



Adolescents' and mothers' temperament types and their roles in early adolescents' socioemotional functioning

Riikka Hirvonen, Johanna Väänänen, Kaisa Aunola,
Timo Ahonen, and Noona Kiuru

Abstract

The present study examined adolescents' and mothers' temperament types and their roles in the socioemotional functioning of early adolescents. A total of 869 sixth-grade students and 668 mothers participated in the study. The students rated their temperament and socioemotional functioning and the mothers rated their own temperament. Latent profile analyses identified four temperament types among the adolescents (resilient, reserved, average, and mixed) and three types among the mothers (resilient, average, and mixed). The results showed that the adolescents with resilient or reserved temperaments reported significantly fewer conduct problems and emotional symptoms, less hyperactivity, and higher prosociality than adolescents with a mixed temperament type. The most adaptive adolescent–mother temperament matches were between a resilient or reserved adolescent and a resilient or average mother; these adolescents reported the highest levels of socioemotional functioning. Mothers with mixed or average temperaments were related to fewer conduct problems and emotional symptoms and less hyperactivity among adolescents with a mixed temperament, while mothers with a resilient temperament type were beneficial for prosocial behavior among adolescents with a mixed temperament. These findings increase understanding of the role of temperament and the interplay between adolescents' and mothers' temperaments in the development of early adolescents' socioemotional adjustment.

Keywords

Early adolescence, emotion regulation, externalizing problems, goodness-of-fit, relationship with parents, temperament

Introduction

Adolescents undergo multiple changes in themselves and their social environment amid biological maturation, cognitive development, evolving sexuality, school transitions, and changes in social relationships (e.g., Denham, Wyatt, Bassett, Echeverria, & Knox, 2009). Adolescents' temperamental characteristics can be assumed to play a role in how they adjust to these changes (Sanson, Hemphill, & Smart, 2004). According to goodness-of-fit theory (Thomas & Chess, 1977), a good fit between an individual's characteristics and environmental expectations improves adaptive socioemotional functioning, whereas poor fit may undermine it. The vast majority of research on goodness-of-fit between individuals' temperaments and different aspects of the home environment has been carried out among children (see Kiff, Lengua, & Zalewski, 2011; Sanson et al., 2004). However, research on older age groups is needed because the fit between individuals' temperament and environment may change as they face new developmental tasks in different developmental stages (see Denham et al., 2009). Consequently, the present study was aimed at examining the roles of early adolescents' and their mothers' temperaments in adolescents' socioemotional functioning.

Temperament

Temperament can be defined as innate or early-appearing individual differences in emotional and behavioral responses (e.g., Thomas & Chess, 1977). These differences manifest in the threshold, intensity,

and duration of individuals' reactions to environmental and internal stimuli and in the self-regulation processes that modulate these reactions (Putnam, Ellis, & Rothbart, 2001; Rothbart, 2011). The manifestations of individual characteristics develop across time and situations as a result of maturation and socialization processes and individual experiences of various situations and environments (Putnam et al., 2001; Rothbart, Ahadi, Hershey, & Fisher, 2001).

The present study applied the developmental model of temperament constructed by Rothbart and colleagues (Rothbart, 2011; Rothbart et al., 2001). According to this model, there are three broader dimensions of temperament. *Surgency/extraversion* refers to characteristics related to positive emotionality and approach behavior (Rothbart, 2011; Rothbart et al., 2001). Individuals with high surgency/extraversion have rapid responses, seek intense stimuli, and are comfortable with new people and situations. *Negative affectivity* refers to individual differences in the threshold, intensity, and recovery of negative emotions. Individuals with high negative affectivity are sensitive to negative environmental cues and prone to experience and dwell on intense negative feelings when, for example, confronted with disappointments. *Effortful*

Department of Psychology, University of Jyväskylä, Finland

Corresponding author:

Riikka Hirvonen, Department of Psychology, University of Jyväskylä, PO Box 35, Jyväskylä, 40014, Finland.
Email: riikka.e.hirvonen@jyu.fi

control refers to the self-regulative aspect of temperament (Rothbart et al., 2001). High effortful control enables individuals to direct and maintain attention and to control their behavioral and affective responses. Two other temperament dimensions have also been proposed. *Affiliativeness*, whose importance increases in early adolescence, involves concern for others and the desire for closeness with others (Ellis & Rothbart, 2001; Putnam et al., 2001). *Orienting sensitivity* refers to individual differences in perceptual and associative sensitivity to internal and external stimulation (Evans & Rothbart, 2007). The temperament scales used in this study included surgency, negative affectivity, and effortful control for both adolescents and their mothers, so the study focused on these three dimensions.

Analyzing only separate temperament dimensions disregards the fact that temperament dimensions are often highly inter-correlated and, thus, does not provide knowledge about the organization of these dimensions within individuals. Understanding temperament as constellations of various dimensions (Rothbart, 2011) calls for a person-oriented approach (Bergman, Magnusson, & El-Khoury, 2003) which enables grouping individuals by patterns of characteristics, as opposed to examining individual characteristics in isolation (see Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; van Leeuwen, de Fruyt, & Mervielde, 2004). An example of temperament typology is easy, difficult, and slow-to-warm-up temperaments defined by Thomas and Chess (1977) in their pioneering study on child temperament.

Similarly, research in the field of personality development has identified personality types using the Big Five personality traits. Three types found among children, adolescents, and adults in several studies are *resilient*, *undercontrolled*, and *overcontrolled* (e.g., Asendorpf et al., 2001; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Resilient individuals have relatively high extraversion, good social skills and self-regulation, and low negative emotionality (Asendorpf et al., 2001; van Leeuwen et al., 2004). The undercontrolled type is characterized by impulsivity, high extraversion, relatively low self-regulation, and unstable negative emotionality. Overcontrolled individuals tend to have relatively high negative emotionality, self-regulation, and social inhibition, as well as low extraversion.

Although these three types have been found in several studies, recent research has also identified alternative types. Researchers have described, for example, a *reserved* type with high self-regulation and low extraversion, openness, and negative emotionality (Grumm & von Collani, 2009; Kinnunen et al., 2012; Roth & von Collani, 2007); a *non-desirable* type with high negative emotionality and low extraversion, openness, and self-regulation (Grumm & von Collani, 2009; Rammstedt, Riemann, Angleitner, & Borkenau, 2004; Roth & von Collani, 2007); and a *confident* type with high extraversion and openness and moderately high self-regulation (Roth & von Collani, 2007). An *average* type (Kinnunen et al., 2012; Rammstedt et al., 2004) with average scores for all personality traits has also been described.

Although previous studies typically have examined typologies using the Big Five personality traits, it has been suggested that the typological approach can also be applied to temperament dimensions (Rothbart, 2011). Using parent ratings of surgency, negative affectivity, and effortful control, Komsis and colleagues (2006) identified the resilient, undercontrolled, and overcontrolled types among 5-year-old children, while Berry and Schwebel (2009) did the same among 6- to 9-year-old children. However, to the authors' knowledge, no studies using the typological approach with

temperamental effortful control, surgency, and negative affectivity have been carried out among adolescents.

Temperament and Socioemotional Functioning

Socioemotional functioning largely originates from individuals' interactions with their environments (Denham et al., 2009). Social and emotional competencies, or the abilities to comprehend, express, and react to one's own and others' emotions in socially appropriate ways, support the development of empathy and sympathy and thereby promote prosocial behavior. Prosociality refers to an individual's voluntary behavior that has positive outcomes for others independent of whether the behavior benefits the individual (Grusec, Davidov, & Lundell, 2002). Maladaptive socioemotional functioning, as evidenced in, for example, problems in emotion regulation, becomes visible in various problem behaviors. Externalizing problems have been suggested to result from emotion under-regulation, whereas internalizing problems are considered to be the result of emotion over-regulation (see Eisenberg, Fabes, Guthrie, & Reiser, 2000). Externalizing problems refer to difficulties with attention, self-regulation, and non-compliance and to norm-breaking, aggressive, hyperactive, and antisocial behavior (Achenbach, 1978). Internalizing problems refer to the emotional symptoms of depression and anxiety and to social withdrawal and self-consciousness (Achenbach, 1978).

Previous research has shown that the resilient, undercontrolled, and overcontrolled types are associated with different developmental outcomes in socioemotional adaptation. In studies among 10- to 15-year-olds, over- and undercontrolled types have consistently been linked to poor adaptation (Asendorpf et al., 2001; de Haan, Dekovic, Hart, Burock, London, Atkins, & Bonilla-Santiago, 2005; van den Akker, Stoltz, & Prinzie, 2013). Overcontrolled individuals tend to exhibit internalizing problems, and under-controlled persons show more externalizing problems. In a study among 10- to 12-year-old boys, the undercontrolled type was also associated with emotional problems and poor academic performance (Robins et al., 1996). In contrast, the resilient type generally has been found to be well adjusted (e.g., Asendorpf et al., 2001; Hart et al., 2005). There are fewer findings concerning the social and emotional outcomes of the other suggested types, but in a study on adult health, the average and reserved personality types reported average levels of subjective health (Kinnunen et al., 2012). In a study on college students, the non-desirable type was associated with the highest and the reserved type with the lowest level of aggression (Grumm & von Collani, 2009).

The relationship between adolescents' temperament and socioemotional functioning may also be affected by the fit between their temperament and their growth environment, which is described by the construct of goodness-of-fit (Thomas & Chess, 1977). No characteristic or a combination of characteristics is good or bad in and of itself, but different characteristics can have either positive or negative consequences for adolescents' adjustment depending on the environment in which they grow up (Thomas & Chess, 1977). Adolescents start to establish independence from their parents and form mature, meaningful relationships with their peers (Steinberg, 2001). Parents, however, still serve as important role models as adolescents build their identities, adjust to new roles and responsibilities, determine moral standards and values, and reflect on who they are and what they want to be (Denham et al., 2009). Given the major role of parents, the goodness-of-fit between adolescents'

characteristics and their parents' characteristics becomes relevant (see Kiff et al., 2011). Poor fit might expose adolescents and their parents to negative interactions and conflicts, which, in turn, increases the risk for adjustment problems (Sanson et al., 2004). Sensitive parenting and parental support, in contrast, can create a protective environment against the potentially harmful effects of adolescents' own characteristics (see Kiff et al., 2011; Sanson et al., 2004), resulting in a good fit between adolescents and the environment.

In numerous studies, especially those involving children, the child–parent goodness-of-fit has been conceptualized as the fit between child temperament and parenting (for a review, see Kiff et al., 2011; Sanson et al., 2004). For example, studies of 7- to 12-year-old children found that children's frustration or difficult temperament, combined with punitive parenting and a lack of emotional warmth, could result in depressive symptoms and negative affect (e.g., Oldehinkel, Veenstra, Ormel, De Winter, & Verhulst, 2006; Zarra-Nezhad, Aunola, Kiuru, Mullola, & Moazami-Goodarzi, 2015), while inhibited children benefited from maternal affection (e.g., Zarra-Nezhad et al., 2015).

So far, only a few studies have examined goodness-of-fit in respect to child–parent temperament and their effect on children's and adolescents' socioemotional functioning. Rettew, Stanger, McKee, Doyle, and Hudziak (2006) found that internalizing problems among 6- to 18-year-old children and adolescents were associated with a combination of high child and father harm avoidance. As well, low child novelty seeking combined with high mother harm avoidance predicted high externalizing problems, and high child persistence combined with high father persistence predicted low externalizing problems (Rettew et al., 2006). Moreover, studies focusing on outcomes other than socioemotional functioning have shown that early adolescents' and their parents' temperaments together contribute to, for example, the quality of adolescent–parent relations (e.g., Galambos & Turner, 1999). In conclusion, the joint effects of early adolescents' and parents' temperaments have not yet been widely studied, and more research on their role in the socioemotional functioning of this age group is needed.

The Present Study

The aim of the present study was to examine the roles played by early adolescents' and mothers' temperament types in early adolescents' maladaptive (emotional symptoms, conduct problems, and hyperactivity) and adaptive (prosociality) socioemotional functioning. Previous studies adopting a typological approach to temperament or personality have found inconsistent findings concerning the number and characterizations of different types (see Rammstedt et al., 2004; Roth & von Collani, 2007), so we could not formulate a hypothesis on the exact number of temperament types to be found. However, adolescents' temperament type(s) characterized by a low level of effortful control and moderate or high levels of negative emotionality (cf. undercontrolled or non-desirable temperament) were expected to be associated with high externalizing problems (conduct problems and hyperactivity). In contrast, temperament type(s) with high levels of negative emotionality and effortful control (cf. overcontrolled temperament) were expected to be related to high internalizing problems, that is, emotional symptoms (see de Haan et al., 2013; Hart et al., 2005; Robins et al., 1996). A temperament type with high levels of surgency/extraversion and effortful control and a low level of negative emotionality (cf. resilient

temperament) was expected to be associated with adaptive socioemotional functioning. The mixed findings and limited number of previous studies precluded setting strong hypotheses regarding the effects of maternal temperament or the combined effects of adolescent and maternal temperaments.

Method

Participants

The participants were involved in a larger longitudinal study (Ahonen & Kiuru, 2014). The sample of the present study consisted of 869 early adolescents (472 girls, 397 boys). The participants' age at the beginning of the study ranged from 10.83 to 14.75 years (mean = 12.29, standard deviation = 0.41). The mother tongue of 96% of the adolescents was Finnish, 2% were bilingual (Finnish and another language), and 2% spoke a language other than Finnish.

The adolescents' mothers were also asked to participate in the study. Responses were not received from 201 (23%) mothers. Adolescents whose mothers did not participate reported more conduct problems, higher hyperactivity, and lower effortful control than adolescents whose mothers did participate. However, the effect sizes of these differences were small (Cohen's $d = 0.21, 0.16, \text{ and } 0.18$, respectively).

Seventy-five percent of the families were nuclear families, 13% were single-parent families, 12% were blended families, and 1% were other types of families. Four percent of the participating mothers were not educated beyond nine years of basic education, 29% had completed upper secondary education, 40% had a bachelor or vocational college degree, and 27% had a master's degree or higher. The sample was fairly representative of the Finnish population. However, two-parent households (Official Statistics of Finland, 2016b) and mothers with a bachelor's degree or higher (Official Statistics of Finland, 2016a) were slightly overrepresented in the sample.

Parents' written consent was requested for their children's and their own participation. The larger longitudinal project was evaluated and approved by the ethics committee of the local university.

Procedures

Students' data were collected in the classrooms in the fall semester of Grade 6 during regular school days. Trained testers administered the questionnaires. Data on the mothers were collected through questionnaires at approximately the same time as the adolescents' data were collected.

Adolescents' Measures

Temperament. The adolescents evaluated their own temperament using the Finnish version of the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Capaldi & Rothbart, 1992; Ellis & Rothbart, 2001; Finnish translation by Katri Räikkönen-Talvitie). The EATQ-R consists of 65 statements assessed 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'm 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 effortful control, negative affectivity, affiliativeness, and surgency. The affiliativeness scale was not used in the present study. Mean scores for effortful control, negative

affectivity, and surgency were calculated. The Cronbach's alpha reliabilities of the scales were 0.79, 0.86, and 0.73, respectively. Information on the validity of the EATQ-R in the present sample can be found in Kiuru, et al. (2017).

Socioemotional functioning. The adolescents assessed their socioemotional functioning using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) with a scale of 0 (*not true*) to 2 (*certainly true*). The study included four subscales of the SDQ: hyperactivity; emotional symptoms; conduct problems; and prosociality. The original five items in each subscale were used, and after a pilot study, two items were added to the hyperactivity scale (e.g., "*It is difficult for me to finish what I start*"), three items to the conduct problems scale (e.g., "*I skip school or cut some classes*"), and one item to the prosociality scale ("*I try to be fair to others*") to improve the reliability of the subscales (the added items were adapted from similar subscales of the Child Behavior Checklist; Achenbach, 1991). Mean scores were calculated for the subscales. The Cronbach's alpha reliability was 0.70 for hyperactivity, 0.71 for emotional symptoms, 0.70 for conduct problems, and 0.72 for prosociality.

Mothers' Temperament

The mothers evaluated their temperament using a short form of the Adult Temperament Questionnaire – Revised (ATQ-R; Evans & Rothbart, 2007; Finnish translation by Katri Räikkönen-Talvitie). The short version consists of 77 statements assessed on a seven-point Likert scale (1 = *fits me very poorly*, 7 = *fits me very well*). The statements evaluate four temperamental scales: effortful control; negative affectivity; orienting sensitivity; and surgency/extraversion. The orienting sensitivity scale was not used in the present study. Mean scores for effortful control, negative affectivity, and surgency were calculated. The Cronbach's alpha reliabilities for the scales were 0.81, 0.84, and 0.76, respectively. Information on the validity of the ATQ-R for the present sample can be found in Kiuru et al. (2017).

Statistical Analyses

The adolescents' and mothers' temperament profiles were identified using latent profile analysis (LPA) in Mplus7.4 (Muthén & Muthén, 1998–2015). Before LPA was conducted, the adolescents' and mothers' scores for the temperament dimensions were standardized. Subgroups with different means and variances of effortful control, negative affectivity, and surgency were identified by LPA with maximum likelihood estimation with robust standard errors. Due to the hierarchical structure of the data (students nested within classrooms and schools), intraclass correlation coefficients (ICC) were calculated for the study variables. The ICCs ranged from 0.001 to 0.05 and the respective design effects from 1.01 to 1.69, which can be considered low or modest (Muthén & Satorra, 1995). Nevertheless, the stratification and non-independence of observations were taken into account by using the COMPLEX option (Muthén & Muthén, 1998–2015). The number of latent classes was decided by considering the model fit (Akaike information criterion (AIC), Bayesian information criterion (BIC), and adjusted Bayesian information criterion (aBIC) values, entropy values, Vuong–Lo–Mendell–Rubin (VLMR) and Lo–Mendell–Rubin Adjusted (LMR)

likelihood ratio test statistics), the average latent class probabilities of class membership, and theoretical meaningfulness of the classes.

After the temperament profiles were extracted, the analysis was continued by assigning each participant to the latent class with the highest posterior probability. The socioemotional functioning of adolescents was then compared across the classes by conducting analyses of variance in IBM SPSS Statistics 24. The analyses controlled for the effect of the adolescents' gender.

Results

Descriptive Statistics

The means, standard deviations, and correlations between the study variables are reported separately for girls and boys in Table 1. Girls reported slightly higher negative affectivity than boys (Cohen's $d = 0.19$), whereas boys reported significantly higher surgency than girls (Cohen's $d = 0.64$). There were no gender differences in effortful control. Girls reported higher prosociality (Cohen's $d = 0.51$) and more emotional symptoms (Cohen's $d = 0.41$) than boys. In contrast, boys reported more conduct problems (Cohen's $d = 0.41$) and slightly higher hyperactivity (Cohen's $d = 0.16$) than girls.

Adolescents' and Mothers' Temperament Types

To identify the adolescents' and mothers' temperament types, separate LPAs were conducted. The model fit indices and class sizes of the one- to six-class solutions are presented in Table 2. Among the adolescents, the BIC values indicated that the four-class solution was superior to other solutions. Based on Monte Carlo simulation studies, BIC value has been suggested to be the most reliable criteria for deciding the number of latent classes (Nylund, Asparouhov, & Muthén, 2007; Tolvanen, 2007). Also, according to the LMR and VLMR test statistics, the four-class solution was better than the three-class solution. However, the test statistics and entropy values suggested that the five-class model had even better fit with the data than the four-class model. This was supported by the AIC and aBIC values that kept decreasing even for solutions with more than six classes. The final decision regarding the number of classes was based on the theoretical meaningfulness and usefulness of the latent classes. In the five- and six-class solutions, one or two classes were small, which was considered problematic for further analyses. The two small classes did not advance interpretation of the content compared to the other four profiles. Therefore, the five- and six-class solutions were rejected, and the four-class solution was chosen. In this solution, the average individual posterior probabilities of being assigned to a specific latent class ranged from 0.75 to 0.81.

Among the mothers, the BIC value supported the three-class solution, although the LMR and VLMR tests suggested it was not significantly better than the two-class solution. For the four-, five-, and six-class solutions, the entropy values kept increasing and the AIC and aBIC values decreasing, but some classes in these solutions were very small. Consequently, the more parsimonious three-class solution was chosen. In this solution, the average individual posterior probabilities of being assigned to a specific latent class ranged from 0.79 to 0.83.

The profiles of the final four classes for adolescents and three classes for mothers are presented in Figure 1. Among both

Table 1. Descriptive Statistics and Intercorrelations of the Study Measures for Girls (Below the Diagonal) and Boys (Above the Diagonal).

	1	2	3	4	5	6	7	8	9	10	Range	Mean (M)	Standard deviation (SD)
Adolescents													
1. Effortful control ¹		0.08	-0.46***	-0.43***	-0.35***	-0.57***	0.36***	0.17**	0.01	-0.14*	-3.12-3.00	-0.06	1.01
2. Surgency ¹	0.05		-0.35***	-0.02	-0.27***	-0.15**	0.11*	0.01	0.11	-0.02	-2.06-2.63	0.33	0.91
3. Negative affectivity ¹	-0.47***	-0.25***		0.40***	0.46***	0.44***	-0.20***	-0.08	0.01	0.08	-2.58-3.27	-0.10	0.97
4. Conduct problems	-0.44***	0.06	0.43***		0.58***	0.60***	-0.26***	-0.10	0.03	0.03	0.00-1.88	0.29	0.30
5. Emotional symptoms	-0.30***	-0.33***	0.53***	0.45***		0.50***	-0.05	-0.05	-0.03	-0.03	0.00-2.00	0.36	0.39
6. Hyperactivity	-0.59***	-0.07	0.46***	0.55***	0.44***		-0.31***	-0.08	0.04	0.03	0.00-1.71	0.52	0.35
7. Prosociality	0.37***	0.15**	-0.22***	-0.28***	-0.14**	-0.29***		0.09	0.09	-0.11	0.20-2.00	1.38	0.37
Mothers													
8. Effortful control ¹	0.17**	0.04	-0.19***	-0.14**	-0.13*	-0.11*	0.11*		0.22***	-0.54***	-3.14-2.08	-0.06	0.95
9. Surgency ¹	0.11*	-0.00	-0.05	-0.00	-0.08	-0.04	0.09	0.21***		-0.35***	-2.83-2.49	-0.05	0.95
10. Negative affectivity ¹	-0.05	0.02	0.11*	0.02	0.11*	-0.03	-0.04	-0.54***	-0.37***		-2.57-2.96	0.07	0.96
Range	-3.00-3.12	-3.69-2.30	-2.67-3.10	0.00-1.50	0.00-2.00	0.00-2.00	0.00-2.00	0.00-2.00	-4.25-2.24	-4.05-2.66	-3.43-3.59		
M	0.05	-0.28	0.09	0.18	0.53	0.47	1.56	0.05	0.04	-0.06			
SD	0.99	0.99	1.02	0.22	0.43	0.31	0.33	1.04	1.04	1.03			

Notes: $n = 472$ for girls; $n = 394$ for boys. ¹ The variables are standardized to the mean and standard deviation of the whole sample. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

adolescents and mothers, the classes significantly differed in all criteria variables (see Table 3).

Adolescents' temperament types. The first class, characterized by higher-than-average scores for effortful control and surgency and less-than-average scores for negative affectivity, was labeled the *resilient* type (12.9% of adolescents). The second class, with average scores for all three temperament dimensions, was named the *average* type (45.0%). The third class, with higher-than-average scores for effortful control, average scores for negative affectivity, and slightly less-than-average scores for surgency, was labeled the *reserved* type (18.1%). The fourth class, with higher-than-average scores for negative affectivity and less-than-average scores for effortful control and surgency, was named the *mixed* type (23.9%). Girls were overrepresented in the reserved type (adjusted residual = 4.2), while boys were overrepresented in the resilient (adjusted residual = 3.5) and average types (adjusted residual = 2.5) ($\chi^2(3) = 31.01, p < 0.001$).

Mothers' temperament types. The first class of mothers, characterized by higher-than-average scores in effortful control and surgency and less-than-average scores in negative affectivity, was labeled the *resilient* type (25.0% of mothers). The second class, with average scores in all three temperament dimensions, was named the *average* type (55.2%). The third class, with higher-than-average scores in negative affectivity and less-than-average scores in effortful control and surgency, was labeled the *mixed* type (19.8%).

Associations Between Temperament Types and Adolescents' Socioemotional Functioning

Mean level differences in adolescents' socioemotional functioning were first analyzed separately for adolescents' and mothers' temperament types. Adolescents' temperament type significantly explained inter-individual differences in conduct problems ($F(3,860) = 56.81, p < 0.001$; partial $\eta^2 = 0.17$), emotional symptoms ($F(3,860) = 66.26, p < 0.001$; partial $\eta^2 = 0.19$), hyperactivity ($F(3,860) = 106.11, p < 0.001$; partial $\eta^2 = 0.27$), and prosociality ($F(3,860) = 25.46, p < 0.001$; partial $\eta^2 = 0.08$). Adolescents with a mixed temperament type reported more emotional symptoms, conduct, and hyperactivity problems than the average, resilient, and reserved types, and the average type reported more of these problems in comparison with the resilient and reserved types. In emotional symptoms, also the reserved type reported more symptoms than the resilient type. Finally, adolescents with a mixed temperament reported lower prosociality in comparison with all other types and adolescents with an average temperament also reported lower prosociality than the resilient and reserved types.

Mothers' temperament type was not significantly related to adolescents' conduct problems or emotional symptoms, but it was marginally related to hyperactivity ($F(2,661) = 2.45, p = 0.09$; partial $\eta^2 = 0.01$) and prosociality ($F(2,661) = 2.93, p = 0.05$; partial $\eta^2 = 0.01$). Adolescents of resilient mothers reported slightly less hyperactivity than adolescents of mothers with an average temperament and slightly more prosociality than adolescents of mothers with a mixed temperament.

To examine the combined role of adolescents' and mothers' temperaments, each adolescent-mother dyad was first grouped

Table 2. Comparisons of Latent Profile Analyses with 1 to 6 Classes for Adolescents ($n = 866$) and Mothers ($n = 668$), with Selected Solutions in Boldface Type.

Number of classes	Log L	AIC	BIC	aBIC	LMR (p value)	VLMR (p value)	Entropy	Class 1 n	Class 2 n	Class 3 n	Class 4 n	Class 5 n	Class 6 n
Adolescents													
1	-3684.90	7381.80	7410.39	7391.33	n/a	n/a	n/a	866					
2	-3585.04	7196.08	7258.01	7216.73	0.23	0.22	0.59	258	608				
3	-3550.07	7140.15	7235.42	7171.91	0.18	0.18	0.59	515	138	213			
4	-3517.73	7089.46	7218.08	7132.34	0.02	0.02	0.61	390	207	112	157		
5	-3496.37	7060.73	7222.71	7114.73	0.03	0.03	0.66	266	126	60	305	109	
6	-3479.71	7041.42	7236.74	7106.54	0.16	0.15	0.69	140	265	100	296	61	4
Mothers													
1	-2842.05	5696.10	5723.13	5704.08	n/a	n/a	n/a	668					
2	-2719.57	5465.15	5523.70	5482.43	0.001	0.001	0.59	366	302				
3	-2679.98	5399.95	5490.04	5426.54	0.17	0.17	0.58	132	369	167			
4	-2659.65	5373.30	5494.91	5409.19	0.14	0.13	0.71	315	232	21	100		
5	-2644.24	5356.48	5509.62	5401.67	0.26	0.25	0.75	21	313	2	101	231	
6	-2628.14	5338.28	5522.95	5392.78	0.40	0.39	0.75	9	122	270	248	17	2

Notes: Log L = log likelihood value; AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = adjusted Bayesian information criterion; LMR = Lo-Mendell-Rubin adjusted likelihood ratio test; VLMR = Vuong-Lo-Mendell-Rubin likelihood ratio test; n/a = not applicable.

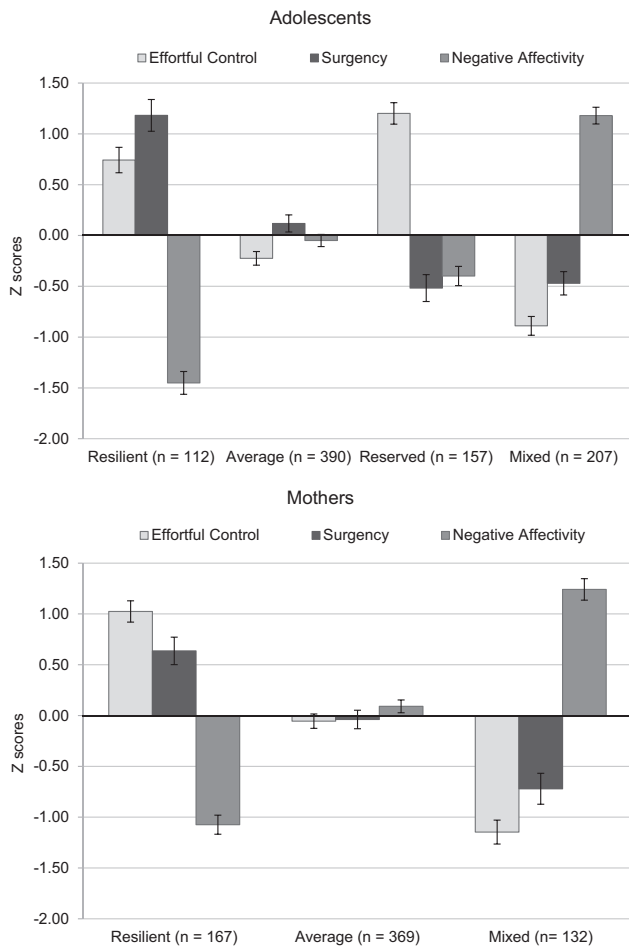


Figure 1. Estimated means and 95% confidence intervals for latent classes identified by latent profile analysis among adolescents (top) and mothers (bottom).

based on the combination of their temperament types. The four adolescent temperament types and three mother temperament types formed 12 combinations. The results for analyzing mean level differences between these groups in adolescents' socioemotional functioning are presented in Table 4. The results remained similar in additional analyses controlling for mothers' age and education.

Conduct problems. Compared to adolescents with a mixed temperament, fewer conduct problems were reported among resilient adolescents whose mothers had resilient or average temperaments, average adolescents whose mothers had a mixed temperament, and reserved adolescents regardless of their mothers' temperament. Resilient adolescents whose mothers had an average temperament also reported fewer problems than adolescents who had an average temperament along with their mothers. Resilient adolescents with mothers with a mixed temperament reported fewer conduct problems than adolescents with a mixed temperament and resilient mothers. Average adolescents with resilient or average mothers reported fewer problems than adolescents who had a mixed temperament and a resilient or average mother.

Emotional symptoms. Regardless of the mothers' temperament type, adolescents with resilient or average temperaments reported fewer emotional symptoms than adolescents with a mixed temperament. Also, reserved adolescents whose mothers had resilient or average temperaments reported fewer emotional symptoms than adolescents with a mixed temperament. Reserved adolescents whose mothers had a mixed temperament reported fewer symptoms only in comparison with adolescents with a mixed temperament and a resilient mother. In addition, resilient adolescents whose mothers had an average temperament reported fewer emotional symptoms than adolescents who had an average temperament along with their mothers. Adolescents who had a mixed temperament and whose mothers had an average temperament also reported fewer symptoms than adolescents who had a mixed temperament and whose mothers had a resilient temperament.

Table 3. Means (*M*) and Standard Deviations (*SD*) of Standardized Temperament Variables as a Function of the Classes Identified by Latent Profile Analysis.

	Resilient <i>M</i> (<i>SD</i>)	Average <i>M</i> (<i>SD</i>)	Mixed <i>M</i> (<i>SD</i>)	Reserved <i>M</i> (<i>SD</i>)	<i>F</i>	Partial η^2
<i>Adolescents</i>					<i>F</i> (3, 862)	
Effortful control	0.74 ^a (1.13) [0.62, 0.87]	-0.22 ^b (0.51) [-0.29, -0.16]	-0.89 ^c (0.78) [-0.98, -0.80]	1.20 ^d (0.43) [1.10, 1.31]	344.60***	0.55
Surgency	1.18 ^a (0.61) [1.03, 1.34]	0.12 ^b (0.77) [0.04, 0.20]	-0.47 ^c (1.06) [-0.59, -0.36]	-0.52 ^c (0.86) [-0.65, -0.39]	116.63***	0.29
Negative affectivity	-1.45 ^a (0.51) [-1.56, -1.34]	-0.05 ^b (0.50) [-0.11, 0.01]	1.18 ^c (0.65) [1.10, 1.26]	-0.40 ^d (0.81) [-0.49, -0.30]	500.73***	0.64
<i>Mothers</i>					<i>F</i> (2, 665)	
Effortful control	1.03 ^a (0.57) [0.92, 1.13]	-0.05 ^b (0.64) [-0.13, 0.02]	-1.15 ^c (0.94) [-1.26, -1.03]		366.51***	0.52
Surgency	0.64 ^a (0.73) [0.50, 0.77]	-0.03 ^b (0.84) [-0.13, 0.05]	-0.72 ^c (1.18) [-0.87, -0.57]		85.67***	0.21
Negative affectivity	-1.07 ^a (0.61) [-1.17, -0.98]	0.09 ^b (0.56) [0.03, 0.15]	1.24 ^c (0.77) [1.14, 1.35]		521.02***	0.61

Notes: *n* = 866 for adolescents; *n* = 668 for mothers. 95% confidence intervals are reported in brackets. Means in a row with the same superscript are not significantly different at the level of *p* < 0.05 (Tamhane's T2 adjustment was used because the variances were not equal across the groups).

*** *p* < 0.001.

Hyperactivity. Regardless of the mothers' temperament, the resilient and reserved adolescents reported lower hyperactivity than adolescents with a mixed temperament. Compared to adolescents with an average temperament, less hyperactivity was also reported among resilient adolescents whose mothers had an average temperament and among reserved adolescents whose mothers had an average or mixed temperament. Resilient and reserved adolescents with resilient mothers reported less hyperactivity than adolescents with an average temperament along with their mothers. Finally, adolescents with an average temperament reported lower hyperactivity than adolescents who had a mixed temperament and whose mothers had resilient or average temperaments.

Prosociality. Resilient adolescents with resilient mothers and reserved adolescents with resilient or average mothers reported higher prosociality than adolescents with a mixed temperament whose mothers had average or mixed temperaments and adolescents with an average temperament whose mothers had a mixed temperament. Resilient adolescents whose mothers had average or mixed temperaments and reserved adolescents whose mothers had a mixed temperament reported being more prosocial than adolescents with a mixed temperament along with their mothers. Average adolescents with resilient or average mothers and adolescents with a mixed temperament and resilient mothers did not differ from the other groups.

Discussion

The aim of the study was to examine how the temperament types of early adolescents and their mothers are related to the adolescents' socioemotional functioning. Resilient, average, and mixed temperament types were identified among both the adolescents and mothers. A fourth group with a reserved temperament was also identified among the adolescents. As hypothesized, adolescents with resilient or reserved temperaments reported more prosociality and fewer emotional symptoms, conduct and hyperactivity problems than adolescents with a mixed temperament. Adolescents with an average temperament type reported average levels of socioemotional functioning. Adolescents with resilient or reserved

temperaments achieved the best outcomes in socioemotional functioning if their mothers had resilient or average temperaments. Adolescents with a mixed temperament reported fewer conduct problems and emotional symptoms and less hyperactivity if they had mothers with mixed or average temperaments. However, in prosocial behavior these adolescents had the best outcomes with a resilient mother.

The adolescents' and mothers' temperament types found in the present study resemble personality and temperament types identified in previous studies. The resilient groups showed an expected pattern of characteristics similar to those previously found with different age groups: high effortful control; high surgency; and low negative affectivity (e.g., Asendorpf et al., 2001; Berry & Schwebel, 2009; Komi et al., 2006). A personality type similar to the mixed type, characterized by low effortful control, high negative affectivity, and relatively low surgency, has also been previously identified, especially among adult populations (Grumm & von Collani, 2009; Rammstedt et al., 2004; Roth & von Collani, 2007). In previous studies, this type has been labelled non-desirable because it combines the least favorable aspects of the overcontrolled and undercontrolled types (Roth & von Collani, 2007). It has also been described as an anti-type of the resilient type (Roth & von Collani, 2007).

In addition, a large number of both adolescents and mothers were identified as having average temperaments characterized by average levels of effortful control, surgency, and negative affectivity. Previous research has found groups with similar non-distinctive personality profiles, for example, among Finnish (Kinnunen et al., 2012) and German adults (Rammstedt et al., 2004). Finally, a fourth temperament profile was identified among the adolescents. This reserved group, with high effortful control and low surgency, resembled groups labelled as overcontrolled in previous studies. Overcontrolled individuals, though, generally have exhibited a high level of negative affectivity (e.g., Asendorpf et al., 2001; van Leeuwen et al., 2004), whereas the reserved adolescents in this study reported low negative affectivity. A similar group of individuals was previously identified among Finnish adults using the Big Five personality scale (Kinnunen et al., 2012).

The results further showed that the adolescents' temperament type contributed to their socioemotional functioning. In line with

Table 4. Mean Level Differences in Adolescents' Socioemotional Functioning (Estimated Marginal Means (M)) Between the Adolescent–Mother Temperament Types, Controlling for Adolescents' Gender.

	Adolescent–mother temperament types												Partial η^2		
	Resilient		Resilient		Average		Reserved		Reserved		Mixed				
	M	[95% CI]	M	[95% CI]	M	[95% CI]	M	[95% CI]	M	[95% CI]	M	[95% CI]			
Conduct problems	0.13 ^{a,b}	[0.04, 0.22]	0.21 ^{a,b,c,d}	[0.09, 0.33]	0.17 ^{a,b}	[0.11, 0.23]	0.10 ^{a,b}	[0.03, 0.17]	0.12 ^{a,b}	[0.06, 0.18]	0.11 ^{a,b}	[0.01, 0.20]	0.38 ^{d,e}	[0.33, 0.43]	0.17
Emotional symptoms	0.22 ^{a,b}	[0.04, 0.17]	0.16 ^{a,b}	[0.09, 0.33]	0.43 ^b	[0.20, 0.27]	0.38 ^{a,b}	[0.03, 0.17]	0.30 ^{a,b}	[0.06, 0.18]	0.50 ^{a,b,c}	[0.01, 0.20]	0.64 ^c	[0.33, 0.43]	0.19
Hyperactivity	0.29 ^{a,b}	[0.08, 0.36]	0.31 ^{a,b,c}	[–0.03, 0.35]	0.48 ^{b,c,d}	[0.23, 0.40]	0.31 ^{a,b}	[0.27, 0.49]	0.29 ^a	[0.20, 0.39]	0.24 ^a	[0.36, 0.65]	0.78 ^e	[0.56, 0.71]	0.26
Prosociality	1.65 ^a	[0.19, 0.40]	1.68 ^{a,b}	[0.17, 0.45]	1.45 ^{a,b,c}	[0.47, 0.55]	1.62 ^a	[0.40, 0.53]	1.62 ^a	[0.22, 0.37]	1.60 ^{a,b}	[0.12, 0.35]	1.37 ^{b,c}	[0.69, 0.80]	0.09
	0.19, 0.40]	[0.20, 0.36]	[0.17, 0.45]	[0.40, 0.53]	[0.47, 0.55]	[0.40, 0.55]	[0.22, 0.39]	[0.22, 0.37]	[0.12, 0.35]	[0.67, 0.89]	[0.69, 0.80]	[0.56, 0.75]	[0.69, 0.80]	[0.56, 0.75]	

Note: Means in a row with the same superscript are not significantly different at the level of $p < 0.05$ (Bonferroni adjustment was used).
 *** $p < 0.001$.

the hypothesis, adolescents with resilient or reserved temperaments showed the most adaptive socioemotional functioning. They reported significantly less hyperactivity, fewer emotional symptoms and conduct problems, and greater prosociality than the most non-adaptive adolescents with a mixed temperament. These results suggest that the adolescents with resilient or reserved temperaments benefited from their high level of effortful control and low level of negative affectivity compared to their peers with lower effortful control and higher negative affectivity (see also Muris, Meesters, & Blijlevens, 2007; Zhou, Main, & Wang, 2010). In previous studies, especially the resilient type has been associated less frequently with psychological and social problems than the over- and undercontrolled types (e.g., Asendorpf et al., 2001; Hart et al., 2005). In the present study, the reserved type was found to be equally adaptive as the resilient type. Notably, the most prominent difference in the resilient and reserved temperament profiles was in the level of surgency: resilient adolescents had higher-than-average surgency, and reserved adolescents less-than-average surgency. These results suggest that, when adolescents have temperaments characterized by an adaptive pattern of high effortful control and low negative affectivity, the level of their temperamental surgency does not uniquely contribute to their socioemotional functioning.

In contrast to the resilient and reserved temperaments, the mixed temperament was found to be the most maladaptive. Adolescents with this type of temperament reported the most conduct problems, hyperactivity, and emotional symptoms and least prosocial behavior. These results support the hypothesis and are in line with previous findings showing that high temperamental negative affectivity is associated with high internalizing and externalizing problem behaviors (e.g., Ormel et al., 2005; Zhou et al., 2010), especially when accompanied by low effortful control (Eisenberg et al., 2000; Muris et al., 2007). Individuals with a mixed temperament who express intense, negative feelings and do not have the self-regulative ability to control these emotional reactions can have difficulty behaving according to social norms and thus face problems in their social interactions. It is also possible that, due to high negative affectivity, adolescents with a mixed temperament might be more likely to make negatively loaded self-appraisals (see Watson & Clark, 1984) and report more socioemotional symptoms than other adolescents.

Adolescents with an average temperament, in turn, reported intermediate levels of socioemotional functioning. It should be noted that the average group had average scores in each temperament dimension, and compared to them, the other temperament profiles can be considered to possess extreme levels in one or several dimensions. Unsurprisingly then, the adolescents with an average temperament had intermediate levels of emotional symptoms, conduct problems, hyperactivity, and prosocial behavior. For example, an average level of effortful control may enable adolescents to satisfactorily control their behavior and reactions, supporting their social functioning, despite their average level of negative affectivity (see Eisenberg et al., 2000).

Furthermore, the results showed that the most adaptive adolescent–mother temperament combinations were between adolescents with resilient or reserved temperaments and mothers with resilient or average temperaments. These adolescents reported fewer emotional symptoms, conduct, and hyperactivity problems than adolescents with a mixed temperament and reported somewhat fewer problems than adolescents with an average temperament. In contrast, when combined with mothers with mixed temperaments, resilient adolescents reported as many conduct problems

and reserved adolescents as many emotional symptoms as adolescents with mixed temperaments whose mothers had average or mixed temperaments. Parents' ability to express their emotions creates the emotional environment in which adolescents develop, influencing adolescents' ability to interpret and express their emotions (Denham et al., 2009). A mother who sets an example of unregulated behavior and expression of negative emotions (as may be the case for mothers with mixed temperaments characterized by low effortful control and high negative affectivity) may give adolescents a false impression of socially appropriate or effective ways of behaving and expressing emotions (see Eisenberg et al., 2001). This situation can be seen to illustrate a poor fit between the adolescents and their mothers (Sanson et al., 2004), as it may lead resilient and reserved adolescents to not use their self-regulation abilities as efficiently as they could if their mothers set models of positive expressivity and well-regulated behavior.

Interestingly, unlike resilient and reserved adolescents, adolescents with a mixed temperament benefited from having mothers with mixed or average temperaments rather than mothers with resilient temperaments. This result contradicts the assumption that having a mother who sets examples of good self-regulation and positive affect helps adolescents prone to high negative affectivity and lacking self-regulative abilities learn to regulate their responses in social situations (see Eisenberg et al., 2001). The finding, however, does align with the above-discussed result among the resilient adolescents: just as having a mother with a mixed temperament was least favorable for adolescents with resilient temperaments, adolescents with mixed temperaments did not benefit from having a resilient mother. Adolescents with mixed temperaments and mothers with resilient temperaments had almost mirror-image profiles in effortful control, surgency, and negative affectivity (a reason why the mixed type has been called a resilient anti-type; Roth & van Collani, 2007). These differences might cause conflicts between adolescents and their mothers as a result of a poor fit between their temperaments (Sanson et al., 2004). Consequently, in internalizing and externalizing problems, adolescents with mixed temperaments seemed to benefit from having mothers more similar in self-regulation and expression of negative affect resulting in a better fit between the adolescents and their mothers. In prosocial behavior, however, adolescents with mixed temperaments did benefit from resilient mothers. Adolescents with mixed temperaments were low in surgency, so their prosocial behavior was supported by more extraverted mothers.

The present study also provides practical implications for parents and educators. Although adolescents' temperament was found to make a difference in their socioemotional functioning, it should not be viewed as the only factor determining their course of development. Parents and other significant adults also have important roles in the development of children's and adolescents' social and emotional competencies (see Denham et al., 2009). These adults can create a supportive environment that acts as a protecting factor against the risks for maladaptive socioemotional functioning generated by children's or adolescents' own characteristics (Sanson et al., 2004). For example, to an adolescent with low self-control and high negative emotionality, adults can give guidance and, with their own actions, show an example of how to regulate one's attention, behavior, and negative emotions. Furthermore, it is useful for parents to recognize and be conscious of the possible problems that adolescents' and their own characteristics might introduce in their interactions (see Kiff et al., 2011; Sanson et al., 2004). It is important to remember that parents' and adolescents' characteristics contribute

equally to their interactions (Kiff et al., 2011), and both can learn from each other and supplement each other's characteristics.

Some limitations need to be considered when interpreting the results. First, only the mothers' temperament was examined. In future, it would be important to examine the goodness-of-fit between adolescents and their environment in relation to both parents and other significant persons in their social environment. Second, although mothers rated their own temperament, the adolescents' temperament and socioemotional functioning were assessed by adolescent ratings, which could cause some common method bias. Third, the adolescents whose mothers participated in the study reported higher effortful control and fewer externalizing problems than the adolescents whose mothers did not participate, which may have weakened the associations between the study variables. The study sample was also somewhat biased in family type and mothers' education, which should be taken into account when generalizing the findings. Finally, adolescents' socioemotional functioning was examined at one time point only. In future, it would be important to study to what extent adolescents' and mothers' temperaments relate to the changes in socioemotional functioning in adolescence.

In conclusion, the results of this study showed that early adolescents' and their mothers' temperaments play roles in adolescents' socioemotional functioning. Regarding internalizing problems (emotional symptoms) and externalizing problems (conduct problems and hyperactivity), the most adaptive temperament types among adolescents were the resilient and reserved types, especially when combined with mothers with resilient or average temperaments. Adolescents with a mixed temperament showed the highest level of internalizing and externalizing problems but benefited from mothers with temperaments not too different from theirs. These results emphasize the benefits of the ability to regulate one's emotional and behavioral reactions and the importance of the goodness-of-fit between adolescents' and their mothers' temperaments to the adolescents' socioemotional development. The findings further showed that adolescents with resilient or reserved temperaments were the most adaptive also in prosocial behavior, whereas adolescents with a mixed temperament along with their mothers displayed the lowest levels of prosociality. These results suggest that the combination of high effortful control and low negative affectivity is essential for prosocial behavior, perhaps even more so than high surgency. Moreover, the prosociality of an adolescent with a mixed temperament might be undermined by a mother who also has high negative affectivity and low effortful control and surgency.

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References

- Achenbach, T. (1978). The child behavior profile: I. Boys aged 6–11. *Journal of Consulting and Clinical Psychology, 46*(3), 478–488.
- Achenbach, T. (1991). *Manual for the Child Behavior Checklist/4–18 and 1991 profile*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Ahonen, T., & Kiuru, N. (2014). The Stairway Study - From Primary School to Secondary School [Unpublished data set]. University of Jyväskylä, Finland.
- Asendorpf, J. B., Borkenau, P., Ostendorf, F., & Van Aken, M. A. G. (2001). Carving personality description at its joints: Confirmation of three replicable personality prototypes for both children and adults. *European Journal of Personality, 15*(3), 169–198.
- Bergman, L. R., Magnusson, D., & El-Khoury, B. M. (2003). *Studying individual development in an interindividual context: A person-oriented approach*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Berry, J. W., & Schwebel, D. C. (2009). Configural approaches to temperament assessment: Implications for predicting risk of unintentional injury in children. *Journal of Personality, 77*(5), 1381–1410.
- 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.
- de Haan, A. D., Dekovic, M., van den Akker, A. L., Stoltz, S. E. M. J., & Prinzie, P. (2013). Developmental personality types from childhood to adolescence: Associations with parenting and adjustment. *Child Development, 84*(6), 2015–2030.
- 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 and Community Health, 63*(Supplement 1), i37–i52.
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: Their role in predicting quality of social functioning. *Journal of Personality and Social Psychology, 78*(1), 136–157.
- Eisenberg, N., Gershoff, E. T., Fabes, R. A., Shepard, S. A., Cumberland, A. J., Losoya, S. H., . . . Murphy, B. C. (2001). Mother's emotional expressivity and children's behavior problems and social competence: Mediation through children's regulation. *Developmental Psychology, 37*(4), 475–490.
- Ellis, L. K., & Rothbart, M. K. (2001). *Revision of the Early Adolescent Temperament Questionnaire*. Poster presented at the 2001 Biennial Meeting of the Society for Research in Child Development, Minneapolis, MN. Retrieved from <http://www.bowdoin.edu/~sputnam/rothbart-temperament-questionnaires/pdf/lesa-ellis-srcd-poster-reprint.pdf>
- Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*, 868–888.
- Galambos, N. L., & Turner, P. K. (1999). Parent and adolescent temperaments and the quality of parent-adolescent relations. *Merrill-Palmer Quarterly, 45*(3), 493–511.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*(5), 581–586.
- Grumm, M., & von Collani, G. (2009). Personality types and self-reported aggressiveness. *Personality and Individual Differences, 47*(8), 845–850.
- Grusec, J., Davidov, M., & Lundell, L. (2002). Prosocial and helping behavior. In P. K. Smith & C. H. Hart (Eds.), *The Blackwell handbook of childhood social development* (pp. 457–474). Oxford, UK: Blackwell.
- Hart, D., Burock, D., London, B., Atkins, R., & Bonilla-Santiago, G. (2005). The relation of personality types to physiological, behavioural, and cognitive processes. *European Journal of Personality, 19*(5), 391–407.
- Kiuru, N., Hirvonen, R., & Ahonen, T. (2017). *Assessing temperament among Finnish early adolescents and their parents: Do adolescents' and their parents share similar temperaments?* Manuscript submitted for publication.

- Kiff, C. J., Lengua, L. J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review, 13*, 251–301.
- Kinnunen, M.-L., Metsäpelto, R.-L., Feldt, T., Kokko, K., Tolvanen, A., Kinnunen, U., . . . Pulkkinen, L. (2012). Personality profiles and health: Longitudinal evidence among Finnish adults. *Scandinavian Journal of Psychology, 53*(6), 512–522.
- Komsi, N., Räikkönen, K., Pesonen, A., Heinonen, K., Keskivaara, P., Järvenpää, A., & Strandberg, T. E. (2006). Continuity of temperament from infancy to middle childhood. *Infant Behavior and Development, 29*(4), 494–508.
- 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.
- Muthén, L., & Muthén, B. (1998-2015). *Mplus user's guide*. 7th edition. Los Angeles, CA: Muthén & Muthén.
- Muthén, B., & Satorra, A. (1995). Complex sample data in structural equation modeling. *Sociological Methodology, 25*, 267–316.
- Nylund, K. L., Asparouhov, T., & Muthén, B. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14*(4), 535–569.
- Official Statistics of Finland. (2016a). *Educational structure of population* (e-publication). Helsinki, Finland: Statistics Finland. Retrieved from www.stat.fi/til/vkour/2014/vkour_2014_2015-11-05_tie_001_en.html
- Official Statistics of Finland. (2016b). *Families. Appendix Table 3: Families with underage children by type in 1950–2014* (e-publication). Helsinki, Finland: Statistics Finland. Retrieved from www.stat.fi/til/perh/2014/perh_2014_2015-05-28_tau_003_en.html
- Oldehinkel, A. J., Veenstra, R., Ormel, J., De Winter, A. F., & Verhulst, F. C. (2006). Temperament, parenting, and depressive symptoms in a population sample of preadolescents. *Journal of Child Psychology and Psychiatry, 47*(7), 684–695.
- Ormel, J., Oldehinkel, A. J., Ferdinand, R. F., Hartman, C. A., De Winter, A. F., Veenstra, R., . . . Verhulst, F. C. (2005). Internalizing and externalizing problems in adolescence: General and dimension-specific effects of familial loadings and preadolescent temperament traits. *Psychological Medicine, 35*(12), 1825–1835.
- 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.
- Rammstedt, B., Riemann, R., Angleitner, A., & Borkenau, P. (2004). Resilients, overcontrollers, and undercontrollers: The replicability of the three personality prototypes across informants. *European Journal of Personality, 18*(1), 1–14.
- Rettew, D. C., Stanger, C., McKee, L., Doyle, A., & Hudziak, J. J. (2006). Interactions between child and parent temperament and child behavior problems. *Comprehensive Psychiatry, 47*, 412–420.
- Robins, R. W., John, O. P., Caspi, A., Moffitt, T. E., & Stouthamer-Loeber, M. (1996). Resilient, overcontrolled, and undercontrolled boys: Three replicable personality types. *Journal of Personality and Social Psychology, 70*(1), 157–171.
- Roth, M., & von Collani, G. (2007). A head-to-head comparison of Big-Five types and traits in the prediction of social attitudes: Further evidence for a five-cluster typology. *Journal of Individual Differences, 28*(3), 138–149.
- Rothbart, M. K. (2011). *Becoming who we are: Temperament and personality in development*. New York, NY: Guilford Press.
- 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.
- Sanson, A., Hemphill, S. A., & Smart, D. (2004). Connections between temperament and social development: A review. *Social Development, 13*(1), 142–170.
- Steinberg, L. (2001). We know some things: Parent-adolescent relationships in retrospect and prospect. *Journal of Research on Adolescence, 11*(1), 1–19.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. New York, NY: Brunner/Mazel.
- Tolvanen, A. (2007). *Latent growth mixture modeling: A simulation study*. Doctoral dissertation, University of Jyväskylä, Finland. Retrieved from <http://urn.fi/URN:ISBN:951-39-2971-8>
- van Leeuwen, K., de Fruyt, F., & Mervielde, I. (2004). A longitudinal study of the utility of the resilient, overcontrolled, and undercontrolled personality types as predictors of children's and adolescents' problem behaviour. *International Journal of Behavioral Development, 28*(3), 210–220. doi:10.1080/01650250344000424
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96*(3), 465–490.
- Zarra-Nezhad, M., Aunola, K., Kiuru, N., Mullola, S., & Moazami-Goodarzi, A. (2015). Parenting styles and children's emotional development during the first grade: The moderating role of child temperament. *Journal of Psychology & Psychotherapy, 5*, 206. doi:10.4172/2161-0487.1000206
- Zhou, Q., Main, A., & Wang, Y. (2010). The relations of temperamental effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. *Journal of Educational Psychology, 102*(1), 180–196.