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**Perspective Taking, Empathic Concern, Agreeableness, and Parental Support:
Transactional Associations Across Adolescence**

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Keywords: Adolescence; Empathy ; Parental support ; Agreeableness

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Abstract

Introduction. Empathy consists of a cognitive and an affective component, of which it is thought that there are gender differences. Previous studies also suggest that maternal and paternal support play a more prominent role in the development of an adolescent's affective and cognitive empathy, respectively. Besides the environmental factor, that is parenting, adolescent personality, and more specifically, agreeableness, is closely linked to both empathy and support, but this interplay was not extensively investigated longitudinally. The present study investigated the transactional associations among parental support, adolescent agreeableness, and adolescent empathy. More specifically, we examined (a) whether maternal/paternal support is differentially associated with cognitive/affective empathy, while taking into account adolescent agreeableness and (b) whether adolescent agreeableness still predicts empathy, while taking into account parental support.

Methods. Data from 993 Belgian adolescents ($M_{\text{ageT1}} = 13.96$ years; [12.6-18.4]) and their parents across four time points were used in a random intercept cross-lagged panel model.

Results. At the between-person level, maternal support was associated with affective, but not cognitive empathy, whereas agreeableness was associated with maternal and paternal support as well as with both types of empathy. At the within-person level, affective empathy predicted cognitive empathy one wave later.

Conclusions. At a population level, agreeableness and support are both important in adolescent empathy development with limited evidence for the differential roles of mothers and fathers. Within participants, affective empathy, and not parental support or agreeableness, predicted cognitive empathy.

Keywords: Adolescence; Empathy; Parental support; Agreeableness

Empathy is a multidimensional construct that concerns the ability to understand and share other individuals' emotions. Specifically, empathy consists of an affective and a cognitive component (Davis, 1983; Eisenberg & Fabes, 1990). The affective component pertains to sharing the other's emotions and having feelings of concern for the other (i.e., empathic concern), whereas the cognitive component, often referred to as perspective taking, relates to a cognitive understanding of the other's emotions or internal states. Previous studies found beneficial associations for empathy as a whole (e.g., higher prosocial behavior, better social competencies; Allemand, Steiger, & Fend, 2015; Carlo, Padilla-Walker, & Nielson, 2015) as well beneficial associations for the affective (e.g., decreased relational and overt aggression; Batanova & Loukas, 2011) or cognitive component (e.g., improved interpersonal/intergroup relations; Galinsky, 2002) specifically. The present study will examine longitudinal associations between potential beneficial factors and empathy during adolescence.

Empathy also comprises a situational and dispositional component, which are not necessarily strongly related to each other (Batson, Fultz, & Schoenrade, 1987; Fabi, Weber, & Leuthold, 2019). Situational empathy refers to one's empathic response in a given situation, whereas dispositional empathy concerns one's general tendency to empathize with others (Batson et al. 1987). The latter is the focus of the present study. Although dispositional empathy is thought of as a stable individual characteristic, it is suggested to develop across the life span (Miklikowska, Duriez, & Soenens, 2011; Van der Graaff et al., 2014). Adolescence is generally considered to be a crucial developmental period in empathy development (Allemand et al. 2015). Not only is this period characterized by physical maturation, increased autonomy as well as changing social relationships provide ample opportunities to develop empathy skills in this developmental period (Zarrett & Eccles, 2006).

Furthermore, empathy seems to show gender differences (Allemand et al. 2015; Eisenberg & Lennon, 1983), which were framed in the gender role orientations theory by Bem

(1984, 1993). This theory states that girls and boys behave differently according to gender role expectations, and thus, one would expect gender differences in empathy. Specifically, girls are expected to be more affectionate and caring, and thus show higher levels of empathy, which was supported by a review by Eisenberg and Lennon (1983). Allemand et al. (2015) also did observe this difference in empathy at age 12, whereas they did not detect a gender difference regarding the subsequent development of dispositional empathy. Van der Graaff et al. (2014) used the Interpersonal Reactivity Index questionnaire (IRI) and took a closer look at the development of dispositional empathy across adolescence (i.e., 13 to 18 years of age). They assessed the developmental trends of cognitive and affective empathy separately and found that girls showed a stronger development of perspective taking as compared to boys. Furthermore, girls showed a stable trajectory of empathic concern, whereas boys showed a decline across adolescence in this type of empathy. The aforementioned studies indicate the importance of assessing gender differences in empathy as well as examining cognitive and affective empathy separately.

Socialization by Mother and Father

The importance of social relationships for the development of empathy in adolescence (i.e., ages 10 to 20) was emphasized in a meta-analysis by Boele et al. (2019) and framed within Bandura's (1971) social learning theory. The socialization of empathy is believed to occur through the modeling of warm and supportive behavior by parents (Barnett 1987; Boele, 2019; Eisenberg et al. 2003). Numerous studies investigating a wide range of supportive parenting behaviors (e.g., open communication, constructive conflict resolution) found evidence for the association with empathy (Boele et al., 2019; Stern & Cassidy, 2018). Supportive parents are an example for their child in that the child can experience and observe both emotional concern and perspective taking (Eisenberg et al., 2006). Children can practice these skills in the safe environment of the parent-child relation and as they grow older, more opportunities arise to

practice these skills in peer relationships. It is assumed that during adolescence, despite peer relationships becoming more important, the parent-child relationship remains important. Previous research suggested that mother and father are important for different aspects of empathy, namely that fathers are involved in the cognitive component, that is, perspective taking, whereas mothers are involved in affective empathy (Hastings, Utendale, & Sullivan, 2007; Miklikowska et al. 2011). These findings can be framed within gender role orientations theory (Bem, 1984, 1993) as it is believed that males are socialized to value traits such as problem solving and instrumental responding to others' needs, whereas females are believed to be socialized to express concern and emotional connection (Hastings, Rubin, & DeRose, 2005; Olweus & Enderson, 1998). It is assumed that parents value different traits, and thus, choose to socialize different traits in their children (Miklikowska et al. 2011).

Despite the fact that it is generally agreed upon that adolescence is an important period in the development of empathy and that parent-child relationships are essential in this context, longitudinal research in adolescence is rather scarce. The need for more longitudinal research is acknowledged by the field (Boele et al., 2019; Chopik, O'Brien, & Konrath, 2017), given the fact that the available longitudinal studies do not include key environmental factors such as (supportive) parenting practices (Allemand et al. 2015), or only cover a part of adolescence (Miklikowska et al. 2011). Besides supporting the importance of the distinction between affective and cognitive empathy as well as of environmental factors, these studies also observed an evolution in dispositional empathy (Allemand et al. 2015; Miklikowska et al. 2011; Van der Graaff et al., 2014). This observation shows that dispositional empathy still changes, and as such it can be expected that there are inter- as well as intra-individual changes. In order to get a more detailed insight in the development of empathy, it is necessary to separate the between and within individual portion of this developmental process (Hamaker, Kuiper, & Grasman, 2015). This information could lead to practical implementations such as the innovation of

prevention and intervention efforts in order to support optimal empathy development in adolescents.

The Interplay among Parenting, Empathy, and Adolescent Agreeableness

The role of parenting in empathy development has been frequently observed (Allemand et al. 2015; Boele et al., 2019; Chopik et al., 2017). Besides parenting, other factors, such as adolescent personality (Allemand et al., 2015), were suggested for examination of their role in empathy development. In this regard, a study by Melchers et al. (2016) showed a link between personality patterns (i.e., combination of personality traits) and empathy. In studies that examined the link between empathy and personality traits rather than patterns, a strong association between agreeableness and empathy was observed (Allemand et al. 2015; Chopik et al. 2017; Costa & McCrae, 1992). Agreeableness, with adjectives such as ‘pleasant’, ‘friendly’, and ‘enjoyable’ (Vermulst & Gerris, 2005) is thought of as a more general trait, whereas empathy focuses more on the ability to identify and share emotions (i.e., empathic concern) or thoughts (i.e., perspective taking). Agreeable individuals are considered to be warm and considerate and also able to provide an environment in which the other can feel understood and protected (Prinzle et al., 2009). Furthermore, de Haan, Deković, and Prinzle (2012) showed that agreeableness in adolescents predicts warm and supportive parenting practices. Whereas it is possible that supportive parenting fosters agreeableness in adolescents (Schofield et al., 2012), which in turn predicts empathy, it seems also possible, that agreeableness predicts both supportive parenting in adolescence and empathy. However, to the best of our knowledge, no study to date has addressed the transactional associations among agreeableness, supportive parenting (i.e., both maternal and paternal), and empathy (i.e., both cognitive and affective empathy), despite the ample research attention for potential predictors and intervention targets for empathy-related skills such as emotion recognition (Downs & Strand, 2008; Rawdon et al., 2018). To satisfy the need to examine potential predictors as well as the aforementioned need

for assessing within- and between individual changes in development state-of-the-art statistical techniques, more specifically Random Intercept Cross-Lagged Panel Model; RI-CLPM, will be used.

The Present Study

The present study aimed at investigating the longitudinal associations among parental support, adolescent agreeableness, and cognitive (i.e., perspective taking) and affective (i.e., empathic concern) empathy across adolescence (i.e., 12 to 18 years of age). We tried to fill two important gaps in the literature by addressing two key questions. Specifically, we examined (a) whether maternal and paternal support are differentially associated with cognitive and affective empathy across adolescence and (b) whether adolescent agreeableness plays a role in the development of empathy, in addition to parental support. The current study is also innovative in using state-of-the-art methodologies (i.e., Random Intercept Cross-Lagged Panel Model; RI-CLPM), which allows to take into account within and between person developmental processes.

We hypothesized that empathic concern and perspective taking would be moderately positively associated, given their common basis but focus on different aspects of empathy (Boele et al., 2019; Miklikowska et al. 2011). Furthermore, we expected that maternal support would predict empathic concern and that paternal support would predict perspective taking (Hastings et al. 2007; Miklikowska et al. 2011). Next, we hypothesized that adolescent agreeableness would predict both parental support and both aspects of empathy above and beyond the association between parental support and both aspects of empathy (Chopik et al. 2017; Costa & McCrae, 1992; de Haan et al. 2012). We also compared the aforementioned associations between sexes. However, we did not expect the associations to be different for boys and girls (Boele et al. 2019).

The present study adds to the literature by examining the link between on the one hand maternal and paternal support as well as adolescent agreeableness and on the other hand

cognitive and affective empathy across adolescence. An individual's development comprises both normative and idiosyncratic changes, which is why it is important to distinguish between processes occurring across and within participants.

Method

Participants and Procedure

The STRATEGIES project used an accelerated longitudinal design with three cohorts (i.e., Grade 7, 8, and 9) per wave for five waves with a one-year time interval. The present study used cohort data from Wave 2 (i.e., first wave to include empathy measure) to Wave 5. Data were rearranged to obtain more homogeneous age groups (See Table 1). For instance the second cohort of wave $k-1$ was merged with the first cohort of wave k . In other words, data were rearranged to cluster all participants per grade. This procedure converted five waves into six time points. The retention rates of the families (i.e., at least one family member participating) are presented in Table 1. The decision was made not to include the last two time points, since the retention rate fell below 50%. Missing data were handled through Full Information Maximum Likelihood (FIML). Across the four time points that are included in the present study, the age of the 993 adolescents ranged from 12.6 to 18.4 years. The sample at the first time point comprised 993 families, consisting of adolescents ($M_{\text{ageT1}} = 13.96$, $SD = 0.49$, 55.2% boys), mothers, and/or fathers.

Data collection was conducted in Flanders, Belgium and comprised of both adolescents and their parents completing questionnaires annually. Participants were selected through a randomized multistage sampling approach. In a first stage, Flemish secondary schools were invited to take part in the study. Stratification was used to include students from general, technical, and vocational tracks. In the second stage 121 classes in the seventh, eighth, and ninth grade were selected from the nine schools who agreed to participate. Within these classes, 2,254 students and their parents were invited to participate. The original sample family composition

was representative for the general population in Flanders $\chi^2(2) = 2.78, p = .25$, with 82% two-parent families, 7% single-parent families, and 11% blended families (Janssens et al., 2017; King Baudouin Foundation, 2008). The distribution across educational levels (EDU) and employment activity levels (ACT) of parents was different from the one observed in the general population in Flanders for both mothers (EDU: $\chi^2(3) = 30.34, p < .001$; ACT: $\chi^2(1) = 15.87, p < .001$) and fathers (EDU: $\chi^2(3) = 34.19, p < .001$; ACT: $\chi^2(1) = 15.13, p < .001$) with bachelor degrees and active employees being slightly overrepresented (Janssens et al., 2017; Research Department of the Flemish Government, 2010, 2011). Despite this small deviation, it can be concluded that all categories of socioeconomic status were sufficiently represented in the sample.

Measures

Parental Support.

Mothers and fathers reported on their own parental support (mother Cronbach's α 's range from .90 to .93; father α 's range from .93 to .94) which comprised three measures, as indicated by factor analyses by Janssens et al., (2015). The first one was the Positive Parenting subscale (8 items, e.g., "If my son or daughter wants to tell something, I take my time to listen to him/her") from the Parental Behavior Scale-Short Form (PBS-S; Van Leeuwen et al., 2015). The second one was the Responsivity subscale (7 items, e.g., "I can make my son or daughter feel better when he or she is feeling upset") from the Louvain Adolescent Perceived Parenting Scale (LAPPS; Delhaye et al., 2012). The third measure was the Autonomy Support scale (8 items, e.g., "I take into account my son's or daughter's opinion on affairs that concern him or her"), which was based on the Perceptions of Parents Scale (POPS; Grolnick, Ryan, & Deci, 1991) and the Research Assessment Package for Schools (RAPS; Institute for Research and Reform in Education, 1998). It is important to note that mothers and fathers reported on their own supportive parenting. Van Heel et al. (2019a) established measurement invariance across

adolescence for this measure of parental support on the present data set. All items were rated by mothers and fathers on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). An average score of the items was calculated, with a high score referring to greater support.

Adolescent Empathy: Perspective Taking and Empathic Concern.

Adolescents completed the subscales Empathic concern (α 's range from .71 to .81) and Perspective taking (α 's range from .67 to .76) from the Dutch version (Duriez, 2004) of the Interpersonal Reactivity Inventory (IRI; Davis, 1983). Empathic concern is the affective component and assesses the tendency to experience compassion and concern for others (7 items, e.g., "I often have tender, concerned feelings for people less fortunate than me"). The subscale perspective taking assesses the tendency to adopt the point of view of others in everyday life (7 items, e.g., "I sometimes find it difficult to see things from the other person's point of view"; reverse coded). Following suggestions by Chen (2007), scalar measurement invariance across adolescence for the subscales empathic concern and perspective taking was established in the present sample (See Table S1). The model fit for the configural, metric, and scalar level respectively, was supported by two out of three fit indices. The RMSEA and SRMR (or their confidence interval) were deemed 'acceptable' according to the suggestions by Chen (2007). Furthermore, the difference between the levels, or the worsening of model fit from configural to metric and from metric to scalar also fall well within the limits as proposed by Chen (2007). All items were rated by adolescents on a 5-point scale ranging from 1 (*does not describe me well*) to 5 (*describes me very well*). An average score was calculated across all items of the respective subscales, with a high score referring to greater empathy.

Agreeableness.

Mothers, fathers, and adolescents rated the adolescent's agreeableness by filling out the Quick Big Five (QBF; Vermulst & Gerris, 2005), which used adjectives suggested by Goldberg

(1992). The QBF comprises 30 items with each factor of the Big Five personality factors being represented by six items. In the present study, only the agreeableness subscale was used. The items in this subscale were: agreeable, helpful, kind, cooperative, pleasant, and sympathetic (mother α 's range from .87 to; father α 's range from .86 to .91; adolescent α 's range from .85 to .89). Each item was rated on a 7-point Likert scale, ranging from 1 (*completely incorrect*) to 7 (*completely correct*). Per informant, scores were averaged across items. Van Heel et al. (2019b) showed that this measure was valid to longitudinally assess agreeableness across adolescence in the present dataset.

The present study used a composite score for adolescent agreeableness, which was an average of the scores from mother, father, and adolescent. The separate scores of mother, father, and adolescents showed moderate to strong positive correlations ($ps < .001$). When the report of an informant was missing, the reports from the remaining informants were used. Composite scores are thought to counteract key informant bias (i.e., use of one informant can lead to a one-sided perspective on events (Homburg, Klarmann, & Totzek, 2012) and to be more nuanced, because they use multiple sources of information (Podsakoff, Scott, Mackenzie, & Podsakoff, 2003).

Analysis Strategy

Descriptive statistics were computed for all variables across all time points. Pearson product-moment correlations among all variables per time point were also computed. Additionally, means and Pearson product-moment correlations were also computed for boys and girls separately. It was checked whether there were significant differences between boys and girls regarding variables means and correlations. Little's test of Missing Completely At Random (Little, 1988) was used to assess whether attrition was completely at random in the present study. This test examines whether the null hypothesis of MCAR can be rejected, but cannot differentiate between missing at random (MAR) and missing not at random (MNAR).

As it is based on a chi square test, it is sensitive to sample size. So in large samples, relatively small differences are easily declared significant (Bergh, 2015). Therefore, we decided to adopt a more conservative alpha level of $\alpha = .01$. For the sake of rigor, independent samples t-tests were conducted to assess whether there is a difference regarding the included variables at time point k between the families who still participated and families who dropped out at time point $k + 1$. These tests were conducted in SPSS, Version 24 (IBM, 2016).

A Random Intercept Cross-Lagged Panel Model (RI-CLPM; Hamaker et al. 2015) was fitted to examine transactional associations among parental support, agreeableness, and empathy (i.e., empathic concern and perspective taking) while accounting for within-time correlations (i.e. correlations between variables at one time point) and stability coefficients (i.e. autoregressive coefficients between a variable at t and $t+1$). This allows us to examine both the impact of parental support on adolescent empathy as well as the impact of adolescent empathy on parental support. Analyses were conducted in MPlus Version 7 (Muthén & Muthén, 2012). Three indices were used to examine overall model fit. First, the lower the chi square (S-B χ^2) value, the better the overall fit. Second, a high Comparative Fit Index (CFI), and more specifically values above .90, indicated acceptable model fit. Third, a low Mean Square Error of Approximation (RMSEA), and more specifically values below .08, indicated acceptable fit.

In order to reduce model complexity, parameters were constrained across waves to assess a model that showed good overall fit, but also was more parsimonious. In a first constrained model (Model 2), the within-time correlations were constrained to be equal across time points, whereas the stability paths were additionally constrained to be equal in a second constrained model (Model 3). In order to compare nested models, the Satorra-Bentler scaled chi-square difference test (Δ S-B χ^2) was used with an α of .05 (Hu & Bentler, 1999). A non-significant Δ S-B χ^2 test indicated that the constrained model did not show a significantly worse model fit, and thus that the parameters could be considered equal across waves.

When the best fitting model was selected, we examined whether the RI-CLP model significantly differed between boys and girls. The chi-square difference test ($\Delta S-B\chi^2$) was used to compare a multi-group structural equation model which constrained the parameters across adolescent sex to be equal with a model that allowed the parameters to vary across adolescent sex. A significant difference would indicate that there is a need for separate models for boys and for girls. A non-significant difference would indicate that the interplay between parenting, personality, and empathy is similar for boys and girls.

Results

Descriptive Statistics and Attrition Analysis

Means and standard deviations of all variables per time point are presented in Table 2. When mean levels of the variables are compared between boys and girls, consistent significant differences were observed for perspective taking, empathic concern, and agreeableness (See Table 3). It is important to note that these differences concern the mean, whereas the test for gender differences in the RI-CLP model that will be discussed below concern the associations among the variables. Zero-order correlations per time point in the sample as a whole are presented in Table S2. It is important to note that the two components of empathy, that is, empathic concern and perspective taking, showed correlations between .40 and .50, which indicated that both concepts only had between 16% and 25% common variance. This finding supported our decision to include both concepts separately in the analyses. Additionally, items of the subscales empathic concern and perspective taking do not show content related overlap. Similarly, the correlations between agreeableness and empathic concern and perspective taking respectively were around .30, which indicated a moderate association. This finding also indicated that there was still a large portion of unique variance in these concepts.

Correlations among the study variables per gender are presented in Table S3. Table S3 also examines whether there are significant differences between the respective correlations

across adolescent gender. There were no consistent significant gender differences observed.

Little's test indicated that the hypothesis that missing data in the present dataset was missing completely at random, could not be rejected at $p < .01$ ($\chi^2 = 2578.138$, $df = 2459$, $p = .046$). This results supports the assumption of the data missing completely ad random. According to Little and colleagues (2014), FIML is an adequate approach to handle the missing data in this situation as it will provide unbiased parameter estimates. The results of the attrition analyses showed that there were no consistent differences between participants that continued their participation and participants that dropped out of study at the subsequent time point (Table S4).

RI-CLPM Including Empathy, Parenting, and Agreeableness

Detailed results from the model fit comparisons are presented in Table 4. Model fit did not significantly worsen when the model was made more parsimonious by constraining the within-time correlations to be equal across time points (Model 1 vs. Model 2). Model fit did significantly worsen when stability coefficients were additionally constrained (Model 2 vs. Model 3) and did not significantly improve when the model was estimated separately for boys and girls (Model 2 vs. Model 4). The latter finding indicated that there was no need for separate models for boys and girls. The best model included all transactional associations, stability coefficients, and equal within-time correlations across time points (i.e., Model 2).

At the between-person level, we observed that the two empathy components were significantly positively associated. Furthermore, the cognitive empathy component, that is, perspective taking, was not significantly associated with either paternal or maternal support, whereas the affective component, that is, empathic concern, showed a significant weak positive association with maternal support and a trend towards a positive association with paternal support. When a Wald test was used to assess whether there was statistical difference between maternal and paternal support in the association between support and perspective taking, there

was no significant difference ($W = 0.015$, $df = 1$, $p = .902$). Similarly, the association between empathic concern and support did not show a difference between paternal and maternal support ($W = 0.111$, $df = 1$, $p = .739$). The personality trait agreeableness showed moderate to strong positive associations with all of the variables. All correlations among the random intercepts are presented in Table 5.

At the within-person level, we observed that the stability paths, or carry-over effects, were only consistently significant for maternal support. Other significant stability paths were observed for perspective taking and empathic concern. Furthermore, the only significant transactional associations were observed between empathic concern and perspective taking. Specifically, empathic concern predicted perspective taking at the next time point. The correlations per time point at the within-person level are presented in Table 6 and the significant transactional and autoregressive paths at the within-person level are presented in Figure 1.

Discussion

The present study examined the interplay among adolescent empathy (i.e., perspective taking and empathic concern), maternal and paternal support, and adolescent personality (i.e., agreeableness) across adolescence. A RI-CLP model was used to distinguish time-invariant, between-person effects and within-person effects. Consistent with our hypothesis, model fit indices did not indicate significant differences between boys and girls concerning the interplay between empathy, parental support and agreeableness. At the between-person level, we observed a strong positive association between empathic concern and perspective taking, which was in line with the hypothesis of the two constructs being strongly intertwined. Furthermore, we hypothesized that maternal support predicts empathic concern, whereas paternal support predicts perspective taking. This hypothesis was partially supported in that the results showed that empathic concern was significantly positively associated with maternal support, whereas there was only a trend towards significance for the association with paternal support. However,

these associations did not significantly differ. More parental support was associated with higher levels of empathic concern across adolescence. Perspective taking did not show significant associations with parental support. Agreeableness was strongly associated with both maternal and paternal support as well as with both components of empathy, which is in line with our hypothesis. At the within-person level, our findings showed that high empathic concern predicted high levels of perspective taking, but that this association was not reciprocal, which was inconsistent with our expectation. Our findings indicated that most of the significant associations were at the between-person level, which stresses the importance of the stable, time-invariant components of the included variables.

Empathy Development Across Adolescence

Mean level comparison between boys and girls indicated that girls show higher levels of both perspective taking and empathic concern, and that parents rated girls more agreeable than they did boys. This finding concerning mean-level gender differences was in line with previous studies (Allemand et al., 2015; Eisenberg & Lennon, 198). The main focus of the present study, however, was on the longitudinal associations among the study variables. Consistent with the hypothesis, our results indicated that there were no significant gender differences in the interplay among empathy, support, and agreeableness, which is consistent with the meta-analysis by Boele et al. (2019). The issue of gender differences in this interplay may be more complex, since other studies found mixed results. The study by Miklikowska et al. (2011) examined the interplay among maternal support, paternal support, affective empathy, and cognitive empathy and only found a moderation of adolescent gender in the association between maternal support and empathic concern. Specifically, they found this association to be limited to daughters only. Adolescent gender did not appear to moderate any other associations that were investigated. Regarding the role of supportive parenting and adolescent personality in the development of empathy, it has to be noted that most significant findings were at the

between-person level rather than the within-person level, which indicates the importance of the stable component of the included variables. This finding is consistent with previous research that showed stability in supportive parenting, especially in mothers (Van Heel et al., 2019b) and in personality traits, such as agreeableness (Shiner & Caspi, 2003). Even empathy, for which adolescence is considered a major formative period, has shown some stability across this developmental period (Miklikowska et al. 2011).

When we take a closer look at the associations at the between-person level, we see support for our hypothesis in the strong link between empathic concern and perspective taking, which is not surprising given the common ground in these two components of empathy (Boele et al., 2019). An interesting finding was the difference between empathic concern and perspective taking regarding the association with parental support. Empathic concern showed a significant association with parental support, whereas perspective taking did not. This finding partially supports our hypothesis in that we did observe the link between maternal support and empathic concern, but did not see the link between perspective taking and paternal support. This finding can be interpreted in the context of the suggestion by Schwenck et al., (2013) stating that, in contrast to perspective taking, empathic concern may be influenced to a larger extent by environmental variables, such as the parental and peer environment. Although replication of this finding is necessary, it offers a more differentiated view of the social learning theory approach to empathy development in that this framework may be better suited for the development of affective empathy than the development of cognitive empathy. Children can observe and experience affectionate, empathic responses by their parents, whereas cognitions (i.e., perspective taking) are not as easy to directly observe.

Regarding the gender difference in the association between empathic concern and parental support, we observed a difference in associations regarding maternal and paternal support, but this difference was not statistically significant. Future research should ask parents

about the amount of time they spend interacting with their child so that this can be included as a control variable. This can be an important factor in that the more time a parent and child spend together, the more this parent could be able to assist the child in the development of empathic skills.

Furthermore, we observed these associations between parental support and empathic concern while adolescent agreeableness was taken into account. We found support for our hypothesis in the strong associations between the personality trait agreeableness and both components of empathy, which is consistent with the literature (Chopik et al. 2017) as well as with supportive parenting (de Haan et al. 2011). Taken together with the previous findings, it is interesting that we still observed an association between parental support and affective empathy, even after taking into account adolescent agreeableness. Furthermore our results showed that the link between adolescent agreeableness and empathy is stronger than the association between parental support and (affective) empathy. This finding indicates the need to include adolescent personality in research on the development of empathy, especially.

The relatively limited number of significant findings at the within-person level stresses the importance of the stable, trait-like, part of all the included variables. One possible interpretation is that given the important stable component of all the included variables, the within-person associations are limited. In other words, parental support, adolescent agreeableness, and adolescent cognitive and affective empathy are, for a large part, stable throughout time. Furthermore, our findings indicate that the stable part of the aforementioned concepts influence each other. It is, however, interesting that even after taking in account the between components, we observed that empathic concern predicted perspective taking one year later at the within-person level. A possible explanation is that at late childhood/early adolescence, a period in which parent-child interaction is more prevalent than peer interaction, higher levels of empathic concern than perspective taking are observed (Van der Graaff et al.,

2014). It is possible that the more strongly developed affective empathy, in turn, aids in the development of cognitive empathy through peer interaction rather than parent-child interaction during adolescence. This finding is also interesting in that it may reveal an indirect influence of parenting practices on perspective taking. Our findings and previous research suggest that supportive parenting predicts better empathic concern, which, in turn, at the individual level, improves perspective taking.

Limitations

A number of limitations can be pointed out concerning the present study. First, the data were derived from questionnaires using adolescent- and parent-reports. Especially on sensitive topics such as empathy, being agreeable, or parenting practices, it is possible that there is an effect of social desirability. Whenever possible, we counteracted this bias by using a composite score across multiple informants (i.e., for adolescent agreeableness). Related to this issue, it would be useful to combine questionnaire data with observational data. Second, the literature (Boele et al., 2019) indicated an increasing importance of peer relationships across adolescence. The present study focused on parent-child relationships and as such did not take into account the influence of peers. Third, in order to limit model complexity, the present study made a selection among both personality traits and parenting practices. Although the decision to focus on adolescent agreeableness and supportive parenting was firmly rooted in the literature, it is possible that other aspects of adolescent personality or parenting practices also play a role in the development of empathy. Fourth, future research should take into account the quantity, and perhaps also the quality, of the time that mothers and fathers spend with the child.

Conclusion

Across participants, our findings suggest an association between support and empathic concern, but not with perspective taking. Furthermore, the importance of the adolescent agreeableness in the development of empathy was demonstrated. Adolescent agreeableness was

strongly associated with both empathic concern and perspective taking, as well as with maternal and paternal support. The present study showed that both agreeableness and parental support play a role in the development of adolescent empathy. Within participants, we observed that high levels of empathic concern predicted higher levels of perspective taking, which is an important finding regarding the development of empathy. It is possible that showing empathic concern leads to more opportunities to practice perspective taking. Our study indicated the importance of including the affective and cognitive component of empathy separately as well as making the distinction between maternal and paternal parenting.

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Tables and Figures

Table 1

Visualisation of the Accelerated Longitudinal Design With Retention Rates

	T1	T2	T3	T4	T5	T6
W2	X	X	X			
W3		X	X	X		
W4			X	X	X	
W5				X	X	X
RR	89%	84%	70%	53%	49%	21%

Note. RR = retention rate

Table 2

Descriptive Statistics M (SD) of Study Variables at Each Time Point

Variable	T1	T2	T3	T4
Mother support	4.26 (0.40)	4.27 (0.37)	4.26 (0.41)	4.22 (0.89)
Father support	3.98 (0.48)	3.96 (0.50)	3.95 (0.54)	3.95 (0.49)
Empathic concern	3.54 (0.63)	3.50 (0.62)	3.54 (0.66)	3.54 (0.69)
Perspective Taking	3.23 (0.58)	3.25 (0.61)	3.32 (0.61)	3.37 (0.61)
Agreeableness	5.61 (0.76)	5.60 (0.71)	5.64 (0.73)	5.66 (0.68)

Table 3

Results From T-Test Comparing Variables per Time Point Between Boys and Girls

	<i>T</i>	<i>Df</i>	<i>P</i>	Mean difference	SE	95% CI lower	95% CI upper
Mother support T1	-.439	224	.661	-.023	.053	-.128	.081
Father support T1	-.585	178	.560	-.042	.072	-.183	.100
Perspective taking T1	-3.247	351	.001	-.199	.0612	-.319	-.078
Empathic concern T1	-7.946	352	< .001	-.496	.063	-.619	-.373
Agreeableness T1	-3.525	340	< .001	-.286	.081	-.445	-.126
Mother support T2	-1.847	423	.065	-.073	.040	-.151	.005
Father support T2	-1.810	349	.071	-.097	.054	-.202	.008
Perspective taking T2	-5.089	675	< .001	-.234	.046	-.325	-.144
Empathic concern T2	-11.945	674	< .001	-.513	.043	-.598	-.429
Agreeableness T2	-4.388	651	< .001	-.239	.055	-.347	-.132
Mother support T3	-2.402	488	.017	-.090	.037	-.163	-.016
Father support T3	.129	400	.898	.007	.053	-.099	.112
Perspective taking T3	-7.408	768.092	< .001	-.311	.042	-.393	-.229
Empathic concern T3	-14.322	769	< .001	-.608	.042	-.692	-.525
Agreeableness T3	-3.165	758	.002	-.166	.052	-.269	-.063
Mother support T4	-1.878	340	.061	-.085	.045	-.174	.004
Father support T4	-.640	292	.522	-.037	.057	-.149	.076
Perspective taking T4	-6.809	572	< .001	-.333	.049	-.429	-.237
Empathic concern T4	-12.336	572	< .001	-.630	.051	-.731	-.523
Agreeableness T4	-3.872	576	< .001	-.216	.056	-.326	-.106

Table 4

Results From Model Fit Tests

Model	S-B χ^2	df	p	SCF	Δ S-B χ^2	Δ df	p	CFI	TLI	RMSEA	SRMR
Model 1	91.605	60	.005	.8948	--	--	--	.992	.976	.023	.044
Model 2	115.822	90	.035	.9224	25.436	30	.704	.994	.987	.017	.060
Model 3	136.942	100	.001	.9395	21.120	10	.030	.991	.983	.019	.068
Model 4	218.668	180	.026	.9019	102.544	90	.173	.990	.978	.020	.082

Note. Model in bold is best fitting model.

Table 5

Pearson Correlations Among Random Intercepts of the Best Fitting Model

Variable	1	2	3	4	5
1.Mother support	1				
2.Father support	.47***	1			
3.Perspective taking	.17	.14	1		
4.Empathic concern	.23***	.14 ⁺	.54***	1	
5.Agreeableness	.42***	.45***	.44***	.41***	1

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

Within- Person Pearson Correlations Among Study Variables of the Best Fitting Model

Variable	Time point 1					Time point 2					Time point 3					Time point 4				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mother support (1)	1					1					1					1				
Father support (2)	.24*	1				.24**	1				.26**	1				.27**	1			
Empathic concern (3)	.09	.10	1			.09	.11	1			.09	.09	1			.08	.10	1		
Perspective taking (4)	.11	.04	.32***	1		.11	.04	.34***	1		.13	.04	.31***	1		.13	.05	.31***	1	
Agreeableness (5)	.35***	.25**	.17**	.11*	1	.38***	.30**	.20**	.13*	1	.41***	.27**	.17**	.13**	1	.43***	.34**	.18***	.14**	1

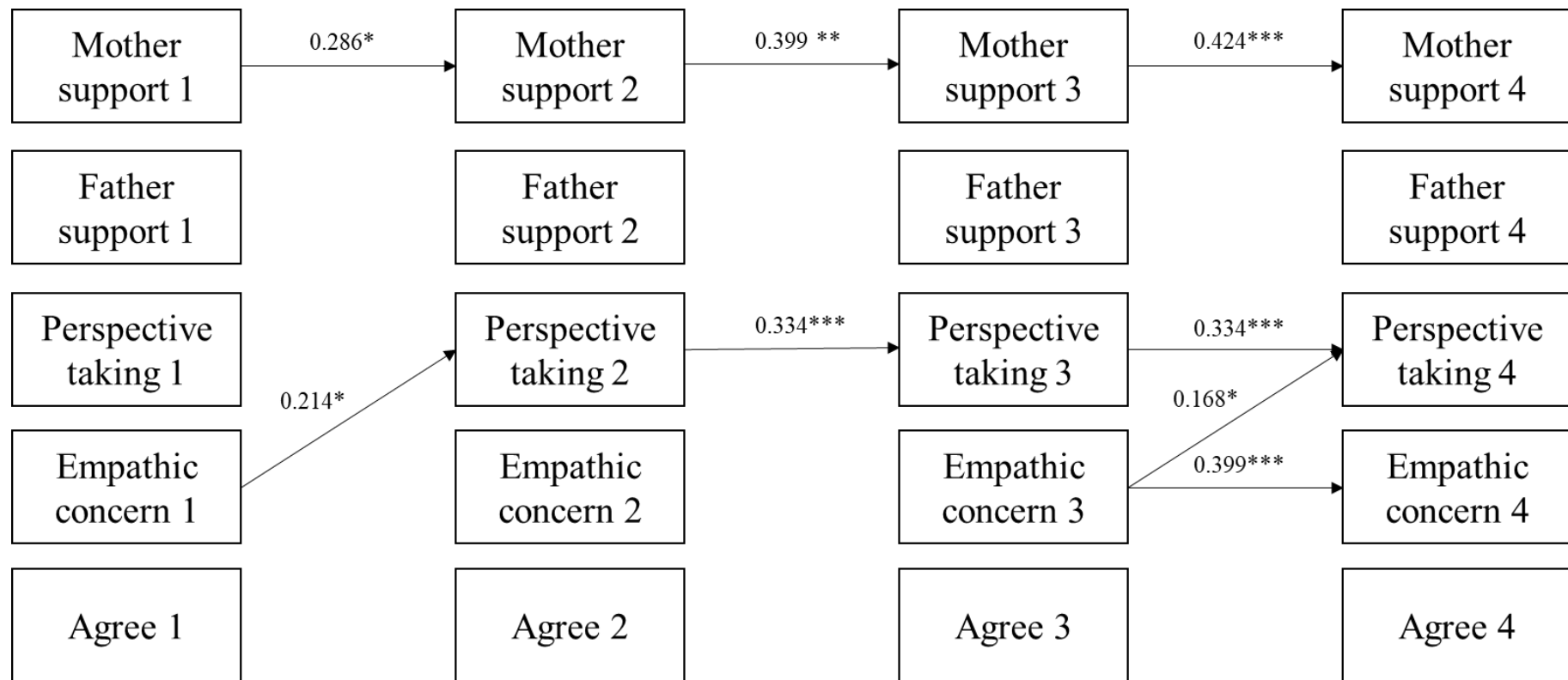


Figure 1. Representation of the significant associations at the within-person level of the RI-CLPM.

Note. * $p < .05$. ** $p < .01$. *** $p < .001$; Agree = agreeableness.

Supplementary Material

Table S1

Measurement Invariance Results for the Subscales of the Interpersonal Reactivity Inventory (IRI) Across Adolescence

Model	CFI	RMSEA [90% CI]	SRMR	Δ CFI	Δ RMSEA	Δ SRMR
Configural	.830	.082 [.078-.085]	.058	--	--	--
Metric	.827	.078 [.074-.082]	.063	.003	.005	.005
Scalar	.816	.076 [.073-.080]	.065	.011	.002	.002

Note. Model fit criteria suggested by Chen (2007) were used. Comparative Fit Index (CFI) $\geq .90$; Root Mean Square Error of Approximation (RMSEA) $\leq .08$; Standardized Root Mean Square Error (SRMR) $\leq .08$. Regarding measurement invariance, between configural and metric level: Δ CFI $< .010$, Δ RMSEA $< .015$, Δ SRMR $< .030$; between the metric and scalar level, Δ CFI $< .010$, Δ RMSEA $< .015$, and Δ SRMR $< .010$; CI: Confidence Interval.

Table S2

Correlations among Study Variables per Time Point

Variable	Time point 1					Time point 2					Time point 3					Time point 4				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mother support (1)	1					1					1					1				
Father support (2)	.32***	1				.28***	1				.38***	1				.46***	1			
Empathic concern (3)	.14*	.11	1			.15**	.14	1			.14**	.09	1			.20***	.18*	1		
Perspective taking (4)	.10	.03	.40***	1		.11*	.08	.41***	1		.18***	.06	.46***	1		.17**	.06	.48***	1	
Agreeableness (5)	.42***	.33***	.32***	.26***	1	.38***	.33*	.32***	.34***	1	.44***	.39***	.32***	.26***	1	.40***	.46***	.35***	.30***	1

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

Table S3

Pearson Correlations among Study Variables for Boys and Girls Separately and Comparison Between Respective Correlations Using Fisher Transformation.

		T1					T2					T3					T4				
Boys		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mother support (1)	<i>r</i>	1					1					1					1				
	<i>N</i>	123					224					243					163				
Father support (2)	<i>r</i>	.37***	1				.27**	1				.37***	1				.49***	1			
	<i>N</i>	93	97				170	18				187	199				133	146			
Empathic concern (3)	<i>r</i>	.19*	.12	1			.11	.074	1			.14*	.080	1			.09	.13	1		
	<i>N</i>	116	92	193			215	179	358	358		231	195	367			155	142	286		
Perspective taking (4)	<i>r</i>	.11	.05	.40**	1		.10	.07	.41**	1		.16*	.12	.34***	1		.09	.06	.39***	1	
	<i>N</i>	116	92	193	193		215	179	358	359		231	195	367	367		155	142	286	286	
Agreeableness (5)	<i>r</i>	.41***	.33**	.35***	.26***	1	.38***	.34***	.31***	.35***	1	.47***	.40***	.28***	.20***	1	.37***	.48***	.34***	.27***	1
	<i>N</i>	123	97	184	184	191	224	184	335	335	345	243	199	358	358	370	163	146	284	284	294
Girls		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Mother support (1)	<i>r</i>	1					1					1					1				
	<i>N</i>	103					201					247					179				
Father support (2)	<i>r</i>	.27*	1				.29***	1				.40***	1				.44**	1			
	<i>N</i>	81	83				157	167				200	203				144	148			
Empathic concern (3)	<i>r</i>	.05	.06	1			.12	.16*	1			.07	.13	1			.25*	.25**	1		
	<i>N</i>	102	83	161			197	165	318			247	203	404			173	146	288		
Perspective taking (4)	<i>r</i>	.08	-.01	.31***	1		.08	.05	.33***	1		.16*	.01	.46***	1		.20*	.063	.45***	1	
	<i>N</i>	102	83	160	160		197	165	318	318		247	203	404	404		173	146	288	288	
Agreeableness (5)	<i>r</i>	.45***	.33**	.14	.21**	1	.37***	.31***	.23***	.29**	1	.40***	.38***	.31***	.27***	1	.46***	.45***	.30***	.27***	1
	<i>N</i>	103	83	150	149	151	201	167	304	304	308	247	203	689	389	390	178	148	278	278	384

Mother support (1)	Z (p)	0 (1)				0 (1)					0 (1)					0 (1)					
Father support (2)	Z (p)	0.72 (.47)	0 (1)			0.19 (.85)	0 (1)				0.37 (.73)	0 (1)				0.52 (.60)	0 (1)				
Empathic concern (3)	Z (p)	1.03 (.30)	0.39 (.70)	0 (1)		-0.10 (.92)	-0.80 (.42)	0 (1)			0.77 (.44)	-0.50 (.62)	0 (1)			-1.48 (.14)	-1.05 (.29)	0 (1)			
Perspective taking (4)	Z (p)	0.22 (.83)	0.39 (.70)	0.96 (.34)	0 (1)	0.20 (.84)	0.18 (.86)	1.2 (.23)	0 (1)		0 (1)	1.09 (.28)	-1.98 (.05)	0 (1)		-1.01 (.32)	-0.03 (.98)	-0.87 (.38)	0 (1)		
Agreeableness (5)	Z (p)	-0.36 (.72)	0 (1)	2.02 (.04)	0.48 (.63)	0 (1)	0.12 (.90)	0.31 (.38)	1.09 (.28)	0.84 (.40)	0 (1)	0.95 (.34)	0.23 (.82)	-0.45 (.65)	-1.01 (.32)	0 (1)	-1 (1)	0.34 (.73)	0.53 (.60)	0 (1)	0 (1)

Table S4

Attrition Analysis Assessing Systematic Attrition

Variables at time point <i>k</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>M</i> Δ	<i>SE</i> Δ	Δ at time point <i>k + 1</i>	
						95% CI Lower	95% CI Upper
Maternal support T1	-0.151	224	.880	-.013	.089	-0.189	0.162
Paternal support T1	0.678	178	.499	.094	.138	-0.179	0.366
Perspective taking T1	-0.361	351	.719	-.031	.086	-0.201	0.139
Empathic concern T1	-0.134	352	.894	-.127	.095	-0.199	0.173
Agreeableness T1	-0.318	340	.750	-.037	.116	-0.265	0.191
Maternal support T2	0.435	423	.664	.021	.049	-0.074	0.116
Paternal support T2	1.104	349	.270	.075	.068	-0.059	0.210
Perspective taking T2	-0.637	675	.525	-.034	.053	-0.138	0.070
Empathic concern T2	0.774	674	.439	.041	.054	-0.064	0.147
Agreeableness T2	-2.051	651	.041	-.130	.063	-0.253	-0.005
Maternal support T3	-0.225	488	.822	-.009	.043	-0.095	0.075
Paternal support T3	-0.797	400	.426	-.050	.069	-0.174	0.074
Perspective taking T3	-0.717	769	.474	-.034	.047	-0.128	0.060
Empathic concern T3	0.011	769	.991	.001	.052	-0.102	0.103
Agreeableness T3	-1.193	758	.233	-.069	.058	-0.183	0.045
Maternal support T4	-1.811	340	.071	-.083	.046	-0.172	0.007
Paternal support T4	-1.424	292	.156	-.082	.058	-0.195	0.031
Perspective taking T4	0.246	572	.806	.013	.051	-0.087	0.112
Empathic concern T4	0.071	572	.944	.004	.058	-0.109	0.112
Agreeableness T4	-0.142	576	.887	-.008	.056	-0.119	0.103