the transition (De Jong et al., 2018; Jaruseviciute et al., 2022; Nurmi et al., 2018; Roorda et al., 2020). Focusing on only one adjustment indicator may not provide an overall picture of the adjustment of adolescents. In addition, different adolescents may show different types of adjustment behaviors across the transition. Therefore, a person-oriented approach is

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essential in identifying distinct groups of adolescents in their adjustment behaviors trajectories, as well as in investigating the role of individual and environmental factors on these trajectories (Laursen & Hoff, 2006; Lubke & Muthén, 2005; Tunkkari et al., 2022). Specifically, the developmental trajectories of adolescents' adjustment behaviors and the role of temperament and relationship with parents and teachers in these trajectories during the critical transition to upper secondary education were examined.

1.1. Developmental trajectories of adolescent adjustment behaviors across the transition to upper secondary education

Adjustment behaviors in the present study represent the outcomes of the propensity to adjust behavior to environmental changes (Kitayama et al., 2018). This study addressed two such outcomes: prosocial behavior and externalizing problems (De Jong et al., 2018; Jaruseviciute et al., 2022; Nurmi et al., 2018; Roorda et al., 2020). Both prosocial behavior and externalizing problems represent observable behaviors that are directed toward others. High prosocial behavior indicates successful adjustment and represents behavior directed toward benefiting others without personal gain, such as sharing, helping, comforting, or empathizing with others (Eisenberg, 1982; Rushton, 1982). When adolescents are more prosocial, they engage in a broader variety of positive behaviors, the indicators of behavioral adaptation at school (Memmott-Elison et al., 2020). In contrast, externalizing problems represent adjustment difficulties that manifest via disruptive behaviors, aggression, disobedience, and difficulty in maintaining attention (Hinshaw, 1992; McMahan, 1994). Primary externalizing domains are frequently conceptualized via conduct problems and hyperactivity (Hinshaw, 1992; McMahan, 1994; Metsäpelto et al., 2017). The more prosocial and helpful adolescents tend to engage less in externalizing problems (Memmott-Elison et al., 2020). When adolescents show higher prosocial behavior they may be perceived as acting in socially prescribed ways, which is an important factor for adjusting to the new school environment. Whereas, high externalizing problems may be perceived as anti-social acts and disobedience to social norms which can indicate a poor adjustment to transition (e.g., De Jong et al., 2018; Metsäpelto et al., 2017; Nurmi et al., 2018). Combined high prosocial behavior and low externalizing problems can therefore act as indicators of successful adjustment across the transition to upper secondary education.

According to the stage-environment fit theory (Eccles et al., 1993; Eccles & Roeser, 2009), the increased challenges in adaptation during the transition can relate to changes in a classroom environment that do not fit with adolescents' developmental needs and expectations. The transition from lower secondary education (or middle school) to upper secondary education (or high school and vocational school) is a critical time in most educational systems as adolescents must choose the educational track to follow. Because some students choose the vocational track and others the academic one, the changes in classroom compositions can be even higher than during previous educational transitions (Virtanen et al., 2022). Previous studies have shown decreased academic achievement (Benner, 2011; Benner et al., 2017), and school attendance (Benner & Wang, 2014) across the transition from lower to upper secondary education. In addition, Jaruseviciute et al. (2023) found that adolescents' prosocial behavior decreased, and externalizing problems increased across the transition from primary to lower secondary school. These studies indicate that educational transitions may bring adjustment challenges for some adolescents. However, less is known about prosocial behavior and externalizing problems across the transition to upper secondary education. Yet not all adolescents have difficulties in adjusting to school transition, thus it is important to investigate the heterogeneity in the developmental trajectories of adjustment behaviors. Previous studies, however, are highly limited as they did not investigate the trajectories of both prosocial behavior and externalizing problems together (Memmott-Elison et al., 2020), especially during the transition to upper secondary education.

Many previous studies investigated the trajectories of externalizing problems and prosocial behavior separately. For example, Shi et al. (2021) found that 11.9 % of students from grades 1 to 12 had low and stable levels of prosocial behavior, 15.0 % had high prosocial behavior which declined during later grades, 20.6 % had moderate levels of prosocial behavior which increased over time, and 52.5 % had stable and high levels in prosocial behavior. Flynn et al. (2015) found three stable trajectories in prosocial behavior from grades 4 to 12: 18.7 % showed a low level of prosocial behavior, 52.8 % a medium level of prosocial behavior, and 29.6 % a high level of prosocial behavior. However, none of these studies focused on adjustment behaviors specifically across the transition from lower to upper secondary education, and only parent or teacher reports on adjustment behaviors were used. Adolescents can identify their adjustment behaviors well, thus investigating their perception may add new insights into the development of their adjustment behaviors across the transition.

In addition, only a few attempts have been made to investigate combined prosocial behavior and externalizing problems trajectories. Jambon et al. (2019) found four distinct trajectories in physical aggression and prosocial behavior from ages 3 to 6: 54.4 % demonstrated low-stable aggression, high-increasing prosocial; 6.7 % high-stable aggression, low-stable prosocial; 19.6 % high-declining aggression, moderate-increasing prosocial; 19.3 % low-increasing aggression, moderate-stable prosocial. Padilla-Walker et al. (2018) found three distinct trajectories in prosocial and problem behaviors at age 12 (75 % prosocial, non-problem; 20 % low levels of prosocial, moderate levels of aggression and delinquency; 5 % low prosocial, moderate aggression, high delinquency), two trajectories at age 15 (88 % prosocial, non-problem; 12 % low levels of prosocial, moderate levels of aggression and delinquency), and three trajectories at age 18 (61 % prosocial, non-problem; 34 % low levels of prosocial, moderate levels of aggression and delinquency; 5 % low prosocial, high aggression and moderate delinquency). Therefore, the current study expands the previous knowledge by investigating the trajectories of both adjustment behaviors together across the specific transition from lower to upper secondary education.

1.2. Temperament as antecedent of developmental trajectories of adjustment behaviors

While investigating adjustment behaviors across the transition, environmental and individual factors should not be ignored. According to Bronfenbrenner's theory of ecological approach (1979), the closest environmental systems, such as home and school, and the individual characteristics of adolescents shape their development. Each of these domains may independently contribute to the trajectories of adjustment behaviors across the transition to upper secondary education.

Individual characteristics of adolescents, such as temperament, can play an important role in the development of adolescents' adjustment behaviors during this transition (e.g., Putnam, 2012; Tackett et al., 2012; Zentner, 2020). Temperament is understood as individual differences in activity, affectivity, attention, and self-regulation (Goldsmith et al., 1987; Shiner et al., 2012). Even though temperament is relatively stable and has biological roots, environmental factors, and individual experiences also contribute to shaping temperament (Putnam et al., 2001; Shiner et al., 2012). The current study focused on three distinct temperamental dimensions of adolescents: surgency (extraversion), negative affectivity, and effortful control (Rothbart et al., 2001).

First, adolescents with higher surgency or extraversion are more active and outgoing, are less shy, and have positive emotionality (Rothbart, 2007; Rothbart et al., 2001), which could be seen as a favorable quality for prosocial behavior and better adjustment across the transition (Putnam, 2012). On the other hand, adolescents with higher surgency might also have a higher tendency for sensation-seeking, which can lead to more risky behaviors and externalizing problems (Tackett et al., 2012). Cui et al. (2016) found that sensation-seeking and

risk-taking contribute to the development of a high and stable trajectory of reactive and proactive aggression. Second, adolescents with higher *negative affectivity* experience more negative emotions and discomfort that can become difficult to manage (Rothbart, 2007; Rothbart et al., 2001), and bring difficulties in adapting to changes brought about by educational transition (Scrimin et al., 2019; Zentner, 2020). Negative emotionality has been shown to predict the developmental trajectory of children who had the highest externalizing problems, which decreased in adolescence (9 %; Kjeldsen et al., 2021). Finally, adolescents with higher *effortful control* can regulate their behavior and emotions, and better focus their attention (Rothbart, 2007; Rothbart et al., 2001) which can assist them in adapting to higher school demands, and academic path decisions (Rothbart et al., 2001; Symonds, 2015). Olson et al. (2017) have found that children with a chronic trajectory of externalizing problems had low effortful control. On the other hand, children who had high effortful control were more likely to develop a low externalizing problems trajectory. Research on the role of different temperamental dimensions in adjustment behaviors trajectories remains scarce, especially during the transition to upper secondary education.

1.3. Relationship quality as antecedent of developmental trajectories of adjustment behaviors

In addition to individual characteristics, environmental factors, such as relationship quality with parents and teachers, have also been shown to be important for the development of adjustment behaviors in adolescence (e.g., Eccles & Roeser, 2011; Jambon et al., 2019; Shi et al., 2021). Parent–adolescent, and teacher–adolescent relationship is understood via the lens of closeness and conflict. Closeness is defined as affection, warmth, and trust toward one another, whereas conflict is understood as a negative and hostile relationship between adolescents and their parents and teachers (Hamre & Pianta, 2001; Pianta, 2001). Support from adolescents' parents and teachers can be a strong indicator of the successful adjustment of adolescents across the transition. For example, Jambon et al. (2019) have found that children whose mothers engaged in positive parenting belonged to either prosocial (54.4 %; low-stable aggression, high-increasing prosocial behavior) or escalating (19.3 %; low-increasing aggression, moderate-stable prosocial behavior) trajectories between ages 3 and 6. Shi et al. (2021) found that the group with high-stable prosocial behavior (52.5 %; grades 1–12) had warmer and less conflicting relationship with their teachers than the other groups with lower or decreasing prosocial behavior. In addition, Shi et al. (2020) have found that the children in the pure-externalizing group (18.6 %; grades 1–12) had more conflict with their teachers (as antecedents) than children from a low-risk group (fewer problem behaviors; 22.8 %). However, to our knowledge, none of the studies investigated the role of relationship quality on the developmental trajectories of combined prosocial behavior and externalizing problems across the transition from lower to upper secondary education. In addition, most studies investigated only parent or teacher reports on relationship quality. The current study examined adolescent as well as parent and teacher reports on relationship to have a more comprehensive view of the importance of such relationship for distinct trajectories of adjustment behaviors.

1.4. The present study

The current study aimed to investigate the developmental trajectories of adolescent adjustment behaviors across the transition to upper secondary education, as well as to investigate the role of adolescent temperament and teacher– and parent–adolescent relationships in these trajectories.

The following research questions were investigated:

1. What combined developmental trajectories can be identified among adolescents concerning their adjustment behaviors (i.e., prosocial

behavior and externalizing problems) during the transition to upper secondary education (across all four time points)? We expected to find that the largest group of adolescents would have high prosocial behavior and low externalizing problems during the transition to upper secondary education (Hypothesis 1a; e.g., Jambon et al., 2019; Padilla-Walker et al., 2018). We also expected to find a trajectory with moderate levels of adjustment behaviors (Hypothesis 1b; e.g., Flynn et al., 2015; Padilla-Walker et al., 2018). Finally, we hypothesized finding groups of adolescents with difficulties in adjusting to school transition indicated by increases in externalizing problems and decreases in prosocial behavior (Hypothesis 1c; e.g., Benner et al., 2017; Shi et al., 2021).

2. To what extent adolescent temperament is associated with the developmental trajectories of combined adjustment behaviors? It was expected that adolescents in the trajectory with high prosocial behavior and low externalizing problems would have the lowest surgency and negative affectivity, and highest effortful control (Hypothesis 2a; e.g., Olson et al., 2017). It was also expected that adolescents with higher surgency and negative affectivity, and lower effortful control would follow the trajectory of decreasing prosocial behavior and increasing externalizing problems (Hypothesis 2b; e.g., Olson et al., 2017).
3. To what extent adolescent closeness and conflict with parents and teachers before the transition (Grade 9 fall and spring) is associated with the developmental trajectories of combined adjustment behaviors? It was expected that the adolescents in the trajectory with high prosocial behavior and low externalizing problems would have closer and less conflicting relationship with their parents and teachers than the other trajectories (Hypothesis 3a; Shi et al., 2021). We further expected that adolescents on the trajectory of decreasing prosocial behavior and increasing externalizing problems would have the least close and the most conflicting relationship with their parents and teachers (Hypothesis 3b; e.g., Shi et al., 2020, 2021).

Previous studies have shown that girls engage less in externalizing problems and conflict with parents and teachers than boys do (Baker, 2006; Hamre & Pianta, 2001). Relationship with parents and teachers and adjustment behaviors have also been linked to parental education and adolescents' achievement (Hinshaw, 1992; Pakarinen et al., 2018). In addition, the educational track (academic or vocational) may also be associated with the behavior of adolescents (Anttila et al., 2022). Therefore gender, mother's education, father's education, adolescents' achievement, and educational track were included in the analyses.

2. Methods

2.1. Participants

The data were collected as part of a broader longitudinal study following a community sample of Finnish adolescents across critical educational transitions. In Finland, compulsory education consists of nine years of comprehensive school (primary school from Grade 1 to Grade 6 and lower secondary school from Grade 7 to Grade 9). After compulsory education, students move to upper secondary education and choose either upper secondary general or vocational education. The latter concentrates on acquiring vocational qualification for a specific field. After nine years of compulsory education, students may also choose to complete a 10th year of basic or preparatory education before entering upper secondary education (Ministry of Education and Culture, 2023).

Four time points were included in the study (Grade 9 fall [T1], Grade 9 spring [T2], Grade 1 of upper secondary education in fall [T3], and Grade 1 of upper secondary education in spring [T4]). In total, 901 adolescents (884 at T1, 885 at T2, 728 at T3, and 684 at T4; 55.9 % girls and 44.1 % boys) answered questions about their adjustment behaviors at all time points, relationship with parents and teachers in T1, and their

temperament in T2. Parents reported on their relationship with adolescents in T1, and home classroom teachers reported on their relationship with adolescents in T2. The mean age of adolescents at T1 was 15.3 years ($SD = 0.37$). Most of the adolescents were living with both parents (69.0 %) or alternately with their mother and their father (10.6 %), 8.8 % lived with only their mother, 7.0 % lived with their mother and stepfather, 1.9 % lived with only their father, and 1.0 % lived with their father and stepmother. The remaining 1.6 % lived with foster parents or somebody else. One-way ANOVA showed significant differences between categories of family structure and adolescent-reported conflict with mothers ($F[4833] = 3.591, p = .007$), closeness with fathers ($F[4818] = 15.409, p < .001$), and externalizing problems at T2 ($F[4829] = 3.579, p = .007$). In particular, adolescents who lived with their mother and stepfather perceived more conflict with their mothers than those adolescents who lived with their mother and father ($p = .007$) or alternately with their mother and father ($p = .004$). In addition, adolescents who lived with their mother and father or alternately with mother and father perceived a closer relationship with their fathers than those adolescents who lived with only their mother ($p < .001$) or those adolescents who lived with their mother and stepfather ($p < .001$). Regarding externalizing problems, adolescents who lived with mother and stepfather had more externalizing problems at T2, than those adolescents who lived with mother and father ($p = .006$). In the current study, 57.9 % of adolescents chose general upper secondary education, and 32.2 % chose vocational school. The procedures followed the principles of the Helsinki Declaration on research with human subjects. Written consent to participate was collected from the participants and the research plan of the project was approved by the Human Sciences Ethics Committee of the local university.

2.2. Measures

For a description of the respondents and the number of participants at each time point see Table 1.

2.2.1. Temperament (T2)

Each adolescent filled in the Finnish version of the Early Adolescent Temperament Questionnaire-Revised EATQ-R (Capaldi & Rothbart, 1992; Ellis, 2002; Ellis & Rothbart, 2001). Adolescents rated 51 statements on a five-point Likert scale (1 = almost never true; 5 = almost always true). The statements measured temperamental surgency/extraversion, negative affectivity, and effortful control. The mean scores for effortful control, negative affectivity, and surgency/extraversion were calculated. For the validity of the measure in the Finnish sample, see Kiuru, Hirvonen, and Ahonen (2019).

2.2.2. Parent-adolescent relationship (T1)

The adolescents answered questions about their perceived Closeness (five items, e.g., "I have a warm and close relationship with my mother") and Conflict (six items, e.g., "I am often angry at my father") with their

mothers and fathers using the short form of the Child-Parent Relationship Scale (CPRS; Driscoll & Pianta, 2011; Pianta, 1992; see also Kiuru, Wang, et al. (2019); Mauno et al., 2018) in Grade 9 fall (T1). The adolescents answered the questions on a five-point Likert scale (1 = not true at all; 5 = completely true). In addition, parents also answered questions about their perceived close (five items "I share an affectionate, warm relationship with my child") or conflicting relationship (six items "My child easily becomes angry at me") in Grade 9 fall (T1) based on the same scale.

2.2.3. Teacher-adolescent relationship (T1 and T2)

The adolescents reported their perceived quality of relationship with their teachers in Grade 9 fall (T1) using the short form of the Student-Teacher Relationship Scale (STRS; Pianta, 1992; Pianta, 2001). The scale includes 11 items rated on a five-point Likert scale (1 = completely disagree; 5 = completely agree); five items measure Closeness (e.g., "If I am upset, I go to my teachers for comfort"), and six items measure Conflict (e.g., "My teachers are tired of my behavior"). In addition, home classroom teachers ($n = 57$, mean age 44.7 years) answered questions about their perceived closeness (five items "I share an affectionate, warm relationship with this student") or conflict (five items "Dealing with this student drains my energy") with a subsample of adolescents (max. six students per class) in Grade 9 spring (T2) based on the same scale. Home classroom teachers reported on their work experience in that particular school: 14 % of teachers worked under 2 years, 22.8 % worked 3–5 years, 24.6 % worked 6–10 years, 19.3 % worked 11–15 years, and 19.3 % worked over 15 years in schools that data collection took place in. In addition, 51.1 % of home classroom teachers reported that they teach their Grade 9 students up to 3 h during a week, 31.6 % – 4 to 6 h, and 12.5 % – 13 h and more. Besides teaching their subject home classroom teachers are assigned a class that they meet with occasionally to discuss important school matters. For additional analyses, we also included adolescent reports on their relationship closeness ($\alpha = 0.81$) and conflict ($\alpha = 0.88$) with their teachers at T3.

2.2.4. Adjustment behaviors (T1, T2, T3, and T4)

The adolescents answered questions about their adjustment behaviors using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) on a scale from 0 to 2 (0 = not true; 2 = certainly true), two times in Grade 9 and two times in Grade 1 of upper secondary education. The scale measures: hyperactivity (five items, e.g., "I am restless, I cannot sit still for a long time"); conduct problems (five items, e.g., "I fight a lot. I get others to do what I want"); and prosocial behavior (five items, e.g., "I am kind to younger people"). Mean scores were calculated for each scale. Hyperactivity and conduct problems scales are recommended to be combined in low-risk or general population samples (Goodman et al., 2010). Therefore, the score of externalizing problems was calculated by averaging the scores of ten items from two scales – hyperactivity and conduct problems.

2.2.5. Control variables

The adolescents' gender was coded as 1 (for girls) or 2 (for boys). Adolescents reported their grade point average in Grade 1 fall of upper secondary education. In Finnish schools, grades range from 4 to 10, with 5 being the lowest passing grade and 10 the highest passing grade. Fathers and mothers separately reported their education level from 1 to 7 (1 = no vocational training; 2 = employment or vocational training courses; 3 = vocational training, 4 = college level education, 5 = university of Applied Sciences, 6 = university or college, 7 = university postgraduate degree). In addition, an educational track with an auxiliary setting was included in the analyses. The adolescents who followed the vocational school track were coded as 1 and adolescents who followed the upper general secondary education (or high school) track were coded as 2.

Table 1

Respondents at each time point.

| Respondent | Measures | Time points | n |
|------------|--|-------------|-----|
| Adolescent | Early Adolescent Temperament Questionnaire | T2 | 871 |
| | | T1 mother | 876 |
| | Child-Parent Relationship Scale | T1 father | 862 |
| | | T1 | 881 |
| | Student-Teacher Relationship Scale | T1 | 879 |
| | | T2 | 860 |
| Parent | Strengths and Difficulties Questionnaire | T3 | 727 |
| | | T4 | 681 |
| | | T1 | 626 |
| | | T2 | 295 |
| Teacher | Student-Teacher Relationship Scale | T2 | 295 |

Note. T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

2.3. Data analysis strategy

Data analysis was performed using Mplus Version 8.6 (Muthén & Muthén, 1998–2017). The missing data of the main study variables ranged from 0 % to 67.3 % (for teacher-reported relationship quality), $M = 15.6\%$, $SD = 18.9\%$. Full information maximum likelihood estimation (FIML) with robust standard errors (MLR) was applied. Missing data were assumed to be missing at random (MAR). All the available data were included in the analyses.

The longitudinal factor model with four measurement points was built together for prosocial behavior and externalizing problems. The four time points of prosocial behavior and externalizing problems measures were loaded for both factors separately, which were allowed to be correlated. First, to answer what kind of developmental trajectories adolescents follow based on their prosocial behavior and externalizing problems, factor mixture analysis (FMA; Lubke & Muthén, 2005) was conducted across all four time points. Fig. 1 shows two continuous factors of the tested model, with c representing latent classes. The subgroups were identified based on means of prosocial behavior and externalizing problems at different time points. The random starting values and iteration rounds were increased based on the Mplus manual to avoid local maxima (Muthén & Muthén, 1998–2017). The COMPLEX approach was applied to consider the nested nature of the data. To identify the optimal number of latent trajectory groups, the fit of the model, the number of adolescents assigned to each group, and the theoretical justification of the model solution were considered. For the model fit, the following indices were evaluated: the log-likelihood value (Log L), the Akaike information criterion (AIC), the Bayesian information criterion (BIC), the adjusted Bayesian information criterion (ABIC), the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMRT), and the Lo-Mendell Rubin adjusted likelihood ratio test (ALMRT; Lo et al., 2001). Lower Log L, AIC, BIC, and ABIC values indicated a better model, and significant ALMRT and VLMRT values suggested the need to choose a higher number of groups. In addition, the posterior probabilities and entropy coefficient were used to identify the final number of latent

trajectories. Posterior probabilities and entropy evaluate the overall classification quality; the higher posterior probabilities and entropy, the clearer classification (Muthén, 2003). FMA was chosen because it considers the heterogeneity of the population and is more flexible toward the fluctuation of nonlinear changes between different time points than, for example, growth mixture modeling (Lubke & Muthén, 2005).

Second, to answer to what extent combined developmental trajectories differ in terms of individual and environmental factors, parent–adolescent relationship (closeness and conflict), teacher–adolescent relationship (closeness and conflict), and temperament (surgency, negative affectivity, and effortful control) were added as auxiliary variables. As an auxiliary setting, a three-step approach (DU3STEP, DE3STEP) was considered. However, the approach did not work well for the current analyses and caused estimation problems. BCH auxiliary setting was therefore chosen as it worked well for the data and did not cause any estimation problems (Asparouhov & Muthén, 2014). In addition, the BCH auxiliary setting does not change the classification of groups. Gender, GPA, mothers’ education, fathers’ education, and educational track were also included as auxiliary variables in the model. As additional analyses teacher–adolescent closeness and conflict at T3 were included with a BCH auxiliary setting.

3. Results

For descriptive statistics including internal consistency, and zero-order correlations, see Tables 2 and 3, respectively.

3.1. Developmental trajectories of adjustment behaviors

To answer the first research question about the developmental trajectories that adolescents follow concerning their prosocial behavior and externalizing problems during the transition to upper secondary education, first, a two-factor model was estimated for the whole sample, which had a good model fit ($\chi^2[19] = 125.970$, $p < .001$, $CFI = 0.946$, $TLI = 0.920$, $RMSEA = 0.079$, $SRMR = 0.031$). Second, the factor

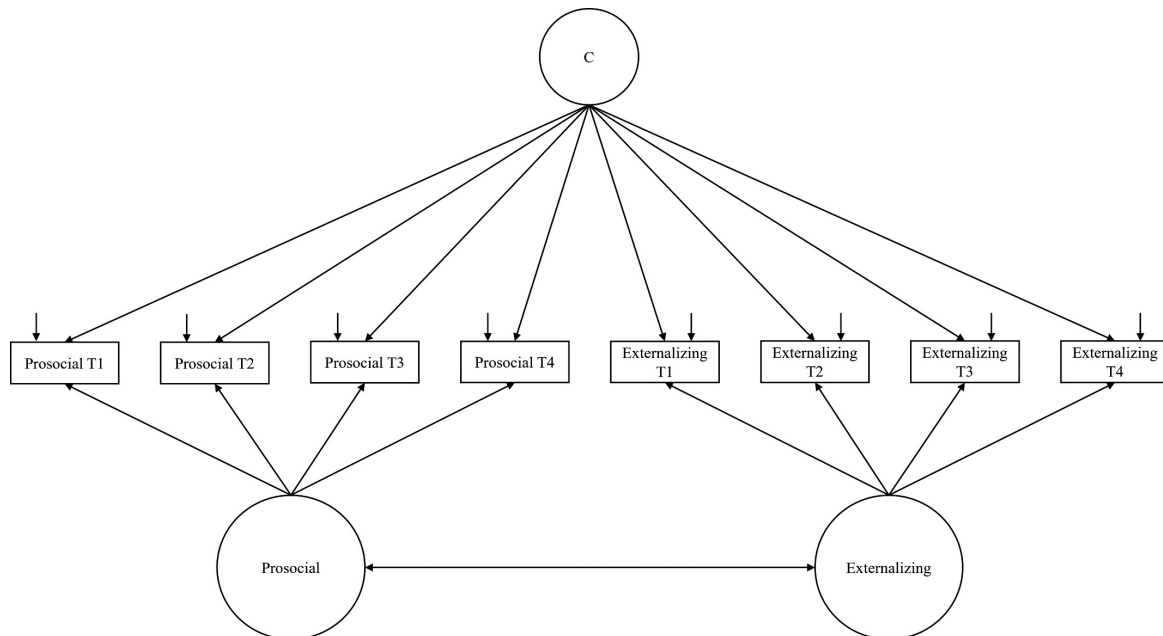


Fig. 1. The tested factor mixture model.

Note. T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

Table 2
Descriptive statistics of main study variables.

| Variable names | <i>n</i> | <i>M</i> | <i>SD</i> | α | Potential range | Actual range | Skewness |
|--|----------|----------|-----------|----------|-----------------|--------------|----------|
| <i>Adjustment behaviors</i> | | | | | | | |
| Prosocial behavior T1 | 879 | 1.47 | 0.39 | 0.71 | 0–2 | 0–2 | –0.57 |
| Prosocial behavior T2 | 860 | 1.43 | 0.41 | 0.73 | 0–2 | 0–2 | –0.52 |
| Prosocial behavior T3 | 727 | 1.52 | 0.39 | 0.73 | 0–2 | 0.2–2 | –0.74 |
| Prosocial behavior T4 | 681 | 1.54 | 0.38 | 0.70 | 0–2 | 0–2 | –0.68 |
| Externalizing problems T1 | 879 | 0.49 | 0.34 | 0.79 | 0–2 | 0–1.7 | 0.76 |
| Externalizing problems T2 | 860 | 0.56 | 0.37 | 0.81 | 0–2 | 0–2 | 0.45 |
| Externalizing problems T3 | 727 | 0.49 | 0.34 | 0.79 | 0–2 | 0–1.7 | 0.70 |
| Externalizing problems T4 | 681 | 0.48 | 0.32 | 0.75 | 0–2 | 0–1.5 | 0.60 |
| <i>Temperament</i> | | | | | | | |
| Surgey/extraversion T2 | 871 | 3.39 | 0.65 | 0.73 | 1–5 | 1.2–5 | –0.25 |
| Negative affectivity T2 | 871 | 2.71 | 0.56 | 0.86 | 1–5 | 1–4.4 | –0.19 |
| Effortful control T2 | 871 | 3.27 | 0.51 | 0.79 | 1–5 | 1.6–4.8 | 0.22 |
| <i>Closeness</i> | | | | | | | |
| Mother–adolescent closeness T1 (youth r.) | 876 | 3.67 | 1.05 | 0.89 | 1–5 | 1–5 | –0.58 |
| Father–adolescent closeness T1 (youth r.) | 861 | 3.27 | 1.07 | 0.88 | 1–5 | 1–5 | –0.30 |
| Parent–adolescent closeness T1 (parent r.) | 626 | 4.01 | 0.66 | 0.82 | 1–5 | 1.2–5 | –0.66 |
| Teacher–student closeness T1 (youth r.) | 880 | 1.91 | 0.73 | 0.79 | 1–5 | 1–4.6 | 1.00 |
| Teacher–student closeness T2 (teacher r.) | 295 | 3.02 | 0.84 | 0.86 | 1–5 | 1–5 | 0.06 |
| <i>Conflict</i> | | | | | | | |
| Mother–adolescent conflict T1 (youth r.) | 876 | 2.09 | 0.92 | 0.87 | 1–5 | 1–5 | 0.82 |
| Father–adolescent conflict T1 (youth r.) | 862 | 1.94 | 0.83 | 0.84 | 1–5 | 1–5 | 0.99 |
| Parent–adolescent conflict T1 (parent r.) | 626 | 2.08 | 0.83 | 0.87 | 1–5 | 1–5 | 0.95 |
| Teacher–student conflict T1 (youth r.) | 881 | 1.73 | 0.83 | 0.86 | 1–5 | 1–5 | 1.43 |
| Teacher–student conflict T2 (teacher r.) | 295 | 1.45 | 0.68 | 0.88 | 1–5 | 1–4.6 | 1.93 |
| <i>Control variables</i> | | | | | | | |
| Gender (1 = girl, 2 = boy) | 901 | 1.44 | 0.50 | | 1–2 | 1–2 | 0.24 |
| Mother education | 692 | 4.41 | 1.36 | | 1–7 | 1–7 | 0.02 |
| Father education | 556 | 4.00 | 1.47 | | 1–7 | 1–7 | 0.26 |
| Achievement (GPA) | 875 | 8.27 | 0.94 | | 5–10 | 5–10 | –0.52 |
| Track (1 = vocational, 2 = academic) | 812 | 1.64 | 0.48 | | 1–2 | 1–2 | –0.60 |

Note. T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

mixture analyses were conducted (see fit indices in Table 4). The analyses have shown good model fit up to the seven-group model. Seven-group model had the lowest Log L, AIC, BIC, and ABIC. In addition, even though six- and seven-group models had high posterior probabilities and entropy, they also had some extremely small subgroups. Therefore, six- and seven-group models were not chosen as finals, and four- and five-group models were considered further. Because the four-group model had a higher entropy score and lower pVLMR and pLMRI values than the five-group model, the four-group model was chosen as the final model. Due to the theoretical justification and meaningfulness of the results, the smallest subgroup of adolescents ($n = 14$) was not excluded. The individual curves of 14 participants from the smallest subgroup and the variation within the class were explored. There were no unusual patterns or strong discrepancies between cases in the smallest class found. However, this result should be interpreted carefully, and future studies are needed to replicate this result.

The four groups were distinguished (Fig. 2):

1. *Moderate prosocial and high externalizing*: (Group 1, 25.8 %). Prosocial behavior remained at a relatively stable moderate level and externalizing problems remained at a relatively stable high level across the transition.
2. *High prosocial and low externalizing*: (Group 2, 64.9 %). Prosocial behavior remained at a relatively stable high level and externalizing problems remained at a relatively stable low level.
3. *Decreasing prosocial and increasing externalizing before transition*: (Group 3, 7.4 %). Prosocial behavior dropped and externalizing problems peaked right before the transition (in T2).

4. *Decreasing prosocial and increasing externalizing after transition*: (Group 4, 1.9 %). Prosocial behavior dropped and externalizing problems peaked right after the transition (in T3).

In addition, follow-up analyses identified the significant differences between time points in each class separately (see Table 5). Even though results showed significant fluctuations in Group 1 (*moderate prosocial and high externalizing*) and 2 (*high prosocial and low externalizing*) across the transition, they were small enough to presume that adjustment behaviors were relatively stable across the transition in Groups 1 and 2. For example, in Group 1 (*moderate prosocial and high externalizing*), prosocial behavior slightly increased and externalizing problems slightly decreased from T2 to T3. In addition, in Group 2 (*high prosocial and low externalizing*), prosocial behavior and externalizing problems slightly increased from T1 to T4.

3.2. Developmental trajectories in terms of temperament

To answer the second research question, the role of adolescents' temperament in distinct trajectories was investigated (see Table 6). Negative affectivity was significantly associated with the trajectories of adjustment behaviors. Group 1 adolescents with *moderate prosocial behavior and high externalizing problems* had the highest negative affectivity and were significantly different from all other groups. However, there were no significant differences between the remaining three groups in terms of negative affectivity. Regarding effortful control, adolescents in Group 1 (*moderate prosocial and high externalizing*) had the lowest levels of effortful control and were significantly different from all other groups. Group 3 adolescents with *decreasing prosocial behavior and*

Table 3
Pearson correlations between main study variables.

| Variable name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--|
| 1. Prosocial behavior T1 | - | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Prosocial behavior T2 | 0.61** | - | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Prosocial behavior T3 | 0.63** | 0.63** | - | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Prosocial behavior T4 | 0.58** | 0.63** | 0.69** | - | | | | | | | | | | | | | | | | | | | | | | |
| 5. Externalizing problems T1 | -0.37** | -0.31** | -0.28** | -0.28** | - | | | | | | | | | | | | | | | | | | | | | |
| 6. Externalizing problems T2 | -0.33** | -0.42** | -0.28** | -0.31** | 0.66** | - | | | | | | | | | | | | | | | | | | | | |
| 7. Externalizing problems T3 | -0.30** | -0.32** | -0.37** | -0.27** | 0.62** | 0.67** | - | | | | | | | | | | | | | | | | | | | |
| 8. Externalizing problems T4 | -0.25** | -0.29** | -0.27** | -0.32** | 0.62** | 0.64** | 0.73** | - | | | | | | | | | | | | | | | | | | |
| 9. Surgency/extraversion T2 | 0.16** | 0.19** | 0.19** | 0.20** | -0.05 | -0.08* | -0.09* | -0.08* | - | | | | | | | | | | | | | | | | | |
| 10. Negative affectivity T2 | -0.05 | -0.05 | 0.01 | -0.03 | 0.33** | 0.32** | 0.30** | 0.34** | -0.30** | - | | | | | | | | | | | | | | | | |
| 11. Effortful control T2 | 0.32** | 0.36** | 0.26** | 0.22** | -0.55** | -0.59** | -0.51** | -0.46** | 0.14** | -0.32** | - | | | | | | | | | | | | | | | |
| 12. Mother-adolescent closeness T1 (youth r.) | 0.32** | 0.26** | 0.21** | 0.21** | -0.35** | -0.29** | -0.25** | -0.24** | 0.06 | -0.17** | 0.30** | - | | | | | | | | | | | | | | |
| 13. Father-adolescent closeness T1 (youth r.) | 0.26** | 0.22** | 0.21** | 0.19** | -0.34** | -0.29** | -0.29** | -0.28** | 0.13** | -0.28** | 0.33** | 0.67** | - | | | | | | | | | | | | | |
| 14. Parent-adolescent closeness T1 (parent r.) | 0.18** | 0.12** | 0.11* | 0.18** | -0.11** | -0.09* | -0.09* | -0.10* | 0.04 | -0.09* | 0.14** | 0.38** | 0.28** | - | | | | | | | | | | | | |
| 15. Teacher-student closeness T1 (youth r.) | 0.26** | 0.23** | 0.18** | 0.17** | -0.23** | -0.23** | -0.19** | -0.21** | 0.05 | -0.09** | 0.30** | 0.35** | 0.37** | 0.13** | - | | | | | | | | | | | |
| 16. Teacher-student closeness T2 (teacher r.) | 0.14* | 0.13* | 0.07 | 0.09 | -0.05 | -0.02 | -0.02 | 0.00 | 0.08 | 0.01 | 0.14* | 0.19** | 0.10 | 0.18** | 0.26** | - | | | | | | | | | | |
| 17. Mother-adolescent conflict T1 (youth r.) | -0.20** | -0.15** | -0.12** | -0.11** | 0.43** | 0.36** | 0.34** | 0.34** | -0.01 | 0.33** | -0.33** | -0.40** | -0.28** | -0.17** | -0.15** | -0.00 | - | | | | | | | | | |
| 18. Father-adolescent conflict T1 (youth r.) | -0.20** | -0.18** | -0.17** | -0.16** | 0.41** | 0.30** | 0.32** | 0.29** | -0.05 | 0.29** | -0.31** | -0.22** | -0.33** | -0.15** | -0.10** | 0.06 | 0.68** | - | | | | | | | | |
| 19. Parent-adolescent conflict T1 (parent r.) | -0.16** | -0.09* | -0.11** | -0.10* | 0.29** | 0.23** | 0.21** | 0.21** | -0.03 | 0.21** | -0.21** | -0.28** | -0.22** | -0.35** | -0.20** | 0.02 | 0.46** | 0.35** | - | | | | | | | |
| 20. Teacher-student conflict T1 (youth r.) | -0.29** | -0.31** | -0.26** | -0.23** | 0.50** | 0.44** | 0.38** | 0.38** | 0.03 | 0.14** | -0.35** | -0.16** | -0.08* | 0.01 | -0.13** | 0.03 | 0.40** | 0.37** | 0.17** | - | | | | | | |
| 21. Teacher-student conflict T2 (teacher r.) | -0.14* | -0.25** | -0.18** | -0.11 | 0.32** | 0.32** | 0.34** | 0.33** | -0.02 | 0.11 | -0.25** | -0.03 | -0.03 | -0.07 | -0.17** | -0.03 | 0.01 | -0.02 | 0.20** | 0.30** | - | | | | | |
| 22. Gender (1 = girl, 2 = boy) | -0.25** | -0.32** | -0.32** | -0.28** | 0.05 | 0.15** | 0.05 | -0.03 | -0.01 | -0.29** | -0.06 | -0.08* | 0.09* | -0.09* | 0.02 | -0.06 | -0.05 | 0.00 | -0.05 | 0.26** | 0.09 | - | | | | |
| 23. Mother education | 0.07 | 0.09* | 0.09* | 0.06 | -0.08* | -0.08 | -0.09* | -0.04 | 0.11** | -0.04 | 0.06 | 0.09* | 0.10** | 0.03 | 0.07 | 0.08 | -0.01 | 0.01 | -0.01 | -0.05 | -0.09 | -0.00 | - | | | |
| 24. Father education | 0.10* | 0.09* | 0.05 | 0.13** | -0.13** | -0.10* | -0.08 | -0.11* | 0.04 | -0.02 | 0.11* | 0.11* | 0.11** | 0.06 | 0.07 | 0.09 | 0.01 | 0.05 | -0.02 | -0.05 | -0.08 | 0.03 | 0.46** | - | | |
| 25. Achievement (GPA) | 0.28** | 0.30** | 0.27** | 0.25** | -0.39** | -0.41** | -0.34** | -0.32** | 0.06 | 0.07* | 0.38** | 0.20** | 0.12** | 0.09* | 0.17** | 0.13* | -0.13** | -0.09** | -0.22** | -0.34** | -0.48** | -0.35** | 0.30** | 0.31** | - | |
| 26. Track (1 = vocational, 2 = academic) | 0.20** | 0.24** | 0.15** | 0.24** | -0.27** | -0.34** | -0.20** | -0.19** | 0.06 | -0.00 | 0.24** | 0.10** | 0.05 | -0.00 | 0.07* | 0.10 | -0.09* | -0.07 | -0.15** | -0.26** | -0.26** | -0.24** | 0.26** | 0.30** | 0.59** | |

Note. * $p < .05$, ** $p < .01$; T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

Table 4
Fit Indices and group sizes for factor mixture model with different number of groups (n = 899).

| No. of Groups | Log-likelihood (df), scaling correction | AIC | BIC | Adjusted BIC | pVLMR | pLMR | Posterior Probabilities | Group Sizes | Entropy |
|---------------|---|-----------------|-----------------|-----------------|---------------|---------------|--|-----------------------------|--------------|
| 1 | -1090.075 (25) 1.5337 | 2230.151 | 2350.183 | 2270.787 | - | - | - | 899 | - |
| 2 | -1007.897 (34) 1.4864 | 2083.795 | 2247.039 | 2139.060 | 0.1101 | 0.1137 | 0.88, 0.99 | 857, 42 | 0.922 |
| 3 | -928.743(43) 1.5879 | 1943.486 | 2149.941 | 2013.380 | 0.3228 | 0.3290 | 0.88, 0.98, 0.99 | 43, 842, 14 | 0.931 |
| 4 | -854.752(52) 1.7660 | 1813.505 | 2063.172 | 1898.028 | 0.1626 | 0.1672 | 0.86, 0.92, 0.87, 0.99 | 222, 604, 59, 14 | 0.818 |
| 5 | -803.203 (61) 1.6736 | 1728.406 | 2021.284 | 1827.559 | 0.6927 | 0.6947 | 0.93, 0.85, 0.78, 0.99, 0.84 | 524, 54, 201, 14, 106 | 0.805 |
| 6 | -760.367 (70) 1.5609 | 1660.734 | 1996.824 | 1774.516 | 0.3197 | 0.3213 | 0.80, 0.99, 0.81, 0.93, 0.84, 0.87 | 532, 208, 52, 60, 11, 36 | 0.828 |
| 7 | -726.793(79) 1.4210 | 1611.587 | 1990.888 | 1739.998 | 0.4284 | 0.4300 | 0.96, 0.86, 0.79, 0.81, 0.80, 0.93, 0.99 | 13, 53, 64, 39, 195, 531, 4 | 0.838 |

Note: The row in bold marks the indices based on which the number of groups were chosen.

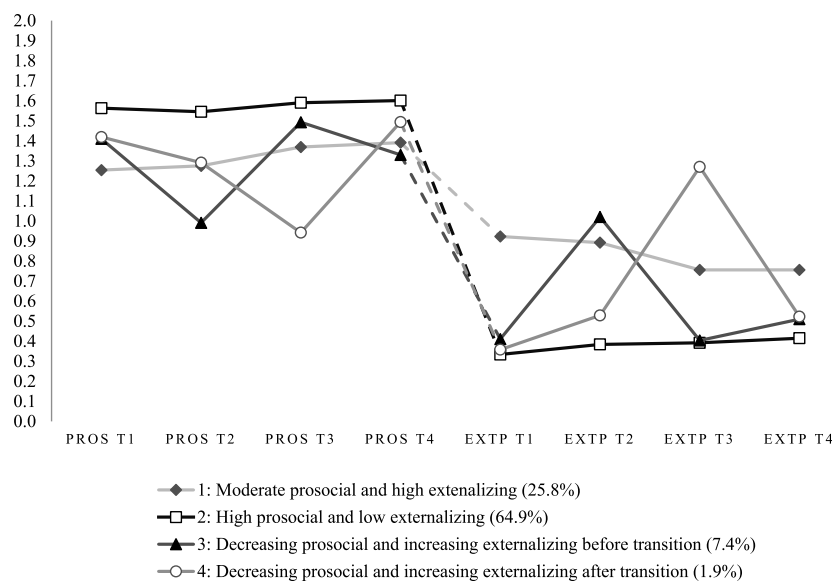


Fig. 2. Four latent groups based on prosocial behavior and externalizing problems at four time points.
Note. PROS = prosocial behavior; EXTP = externalizing problems; T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

increasing externalizing problems before the transition had the second lowest effortful control and were significantly different from all other groups. Adolescents from Groups 2 (high prosocial and low externalizing) and 4 (decreasing prosocial and increasing externalizing after transition) had the highest effortful control and were significantly different from Groups 1 (moderate prosocial and high externalizing) and 3 (decreasing prosocial and increasing externalizing before transition). Regarding temperamental surgency, there were no statistically significant differences between the groups.

3.3. Developmental trajectories in terms of relationship quality

To answer the third research question, the role of adolescents' relationship quality with parents and teachers on distinct trajectories was examined (see Table 6). Regarding relationship closeness with parents, the adolescents in Group 1 (moderate prosocial and high externalizing) reported the lowest closeness with both parents before the transition, which was significantly different from all other groups. Adolescents in Group 3 (decreasing prosocial and increasing externalizing before transition) had a lower closeness with their mothers than did those in Group 2 (high prosocial and low externalizing), and lower closeness with

their fathers than those in Group 4 (decreasing prosocial and increasing externalizing after transition), which indicates that the adolescents in Groups 2 and 4 perceived the highest closeness with their parents. Parent reports on relationship closeness before the transition did not statistically significantly predict the trajectories of adjustment behaviors. For conflict, Group 1 (moderate prosocial and high externalizing) adolescents had the most conflict with their mothers and fathers, which was significantly different from all other groups. Group 3 (decreasing prosocial and increasing externalizing before transition) adolescents reported (significantly different from all other groups) the second highest conflict with mothers and, together with Group 2 (high prosocial and low externalizing), with fathers (significantly different from Groups 1 and 4). Regarding adult reports, parents perceived the least conflict at the beginning of the transition with Group 4 (decreasing prosocial and increasing externalizing after transition) adolescents (significantly different from all other groups) and more conflict with Group 1 (moderate prosocial and high externalizing) adolescents than with Group 2 (high prosocial and low externalizing).

Regarding relationship closeness with teachers, adolescents in Group 1 (moderate prosocial and high externalizing) reported significantly lower closeness with teachers than adolescents in Groups 2 (high prosocial and

Table 5
Differences in changes of adjustment behaviors between time points in each class.

| Difference between time points | Prosocial behavior | | Externalizing problems | |
|--------------------------------|-----------------------|----------------|------------------------|----------------|
| | Wald's test | Diff (p) | Wald's test | Diff (p) |
| <i>Group 1</i> | 17.360(3), $p < .001$ | | 33.529(3), $p < .001$ | |
| T1 and T2 | | -0.021 (.578) | | 0.031 (.613) |
| T2 and T3 | | -0.094 (.004) | | 0.136 (<.001) |
| T3 and T4 | | -0.022 (.475) | | 0.000 (.985) |
| T1 and T4 | | -0.137 (.001) | | 0.167 (.005) |
| <i>Group 2</i> | 18.528(3), $p < .001$ | | 30.593(3), $p < .001$ | |
| T1 and T2 | | 0.018 (.123) | | -0.049 (.022) |
| T2 and T3 | | -0.045 (.001) | | -0.008 (.542) |
| T3 and T4 | | -0.011 (.499) | | -0.023 (.03) |
| T1 and T4 | | -0.038 (.022) | | -0.080 (<.001) |
| <i>Group 3</i> | 17.626(3), $p < .001$ | | 111.523(3), $p < .001$ | |
| T1 and T2 | | 0.419 (<.001) | | -0.609 (<.001) |
| T2 and T3 | | -0.502 (<.001) | | -0.617 (<.001) |
| T3 and T4 | | 0.163 (.072) | | -0.106 (.083) |
| T1 and T4 | | 0.080 (.404) | | -0.099 (.087) |
| <i>Group 4</i> | 10.158(3), $p = .017$ | | 757.436(3), $p < .001$ | |
| T1 and T2 | | 0.128 (.260) | | -0.171 (.116) |
| T2 and T3 | | 0.349 (.005) | | -0.742 (<.001) |
| T3 and T4 | | -0.551 (.002) | | 0.747 (<.001) |
| T1 and T4 | | -0.074 (.555) | | -0.165 (.133) |

Note. T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

low externalizing) and 4 (decreasing prosocial and increasing externalizing after transition). Teacher-reported relationship closeness did not statistically significantly predict the trajectories of adjustment behaviors. For conflict, Group 1 (moderate prosocial and high externalizing) adolescents reported the highest conflict with their teachers before the transition which was significantly different from all other groups. In addition, Group 3 (decreasing prosocial and increasing externalizing before transition) adolescents perceived more conflict with their teachers at the beginning of the transition than Group 2 (high prosocial and low externalizing) adolescents did. Teachers perceived that they had more conflicting relationship with Group 1 (moderate prosocial and high externalizing) adolescents than with Group 2 (high prosocial and low externalizing) adolescents.

Regarding the additional variables, gender, achievement, and educational track differences were found between groups. There were more girls in Group 2 (high prosocial and low externalizing) than boys in comparison to the other three groups and more boys in Group 3 (decreasing prosocial and increasing externalizing before transition) than in Group 1 (moderate prosocial and high externalizing). In addition, adolescents in Groups 2 (high prosocial and low externalizing) and 4 (decreasing prosocial and increasing externalizing after transition) had higher achievement than adolescents in the remaining two groups. Finally, more adolescents chose the vocational track in Groups 1 (moderate prosocial and high externalizing) and 3 (decreasing prosocial and increasing externalizing before transition) than the other two groups, and more adolescents chose the academic track in Groups 2 (high prosocial and low externalizing) and 4 (decreasing prosocial, increasing externalizing after transition) than the other two groups.

3.4. Additional analyses

Due to the discontinuity of teacher-adolescent relationship when adolescents switch from lower secondary school to upper secondary education, the present study also examined the role of teacher-adolescent relationship after the transition (T3) on adjustment behaviors trajectories. There were no significant differences between groups in terms of closeness with teachers, however, there were significant differences in terms of conflict with teachers. Adolescents who followed the trajectory of moderate prosocial behavior and high externalizing problems (Group 1) had higher conflicts with teachers at T3 than adolescents who followed either the trajectory of high prosocial behavior and low externalizing problems (Group 2) or the trajectory of decreasing prosocial behavior and

increasing externalizing problems before the transition (Group 3).

4. Discussion

The current study applied a person-oriented approach to obtain further knowledge on the differences between distinct trajectories of adolescents in terms of their adjustment behaviors across the critical transition from lower to upper secondary education. In particular, this is one of the first attempts to investigate the role of individual and environmental factors on combined adjustment behaviors trajectories across this specific transition. Results have shown that adolescents fell into four distinct developmental trajectories: moderate prosocial and high externalizing (25.8 %); high prosocial and low externalizing (64.9 %); decreasing prosocial and increasing externalizing before the transition (7.4 %); and decreasing prosocial and increasing externalizing after the transition (1.9 %). In addition, developmental trajectories of adjustment behaviors differed in terms of adolescents' temperamental negative affectivity, effortful control, and relationship with parents and teachers.

4.1. Developmental trajectories of adjustment behaviors across the transition to upper secondary education

The first aim of the study was to investigate the combined developmental trajectories of adolescents' prosocial behavior and externalizing problems during the transition from lower to upper secondary education. A person-oriented approach was applied to the data and four distinct trajectories in combined adjustment behaviors were found. As expected (Hypothesis 1a), the largest group of adolescents had high prosocial behavior and low externalizing problems across the transition (Group 2, 64.9 %). Despite slight variation in means between subsequent measurement points, the overall pattern of results was that prosocial behavior was high and relatively stable, and externalizing problems were low and relatively stable. Previous studies that applied a person-oriented approach also found that the majority of adolescents showed positive adjustment patterns (e.g., Jambon et al., 2019; Shi et al., 2021). The results indicate that the adolescents from the largest group successfully cope with challenges brought on by the transition to upper secondary education. Moreover, as expected (Hypothesis 1b) and in accordance with the previous studies (e.g., Flynn et al., 2015; Padilla-Walker et al., 2018), the second-largest group of adolescents (Group 1, 25.8 %) had lower prosocial behavior and higher externalizing problems than Group 2. Follow-up analyses showed that prosocial behavior

Table 6
Differences between the adjustment behaviors trajectories in terms of relationship quality and adolescents' temperament.

| Variable names | Group 1: Moderate prosocial and high externalizing (25.8 %) | Group 2: High prosocial and low externalizing (64.9 %) | Group 3: Decreasing prosocial and increasing externalizing before transition (7.4 %) | Group 4: Decreasing prosocial and increasing externalizing after transition (1.9 %) | Overall test | | Pairwise comparison |
|--|---|--|--|---|--------------|----------|----------------------|
| | M (S.E.) | M (S.E.) | M (S.E.) | M (S.E.) | χ^2 | <i>p</i> | |
| Temperament | | | | | | | |
| Surgency T2 (youth report) | 3.33 (0.05) | 3.42 (0.03) | 3.40 (0.06) | 3.30 (0.14) | 2.655 | .448 | |
| Negative affectivity T2 (youth report) | 3.00 (0.04) | 2.61 (0.03) | 2.65 (0.07) | 2.56 (0.15) | 70.047 | <.001 | 1 > 2,3,4 |
| Effortful control T2 (youth report) | 2.85 (0.04) | 3.46 (0.02) | 3.06 (0.07) | 3.35 (0.08) | 180.804 | <.001 | 1 < 2,3,4 3 < 2,4 |
| Closeness | | | | | | | |
| Mother-adolescent closeness T1 (youth report) | 3.06 (0.09) | 3.92 (0.05) | 3.56 (0.14) | 3.97 (0.29) | 64.204 | <.001 | 1 < 2,3,4 2 > 3 |
| Father-adolescent closeness T1 (youth report) | 2.65 (0.07) | 3.48 (0.05) | 3.35 (0.14) | 3.94 (0.29) | 96.546 | <.001 | 1 < 2,3,4 4 > 3 |
| Parent-adolescent closeness T1 (parent report) | 3.91 (0.07) | 4.04 (0.04) | 4.03 (0.11) | 4.24 (0.15) | 4.721 | .193 | |
| Teacher-student closeness T1 (youth report) | 1.69 (0.06) | 2.00 (0.04) | 1.81 (0.11) | 2.13 (0.21) | 26.281 | <.001 | 1 < 2,4 |
| Teacher-student closeness T3 (youth report) | 1.92 (0.09) | 1.95 (0.05) | 1.78 (0.10) | 1.73 (0.22) | 2.190 | .534 | |
| Teacher-student closeness T2 (teacher report) | 2.92 (0.14) | 3.02 (0.10) | 3.23 (0.14) | 3.40 (0.32) | 3.211 | .360 | |
| Conflict | | | | | | | |
| Mother-adolescent conflict T1 (youth report) | 2.69 (0.08) | 1.86 (0.04) | 2.15 (0.14) | 1.64 (0.16) | 78.740 | <.001 | 1 > 2,3,4 3 > 2,4 |
| Father-adolescent conflict T1 (youth report) | 2.54 (0.08) | 1.73 (0.04) | 1.88 (0.13) | 1.45 (0.13) | 91.781 | <.001 | 1 > 2,3,4 4 < 3,2 |
| Parent-adolescent conflict T1 (parent report) | 2.52 (0.10) | 1.94 (0.04) | 2.14 (0.16) | 1.59 (0.15) | 46.851 | <.001 | 4 < 1,2,3 1 > 2 |
| Teacher-student conflict T1 (youth report) | 2.49 (0.07) | 1.41 (0.03) | 1.96 (0.15) | 1.73 (0.21) | 198.363 | <.001 | 1 > 2,3,4 3 > 2 |
| Teacher-student conflict T3 (youth report) | 1.88 (0.08) | 1.31 (0.03) | 1.37 (0.10) | 1.70 (0.16) | 48.960 | <.001 | 1 > 2,3 |
| Teacher-student conflict T2 (teacher report) | 1.87 (0.15) | 1.30 (0.05) | 1.50 (0.24) | 1.91 (0.47) | 12.892 | <.01 | 1 > 2 |
| Control variables | | | | | | | |
| Gender (1 = girl, 2 = boy) | 1.53 (0.04) | 1.35 (0.02) | 1.83 (0.08) | 1.72 (0.11) | 46.865 | <.001 | 2 < 1,3,4 3 > 1 |
| Mother education | 4.27 (0.12) | 4.48 (0.09) | 4.32 (0.23) | 4.27 (0.42) | 2.156 | .541 | |
| Father education | 3.77 (0.14) | 4.13 (0.10) | 3.79 (0.37) | 3.55 (0.36) | 5.663 | .129 | |
| Achievement (GPA) | 7.59 (0.08) | 8.56 (0.05) | 7.89 (0.15) | 8.33 (0.17) | 136.763 | <.001 | 2 > 1,3 4 > 1,3 |
| Track (1 = vocational, 2 = academic) | 1.39 (0.05) | 1.76 (0.02) | 1.30 (0.08) | 1.79 (0.11) | 107.890 | <.001 | 1,3 < 2,4 |

Note. T1 = Grade 9 fall; T2 = Grade 9 spring; T3 = Grade 1 fall of upper secondary education; T4 = Grade 1 spring of upper secondary education.

slightly increased and externalizing problems slightly decreased during the transition (from T2 to T3), yet adolescents in Group 1 still had lower prosocial behavior and elevated externalizing problems across the transition to upper secondary education.

Finally, in accordance with the previous studies (e.g., Benner et al., 2017; Shi et al., 2021), the results showed groups of adolescents who were more susceptible to the changes across the transition to upper secondary education (Hypothesis 1c). The remaining two smallest groups had the strongest fluctuation in their adjustment behaviors across the four time points. In Group 3 (7.4 %), the prosocial behavior of

adolescents dropped, and externalizing problems increased right before the transition, whereas in Group 4 (1.9 %) prosocial behavior of adolescents dropped, and externalizing problems increased right after the transition. This is a new and important finding that identifies sensitive groups of adolescents concerning the transition to upper secondary education. The results indicate that even though a majority of adolescents successfully transition to upper secondary education, some might face challenges that should not be ignored. Some adolescents face difficulties preparing for the next stage of their school career, while others face challenges adjusting to changes brought about by upper secondary

education.

4.2. The role of temperament

The second aim of the study was to examine the role of individual factors on adjustment behaviors trajectories during the transition to upper secondary education. In line with the bioecological approach (Bronfenbrenner, 1979), both individual and environmental factors played a significant role in adolescents' adjustment behaviors across the transition. In particular, adolescents' temperament was associated with groups of trajectories of prosocial behavior and externalizing problems. First, adolescents who manifested the highest effortful control were more likely to fall into the trajectory of *high prosocial behavior and low externalizing problems* (Group 2), or the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition* (Group 4). As expected, (Hypothesis 2a) and in accordance with the previous studies (e.g., Olson et al., 2017), higher effortful control was associated with the trajectory of adolescents with high prosocial behavior and low externalizing problems across the transition. Adolescents with high effortful control can focus their attention, and control their behavior, and emotions (Rothbart, 2007; Rothbart et al., 2001). Therefore, such adolescents can engage in successful social interactions and obey social and classroom norms. In addition, adolescents with high effortful control may show more consistent adjustment behaviors shown by relatively stable high prosocial behavior and low externalizing problems across the transition. However, contrary to our expectations (Hypothesis 2b), even some adolescents with high effortful control had a decline in prosocial behavior and an increase in externalizing problems after the transition. This is an important finding that indicates that even those adolescents who excel in focusing their attention and controlling their behavior can have difficulties in adjusting to changes after the transition. One of the possible explanations is that adolescents face higher academic demands when they enter upper secondary education and may lose peers or teachers to whom they feel connected. When adolescents enter a new classroom it may become difficult to feel like they belong, which disrupts their need for relatedness (Ryan & Deci, 2000). In addition, most of the adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems after the transition* (Group 4) chose the academic track. The academic track in Finland is highly demanding which may become stressful and difficult to handle (Salmela-Aro et al., 2008). Therefore, high effortful control may not be enough for some adolescents, to successfully adjust to upper secondary education.

Second, adolescents who fell into a trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition* (Group 3) had lower effortful control than the groups with the highest effortful control (Groups 1 and 2). Adolescents, who had a bit lower effortful control, had some difficulties before the transition, however, they had some self-regulatory resources to regain their ability to adjust well to upper secondary education. However, adolescents who had the lowest effortful control did not have such resources and followed the trajectory of *moderate prosocial behavior and high externalizing problems* (Group 1) across the transition. When adolescents have a lower ability to control their behavior and emotions, they are less keen on being prosocial and engage in more externalizing problems throughout the transition from lower to upper secondary education. Previous research has shown that low effortful control was associated with the trajectories with elevated levels of externalizing problems (Olson et al., 2017). Adolescents with low effortful control have difficulties in regulating their behavior and emotions (Rothbart, 2007; Rothbart et al., 2001) which can contribute to the difficulties in adjusting across the transition (Rothbart et al., 2001; Symonds, 2015).

Finally, adolescents with the highest negative affectivity were more likely to have *moderate prosocial behavior and high externalizing problems* (Group 1) across four time points. The results indicate that when adolescents have heightened negative emotions and irritability, they engage

less in prosocial behavior and show elevated externalizing problems both before and after the transition from lower to upper secondary education. Higher negative affectivity may cause discomfort for adolescents and difficulties in distancing themselves from their negative emotions (Rothbart, 2007; Rothbart et al., 2001), which may predict difficulties in adjustment behaviors already before the transition and continue across the transition.

4.3. The role of relationship quality with parents and teachers

To address the third aim of the study, parent- and teacher-adolescent relationships were investigated as environmental factors that were associated with the trajectories of combined adjustment behaviors across the transition to upper secondary education. First, in terms of relationship with parents, the results of the current study showed that when adolescents felt a low closeness with both mothers and fathers, they were more likely to follow the *moderate prosocial behavior and high externalizing problems* trajectory (Group 1). The transition from lower to upper secondary education is a challenging time when adolescents may need social support (Eccles & Roeser, 2009; Virtanen et al., 2022). During this time parents may form the only constant relationship with adolescents (Virtanen et al., 2022). If adolescents do not feel close to their parents their need for relatedness is unsatisfied (Ryan & Deci, 2000), which prevents them from engaging in successful social interactions and manifests in poor adjustment outcomes. Second, adolescents who followed the *decreasing prosocial behavior and increasing externalizing problems trajectory before the transition* to upper secondary education (Group 3), reported the second lowest closeness with mothers and fathers. The results may indicate that for some adolescents lower closeness with parents may have been detrimental when preparing for upper secondary education. However, when they entered a new educational setting it aligned to their needs and assisted in successful adjustment (Eccles & Roeser, 2009). It is possible to speculate that such needs may have been related to new friendships, more supportive teachers, or increased closeness to parents. In addition, some adolescents who did not feel confident with their academic path might have felt more confident choosing the vocational path and showed successful adjustment when entered vocational school. As expected, the largest group with successful adjustment behaviors had one of the closest relationships with parents (Group 2; Hypothesis 3a). Previous studies have also shown that positive parenting was associated with adolescents belonging to the largest group with the most prosocial behavior and least externalizing problems (e.g., Jambon et al., 2019; Shi et al., 2021). When adolescents have a closer relationship with their parents, they are keener to internalize social norms and behave according to the expectations of their parents (Shi et al., 2021). However, in addition to the expected findings, the closeness with parents of Group 2 (*high prosocial and low externalizing*) did not differ from a small group of adolescents who experienced drops in their adjustment behaviors upon entering upper secondary education (Group 4). Some adolescents, even with support from parents, may feel too much pressure to successfully start upper secondary education, which may lead to stressful experiences and a decline in adjustment behaviors after the transition. It may also imply that the changed context of school after the transition did not fit the expectations of some adolescents (Eccles & Roeser, 2009). Changes in the classroom composition and higher academic demands may encourage some adolescents to act out even though they perceive a close relationship with their parents.

On the other hand, parents' perceptions of closeness with their children did not predict the trajectories of adjustment behaviors. Results indicate that adolescents' perceptions of their closeness with parents are important in understanding the development of their adjustment behaviors across the transition. Parents should be aware that adolescents' perceptions of closeness may be detrimental to their successful adjustment across the transition to upper secondary education.

In terms of conflict with parents, adolescents who perceived high

conflict with their mothers and fathers followed the *moderate prosocial behavior and high externalizing problems* trajectory (Group 1). Conflicts bring tension between parents and adolescents. When adolescents feel tense, they may sense a lack of safety in their homes (Eccles & Roeser, 2009; Grolnick et al., 2009). Such an environment does not fit their need for relatedness, which brings adjustment difficulties (Eccles et al., 1993; Ryan & Deci, 2000). In addition, adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition* (Group 3) had less conflict with parents than those in the *moderate prosocial behavior and high externalizing problems* group (Group 1), and more conflict than the remaining two groups. The findings may indicate that these adolescents who had some unresolved conflicts with their parents acted out before the transition and did not feel safe expressing their worries to their parents (Branje, 2018; Branje et al., 2009; Grolnick et al., 2009). However, if these conflicts were successfully resolved after the transition and upper secondary education fit the expectations of adolescents, they were able to show successful adjustment (Branje, 2018; Eccles & Roeser, 2009). Finally, as expected (Hypothesis 3a), and in line with the previous research (Jambon et al., 2019), adolescents in the *high prosocial and low externalizing* trajectory (Group 2) had one of the least conflicting relationships with their parents. This study indicates that to ensure the successful adjustment of adolescents, it is important to make sure that adolescents do not perceive their relationship with parents as tense and conflicting. However, Group 2 (*high prosocial and low externalizing trajectory*) did not differ from adolescents who had a *decrease in prosocial behavior and an increase in externalizing problems after the transition* (Group 4) in terms of conflict with parents. This is an important finding that shows that even though adolescents would have little conflict with their mothers and fathers, changes after the transition may not fit their expectations, which may add to the adjustment difficulties to a new school environment (Eccles et al., 1993).

In addition, parents reported more conflict with Group 1 adolescents than those who later developed either *high prosocial behavior and low externalizing problems* (Group 2) or those who had a *decrease in prosocial behavior and an increase in externalizing problems after the transition* (Group 4). Some parents may strongly react to their adolescents' expressions of worry and unfulfilled expectations regarding the transition. Such reactions may lead to conflicting situations. If conflicts are not successfully resolved, it can disrupt adolescents' perspective-taking and socialization skills (Branje, 2018; Branje et al., 2009), which is detrimental to lower prosocial behavior and higher externalizing problems. The results have shown that both adult- and youth-reported conflict were detrimental for the adolescents who later developed moderate prosocial behavior and elevated externalizing problems across the transition. To our surprise (Hypothesis 2d), parents reported the least conflicting relationship with adolescents who had a *decrease in prosocial behavior and an increase in externalizing problems after the transition* (Group 4). Both adolescents' and parents' perceptions of their relationship showed that a small group of adolescents (1.9%) experienced difficulties in adjusting to a new school environment despite relatively high support from their parents. When adolescents enter upper secondary education, their school context changes. Some changes (e.g., teachers, peers, academic demands, track choices), may have disrupted the adjustment of some adolescents despite the supportive parents. This is an interesting finding, which should be investigated further.

The home context is important in shaping adolescents' adjustment behaviors across the transition because experiences at home are brought to the school context (Bronfenbrenner, 1979). When adolescents have less close and more conflicting relationship with their parents, they may feel less supported and not feel obliged to behave according to their expectations, and engage less in prosocial behavior, and more elevated externalizing problems (Shi et al., 2021).

In terms of relationship with teachers, the results of the current study showed that when adolescents felt low closeness with teachers, they were more likely to develop *moderate prosocial behavior and high*

externalizing problems trajectory (Group 1). When adolescents have less close relationship with teachers, they may not feel the need to behave according to the teachers' expectations, which may result in less prosocial behavior and more elevated externalizing problems (Shi et al., 2021). However, the perceptions of Group 1 adolescents about their closeness with teachers did not differ from those who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition* (Group 3). One of the possible explanations lies in the discontinuity of teacher-adolescent relationship across transitions (Virtanen et al., 2022). When adolescents switch to upper secondary education, their teachers change. Therefore, even though some adolescents had conflicting relationship with their lower secondary school teachers, such relationship may have changed when they entered upper secondary education.

Regarding teacher-reported closeness, there were no significant differences between distinct trajectories. Teachers did not perceive their closeness with adolescents as significantly different. The results showed that the perceptions of relationship closeness may be perceived differently by teachers and adolescents. This indicates the strength of our study in investigating multiple reports on relationship quality.

In terms of conflict with teachers, the results of the current study showed that when adolescents felt elevated conflict with their teachers, they were more likely to develop *moderate prosocial behavior and high externalizing problems* trajectory (Group 1). When adolescents perceive conflicts with their teachers, they may feel rejected and less safe in a school environment (Eccles & Roeser, 2009; Wentzel, 2009). This finding indicates that when adolescents feel more distant from their teachers, they do not feel obliged to behave in the expected manner and may lack support during the transition, resulting in lower levels of prosocial behavior and elevated externalizing problems (e.g., Shi et al., 2021). Second, adolescents who followed the *decreasing prosocial behavior and increasing externalizing problems before the transition* to upper secondary education trajectory (Group 3) had less conflict than Group 1 adolescents did, but more than Group 2 (*high prosocial and low externalizing*). The results are in line with a previous study that showed conflict with teachers as an antecedent for a trajectory with lower externalizing problems (Shi et al., 2020). The relationship quality with parents and teachers may not have fit the needs of adolescents before the transition, thereby promoting declines in successful adjustment and inclines in poor adjustment behaviors (Eccles et al., 1993). However, when adolescents switched to upper secondary education, their teachers may have also changed. Therefore, it could be possible to speculate that adolescents who followed the trajectory of *decreasing prosocial behavior and increasing externalizing problems before the transition* (Group 3), had less conflicting relationship with their new teachers in upper secondary education. The additional analyses also showed that when adolescents entered a new educational setting, the Group 3 adolescents had less conflict with their teacher. This may partially explain why Group 3 adolescents had better adjustment outcomes after the transition than before.

Regarding teacher-reported conflict, teachers felt they have had more conflict with Group 1 adolescents than with those adolescents who followed the trajectory of *high prosocial behavior and low externalizing problems* across the transition. The results may indicate that teachers felt the need to give more attention and discipline to those adolescents who have moderate prosocial behavior and high externalizing problems than to those who have high prosocial behavior and low externalizing problems. In addition, when teachers perceive tension with their students, they may show less care and less encouragement for them to engage in classroom activities (Eccles & Roeser, 2009; Wentzel, 2009). If adolescents sense that teachers care less about their learning and react with discontent instead of understanding and encouragement, they may show lower prosocial behavior and more externalizing problems.

School context as well as home context contribute to shaping the behavior of adolescents (Bronfenbrenner, 1979). Adolescents spend a significant amount of time at school, meaning teachers become

important nonfamilial adult figures that shape the adjustment behaviors of adolescents, especially across the transition to upper secondary education (Eccles & Roeser, 2009). Low conflict and high closeness with parents and teachers provide a supportive home and school environment that allows adolescents to engage in more successful adjustment behaviors across the transition (high prosocial behavior and low externalizing problems).

4.4. Limitations and future implementations

The current study has several limitations. First, a person-oriented approach to longitudinal data was applied, but the direction of associations between antecedents and trajectories of adjustment behaviors should be interpreted with caution. Second, both adjustment behaviors and temperament dimensions were reported by the same adolescents. Common-method bias may have affected the associations between temperament and trajectories of combined adjustment behaviors. To mitigate this bias regarding the associations between relationship quality and adjustment behaviors, multiple parent, teacher, and adolescent reports on the close and conflicting relationship were included. Third, only a small sample of teachers reported their relationship with adolescents, which had a large proportion of missing data (67.3 %). This sample is much smaller compared to parent reports or adolescent reports on relationship quality. To mitigate this limitation, both teacher and adolescent reports on teacher–adolescent relationship were added. However, the results should be interpreted while keeping in mind that teachers reported their relationships with only a part of adolescents. In addition, home classroom teachers reported about their relationships with their class students. Some teachers met their class students more often than others depending on their taught subject, thus related results should be interpreted with caution. Fourth, the *decreasing prosocial behavior and increasing externalizing problems after the transition* trajectory was very small (1.9 %). Therefore, interpretations regarding this group should be made with caution. Future studies could investigate this further and replicate the study in order to see if the smallest group of adolescents may have difficulties in their adjustment behaviors only after the transition. Fifth, the study aimed to investigate only observable adjustment behaviors such as prosocial behavior and externalizing problems. However, future studies could also benefit from investigating the trajectories of inner experiences such as internalizing problems across the transition. Sixth, only self-reports on adjustment behaviors were used in the present study. Combining self-reports with parent or teacher reports could add strength to our findings. Finally, future studies could benefit from investigating the role of interaction between adolescents' temperament and their relationships with parents and teachers on trajectories of adolescents' adjustment behaviors across the transition from lower secondary school to upper secondary education.

Moreover, different adolescents may have different adjustment behaviors across the transition. Some momentary changes in behavior can appear right before the transition and others right after the transition for some adolescents. This should be carefully monitored to identify what help adolescents require before and after the transition. By observing classroom students and their temperamental characteristics, teachers can identify students who need the most support for successful adjustment during the transition. The results of this study suggest parents and teachers should note that even adolescents with high effortful control may have difficulties adjusting to the challenges of upper secondary education. In addition, some adolescents are more sensitive to environmental factors than others. For example, low closeness and high conflict with parents and teachers may create difficulties throughout the whole transition for some adolescents (Group 1). It becomes especially important for teachers and parents to observe adolescents' behavior and reflect on their relationship with and reactions to adolescents with potentially poor adjustment behaviors.

4.5. Conclusions

The results of the current study showed that most adolescents adjusted well to educational transition (64.9 %). However, some adolescents showed adjustment difficulties across the transition (25.8 %), and some either during the period before (7.4 %) or after the transition to upper secondary education (1.9 %). Teachers and parents should note that all adolescents with different temperaments may need additional support at some point during the transition. For instance, adolescents with higher negative affectivity may be more susceptible to educational transitions thus showing some adjustment difficulties across the transition. However, even adolescents with high effortful control may face challenges after the transition, thus requiring additional encouragement. Therefore, providing a safe home and school environment by avoiding conflict and maintaining close relationship with adolescents can help parents and teachers to provide the necessary support for adolescents during the transition.

CRedit authorship contribution statement

Vilija Jaruseviciute: Writing – review & editing, Writing – original draft, Visualization, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Gintautas Silinskas:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization. **Joona Muotka:** Writing – review & editing, Methodology. **Noona Kiuru:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

Declaration of competing interest

We have no conflicts of interest to disclose.

References

- Anttila, S., Lindfors, H., Hirvonen, R., Määttä, S., & Kiuru, N. (2022). Dropout intentions in secondary education: Student temperament and achievement motivation as antecedents. *Journal of Adolescence*, *95*(2), 248–263. <https://doi.org/10.1002/jad.12110>
- Asparouhov, T., & Muthén, B. (2014). 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*(2), 1–22.
- Aunola, K., Sorkkila, M., Viljaranta, J., Tolvanen, A., & Ryba, T. V. (2018). The role of parental affection and psychological control in adolescent athletes' symptoms of school and sport burnout during the transition to upper secondary school. *Journal of Adolescence*, *69*(1), 140–149. <https://doi.org/10.1016/j.adolescence.2018.10.001>
- Baker, J. A. (2006). Contributions of teacher–child relationships to positive school adjustment during elementary school. *Journal of School Psychology*, *44*(3), 211–229. <https://doi.org/10.1016/j.jsp.2006.02.002>
- Benner, A. D. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review*, *23*(3), 299–328. <https://doi.org/10.1007/s10648-011-9152-0>
- Benner, A. D., Boyle, A. E., & Bakhtiari, F. (2017). Understanding students' transition to high school: Demographic variation and the role of supportive relationships. *Journal of Youth and Adolescence*, *46*(10), 2129–2142. <https://doi.org/10.1007/s10964-017-0716-2>
- Benner, A. D., & Wang, Y. (2014). Shifting attendance trajectories from middle to high school: Influences of school transitions and changing school contexts. *Developmental Psychology*, *50*(4), 1288–1301. <https://doi.org/10.1037/a0035366>
- Branje, S. (2018). Development of parent–adolescent relationships: Conflict interactions as a mechanism of change. *Child Development Perspectives*, *12*(3), 171–176. <https://doi.org/10.1111/cdep.12278>
- Branje, S. J. T., van Doorn, M., van der Valk, I., & Meeus, W. (2009). Parent–adolescent conflicts, conflict resolution types, and adolescent adjustment. *Journal of Applied Developmental Psychology*, *30*(2), 195–204. <https://doi.org/10.1016/j.appdev.2008.12.004>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. US: Harvard university press.
- Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an early adolescent temperament measure. *The Journal of Early Adolescence*, *12*(2), 153–173. <https://doi.org/10.1177/0272431692012002002>
- Cui, L., Colasante, T., Malti, T., Ribeaud, D., & Eisner, M. P. (2016). Dual trajectories of reactive and proactive aggression from mid-childhood to early adolescence: Relations to sensation seeking, risk taking, and moral reasoning. *Journal of Abnormal Child Psychology*, *44*(4), 663–675. <https://doi.org/10.1007/s10802-015-0079-7>

- De Jong, E. M., Koomen, H. M., Jellesma, F. C., & Roorde, D. L. (2018). Teacher and child perceptions of relationship quality and ethnic minority children's behavioral adjustment in upper elementary school: A cross-lagged approach. *Journal of School Psychology, 70*, 27–43. <https://doi.org/10.1016/j.jsp.2018.06.003>
- Driscoll, K., & Pianta, R. (2011). Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *Journal of Early Childhood and Infant Psychology, 7*, 1–24.
- 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: Individual bases of adolescent development* (pp. 404–434). John Wiley & Sons, Inc. <https://doi.org/10.1002/9780470479193.adlpsy001013>
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence, 21*, 225–241. <https://doi.org/10.1111/j.1532-7795.2010.00725.x>
- Eisenberg, N. (1982). *The development of prosocial behavior* (pp. 3–11). Academic Press, Inc.
- Ellis, L. K. (2002). *Individual differences and adolescent psychosocial development* (publication no. 3061943). Doctoral dissertation, University of Oregon. ProQuest Dissertations and Theses Global.
- Ellis, L. K., & Rothbart, M. K. (2001, April). Revision of the early adolescent temperament questionnaire [Poster presentation]. In *2001 biennial meeting of the society for research in child development*, Minneapolis, Minnesota.
- Flynn, E., Ehrenreich, S. E., Beron, K. J., & Underwood, M. K. (2015). Prosocial behavior: Long-term trajectories and psychosocial outcomes. *Social Development, 24*(3), 462–482. <https://doi.org/10.1111/sode.12100>
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., ... McCall, R. B. (1987). Roundtable: What is temperament? Four approaches. *Child Development, 58*(2), 505–529. <https://doi.org/10.2307/1130527>
- Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British parents, teachers and children. *Journal of Abnormal Child Psychology, 38*, 1179–1191.
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581–586.
- Grolnick, W. S., Friendly, R. W., & Bellas, V. M. (2009). Parenting and children's motivation at school. In K. R. Wentzel, & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 279–300). Routledge.
- 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://doi.org/10.1111/1467-8624.00301>
- Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*(1), 127–155. <https://doi.org/10.1037/0033-2909.111.1.127>
- Jambon, M., Madigan, S., Plamondon, A., & Jenkins, J. (2019). Developmental trajectories of physical aggression and prosocial behavior in early childhood: Family antecedents and psychological correlates. *Developmental Psychology, 55*(6), 1211–1225. <https://doi.org/10.1037/dev0000714>
- Jaruseviciute, V., Kiuru, N., & Silinskas, G. (2022). Teacher- and parent-child relationships and children's adjustment behaviors in grade 1: The role of temperament. *Journal of Family Psychology, 36*(8), 1363–1375. <https://doi.org/10.1037/fam0001023>
- Jaruseviciute, V., Silinskas, G., & Kiuru, N. (2023). Socioemotional functioning across the transition to lower secondary school: The role of temperament and relationships with mothers and teachers. *Journal of Research on Adolescence, 00*, 1–21. <https://doi.org/10.1111/jora.12866>
- Kitayama, S., Park, J., Miyamoto, Y., Date, H., Boylan, J. M., Markus, H. R., ... Ryff, C. D. (2018). Behavioral adjustment moderates the link between neuroticism and biological health risk: A U.S.-Japan comparison study. *Personality and Social Psychology Bulletin, 44*(6), 809–822. <https://doi.org/10.1177/0146167217748603>
- Kiuru, N., Hirvonen, R., & Ahonen, T. (2019). Assessing temperament among Finnish early adolescents and their parents: Psychometric properties of the short forms of the temperament questionnaires. *Merrill-Palmer Quarterly, 65*(3), 294–328. <https://doi.org/10.13110/merrpalmquar1982.65.3.0294>
- Kiuru, N., Wang, M.-T., Salmela-Aro, K., Kannas, L., Ahonen, T., & Hirvonen, R. (2019). Associations between adolescents' interpersonal relationships, school well-being, and academic achievement during educational transitions. *Journal of Youth and Adolescence, 49*(5), 1057–1072. <https://doi.org/10.1007/s10964-019-01184-y>
- Kjeldsen, A., Nes, R. B., Sanson, A., Ystrom, E., & Karevold, E. B. (2021). Understanding trajectories of externalizing problems: Stability and emergence of risk factors from infancy to middle adolescence. *Development and Psychopathology, 33*(1), 264–283. <https://doi.org/10.1017/s0954579419001755>
- Laursen, B. P., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly, 52*(3), 377–389. <https://doi.org/10.1353/mpq.2006.0029>
- Lo, Y., Mendell, R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika, 88*, 767–778. <https://doi.org/10.1093/biomet/88.3.767>
- Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods, 10*(1), 21–39. <https://doi.org/10.1037/1082-989X.10.1.21>
- Mauno, S., Hirvonen, R., & Kiuru, N. (2018). Children's life satisfaction: The roles of mothers' work engagement and recovery from work. *Journal of Happiness Studies, 19*, 1379–1393. <https://doi.org/10.1007/s10902-017-9878-6>
- McMahon, R. J. (1994). Diagnosis, assessment, and treatment of externalizing problems in children: The role of longitudinal data. *Journal of Consulting and Clinical Psychology, 62*(5), 901–917. <https://doi.org/10.1037/0022-006X.62.5.901>
- Memmott-Elison, M. K., Holmgren, H. G., Padilla-Walker, L. M., & Hawkins, A. J. (2020). Associations between prosocial behavior, externalizing behaviors, and internalizing symptoms during adolescence: A meta-analysis. *Journal of Adolescence, 80*(1), 98–114. <https://doi.org/10.1016/j.adolescence.2020.01.012>
- Metsäpelto, R.-L., Taskinen, P., Kracke, B., Silinskas, G., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2017). Changes in achievement values from primary to lower secondary school among students with and without externalizing problems. *Learning and Individual Differences, 58*, 75–82. <https://doi.org/10.1016/j.lindif.2017.08.002>
- Ministry of Education and Culture. (2023). Suomen koulutusjärjestelmä [Finnish educational system]. <https://minedu.fi/koulutusjarjestelma>
- Muthén, B. (2003). Statistical and substantive checking in growth mixture modeling: Comment on Bauer and Curran (2003). *Psychological Methods, 8*, 369–377. <https://doi.org/10.1037/1082-989X.8.3.369>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Author.
- Nurmi, J. E., Silinskas, G., Kiuru, N., Pakarinen, E., Turunen, T., Siekkinen, M., ... Lerkkanen, M. K. (2018). A child's psychological adjustment impacts teachers' instructional support and affective response. *European Journal of Psychology of Education, 33*(4), 629–648. <https://doi.org/10.1007/s10212-017-0337-x>
- Olson, S. L., Choe, D. E., & Sameroff, A. J. (2017). Trajectories of child externalizing problems between ages 3 and 10 years: Contributions of children's early effortful control, theory of mind, and parenting experiences. *Development and Psychopathology, 29*(4), 1333–1351. <https://doi.org/10.1017/S095457941700030X>
- Padilla-Walker, L. M., Memmott-Elison, M. K., & Coyne, S. M. (2018). Associations between prosocial and problem behavior from early to late adolescence. *Journal of Youth and Adolescence, 47*(5), 961–975. <https://doi.org/10.1007/s10964-017-0736-y>
- Pakarinen, E., Silinskas, G., Hamre, B. K., Metsäpelto, R.-L., Lerkkanen, M.-K., Poikkeus, A.-M., & Nurmi, J.-E. (2018). Cross-lagged associations between problem behaviors and teacher-student relationships in early adolescence. *The Journal of Early Adolescence, 38*(8), 1100–1141. <https://doi.org/10.1177/0272431617714328>
- Pianta, R. C. (1992). *Student-teacher relationship scale - Short form*. University of Virginia.
- Pianta, R. C. (2001). *Student-teacher relationship scale-short form*. Lutz, FL: Psychological Assessment Resources, Inc.
- Putnam, S. P. (2012). Positive emotionality. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 105–123). The Guilford Press.
- Putnam, S. P., Ellis, L. K., & Rothbart, M. K. (2001). The structure of temperament from infancy through adolescence. In A. Teoksessa Elias, & A. Angleitner (Eds.), *Advances in research on temperament* (pp. 165–182). Lengerich, Germany: Pabst Science.
- Roorde, D. L., Zee, M., & Koomen, H. M. Y. (2020). Don't forget student-teacher dependency! A meta-analysis on associations with students' school adjustment and the moderating role of student and teacher characteristics. *Attachment & Human Development, 23*(5), 490–503. <https://doi.org/10.1080/14616734.2020.1751987>
- Rothbart, M. K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science, 16*(4), 207–212. <https://doi.org/10.1111/j.1467-8721.2007.00505.x>
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The children's behavior questionnaire. *Child Development, 72*(5), 1394–1408. <https://doi.org/10.1111/1467-8624.00355>
- Rushton, J. P. (1982). Social learning theory and the development of prosocial behavior. In N. Eisenberg (Ed.), *The development of prosocial behavior* (pp. 86–95). Academic Press, Inc.
- 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. <https://doi.org/10.1037/0003-066X.55.1.68>
- Salmela-Aro, K., Kiuru, N., & Nurmi, J. (2008). The role of educational track in adolescents' school burnout: A longitudinal study. *British Journal of Educational Psychology, 78*(4), 663–689. <https://doi.org/10.1348/000709908x281628>
- Scrimin, S., Moscardino, U., Finos, L., & Mason, L. (2019). Effects of psychophysiological reactivity to a school-related stressor and temperament on early adolescents' academic performance. *The Journal of Early Adolescence, 39*(6), 904–931. <https://doi.org/10.1177/0272431618797008>
- Shi, Q., Ettekal, I., Deutz, M. H. F., & Woltering, S. (2020). Trajectories of pure and co-occurring internalizing and externalizing problems from early childhood to adolescence: Associations with early childhood individual and contextual antecedents. *Developmental Psychology, 56*(10), 1906–1918. <https://doi.org/10.1037/dev0001095>
- Shi, Q., Ettekal, I., Liew, J., & Woltering, S. (2021). Predicting differentiated developmental trajectories of prosocial behavior: A 12-year longitudinal study of children facing early risks and vulnerabilities. *International Journal of Behavioral Development, 45*(4), 327–336. <https://doi.org/10.1177/0165025420935630>
- Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives, 6*(4), 436–444. <https://doi.org/10.1111/j.1750-8606.2012.00254.x>
- Symonds, J. (2015). *Understanding school transition: What happens to children and how to help them* (1st ed.). Routledge. <https://doi.org/10.4324/9781315714387>
- Tackett, J. L., Martel, M. M., & Kushner, S. C. (2012). Temperament, externalizing disorders, and attention-deficit/hyperactivity disorder. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 562–580). The Guilford Press.

- Tunkkari, M., Aunola, K., Hirvonen, R., Silinskas, G., & Kiuru, N. (2022). A person-oriented approach to maternal homework involvement during the transition to lower secondary school. *Learning and Individual Differences, 97*, Article 102164. <https://doi.org/10.1016/j.lindif.2022.102164>
- Virtanen, T., Vasalampi, K., Lerkanen, M.-K., Pelkonen, J., & Poikkeus, A.-M. (2022). Stability of social support during school transitions: Associations with truancy and not completing upper secondary education in normative time. *Learning and Instruction, 82*, Article 101663. <https://doi.org/10.1016/j.learninstruc.2022.101663>
- Wentzel, K. R. (2009). Students' relationships with teachers as motivational contexts. In K. R. Wentzel, & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 301–322). Routledge.
- Zentner, M. (2020). Identifying child temperament risk factors from 2 to 8 years of age: Validation of a brief temperament screening tool in the US, Europe, and China. *European Child & Adolescent Psychiatry, 29*(5), 665–678. <https://doi.org/10.1007/s00787-019-01379-5>