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Longitudinal Dynamics Between Parenting and Adolescent Deviance: Direct Links and Underlying Mechanisms

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LONGITUDINAL DYNAMICS BETWEEN PARENTING AND ADOLESCENT DEVIANCE: DIRECT LINKS AND UNDERLYING MECHANISMS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Agriculture, Food and Environment
at the University of Kentucky

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ABSTRACT OF DISSERTATION

LONGITUDINAL DYNAMICS BETWEEN PARENTING AND ADOLESCENT DEVIANCE: DIRECT LINKS AND UNDERLYING MECHANISMS

The current dissertation, based on three separate and yet closely related studies, tested the longitudinal dynamic relationships of maternal and paternal parenting factors with adolescent deviance, the direct links as well as underlying mechanisms. Study 1, based on longitudinal data collected from 570 early adolescents, part of the Brno Longitudinal Study of Youth (BLSY), used latent growth modeling and tested the development of three parenting measures, including parental solicitation, knowledge, and peer approval, and deviance during early adolescence, as well as the developmental (i.e., growth to growth) links of these three parenting measures with adolescent deviance over time. Results indicated a linear decrease for maternal solicitation, a quadratic increase for maternal peer approval, a quadratic decrease for paternal solicitation, a linear increase for paternal peer approval, and a linear increase for adolescent deviance during the 1.5 years of study. A more rapid decline in maternal solicitation was associated with a more rapid increase in deviance while a more rapid increase in both parents' peer approval was associated with a slower increase in deviance. Study 2, based on three waves of data collected from 457 adolescents and their parents, part of the National Institute of Child Health and Development (NICHD) Study of Early Child Care and Youth Development (SECCYD), tested the associations between parental emotional distress (i.e., depressive symptoms, anxiety, and anger) and developmental changes in adolescent deviance, as well as underlying processes through developmental changes in interparental relationship quality and parent-child relationship. Results based on an actor-partner interdependence model, indicated that both maternal anger and father reported marital conflict at Grade 5 were associated with changes in adolescent deviance at age 15 through changes in mother-child conflict at Grade 6. Differences between mothers and fathers were observed, where maternal anger was associated with changes in father reported marital conflict, but paternal anger was not associated with changes in mother reported marital conflict, for instance. Study 3, based on 570 early adolescents, part of the BLSY followed over two years, 5 assessments, framed by self-control theory, tested the development of self-control during early adolescence as well as the longitudinal associations between parenting (i.e., parental closeness, support, monitoring, and disciplinary inconsistency) and developmental changes in adolescent deviance mediated by developmental changes in self-control. Results showed that levels of self-control within individuals decreased over time, and that individuals varied in baseline levels of self-control as well as rates of change over time. Structural equation modeling tests provided evidence of full mediation of perceived parenting

behaviors through developmental changes in self-control, such that parental solicitation was positively associated with changes in self-control, which in turn was then negatively associated with changes in deviance. These three studies further elucidate developmental processes and underlying mechanisms addressing the parenting-deviance links among adolescents, thus providing novel and important insights as well as implications for theory, research, preventative work as well as future policies.

KEYWORDS: Parenting, Adolescent Deviance, Longitudinal Links, Underlying Mechanisms, Maternal vs. Paternal Parenting.

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03/17/2022

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LONGITUDINAL DYNAMICS BETWEEN PARENTING AND ADOLESCENT DEVIANCE: DIRECT LINKS AND UNDERLYING MECHANISMS

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DEDICATION

To my parents Xinghe Liu and Mengping Ran, who, in spite of the numerous hardships, has raised me with enormous love and support. They taught me to be kind, appreciative, and courageous. They motivate me to follow my dreams and constantly push my limits.

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CHAPTER 1. LONGITUDINAL RELATIONSHIPS OF PARENTAL SOLICITATION, KNOWLEDGE, AND PEER APPROVAL WITH DEVIANCE DURING EARLY ADOLESCENCE

1.1 Introduction

Parents and peers are closely linked to adolescent deviant behaviors. During adolescence, parental influence on adolescent development is likely to shift while influence of peers increases (Van Ryzin et al., 2012; Wang et al., 2011). However, even though parental influence seems to decrease, it continues to play a key role in shaping adolescent behaviors, controlling for influences by peers and other factors (Van Ryzin et al., 2011). The continuing importance of parents lies in the protective effects of positive parental behaviors, such as effective parental monitoring - one of the most prominent predictor of adolescent deviance (e.g., Crouter & Head, 2002) and management of adolescents' peer relationships. What is less known is how parenting, such as parental solicitation (i.e., seeking information from adolescents or others, one type of monitoring efforts; Statin & Kerr, 2000), and parental peer involvement during adolescence develop and whether and how development in those measures are associated with the development in adolescent deviance. There is no clear or consistent conclusion either concerning how parent and adolescent sex may influence the development of each parenting measure or about the developmental links between each parenting measure and adolescent deviance.

Thus, the current study had three main aims: 1) to test the development of three parenting measures including parental solicitation, parental knowledge - the presumed outcome of parental monitoring and a consistent correlate of adolescent deviance (Crouter

& Head, 2002), and parental peer approval, as well as a measure of deviance during early adolescence; 2) to test developmental links between the parenting measures and adolescent deviance using the growth of each parenting measure to predict the growth of adolescent deviance; and 3) to further test whether development in each measure as well as the growth-to-growth links showed different patterns by parent and adolescent sex.

1.1.1 Development in Deviance during Adolescence

Deviance can be defined as a broad range of behaviors from socially unacceptable behavior (e.g., acting out at school) to acts against the criminal law that include status offenses (e.g., truancy) and index offenses (e.g., robbery) (Farrington, 2004). Based on the arguments developed by Hirschi and Gottfredson (1983) related to the relationship between age and crime and the empirical evidence that has followed (e.g., Carlsson & Sivertsson, 2021; Shulman et al., 2013), crime/deviance generally increases and peaks during adolescence and starts to decline during early adulthood. This pattern of developmental changes in crime/deviance exists invariantly across different social strata as well as cultural contexts. Increase in risk taking and deviance during adolescence seems biologically or evolutionarily planned based on evidence from tests of the dual systems model (Vazsonyi & Ksinan, 2017). Findings from longitudinal studies also support an increasing trend in antisocial or deviant behavior during early and middle adolescence (e.g., Duncan et al., 2000; Reitz et al., 2007; Wang et al., 2011; see review by Farrington, 2004). Thus, increases in deviance are expected and seem rather common during adolescence. In addition to changes in deviant behavior over time, adolescents also experience profound changes in how they are parented, including parental monitoring, knowledge, or involvement in peer associations. Despite the abundant literature on both

parenting practices and adolescent deviance, as well as their relationships, much remains to be learned about how parenting practices vis-à-vis adolescent deviant behavior change over the second decade of life, including parental knowledge, solicitation, and peer approval, and the extent to which these parenting behaviors are associated with developmental changes in deviance over time.

1.1.2 Parental Solicitation, Knowledge and Adolescent Deviance

1.1.2.1 Parental Solicitation and Knowledge

The current study conceptualized parental solicitation and knowledge based on the seminal work by Statin and Kerr (2000), which has generated an impressive body of scholarship, focused in part on the conceptualization and measurement of parental monitoring (e.g., Crouter & Head, 2002; Ellis et al., 2008; Racz & McMahon, 2011). Based on Statin and Kerr (2000), parental monitoring, although conceptualized as parental efforts in active tracking and surveillance (i.e., solicitation and control), has been frequently operationalized as knowledge, defined as parental awareness of adolescents' daily activities, whereabouts, and peer companions, with child disclosure being the primary source. Therefore, Stattin and Kerr (2000) argued that the positive associations between parental monitoring and adolescent adjustment measures in previous studies are in fact the relationship between parental knowledge and adolescent adjustment measures. Indeed, research has consistently shown that more parental knowledge is both concurrently and longitudinally associated with a lower likelihood to engage in deviance or associated with less deviance among youth from different ethnic or SES backgrounds (e.g., Chang & Qin, 2018; Lansford et al., 2014; Lippold et al., 2014; Lippold et al., 2016; Marceau et al., 2015; Walters, 2019; Walther et al., 2012; Wang et al., 2011).

Statin and Kerr (2000) distinguished three ways for parents to obtain knowledge about adolescents, namely through parental monitoring efforts, including parental solicitation (i.e., seeking information from adolescents or others) and control (i.e., making rules), and child disclosure. Contrary to the previous evidence, their research shows that parental monitoring efforts are not important preventive factors of adolescent adjustment; particularly, parental solicitation has been found to have no associations with or are even risk factors for negative adolescent adjustment (Kerr & Statin, 2000; Statin & Kerr, 2000, Kerr et al., 2010). Some other work has found no associations between parental solicitation and adolescent risky/delinquent behaviors as well (e.g., Eaton et al., 2009; Rekker et al., 2017; Wang et al., 2013). However, studies also found that more parental solicitation was associated with less adolescent deviance (e.g., Keijsers et al., 2009; Keijsers et al., 2010; Laird et al., 2010). Thus, the evidence concerning how parental monitoring efforts, particularly parental solicitation, are related to adolescent deviance seems rather inconsistent. The current study sought to examine developmental changes in both a measure of parental solicitation and a measure of parental knowledge, and associations of developmental changes in each measure with developmental changes in adolescent deviance, to further test the associations of parental solicitation (as parental monitoring efforts) and knowledge with adolescent deviance.

1.1.2.2 Development in Parental Solicitation and Knowledge during Adolescence

Parental solicitation and knowledge are likely to change during adolescence. As adolescents develop and strive for more autonomy, active tracking and surveillance might be perceived as more and more intrusive (Crouter & Head, 2002), and adolescents will be less willing to disclose, which is a key predictor of parental knowledge based on Statin

and Kerr (2000). Adolescents' need for more autonomy may also lead parents to adjusting their monitoring techniques or reducing their active tracking and surveillance (Racz & McMahon, 2011). As a result, parental knowledge might decrease throughout adolescence (e.g., Grundy et al., 2010; Laird et al., 2003; Racz & McMahon, 2011; Keijsers & Poulin, 2013; Wang et al., 2011), with few exceptions (e.g., Moilanen et al., 2009). Parental solicitation has been shown to decrease based on parental report but to remain unchanged based on adolescent reports, according to a recent meta-analytic study (Lionetti et al., 2019). Comparatively fewer studies have examined the development of parental solicitation during adolescence. Keijers and colleagues (2009; 2013) tested the growth of parental solicitation and found that its trajectory varied by informants and developmental stages during adolescence. In general, the evidence seems to suggest a decreasing or declining trend for both parental solicitation and knowledge during early adolescence.

1.1.2.3 Links of Development in Parental Solicitation and Knowledge with Development in Adolescent Deviance

Although parental solicitation and knowledge as well as adolescent deviance continue to develop during adolescence, research has rarely focused on how developmental changes in these two parenting measures are associated with developmental changes in adolescent deviance. In fact, there appears to be very little work conducted on the link between developmental changes in parental solicitation and developmental changes in deviance. Keijsers et al. (2009) sought to test this link among Dutch adolescents, using four waves of data, but were unable to do so due to model convergence problems. There appears to have been no other attempts to test this important question. Several studies have examined how trajectories and patterns of change in parental

knowledge are associated with levels of adolescent deviance subsequently (Chang & Qin, 2018; Lippold et al., 2016; Wang et al., 2011). Using growth mixture modeling, Chang and Qin (2018) found that long-term (from early to late adolescence) high levels of maternal knowledge were associated with a lower level of externalizing or delinquent behavior in late adolescence. Lippold et al. (2016) found that more fluctuation in parental knowledge during early adolescence was associated with more delinquency later, among female adolescents. Wang et al. (2011) tested the development of both parental knowledge and adolescent antisocial behavior but did not further test how developmental changes in each was associated with developmental changes in the other. Only a handful of studies have tested the developmental links between parental knowledge and adolescent deviance (Laird et al., 2003; Reitz et al., 2007). Using latent growth modeling with four waves of data from US 14-year-olds over the course of four years, Laird et al. (2003) found that increases in parental knowledge were negatively correlated with increases in parent- but not adolescent-reported delinquency. Reitz et al. (2007) followed a group of 13-14-year-olds from Netherlands over two years using three assessments and found that decreases in parental knowledge over time were correlated with increases in adolescent delinquency over time. These studies reached very similar conclusions based on samples from different cultural backgrounds. The current study extended these previous studies in a number of ways, including a sample followed during early adolescence in particular, the use of both maternal and paternal measures of parenting, and a test of the link between the developmental changes in parental solicitation and adolescent deviance.

1.1.3 Parental Peer Approval and Deviance

1.1.3.1 Parental Peer Involvement and Deviance

Peers act as another important factor in adolescent deviance, although studies are not conclusive about whether influence by parents or influence by peers is stronger or whether both influences are simply qualitatively different. Influence by peers, either through peer deviant behavior or associations with deviant peers, has been found to be significant in both cross-sectional and longitudinal studies, among boys and girls, and across different racial/ethnic groups (e.g., Criss et al., 2016; Ferguson et al., 2009; Meldrum & Barnes, 2017; Reynolds & Crea, 2015). However, no matter how influential peers become during adolescence, the influence by parents continues (Van Ryzin et al., 2012). In addition to active monitoring, parents can also influence adolescents' behavior by managing their peer relationships.

Parents can either directly or indirectly involve in adolescents' peer relationships. Directly, parents could monitor, limit, and prohibit adolescent activities with peers, act as a consultant or moderator in peer relationships, or spend time with both adolescents and peers, all of which could influence adolescents' choice of friends, affiliations with deviant peers, and also adolescents' deviant behaviors (Lahey et al., 2008; Laird et al., 2008; Mounts, 2007; Müller et al., 2017; Updegraff et al., 2010), although the direction of effects may depend on whether adolescents feel overcontrolled by their parents (Mounts, 2001; Soenens et al., 2009; Tilton-Weaver et al, 2013). Indirectly, positive parenting behavior can reduce adolescents' affiliations with deviant peers or even peer delinquency, which then reduces adolescents' deviance (e.g., Cutrín et al., 2019; Janssen et al., 2016).

Given the importance of parental involvement in adolescents' peer relationships and adolescents' strong desire for more autonomy, it is important to examine how parental peer approval, which is related to both parental control and adolescent autonomy, relates to adolescent deviance. The current study specifically aimed to examine how parental peer approval changes in early adolescence, and how the changes are related to changes in adolescent deviance.

1.1.3.2 Development in Parental Peer Approval during Adolescence and Its Influence

It remains unclear how parental peer approval develops during adolescence. On the one hand, parental control and rule-making of activities, such as homework and staying out late without supervision, have been found to decrease over time (Wang et al., 2011), suggesting that parents may give adolescents more autonomy in peer relationships as well and therefore more peer approval. On the other hand, as adolescents strive for more autonomy, parents may still want to hold the control over them, which includes their peer relationships (Mount, 2001), suggesting that some parents may try to intervene more into adolescents' peer relationships and thus will not grant the needed autonomy.

Relevant study findings are largely in favor of a positive effect between less parental disapproval or prohibition of peer relationships and adolescents' associations with deviant peers or deviance. For example, higher levels of parental autonomy granting in peer relationships predicted less conflict with friends as well as less delinquency and drug use (Mounts, 2004), while higher levels of parental prohibition of peers predicted higher levels of adolescent delinquency (Mounts, 2001); more parent-reported prohibition of adolescents' friendships predicted more contacts with deviant peers, which then predicted more adolescent delinquency, in which case, forbidden friends seemed to have become

"forbidden fruit" (Keijsers et al., 2012), contrary to what parents wanted to prevent. Other findings suggest that moderate levels of parental prohibition were preventive of adolescent delinquency while low and high levels of parental prohibition accelerate it (Mounts, 2001). Or the effects of parental prohibition may depend on how adolescents perceive it: If adolescents perceive it as autonomy supportive controlling, they may have fewer deviant peer affiliations, but if they perceive it as autonomy controlling, they may instead have even more deviant peer affiliations (Soenens et al., 2009).

No studies have examined the developmental changes in parental peer approval/disapproval over time during adolescence and how these changes might be associated with developmental changes in adolescent deviance. Both of these questions were examined in the current study.

1.1.4 Sex Differences

Evidence from meta-analytic research suggests that parent and adolescent sex matters when considering the influences of parenting on adolescent deviance (Hoeve et al., 2009). This conclusion applies to the parental knowledge- and parental peer involvement-deviance links. It is not new that males report more deviance than females (e.g., Cota-Robles & Gamble, 2006; Low et al., 2018; Richards et al., 2004; Wang et al., 2011). In terms of knowledge, adolescents generally perceive their mothers as having more knowledge than their fathers (Lansford et al., 2014); maternal knowledge seems to have a larger effect than paternal knowledge (e.g., Cota-Robles & Gamble, 2006; Silverman & Caldwell, 2005; Webb et al., 2002); more evidence suggests that parental knowledge may have a greater influence on male deviance (Cutrín et al., 2019; Lansford et al., 2014; McAdams et al., 2014; Reitz et al., 2007; Silverman & Caldwell, 2005) with few

exceptions (e.g., Yoo, 2017), although females have reported more parental monitoring and knowledge (Cota-Robles, 2006; Jacobson & Crockett, 2006; Racz & McMahon, 2011; Richards et al., 2004; Webb et al., 2002). In terms of peer relationship involvement, mother's but not father's restrictions were related to adolescents' affiliations with deviant peers (Updegraff et al., 2010); females seem to be more susceptible to peer delinquency (Cutrín et al., 2019; McAdams et al., 2014; Reitz et al., 2007; see exceptions in Müller et al., 2017) while experiencing more parental restrictions or rule making (e.g., Updegraff et al., 2010; Wang et al., 2011). There are also studies that found no differences by parent or adolescent sex (e.g., Criss et al., 2016; Walters, 2019), but more evidence seems to suggest otherwise. Therefore, tests in the current study took into consideration the influences of both parent and adolescent sex.

1.1.5 The Current Study

The current study had three main research goals: 1) to examine development of parental solicitation, knowledge, peer approval, and adolescent deviance in early adolescence; 2) to examine whether and how development of the three parental measures were related to development in adolescent deviance; and 3) to examine whether different patterns of development in each measure as well as developmental links between each parenting measure and adolescent deviance emerged by parent and adolescent sex. The following hypotheses were developed. It was expected that

H1: Solicitation and knowledge of both parents would decrease during early adolescence (W1 to W4).

H2: Adolescent deviance would increase during early adolescence (W1 to W4).

H3: A lower initial level of parental solicitation and knowledge (W1) would predict a higher initial level of adolescent deviance (W1).

H4: A slower decrease (i.e., slope/rate of change) in parental solicitation and knowledge (W1 to W4) would predict a slower increase (i.e., slope/rate of change) in adolescent deviance (W1 to W4).

H5: Developmental links between parental solicitation and knowledge and adolescent deviance would differ by parent and adolescent sex, although specific directions were not hypothesized.

The relationships between the initial level/intercept of each parenting measure (W1) and slope/rate of change in the deviance measure (W1 to W4) were exploratory due to a lack of evidence from previous research as well as missing conceptual considerations to make directional predictions. In terms of developmental changes in parental peer approval, its associations with developmental changes in deviance, as well as potential similarities or differences by parent and adolescent sex, the model tests were also exploratory, given unclear trends in developmental changes in parental peer approval as well as the directions of association based on the previous literature.

1.2 Method

1.2.1 Sampling

Data were collected as part of the Brno Longitudinal Study of Youth (BLSY), an accelerated longitudinal study that followed two cohorts of Czech 6th and 7th graders over the course of approximately four years. At the baseline, 570 adolescents (58.4% female; Mage=12.43 years, SD=0.66) enrolled in the study. Data collection (six assessments or Waves [W]) happened half a year apart for the first four assessments and one year apart

between the last two assessments. Following Wave 4, half of the participating schools discontinued the study, thus resulting in a loss of n = 195 participants (34.21% of the original sample). The current study focused on data collected in W1 through W4, spanning one and half years, from fall 2014 to spring 2016. The study received IRB approval from a university in the United States as well as a local ethics committee. Both parental consent and adolescent assent were obtained for each study participant. Students completed a 60 to 90-minute paper and pencil survey during regular school hours.

1.2.2 Measures

Background Information. Participants reported their birth year and month, which was then used to calculate their age. And they reported their sex by choosing 0 *male* or 1 *female*. They reported family structure by choosing one from eight options: *biological parents, biological mother only, biological father only, biological mother and stepfather, biological father and stepmother, biological parent and significant other, shared custody, and other*; responses were recoded so that 1 represented two-parent families while 0 represented other types of families. In addition, participants reported their mother's and father's education (six options ranging from *basic education through 9th grade* to *having a graduate degree*) as well as monthly family income (five options ranging from *20,000 Czech Crowns* (about US$ 1,010) or *less to 100,000 Czech Crowns* (about US$ 5,050) or more; a socioeconomic status (SES) score was calculated as the average of standardized mean parental education and monthly family income.

Maternal and Paternal Solicitation were measured by two items part of the parental monitoring subscale of the Adolescent Family Process measure at all four assessments (AFP; Vazsonyi et al., 2003). These two items are "My mother/father wants to know who

I am with when I go out with friends or on a date," "My mother/father wants me to tell him where I am if I don't come home right after school." Adolescents rated the statements separately for the maternal and paternal measures using a 5-point Likert type scale ranging from 1 strongly disagree to 5 strongly agree; response scores were averaged across the two items ranging from one to five with a higher number indicating a higher level of parental solicitation. Maternal and paternal solicitation scores were calculated separately. The maternal and paternal measures were internally consistent across majority of the four assessments (mother: α = .61- .75; father: α = .77- .87).

Maternal and Paternal Knowledge were measured by two items part of the parental monitoring subscale of the Adolescent Family Process across all four assessments (AFP; Vazsonyi et al., 2003), namely "In my free time away from home, my mother/father knows who I'm with and where I am," "When I am not home, my mother/father knows my whereabouts." Adolescents rated two statements separately for the maternal and paternal measures using a 5-point Likert type scale ranging from 1 *strongly disagree* to 5 *strongly agree*; response scores were averaged across the two items ranging from one to five with a higher number indicating a higher level of parental knowledge. Maternal and paternal knowledge scores were calculated separately. The maternal and paternal measures were internally consistent across the four assessments (mother: α = .80- .91; father: α = .88- .92).

Maternal and Paternal Peer Approval were measured by the 3-item parental peer approval subscale of the AFP measure at all four assessments (Vazsonyi et al., 2003). Adolescents indicated the frequency of their mother/father approving their friends, approving their boyfriend/girlfriend, and liking when they went out with friends. Again,

they rated their mother's and father's approval separately, using a 5-point Likert type scale ranging from 1 *never* to 5 *very often*; response scores were averaged across the three items ranging from one to five with a higher number indicating more frequent parental peer approval. Maternal and paternal peer approval scores were calculated separately. The maternal and paternal measures were internally consistent across most of the four assessments: Mother: α = .60- .73; father: α = .67- .82.

Deviance was measured by the 21-item Normative Deviance Scale (short form; Vazsonyi, 2012; Vazsonyi et al., 2001) at all five assessments. Participants responded to questions, such as "Have you smashed bottles on the street, school grounds, or other areas?" and "Have you intentionally damaged or destroyed property belonging to a school?", using a 5-point Likert type scale ranging from 1 *never* to 5 *more than 6 times*. Responses were averaged across the 21 items with a score range of one to five with a higher number indicating a higher frequency of deviance. The measure was internally consistent across the four assessments (α = .74- .91).

1.2.3 Plan of Analysis

Descriptive statistics of background and focal variables were calculated in an initial step. Missing data were examined to diagnose whether the pattern of missingness was completely at random (MCAR; using the Little's MCAR test), at random (MAR; using a sensitivity analysis), or not at random. For diagnosis of MAR, variables with missing values were recoded into a dummy variable indicating missingness (0 = not missing, 1 = missing), which was then correlated with other variables; a statistically significant correlation between the dummy coded variable for missingness and another variable would provide evidence for MAR (Kline, 2016). Attrition was examined to determine whether

and how participants who did not provide data differed from participants who provided data at each wave. Normality of variables were examined based on the skewness and kurtosis statistics: Means larger than three times of the standard errors were considered as evidence for non-normality. Following descriptive statistics, a series of *t* tests were conducted to compare mean levels of study variables between males and females. Correlations among study variables were then calculated, using SPSS version 28.

Next, as the parental solicitation and knowledge measures came from the same measure originally, a series of CFAs were completed to examine whether a 1-factor model with both parental solicitation and knowledge items or a 2-factor model with the solicitation factor and the knowledge factor in one model had a better fit based on a chi-square difference test. If the 1-factor model turns out to have a better fit, all subsequent analyses would also be completed using the composite "monitoring" measure. Separate analyses were completed for the parental solicitation and parental knowledge measures whether the 1-factor model fit better or not, to be consistent with distinctions made by Statin and Kerr (2000). Finally, a 2-step latent growth modeling (LGM) were used to test study hypotheses and questions. In Step 1, unconditional latent growth models of maternal/paternal solicitation, maternal/paternal knowledge, maternal/paternal peer approval, and adolescent deviance were specified and tested to determine whether there was significant growth in each measure and whether the growth was linear or quadratic. In Step 2, multivariate latent growth models (i.e., growth-to-growth models) were specified with the intercept factor of deviance regressed on the intercept factors of all parenting measures and the slope factor of deviance on the intercept and slope factors of all parenting measures (see Figure 1.1 for the conceptualized model). Maternal measures

and paternal measures were examined separately to investigate potentially different patterns of growth or associations. In testing each unconditional growth model and the growth-to-growth associations, multigroup tests were also conducted to examine whether growth of each measure and the growth-to-growth associations differed between males and females. Model fit of all tested models were evaluated based on the following criteria: model χ^2 was not statistically significant, CFI > .90, RMSEA < .08 (Hu & Bentler, 1999). Control variables included W1 participant age, SES, and family structure. Model tests were completed in Mplus using maximum likelihood estimation with robust standard errors (MLR) with full information maximum likelihood (FIML) for missing data handling.

1.3 Results

1.3.1 Attrition and Missing Data

Although 570 adolescents agreed to participate in the study, not of them completed all waves of assessment. Specifically, 66 adolescents (11.6%), 49 adolescents (8.6%), 94 adolescents (16.6%), and 99 adolescents (17.4%) did not participate in W1, W2, W3, and W4 assessments respectively. A series of *t*/Chi-square tests were completed to compare youth who did not provide data at each wave with those who did on demographics and main study variables. Compared with youth who provided data, youth who did not at W1 indicated a slightly lower level of paternal peer approval ($t(514) = -3.121$, $p = .002$) at W2; youth who did not provide data at W2 did not differ on any measures; youth who did not provide data at W3 indicated a younger age ($t(567) = 2.043$, $p = .042$) and a higher level of W1 paternal knowledge ($t(117.214) = 2.629$, $p = .010$) and W2 maternal solicitation

(t(115.991) = 2.255, p = .026); and youth who did not provide data at W4 indicated a higher SES (t(116.058) = 2.420, p = .017).

The percentage of missingness on variables ranged from 0.7% to 16.2%. The Little's MCAR test indicated missing not completely at random. A follow-up analysis was then completed, and results indicated that missing was at random. Given this finding, full information maximum likelihood (FIML) was used for missing data handling.

1.3.2 Descriptive Statistics and Correlations

Descriptive statistics of study variables are presented in Table 1.1. The sample (M_{age} = 12.43 years, SD = 0.66) was composed of a slightly larger percentage of females (58.6%) as well as youth from a two-parent family (76.0% of study sample). About 45.5% of participants reported a monthly family income of 35,000 Czech crowns (about US$ 1,767) or less, 34.5% between 35,000 to 60,000 Czech crowns (about US$ 1,767 to 3,030), and 20.0% more than 60,000 Czech crowns (about US$ 3,030). About 47.5% of the mothers obtained a college degree or above, and that number was 54.3% for fathers. There was some evidence of violations of normality, and maximum likelihood with robust standard errors (MLR) was used to address the issue.

Based on results from t tests (see Table 1.1 for p values), compared with males, females reported more maternal knowledge and solicitation across all four assessments, more paternal solicitation at W1, and less deviance at W1 and W2. They did not differ on other parental and deviance variables.

Correlations among main study variables are presented in Table 1.2. Both maternal and paternal knowledge showed a consistently negative association with adolescent deviance across the four assessments. Both maternal and paternal solicitation were also

negatively associated with adolescent deviance across assessments, with two exceptions (i.e., W1 maternal solicitation with W3 deviance, W1 deviance with W2 paternal solicitation). Finally, both maternal and paternal peer approval were negatively associated with adolescent deviance across assessments, but for paternal peer approval, most of the correlations were not statistically significant. Maternal measures and paternal measures were fairly strongly correlated at each wave. Specifically, maternal knowledge was moderately correlated with paternal knowledge at each wave: *r*s = .42 - .49, *p*s< .001; maternal solicitation was also moderately correlated with paternal solicitation: *r*s = .36 - .44, *p*s< .001; and maternal peer approval and paternal peer approval were strongly correlated at each wave: *r*s = .62 - .66, *p*s< .001.

1.3.3 Unconditional Growth Models

A series of CFAs on maternal and paternal measures across all four waves of assessments consistently showed a better fit for a two-factor model of the Parental Monitoring scale based on a Satorra-Bentler scaled chi-square difference test, indicating the distinguishability between the parental knowledge construct and the parental solicitation construct. Therefore, a composite monitoring measure was not used in subsequent model tests.

Results of unconditional growth model tests are presented in Table 1.3. Each measure was examined for a linear and quadratic growth trend. For maternal knowledge, both the linear and quadratic models had acceptable fit, but none of the slope factors reached statistical significance, indicating no growth during the one and half years of the study. For maternal solicitation, the linear trend model had acceptable fit, while an error message in analysis indicated that the quadratic model was not appropriate for the data.

Both the intercept and slope factors of the linear model were statistically significant; the negative slope coefficient indicated a declining trend of maternal solicitation over time. The intercept and slope factors did not covary, but both varied across participants: intercept variance = 0.33 ($p < .001$); slope variance = 0.03 ($p = .016$). For maternal peer approval, both the linear and the quadratic models had acceptable CFIs and RMSEAs, and the fit for the quadratic model was better based on a Satorra-Bentler scaled chi-square difference test. But the higher limits of the 90% RMSEA confidence intervals for both models indicated some concern for poor model fit. However, an examination of the local fit based on normalized residuals suggested that the misfit was minor with absolute values ranging from 0.08 to 1.865 for the linear model and from 0 to 0.010 for the quadratic model, and therefore, model fit was adequate for both models. For the linear model, both the intercept and the slope factors were statistically significant. The positive slope factor indicated an increasing developmental trend in maternal peer approval over time. The intercept and slope were correlated at $r = -.31$ ($p = .008$), indicating that a higher initial level of maternal peer approval was associated with a slower increase in the measure over time. Both the intercept and the slope varied across individuals: intercept variance = 0.37 ($p < .001$); slope variance = 0.04 ($p = .007$). For the quadratic model, the negative quadratic slope factor indicated that the developmental change or increase in maternal peer approval slowed down over time. The intercept factor was unrelated to either the linear slope or the quadratic slope. The intercept factor varied across adolescents while the linear and quadratic slope factors did not: intercept variance = 0.45 ($p < .001$); linear slope variance = 0.34 ($p = .052$); quadratic slope variance = 0.03 ($p = .103$). The chi-square difference

test comparing the linear model and the quadratic model of maternal peer approval indicated that the quadratic model fit better.

For paternal knowledge, both the linear and quadratic models had acceptable fit, but none of the slope factors reached statistical significance, indicating no developmental changes or growth over time during the one and half years of the study. For paternal solicitation, both the linear and quadratic models had acceptable fit. But the chi-square difference test comparing the linear model and the quadratic model of paternal solicitation indicated that the quadratic model fit better. The negative linear slope factor indicated that the mean level of paternal solicitation decreased over time, and the positive quadratic slope factor indicated that the decrease leveled off over time. The intercept factor was unrelated to either the linear slope or the quadratic slope. While the intercept factor varied across individuals, neither of the two slope factors varied across individuals: intercept variance = 0.97 ($p < .001$); linear slope variance = 0.33 ($p = .215$); quadratic slope variance = 0.03 ($p = .073$). For paternal peer approval, although the quadratic model had a better fit than the linear model, an error message while running the model indicated that the quadratic model was not appropriate for the data. Meanwhile, the linear model had acceptable fit with a statistically significant slope factor, it was determined that a linear growth trend described developmental changes in paternal peer approval the best. The positive slope factor indicated an increasing trend of paternal peer approval over the one and half years of study. The intercept and slope were negatively correlated at $r = -.25$ ($p = .015$), indicating that a higher initial level of paternal peer approval was associated with a slower increase in the measure over time. Both the intercept and the slope varied across individuals: intercept variance = 0.56 ($p < .001$); slope variance = 0.06 ($p < .001$).

For adolescent deviance, the linear model had better fit than the quadratic one, although both the linear and quadratic models had an acceptable fit. Additionally, the quadratic slope factor did not reach statistical significance, and therefore it was determined that a linear growth trend best described developmental changes in deviance. The positive slope factor indicated an increasing trend of deviance over the one and half years of study. The intercept and the slope did not covary, but both varied across individuals: intercept variance = 0.06 ($p < .001$); slope variance = 0.01 ($p = .009$).

All final unconditional models were also tested for sex differences. However, no differences in trend of growth for any parental measure or for deviance was found.

1.3.4 Multivariate Growth Models

Multivariate growth model tests were completed using the parental measures that showed significant developmental changes or growth to predict developmental changes or growth in deviance (see Figure 1 for the conceptualized multivariate growth model). Models were tested for maternal measures first. Several decisions were made. First, as maternal knowledge did not show growth over time, only the baseline (W1) mean maternal knowledge was added to the final model tests. Second, as the model wouldn't converge when maternal solicitation with linear growth factors and maternal peer approval with quadratic growth factors were added into the same model, maternal peer approval with linear growth factors were added in model tests instead of the quadratic growth factors. Finally, the model with growth factors of both maternal solicitation and peer approval had issues of multicollinearity as the estimated correlation between the slope factors of peer approval and solicitation was extremely high ($r = .89$, $p < .001$), thus, it was decided that the two measures be included in separate models to predict changes in deviance. Two final

models were tested for the maternal measures (see Table 1.4): One model with the growth of maternal solicitation and the growth of deviance, and the other with the growth of maternal peer approval with the growth of deviance. Both models included W1 maternal knowledge as a predictor of the intercept and slope of deviance. To be consistent with tests with maternal measures, two final models were also tested among the paternal measures: One with the growth of paternal solicitation and the growth of deviance, and the other with the growth of paternal peer approval and the growth of deviance. In both models, W1 paternal knowledge was also added as a predictor of the intercept and slope of deviance. Final models were first tested for sex differences. However, model tests provided error messages that indicated issues with model tests by adolescent sex, or the models would not converge. And therefore, it was determined that the final model tests would be better conducted on the total sample, but that adolescent sex would be added as a control variable; no other demographics were retained as a control because none of them were associated with either the intercept or slope of deviance, and also because adding them hurt the model fit.

Final model test results are presented in Table 1.4. In the model with maternal solicitation and deviance, the slope of maternal solicitation negatively predicted the slope of deviance, indicating that decreases in maternal solicitation was associated with increases in deviance over time. The intercept of maternal solicitation did not predict the intercept or slope of deviance. In this model, a higher level of W1 maternal knowledge was associated with a lower initial level of deviance. In the model with maternal peer approval and deviance, the slope of maternal peer approval negatively predicted the slope of deviance, indicating that a faster increase in maternal peer approval was associated with a slower

increase in deviance. The intercept of maternal peer approval did not predict the intercept or slope of deviance. In the model with paternal solicitation and deviance, none of the hypothesized links were statistically significant, and therefore results for this model are not reported. In the model with paternal peer approval and deviance, the slope, but not the intercept, of paternal peer approval negatively predicted the slope of deviance, indicating that a faster increase in paternal peer approval was associated with a slower increase in deviance. In this model, a higher level of W1 paternal knowledge was associated with a lower initial level of deviance. All final models consistently showed that at the baseline, females had a lower level of deviance than boys, although the slope of deviance did not differ by sex.

Two additional tests were completed to compare the effects between maternal parenting measures and paternal ones on deviance. Specifically, one model was tested using the growth factors of both maternal and paternal solicitation to predict the growth factors of adolescent deviance, and the other using the growth factors of maternal and paternal peer approval as the predictors. Both models had issues of non-positive definite covariance matrices, due to high estimated correlations between the intercepts of parental measures as well as their slopes, leading to uninterpretable results. Thus, no direct comparisons between maternal and paternal parenting measures on their effects on deviance could be completed.

1.4 Discussion

The current study tested the development of three parenting measures that are closely associated with adolescent deviance as well as the associations between their development and the development of adolescent deviance, with the overall aims (1) to add missing

evidence in the literature on the developmental links between parental solicitation, peer approval, and adolescent deviance, (2) to expand our understanding of the longitudinal associations between parental knowledge and adolescent deviance, and (3) to further examine differences in the associations by parent and adolescent sex. Study hypotheses were partially supported; study findings are summarized and discussed below.

1.4.1 Development of Parenting Behaviors and Deviance

Hypothesis 1 was partially supported. As hypothesized, both parents' solicitation declined over the one and half years of study. This is consistent with a finding in previous research (Keijsers & Poulin, 2013), in which though only females, but not males, reported declining parental solicitation during early adolescence. This finding is also consistent with the knowledge that as adolescents strive for more autonomy and may perceive parental active tracking and surveillance as intrusive, parents may adjust their parenting practices accordingly and reduce their active tracking and surveillance for more autonomy support (Crouter & Head, 2002; Keijsers & Poulin, 2013; Racz & McMahon, 2011). However, contrary to the study hypothesis, parental knowledge did not show any significant developmental changes over time. This is inconsistent with findings from previous research that also used self-reports of early adolescents (Keijsers & Poulin, 2013; Wang et al., 2011), and may be related to the fact that only a very brief measure of parental knowledge with two items was used. It could also simply be idiosyncratic to the study sample.

Although not hypothesized, both parents' peer approval increased over the one and half years of study. These are new findings. And similar to decreases in parental solicitation over time, an increase in parental peer approval over time can be explained by

parental efforts to adjust to adolescents' increasing needs for more autonomy (Crouter & Head, 2002; Keijsers & Poulin, 2013; Racz & McMahon, 2011). As peers become more and more important during adolescence (Van Ryzin et al., 2012; Wang et al., 2011), granting adolescents more autonomy in peer associations with more parental peer approval seems also increasingly important for adolescent development.

Hypothesis 2 was supported. Adolescent deviance showed an increasing trend over time. Based on the well-known age-crime relationship (e.g., Carlsson & Sivertsson, 2021; Hirschi & Gottfredson, 1983; Shulman et al., 2013), early adolescents are likely to experience increases in deviance over time, independent of their social or cultural backgrounds. Thus, the current study finding is consistent with this known relationship between age and deviance. It is also consistent with findings in research that focuses on the early adolescent developmental period in particular (Wang et al., 2011; see review by Farrington, 2004). This could be partly explained by the fact that adolescents are biologically wired to be more risk-taking and deviant while not yet having a good sense of impulse control, based on the dual systems model (Vazsonyi & Ksinan, 2017). Being increasingly risky or deviant might serve the purpose of experiencing and learning, from an evolutionary perspective, thus ultimately leading youth to become more independent and self-reliant.

1.4.2 Growth-to-Growth Links Between Parenting Measures and Deviance

Hypothesis 3 was partially supported. A higher level of both W1 maternal and paternal knowledge was associated with a lower initial level of adolescent deviance. No associations were found between the initial levels of parental solicitation and the initial level of deviance, after controlling for effects by the initial levels of parental knowledge.

Although only partially consistent with the study hypothesis, these findings are consistent with previous research that found a more consistent association between more parental knowledge, rather than parental monitoring efforts such as solicitation, and less deviance (Eaton et al., 2009; Kerr et al., 2010; Kerr & Statin, 2000; Statin & Kerr, 2000; Wang et al., 2013). The initial level of parental peer approval was not associated with the initial level of adolescent deviance, after controlling for parental knowledge. This is inconsistent with previous research that found a protective effect of parental peer approval against deviance (e.g., Mounts, 2001, 2004), but it indicated that parental peer approval did not explain much variance in concurrent deviance beyond parental knowledge as well as adolescent sex.

Hypothesis 4 was partially supported. Consistent with the study hypothesis, more decreases in parental solicitation, maternal solicitation in particular, were associated with more increases in adolescent deviance, indicating the continuing importance of maternal solicitation in reducing or slowing down increases in deviance. Based on previous research (e.g., Kerr et al., 2010; Kerr & Statin, 2000; Statin & Kerr, 2000), parental solicitation has no effect or even a negative effect on adolescent adjustment. But based on the current study finding from a developmental perspective, parental solicitation is perhaps associated with deviance in a different way, such that decreasing parental solicitation would be associated with increases in deviance. And although not hypothesized, development in both parents' peer approval was also associated with the development of deviance over time. Specifically, a faster increase in both maternal and paternal peer approval was associated with a slower increase in adolescent deviance, indicating a protective effect of increasing parental peer approval over time against an increase in deviance.

Findings concerning the developmental links between parental solicitation and peer approval with deviance are a novel contribution to the literature as no previous research has completed the same tests. The fact that the rates of changes in, but not the initial levels of, parental solicitation and peer approval were associated with the rate of change in deviance suggested that, it was the changes in these parental behaviors that were associated with the changes in deviance over time, implicating the importance of testing these growth-to-growth links. They indicated that early adolescents benefited from more parental autonomy support behaviors, such as granting more peer approval over time. At the same time, early adolescents would also benefit from continuing parental monitoring efforts, including solicitation. This could be a result of adolescents curtailing their deviant behaviors, in response to parental monitoring, for instance (Laird et al., 2003). These findings suggest that parents are likely to adjust their behaviors over time, and changes in these behaviors are likely to be associated with changes in adolescent behaviors.

1.4.3 Differences/Similarities Between Parents and Males versus Females

Hypothesis 5 was only partially supported. Maternal and paternal parenting behaviors showed more similar than different patterns of growth based on adolescent reports. Specifically, both parents' solicitation declined over time while both parents' peer approval increased over time, and neither maternal nor paternal knowledge showed developmental changes. Although previous research suggested differences between maternal and paternal parenting practices (e.g., Cota-Robles & Gamble, 2006; Lansford et al., 2014; Yaffe, 2020), these studies did not complete similar tests with multiple waves of data. Thus, the findings are not directly comparable. In Keijsers et al. (2009), maternal solicitation had significant changes over time while paternal solicitation did not. This

difference might be due to the different informants: The current study assessed adolescent perceived parental behaviors while Keijsers et al. (2009) utilized parental reports, suggesting that different informants might provide different information, which would need to be further tested and confirmed in future research. In general, findings in the current study consistently show that over time, maternal and paternal knowledge, solicitation, and peer approval seemed to show similar trends in developmental changes or no changes over time.

The longitudinal associations between maternal and paternal parenting behaviors with adolescent deviance showed similarities as well as differences. Specifically, a faster increase in both measures of maternal and paternal peer approval was associated with a slower decrease in adolescent deviance. None of the initial levels of maternal and paternal measures were associated with the changes in deviance, while both parents' knowledge was associated with adolescent deviance at baseline. One difference presented was that while decreases in maternal solicitation was associated with increases in deviance, the association between decreases in paternal solicitation and increases in deviance was not statistically significant. This may suggest a more salient influence of changes in maternal solicitation over time. However, no direct tests were completed to compare whether maternal or paternal measures had a stronger effect, and therefore it could not be determined whether changes in maternal solicitation was associated with changes in adolescent deviance more strongly than paternal solicitation. Thus, findings provide evidence of few differences in the longitudinal links between paternal measures and maternal measures with deviance, although no previous research has completed the same tests.

Lastly, female and male adolescents did not differ in growth trajectories, and it could not be determined whether they differed in the developmental associations between parental behaviors and deviance due to model convergence problems. Study results did show a difference in the mean levels of maternal solicitation, knowledge, paternal solicitation, and deviance with females reporting a higher level of parental solicitation and knowledge but a lower level of deviance, consistent with previous research (Cota-Robles & Gamble, 2006; Jacobson & Crockett, 2006; Low et al., 2018; Richards et al., 2004; Wang et al., 2011; Webb et al., 2002). However, the patterns of developmental changes in those measures over time seemed to be the same for males and females.

1.4.4 Study Limitations and Future Research

Results related to differences by parent and adolescent sex need to be interpreted with caution. As no direct tests were completed to compare effects of maternal measures versus paternal measures on the growth of adolescent deviance, whether maternal measures or paternal measures had a stronger effect was not determined. Therefore, differences/similarities between maternal and paternal measures described in the current study were only for patterns of differences observed. Additionally, due to model convergence problems, tests by adolescent sex on the longitudinal associations between parenting measures and deviance could not be completed. Therefore, it could not be determined whether males and females differed in the associations, although they did not differ in developmental changes in each individual measure.

Some findings in the current study were based on tests not completed before, such as the growth of parental peer approval, and the growth-to-growth links between parental

solicitation and peer approval with adolescent deviance. Thus, additional research is needed to replicate findings from the current study.

Study findings may be subject to self-report biases and limitations with measures of parental behaviors. Only adolescent self-reports of parental behaviors were used, thus potentially introducing mono-method bias. Adolescent perceptions of parental behaviors may not accurately reflect parental behaviors. Future research may consider using parent reports, in addition to adolescent report. In addition, both parental solicitation and knowledge measures were based on only two items, which is a shortcoming; because of this, the measures used might have not been able to fully capture the characteristics of these two constructs. This might be one of the reasons for the non-significant growth for parental knowledge measures. Future research should use measures that have more items and that are more comprehensive to be able to better capture the characteristics of parental solicitation and knowledge.

Findings in the current study are only correlational in nature and do not imply causal links. Although the current study used the growth of parental measures to predict the growth of deviance, it is possible that changes in adolescent deviance over time may have driven the changes in parental behaviors. Future research may test this question with improved measures of parental behaviors and utilize reports from multiple informants. With information from multiple informants, future research may also look at the discrepancies between adolescent perceived parental behaviors versus parental reports of parenting behaviors, as well as how the potential discrepancies are related to adolescent adjustment.

1.4.5 Conclusion

In spite of the limitations, the current study contributes a number of novel findings to improve our understanding of the developmental changes in both parental solicitation and peer approval as well as their growth-to-growth links with adolescent deviance during early adolescence. Interestingly, parental solicitation decreased while peer approval increased over the one and half years of study. And a faster decrease in parental solicitation was associated with a faster increase in adolescent deviance while a faster increase in parental peer approval was associated with a slower increase in adolescent deviance. In terms of maternal and paternal parenting behaviors, more similarities than differences were observed in their individual growth as well as in the growth-to-growth associations with adolescent deviance. While female and male adolescents reported differences in mean-level parental behaviors and deviance at different time points, they did not differ in the developmental changes in perceived parental behaviors or deviance. Taken together, these findings suggest the covarying nature of both maternal and paternal behaviors, including parental solicitation and peer approval, with adolescent deviance over time. And males and females are likely to experience changes in parenting behaviors as well as deviance in a similar way.

Table 1.1 Descriptive Statistics of Study Variables

	n	*Mean*/%	*SD*	% Missingness	α	Sex Difference (*p*)
Cohort				0.0		
Grade 6	289	50.7				
Grade 7	281	49.3				
Age	569	12.43	0.66			.726
Sex				0.7		
Female	334	58.6				
Male	236	41.4				
SES	503	-0.02	0.85	12.4		.024
Monthly Family Income						
<35K Czech Crowns	223	45.5				
35K–60K Czech Crowns	169	34.5				
>60K Czech Crowns	98	20.0				
Mother Education						
Below College	228	52.5				
College & Above	206	47.5				
Father Education						
Below College	193	45.7				
College & Above	229	54.3				
Family Structure				12.0		
Two Parents	384	76.0				
Other	121	24.0				
W1 M Knowledge	504	4.14	0.94	12.2	.80	< .001
W2 M Knowledge	524	4.16	0.95	8.7	.89	< .001
W3 M Knowledge	490	4.12	0.95	14.6	.88	< .001
W4 M Knowledge	495	4.09	0.97	13.8	.88	< .001
W1 M Solicitation	505	4.24	0.82	12.0	.62	.003
W2 M Solicitation	525	4.18	0.84	8.5	.61	.018
W3 M Solicitation	490	4.12	0.95	14.6	.74	.002
W4 M Solicitation	495	4.11	0.91	13.8	.73	< .001
W1 M Peer Approval	501	3.74	0.89	12.7	.60	.272
W2 M Peer Approval	487	3.91	0.85	9.6	.65	.154
W3 M Peer Approval	491	3.92	0.86	15.2	.69	.063
W4 M Peer Approval	491	3.93	0.86	14.5	.73	.114
W1 P Knowledge	500	3.37	1.28	12.9	.88	.121
W2 P Knowledge	516	3.38	1.24	10.1	.91	.315
W3 P Knowledge	484	3.37	1.27	15.7	.92	.699
W4 P Knowledge	490	3.46	1.17	14.6	.92	.248
W1 P Solicitation	500	3.44	1.21	12.9	.77	.028
W2 P Solicitation	517	3.37	1.21	9.9	.82	.066
W3 P Solicitation	484	3.34	1.28	15.7	.87	.682
W4 P Solicitation	490	3.43	1.17	14.6	.85	.064
W1 P Peer Approval	491	3.64	0.97	14.5	.67	.598
W2 P Peer Approval	516	3.78	1.01	10.1	.80	.549
W3 P Peer Approval	481	3.73	1.02	16.2	.82	.101
W4 P Peer Approval	486	3.78	0.98	15.3	.81	.929
W1 Deviance	499	1.20	0.29	13.1	.74	< .001
W2 Deviance	519	1.25	0.35	9.6	.86	< .001
W3 Deviance	483	1.24	0.35	15.9	.87	.072
W4 Deviance	495	1.29	0.45	13.8	.91	.284

Note. M = maternal measure. P = paternal measure. W = wave. SD = standard deviation. P values for sex differences were based on *t* tests comparing mean levels of study variables between males and females. *N* = 570.

Table 1.2 Correlations Among Study Variables

	1. W1 Deviance	2. W2 Deviance	3. W3 Deviance	4. W4 Deviance	5. W1 Parenting	6. W2 Parenting	7. W3 Parenting
1. W1 Deviance							
2. W2 Deviance	.56***						
3. W3 Deviance	.43***	.50***					
4. W4 Deviance	.32***	.44***	.62***				
5. W1 M Knowledge	-.35***	-.23***	-.19***	-.17***			
6. W2 M Knowledge	-.24***	-.25***	-.19***	-.17***	.54***		
7. W3 M Knowledge	-.23***	-.28***	-.30***	-.33***	.54***	.59***	
8. W4 M Knowledge	-.24***	-.20***	-.29***	-.30***	.49***	.53***	.64***
5. W1 M Solicitation	-.12**	-.16***	-.09	-.10*			
6. W2 M Solicitation	-.19***	-.19***	-.14**	-.14**	.45***		
7. W3 M Solicitation	-.17***	-.24***	-.23***	-.28***	.46***	.53***	
8. W4 M Solicitation	-.20***	-.19***	-.27***	-.22***	.40***	.46***	.55***
5. W1 M Peer Approval	-.14***	-.07	-.01	.02			
6. W2 M Peer Approval	-.15***	-.09*	-.08	.03	.43***		
7. W3 M Peer Approval	-.09	-.11*	-.20***	-.14**	.33***	.56***	
8. W4 M Peer Approval	-.16***	-.17***	-.27***	-.13**	.29***	.45***	.54***
5. W1 P Knowledge	-.20***	-.15**	-.21***	-.14**			
6. W2 P Knowledge	-.19***	-.19***	-.23***	-.12**	.63***		
7. W3 P Knowledge	-.16***	-.16***	-.23***	-.22***	.59***	.68***	
8. W4 P Knowledge	-.11*	-.15**	-.16**	-.13**	.51***	.60***	.65***
5. W1 P Solicitation	-.17***	-.16***	-.18***	-.16***			
6. W2 P Solicitation	-.09	-.16***	-.17***	-.12**	.63***		
7. W3 P Solicitation	-.13**	-.16***	-.19***	-.18***	.52***	.65***	
8. W4 P Solicitation	-.13**	-.11*	-.14**	-.11*	.48***	.58***	.64***
5. W1 P Peer Approval	-.08	.03	.02	.01			
6. W2 P Peer Approval	-.06	.03	-.06	.03	.49***		
7. W3 P Peer Approval	-.06	-.08	-.11*	-.09	.43***	.56***	
8. W4 P Peer Approval	-.06	-.10*	-.15**	-.07	.38***	.58***	.66***

Note. M = maternal measure. P = paternal measure. W = wave. Correlations in columns of Parenting are between one parenting variable with the same parenting variable at a different time point.
*$p < .05$. ** $p < .01$. *** $p < .001$.

Table 1.3 Results from Unconditional Growth Models

	Model Fit				Growth Factors		
	χ(df)	CFI	RMSEA [90% CI]	S-B Scaled Δχ(df)	Intercept	Linear Slope	Quadratic Slope
M Knowledge							
Linear	2.846(5)	1.000	.000 [.000, .043]		4.17***	-0.02	
Quadratic	0.211(1)	1.000	.000 [.000, .086]	2.529(4)	4.16***	0.01	-0.01
M Solicitation							
Linear	7.469(5)	.991	.029 [.000, .070]		4.24***	-0.05**	
Quadratic[1]	0.000(1)	1.000	.000 [.000, .000]	7.469(4)	4.25***	-0.08	0.01
M Peer Approval							
Linear	20.087(5)**	.949	.073 [.041, .107]		3.80***	0.05**	
Quadratic	0.797(1)	1.000	.000 [.000, .106]	18.551(4)***	3.75***	0.19***	-0.04*
P Knowledge							
Linear	11.935(5)*	.987	.050 [.012, .086]		3.35***	0.03	
Quadratic	0.289(1)	1.000	.000 [.000, .090]	11.522(4)*	3.38***	-0.04	0.02
P Solicitation							
Linear	13.768(5)*	.984	.056 [.021, .092]		3.41***	-0.01	
Quadratic	0.111	1.000	.000 [.000, .078]	13.443(4)*	3.44***	-0.12**	0.04*
P Peer Approval							
Linear	13.968(5)*	.980	.056 [.022, .093]		3.66***	0.04*	
Quadratic[1]	4.519(1)*	.992	.079 [.018, .159]	9.701(4)*	3.63***	0.15**	-0.03*
Deviance							
Linear	2.860(5)	1.000	.000 [.000, .043]		1.20***	0.03***	
Quadratic	2.970(1)	.947	.059 [.000, .141]	1.352(4)	1.20***	0.04	-0.00

Note. M = maternal measure. P = paternal measure. S-B Scaled Δχ = Satorra-Bentler scaled chi-square difference test. CI = confidence interval. Unstandardized estimates of growth factors are presented. [1]For these models, an error message while fitting the models indicated that the quadratic model was not appropriate for the data.

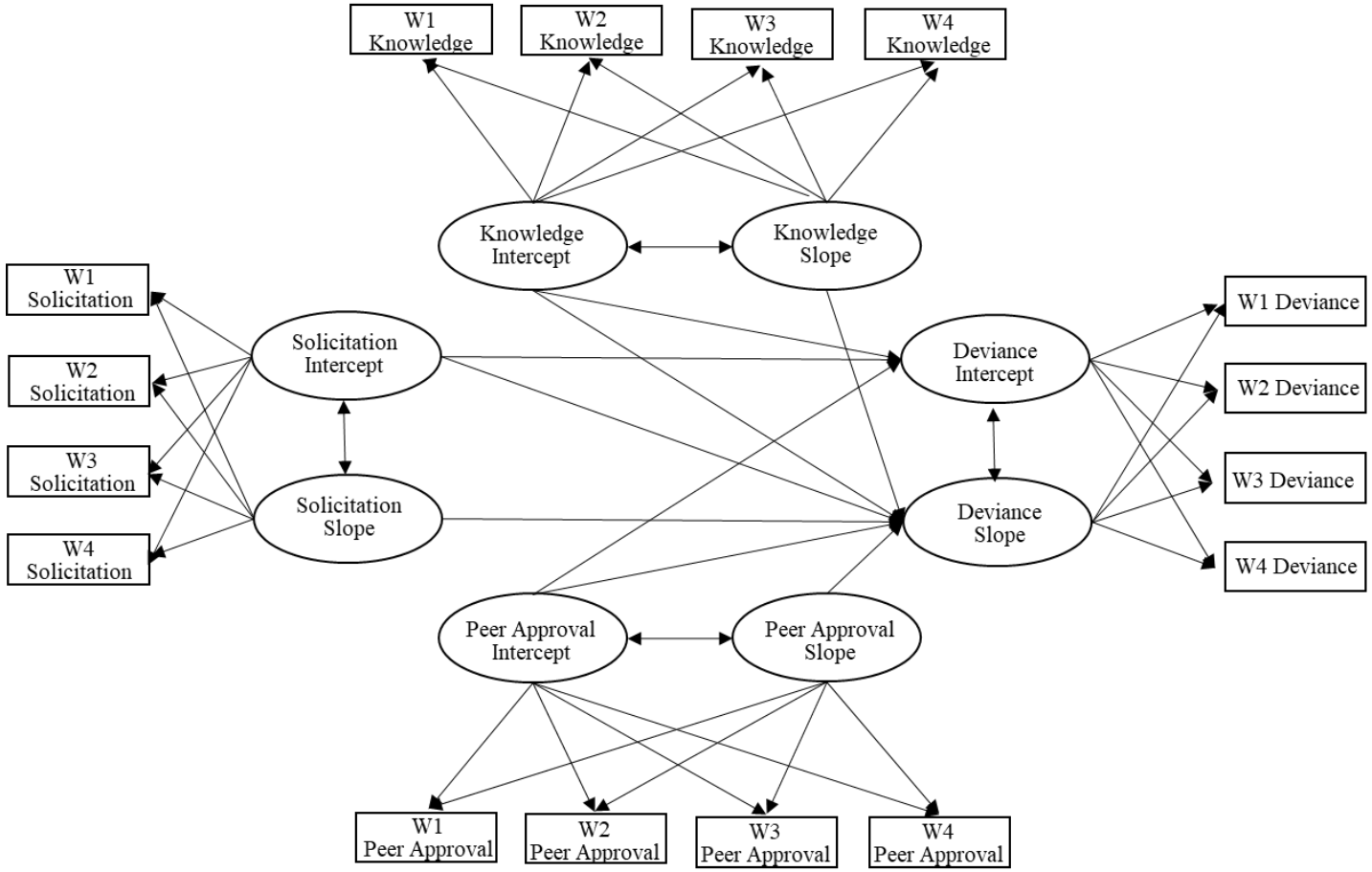
*$p < .05$. ** $p < .01$. *** $p < .001$.

Table 1.4 Standardized Estimates of Multivariate Models Using Growth Factors of Parenting Measures to Predict Growth Factors of Deviance

	β	SE	*p*
Maternal Solicitation – Deviance[1]			
$Intercept_{Solicitation}$ -> $Intercept_{Deviance}$	-0.09	0.09	.298
$Intercept_{Solicitation}$ -> $Slope_{Deviance}$	-0.14	0.12	.246
$Slope_{Solicitation}$ ->$Slope_{Deviance}$	**-0.32**	**0.15**	**.032**
W1 Maternal Knowledge -> $Intercept_{Deviance}$	**-0.31**	**0.09**	**< .001**
W1 Maternal Knowledge -> $Slope_{Deviance}$	0.12	0.10	.227
Sex -> $Intercept_{Deviance}$	**-0.13**	**0.05**	**.011**
Sex -> $Slope_{Deviance}$	0.06	0.06	.259
Maternal Peer Approval – Deviance[2]			
$Intercept_{PeerApproval}$ -> $Intercept_{Deviance}$	0.43	1.75	.808
$Intercept_{PeerApproval}$ -> $Slope_{Deviance}$	0.09	0.09	.313
$Slope_{PeerApproval}$ ->$Slope_{Deviance}$	**-0.44**	**0.14**	**.002**
W1 Maternal Knowledge -> $Intercept_{Deviance}$	-2.36	6.17	.702
W1 Maternal Knowledge -> $Slope_{Deviance}$	0.03	0.06	.631
Sex -> $Intercept_{Deviance}$	**-0.13**	**0.05**	**.012**
Sex -> $Slope_{Deviance}$	0.04	0.06	.437
Paternal Peer Approval – Deviance[3]			
$Intercept_{PeerApproval}$ -> $Intercept_{Deviance}$	-0.01	0.07	.909
$Intercept_{PeerApproval}$ -> $Slope_{Deviance}$	0.10	0.08	.224
$Slope_{PeerApproval}$ ->$Slope_{Deviance}$	**-0.19**	**0.09**	**.023**
W1 Paternal Knowledge -> $Intercept_{Deviance}$	**-0.22**	**0.07**	**.001**
W1 Paternal Knowledge -> $Slope_{Deviance}$	-0.04	0.06	.475
Sex -> $Intercept_{Deviance}$	**-0.20**	**0.05**	**< .001**
Sex -> $Slope_{Deviance}$	0.05	0.05	.317

Note. [1]Fit for Model : $\chi^2(34) = 63.088$, $p = .002$, CFI = .929, RMSEA = .039, 90% RMSEA CI [.023, .053]. [2]Fit for Model: $\chi^2(33) = 60.305$, $p = .003$, CFI = .924, RMSEA = .038, 90% RMSEA CI [.022, .053]. [3]Fit for Model: $\chi^2(34) = 33.699$, $p = .482$, CFI = 1.000, RMSEA = .000, 90% RMSEA CI [.000, .030]. W = wave. Results that achieved statistical significance were boldfaced.

Figure 1.1 Conceptualized Growth to Growth Model Testing Longitudinal Links Between Parenting Measures and Adolescent Deviance



CHAPTER 2. PARENTAL EMOTIONAL DISTRESS AND ADOLESCENT DEVIANCE: THE ROLE OF INTERPARENTAL AND PARENT-ADOLESCENT RELATIONSHIPS

2.1 Introduction

The links between parental emotional distress and adolescent deviance are well established (e.g., Benton et al., 2019; Clay et al., 2017; Giannakopoulos et al., 2009; Goodman et al., 2011; Connell & Goodman, 2002). Improving parental emotional regulation can improve parenting practices, which further decreases children's externalizing problems (e.g., Zimmer-Gembeck et al., 2019). However, the underlying mechanisms are less well understood although more and more research has investigated this (e.g., Cummings et al., 2005; El-Sheikh & Elmore–Staton, 2004; Low & Stocker, 2005; Shawler & Sullivan, 2017; Shelton & Harold, 2008). The current study utilized the family stress model (Conger & Donnellan, 2007) and family systems theory (Cox & Paley, 2003) with an actor partner interdependence model (APIM) to (1) examine links between parental emotional distress (i.e., depressive symptoms, anxiety, and anger) and developmental changes in adolescent deviance through two processes including interparental and parent-child relationships, (2) further test the interdependence between maternal and paternal family processes, and (3) further investigate differences in the associations by parent and adolescent sex, in order to address a number of noted limitations in existing research. For instance, crossover effects from one parental measure to the measure of the other parent are still poorly understood (e.g., the links between one parent's emotional distress and partner marital relationship or partner-child interactions).

Additionally, research on the parental emotional distress-adolescent deviance links has rarely examined symptoms other than depressive symptoms, or considered both interparental and parent-child relationship qualities as underlying mechanisms. And finally, there is a continued unclear picture for potential differences by parent sex or adolescent sex in these tested links. A detailed literature review is provided in the following sections.

2.1.1 Associations between Parental Emotional Distress and Adolescent Deviance

2.1.1.1 Direct Associations

Parental emotional distress has been found to be associated with child and adolescent problem behaviors and measures of deviance (e.g., Goodman et al., 2011). In young children, higher levels of mother's depressive symptoms are associated with higher levels of child negativity and behavioral problems (e.g., Lunkenheimer et al., 2013). This was also found in adolescents. Specifically, mother's mental health or emotional availability is associated with adolescent emotional and behavioral problems (Benton et al., 2019; Clay et al., 2017; Giannakopoulos et al., 2009); children of mentally ill mothers reported more behavioral problems than children of mothers without a mental illness (Khan et al., 2014). Findings also indicate an association between father's emotional availability or depressed mood and adolescent behavioral problems (Clay et al., 2017; Low & Stocker, 2005), and in some cases, the link appeared to be more salient for father-child dyads than mother-child dyads (Lubman et al., 2018; Shafer et al., 2017). In studies that did not distinguish between maternal or paternal parenting processes, parental psychological functioning (e.g., psychological distress, depressive symptoms) were found to be positively associated with adolescent externalizing problems (Cummings et al., 2014; Raj et al., 2014; Roustit

et al., 2010; Shelton & Harold, 2008); these links appear to be stronger in single-parent than two-parent homes (Schleider et al., 2014). In general, study findings consistently show a direct association between parental emotional distress and adolescent problem behaviors or deviance.

2.1.1.2 Underlying Mechanisms Guided by The Family Stress Model

Processes that explain the associations between parental distress and adolescent deviance are needed for a better understanding of the dynamics in-between. The current study is informed by the family stress model (Conger & Donnellan, 2007) to examine the underlying mechanisms through interparental relationship and parent-child relationship. The family stress model was originally developed to examine processes between family economic stress and child or adolescent adjustment. Specifically, the model predicts that family economic stress will cause parental emotional and behavioral problems, which will then affect parenting practices directly and indirectly through interparental conflict; parenting practices ultimately affect child and adolescent emotional and behavioral adjustment. The family stress model has been well supported by research on family economic stress (e.g., Benner & Kim, 2010; Conger et al., 2002; Parke et al., 2004; Ponnet, 2014; Ponnet et al., 2016) as well as research that extended its use for the study of parental discrimination (Anderson et al., 2014; Gibbons et al., 2004; Hou et al., 2017). Findings in these studies suggest that family stressors, such as economic stress and discrimination, are associated with increased depressive symptoms and more marital conflict, which are then associated with suboptimal parenting or parent-child relationship that is further related to child and adolescent internalizing and externalizing problems.

The current study specifically focuses on the part of the model concerning the associations between parental emotional problems and adolescent deviance via interparental and parent-child relationships. Research in the context of family stressors and guided by the family stress model consistently shows that parental depressive symptoms are related to more marital conflict and negative parenting or parent-child relationships, which in turn are associated with poor child or adolescent adjustment (e.g., Benner & Kim, 2010; Ponnet, 2014; Hou et al., 2017). Links between depressive symptoms and child adjustment become largely non-significant once marital conflict and parenting have been accounted for, consistent with the family stress model (Conger & Donnellan, 2007). In research on parental emotional distress/emotional problems particularly, evidence was also found for indirect effects through parenting practices, the parent-child relationship quality, or marital conflict. For instance, parental distress was found to be associated with child or adolescent externalizing problems through poor discipline (Barry et al., 2009; Choe & Olson, 2013; Shawler & Sullivan, 2017) and through low warmth/poor emotional support (Choe & Olson, 2013; Huang et al., 2018). Father's depressed mood was found to be indirectly related to child externalizing problems through father-child hostility (Low & Stocker, 2005). In addition, parental depressive symptoms may communicate to child/adolescent externalizing problems through parenting or parent-child relationship (Shelton & Harold, 2008) or marital conflict (e.g., Cummings et al., 2005). Marital conflict was also found to be directly or indirectly (through parenting or parent-child relationship) associated with child or adolescent adjustment (e.g., El-Sheikh & Elmore–Staton, 2004; Kaczynski et al., 2006). Thus, it is largely established that parental emotional distress is associated with adolescent deviance through interparental and parent-child relationships.

However, some limitations in previous research focusing on the links between parental emotional distress and adolescent deviance were noted: First, although more research has included fathers in such tests, mother and father have been mostly examined separately or simply added as each other's statistical controls, and thus dynamics between the couple, such as how one parental measure is associated with the partner/spouse measure, remain poorly understood. Second, research has mostly focused on depressive symptoms, but other emotional distress problems have rarely been studied, including anxiety or anger, and therefore, it is unclear whether these emotional problems function in a similar manner or not. Third, the specific mediation mechanisms of marital conflict and parenting practices/parent-child relationship quality are rarely tested together to control for each other's effects in research focusing on parental distress, although both have been found to be potential explanatory mechanisms. And lastly, mainly cross-sectional data have been used in tests of underlying mechanisms, limiting the strength of the study conclusions. The current study seeks to address these limitations by utilizing measures of both parents' emotional distress, including depressive symptoms, anxiety, and anger, testing measures of both parents together using an actor partner interdependence model (APIM; reviewed next), including both interparental and parent-child relationship quality measures as potential mediation mechanisms in model tests, and making use of a 3-wave 5-year national longitudinal data set to test these important questions.

2.1.2 Interdependence between Maternal and Paternal Functioning in the Family Systems

The current study is also framed by family systems theory in the study of associations between parental emotional distress and adolescent deviance. The family

systems theory is a grand theory that covers a wide range of family phenomena, including interactions among family members as well as influences of those interactions on each member and the whole family system (Cox & Paley, 2003). Therefore, based on the theory, maternal and paternal functioning can influence each other, and functioning at the parent level can affect the functioning at the child or adolescent level. Interdependence of family processes, such as parental emotional distress, marital conflict, parent-child relationship, and child adjustment, can be further explained by spillover and crossover effects (Erel & Burman, 1995). Spillover effects occur when one family member expresses feelings generated in one situation or relationship in another, while crossover effects occur when one family member's experiences in one domain have been transferred to other family members in another domain, at home, for instance. Examples of spillover effects include parental emotional problems being associated with more conflict with the partner/spouse, suboptimal parenting practices, and negative parent-child relationships (e.g., Cummings et al., 2005; Crnic et al., 2005; Lim et al., 2011; Shelton & Harold, 2008; Van Loon et al., 2014; Yoo et al., 2014). Examples of crossover effects include one parent's emotional problems or other issues affecting how the other parent handles relationship with this parent or with the child (e.g., Day & Padilla-Walker; 2009; Hou et al., 2017; Kopala-Sibley et al., 2017; Ponnet et al., 2016).

The family systems theory and evidence for spillover and crossover effects suggest that both parents should be examined together in a study of their influence on adolescent adjustment, in this case deviance, with both potential spillover as well as crossover effects tested simultaneously. The actor-partner interdependence model (APIM; Kenny et al., 2006) can be used to examine the interdependent processes. In the framework of APIM,

spillover effects are called actor effects while crossover effects are called partner effects. Research that examines parental emotional distress particularly have mainly focused on the actor effects, such as effects of one parent's depressive symptoms on conflict with the other parent (e.g., Cummings et al., 2005) and suboptimal parenting practices (e.g., Crnic et al., 2005; Lim et al., 2011; Shelton & Harold, 2008; Van Loon et al., 2014; Yoo et al., 2013). Some research in the context of family stressors has utilized the APIM and found partner effects, such as associations between one parent's depressive symptoms and a higher level of the other parent reported marital conflict (Ponnet, 2014; Ponnet et al., 2016), and associations between paternal depressive symptoms and mother reported hostility towards the child (Hou et al., 2017). These findings lend support for the importance of testing partner effects, but not all specified partner effects have been found to be significant, and a consistent finding has not emerged about any particular partner effect by a maternal measure or a paternal measure. Therefore, the current study sought to use an APIM model to further test the processes between parental emotional distress and adolescent deviance as well as the potential interdependence of maternal and paternal measures.

2.1.3 Sex Difference

Study findings regarding differences by parent and adolescent sex in the associations among parental emotional problems, parent-adolescent relationships, and adolescent deviance are commonly found, yet inconclusive. In some studies, externalizing problems in males have been found to be more susceptible to influences by maternal emotional problems or parenting practices, while females are influenced more by paternal emotional problems or problems of either parent to a lesser extent, although no clear

explanations have been provided for these differences (e.g., Bosco et al., 2003; Choe et al., 2014; McKinney & Franz, 2019). However, males have also been found to be more influenced by father-son relationship, while females by mother-daughter relationship, providing evidence for the same-sex modeling effect (e.g., Shelton & Harold, 2008). Examining sex differences is important as findings will not only better our understanding of the associations between each parent's parenting and male/female behavioral problems, but they will also better inform interventions that target parenting and adolescent behavioral problems so that interventions could be tailored more accurately to treat issues or needs in each parent, males, or females. Therefore, as proposed in Goodman et al. (2011), the current study continued to examine differences by parent and adolescent sex in the associations among parental emotional problems, parent-adolescent relationships, and adolescent deviance.

2.1.4 The Current Study

In light of the family stress model (Conger & Donnellan, 2007) and based on family systems theory (Cox & Paley, 2003), the current study used the APIM model to study both direct and indirect associations between parental emotional distress (i.e., depressive symptoms, anxiety, and anger) and developmental changes in adolescent deviance, as potentially mediated through developmental changes in parents' marital conflict and parent-child conflict. Specifically, the current study tested whether mother reported and father reported emotional distress problems are associated with their own (actor effects) and the other parent (partner effects) reported marital conflict and parent-child conflict as well as adolescent deviant behavior, whether the associations between parental emotional distress and adolescent deviance functioned indirectly through mother reported and father

reported marital conflict and parent-child conflict, and whether associations differed by parent and adolescent sex. The conceptualized model is presented in Figure 2.1. It was expected that:

Hypothesis 1: W1 parental emotional distress (i.e., depressive symptoms, anxiety, and anger) would be positively associated with W2 self-reported (A1 and A2 paths; actor effects) and partner reported (P1 and P2 paths; partner effects) marital conflict (controlling for W1 marital conflict variables).

Hypothesis 2: W1 parental emotional distress (i.e., depressive symptoms, anxiety, and anger) would be positively associated with W2 self-reported (A5 and A6 paths; actor effects) and partner reported (P5 and P6 paths; partner effects) parent-child conflict (controlling for W1 parent-child conflict variables).

Hypothesis 3: W2 parent marital conflict would be negatively associated with W2 self-reported (A3 and A4 paths; actor effects) and partner reported (P3 and P4 paths; partner effects) parent-child conflict.

Hypothesis 4: W1 parental emotional distress (i.e., depressive symptoms, anxiety, and anger) would be positively associated with W3 adolescent deviance (C1 and C2 paths; direct effects controlling for W1 deviance).

Hypothesis 5: W2 parents' marital conflict would be positively associated with W3 adolescent deviance (C3 and C4 paths; direct effects controlling for W1 deviance).

Hypothesis 6: W2 parent-child conflict would be positively associated with W3 adolescent deviance (C5 and C6 paths; direct effects controlling for W1 deviance).

Hypothesis 7: Tested associations would show differences by parent and adolescent sex. Specific directions of effects could not be specified based on extant knowledge.

2.2 Method

2.2.1 Participants

Data were collected as part of the National Institute of Child Health and Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). The SECCYD is a comprehensive longitudinal study aimed at examining relationships between child development and various contexts of childcare throughout childhood and in middle adolescence. Data collection started in 1991 and followed 1,364 children who were 1 month old at that time and their family through 2007 over four phases. In Phase 4, 1,056 children and families remained in the study (retention rate 77.42%). Data were collected from multiple informants including mothers, fathers, other caregivers, children, teachers, and school principles. Information including family demographics, parents' characteristics, and child physical development as well as emotional and behavioral adjustments/outcomes was gathered. Detailed study design and method could be found in NICHD Early Child Care Research Network (2005).

The study focused on Grade 5 (W1), Grade 6 (W2), and age 15 years (W3) assessments. At Grades 5 and 6, 1,200 families participated in the study; and when adolescents turned 15 years in age, 1,056 families remained in the study. Demographic variables including child sex and race/ethnicity used in the current study were assessed when the child was one month old. As the current study required data from both the mother and the father, the sample was reduced to families where both parents were married/partnered and lived together at the time when data collection happened (all three waves). This reduced the final study sample size to $N = 457$.

In order to gain a better understanding of the extent to which the study sample differed from the total sample, a series of comparisons using χ/t tests were completed which focused on demographic information including participant sex, race/ethnicity, and socioeconomic status (SES), as well as main study constructs including maternal and paternal depression, anxiety, and anger at W1, mother and father reported marital conflict and parent-child conflict at both W1 and W2, and adolescent deviance at both W1 and W3. In these comparisons, the study sample had a higher percentage of European Americans ($\chi^2(1) = 19.691$, $p < .001$) and a higher mean SES ($t(875.560) = -4.498$, $p < .001$). In addition. mothers reported a lower level of depression ($t(1017.810) = 3.297$, $p < .001$), anger ($t(1017.919) = 2.356$, $p = .009$), and anxiety ($t(940.729) = 2.549$, $p = .005$) at W1. Comparisons at Wave 2 provided evidence of lower levels of marital conflict ($t(896.459) = 2.187$, $p = .014$) as reported by mothers; in addition, fathers reported lower levels of parent-child conflict ($t(1048.788) = 1.881$, $p = .030$) as well as marital conflict ($t(1025.424) = 2.730$, $p = .003$). Finally, adolescents reported a lower level of deviance both at W1 ($t(1116.826) = 3.903$, $p < .001$) and at W3 ($t(1077.529) = 4.534$, $p < .001$). Descriptive statistics of the sample demographics are presented in Table 2.1.

2.2.2 Measures

Demographic information available included participant sex and racial/ethnicity collected when participants were 1 month old, family socioeconomic status (SES; operationalized as mean of two measures including standardized annual family total income collected at W1 and standardized mean of both parents' highest education collected at W2). All three variables have been found to be related to parental emotional

problems, parenting practices, or adolescent problem behaviors (e.g., Caputo, 2004; Hoeve et al., 2009; Sullivan et al., 2021).

Depressive symptoms of mother and father were measured at W1 by the 20-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Example items include "I felt sad," "I thought my life had been a failure," "I felt that people dislike me." Parents rated the frequencies of their experiences of the symptoms in the past week using a 4-point Likert type scale ranging from 0 = *Rarely or none of the time (less than once a week)* to 3 *Most or all of the time (5-7 days a week).* Both parents responded to the measure separately. Response scores were summed to be consistent with the original scoring instructions, which resulted into a continuous variable with values ranging from 0 to 60, with a higher score representing higher levels of depressive symptoms. The measure was internally consistent (mother: $\alpha = .88$; father: $\alpha = .87$).

Anxiety symptoms of both parents were measured at W1 by the 10-item State-Trait Anxiety Inventory – State Subscale (STAI-S; Spielberger et al., 1983). Example items include "I felt at ease," "I felt nervous," "I was worried." Parents rated their experiences of anxiety symptoms in the past week using a 4-point Likert type scale ranging from 0 *Rarely or none of the time (less than once a week)* to 3 *Most or all of the time (5-7 days a week).* Both parents responded to the measure separately. Response scores were summed, which resulted into a continuous variable with values ranging from 0 to 30, with a higher score representing higher levels of anxiety symptoms. The measure was internally consistent (mother: $\alpha = .88$; father: $\alpha = .90$).

Anger emotions of both parents were measured at W1 by the 10-item State-Trait Anger Inventory – State Subscale (STAI-S; Spielberger et al., 1983). Example items

include “I was furious,” “I felt angry,” “I felt like yelling at somebody.” Parents rated their experiences of anger emotions in the past week using a 4-point Likert type scale ranging from 0 = *Rarely or none of the time (less than once a week)* to 3 = *Most or all of the time (5-7 days a week).* Both parents responded to the measure separately. Response scores were summed, which resulted into a continuous variable with values ranging from 0 to 30, with a higher score representing higher levels of anger. The measure was internally consistent (mother: $\alpha = .86$; father: $\alpha = .87$).

Interparental conflict was measured at W1 and W2 by five items assessing conflict in partner/marriage relationships (Braiker & Kelley, 1979). Example items include “How often do you and your partner argue with one another?,” “To what extent do you try to change things about your partner that bother you (e.g., behaviors, attitudes, etc.)?,” and “How often do you feel angry or resentful toward your partner?” Both parents rated the scale using a scale ranging from 1 *not at all* to 9 *very much*. Responses were summed, resulting into a continuous variable with values ranging from 5 to 45, with a higher score indicating a higher level of marital conflict. The measure was internally consistent at both waves of assessments (mother: $\alpha = .81$ at W1, .82 at W2; father: $\alpha = .77$ at W1, .79 at W2).

Parent-adolescent relationship was measured at W1 and W2 by the 7-item conflict subscale of the Child-Parent Relationship Scale – Short Form (CPRS-Short Form; Driscoll & Pianta, 2011). Example items include “My child and I always seem to be struggling with each other,” “My child is uncomfortable with physical affection or touch from me.” Both parents rated how much they agreed with the items/statements using 5-point Likert type response options ranging from 1 *definitely does not apply* to 5 *definitely applies*. Response scores were summed across the items. Scores ranged from 7 to 35 with a higher score

indicating a more conflictual parent-adolescent relationship. The measure was internally consistent at both waves of assessments (mother: α = .84 at W1, .85 at W2; father: α = .81 at W1, .83 at W2).

Adolescent deviance was measured at W1 and W3 by the Delinquent Behavior subscale of the parent reported Child Behavior Check List (CBCL) (Achenbach & Rescorla, 2001). Both parents rated the 13-item scale (e.g., "My child steals from places other than home," "My child runs away from home," "My child cuts classes or skip school.") using a 3-point scale ranging from 0 = *not true* to 2 = *very true or often true*. Response scores were summed for each parent and then averaged across both parents; the final response scores had a range from 0 to 26 with a higher score indicating a higher level of deviance. The reliabilities of the measure are as follows (mother: α = .50 at W1, .71 at W2; father: α = .61 at W1, .73 at W2).

2.2.3 Plan of Analysis

Descriptive statistics of study variables were calculated first, followed by correlations, using SPSS. Skewness and kurtosis statistics were used to examine normality of data (means more than three times larger than the standard errors were considered as evidence for data non-normality). Patterns of missing data were examined by using Little's MCAR test and an additional sensitivity analysis if missing was not completely at random for diagnosis of missing at random (MAR). For the sensitivity analysis, variables with missing values were recoded into a dummy variable indicating missingness (0 = not missing, 1 = missing), which was then correlated with other variables; a statistically significant correlation between the dummy variable and another variable was considered as evidence for MAR (Kline, 2016).

Structural Equation Modeling using maximum Likelihood with Robust Standard Errors (MLR) in Mplus were used for model tests, with full information maximum likelihood (FIML) for missing data handling (see Figure 2.1 for the conceptualized model). Three separate models were tested, each with one parental emotional distress problem (i.e., depressive symptoms, anxiety, or anger) as the exogenous variable. Control variables included adolescent age, race/ethnicity, SES, W1 marital conflict, W1 parent-child conflict, and W1 deviance. Models were organized as actor-partner interdependence models (APIM) such that parental emotional distress problems were included as predictors of both self-reported and partner reported marital conflict and parent-child conflict. The mother and father dyad were treated as the unit of analysis (each case included both the mother and the father but with variables distinguishing their role and scores). In each model, actor effects (A paths), partner effects between parents (P paths), and parental effects on adolescent deviance (C paths) were estimated simultaneously. Model fit was examined by following these criteria: model χ^2 was not statistically significant, CFI > .90, RMSEA < .08 (Hu & Bentler, 1999). To examine differences in associations by parent and adolescent sex, Wald tests of parameter estimates and Satorra-Bentler scaled chi-square difference tests were completed.

2.3 Results

2.3.1 Descriptive Statistics and Correlations

Descriptive statistics of study variables are presented in Table 2.1. The sample was balanced with male (49.5%) and female (50.5%) participants, and the majority were of the White race/ethnicity (89.5%). The majority of the studied families (80.1%) reported a total family income over $47,500 a year. About half of the mothers (47.9%) and a slightly

higher percentage of fathers (56.9%) obtained a college or more advanced degree. There was some evidence of violations of normality for values on variables including W2 mother and father reported marital conflict as well as W3 deviance., which was handled by using the estimator of maximum likelihood with robust standard errors (MLR) in Mplus. The percentage of missing values on each variable was minimal, varying from 0 to 0.7%. Thus, no additional tests were completed to examine the pattern of missingness, but full information maximum likelihood (FIML) was used to handle missing data. A comparison of mean levels of study variables by adolescent sex indicated that males and females only differed in levels of W1 deviance: $t(455) = 2.350$, $p = .010$, with females scoring lower on the measure.

Correlations among study variables are presented in Table 2.2. W1 maternal depression, anger, and anxiety were strongly and positively associated with each other, and so were W1 paternal depression, anger, and anxiety. Each W1 parental measure was positively correlated with outcome variables (W2 mediators and W3 adolescent deviance), and each W2 mediator variable was also positively associated with W3 adolescent deviance; the strength of correlations varied from weak to moderate. Three cross-parent correlations did not reach statistical significance: W1 maternal anxiety and W2 mother reported marital conflict with W2 father-child conflict, and W1 paternal anger with W2 mother reported marital conflict. Each pair of W1 maternal and paternal emotional distress problems (e.g., maternal depression and paternal depression) were weakly and positively correlated. W2 mother reported marital conflict was moderately and positively correlated with W2 father reported marital conflict. W2 mother-child conflict and W2 father-child conflict were strongly and positively correlated with each other.

2.3.2 Main Model Tests

As the demographic variables (participant sex, race/ethnicity, and SES) were not all associated with the mediator variables and adolescent deviance (see Table 2.2) and including all of them worsened the model fit, only demographic variables that had an association with the outcome variables were included in final model tests. Multigroup tests indicated no differences between male and female adolescents: depression model: $\Delta\chi^2_{S\text{-}B}(37) = 39.952$, $p = .340$; anger model: $\Delta\chi^2_{S\text{-}B}(37) = 31.181$, $p = .738$; anxiety model: $\Delta\chi^2_{S\text{-}B}(37) = 36.089$, $p = .512$. and therefore, results based on the total sample were reported. All tests controlled for W1 measures of the mediator variables and adolescent deviance.

All models had acceptable fit: Depression model: $\chi^2(42) = 151.986$, $p < .001$, CFI = .915, RMSEA = .076, 90% RMSEA CI [.063, .089]; anger model: $\chi^2(42) = 135.277$, $p < .001$, CFI = .924, RMSEA = .070, 90% RMSEA CI [.057, .083]; anxiety model: $\chi^2(42) = 151.986$, $p < .001$, CFI = .918, RMSEA = .073, 90% RMSEA CI [.060, .086]. Results for the depression, anger, and anxiety models are all presented in Table 2.3.

2.3.2.1 Direct Effects

Hypothesis 1 was mostly supported. Consistent with the hypothesis, each W1 parental emotional distress problem was positively associated with developmental changes in self-reported W2 marital conflict (actor effects). Specifically, maternal or paternal depression, anger, and anxiety at W1 were positively associated with developmental changes in conflict with partner at W2. Partner effects were only found for paths from maternal measures to paternal measures, with W1 maternal depression, anger, and anxiety being positively associated with developmental changes in W2 father reported marital conflict, while none of the associations between W1 paternal emotional distress problems

and developmental changes in W2 mother reported marital conflict were statistically significant.

Hypothesis 2 was partially supported. Among the hypothesized actor effects, W1 maternal anger and anxiety, but not depression, were positively associated with developmental changes in W2 mother-child conflict; W1 father emotional distress problems were not associated with developmental changes in W2 father-child conflict. None of the hypothesized partner effects (i.e., paths from one parent's emotional distress problems to conflict between the other parent and the child) were found.

Hypothesis 3 was partially supported. For the hypothesized actor effects, W2 father reported marital conflict was positively associated with W2 father-child conflict; W2 mother reported marital conflict was not associated with mother-child conflict. For the hypothesized partner effects, W2 father reported marital conflict was positively associated with W2 mother-child conflict, but the association between W2 mother reported marital conflict and W2 father-child conflict was not statistically significant.

Hypothesis 4 was only partially supported. While W1 maternal depression was positively associated with developmental changes in W3 adolescent deviance, none of the other hypothesized direct effects from W1 parental emotional distress problems to developmental changes in W3 adolescent deviance were statistically significant.

Hypothesis 5 was not supported. In contrast to the study hypothesis, W2 mother reported marital conflict was negatively associated with developmental changes in W3 deviance, while W2 father reported marital conflict was unrelated with developmental changes in W3 adolescent deviance.

Hypothesis 6 was partially supported. W2 mother-child conflict was positively associated with developmental changes in W3 adolescent deviance. However, W2 father-child conflict was not associated with developmental changes in W3 adolescent deviance.

Hypothesis 7 was partially supported. As stated above, multigroup tests provided evidence of no differences between the male group and the female group, although females scored lower on the deviance measure at W1. Tests were also completed to test differences between mothers and fathers in each of the hypothesized actor effects and partner effects between maternal and paternal family processes, as well as direct effects from parental measures to adolescent deviance. Differences in some hypothesized partner effects and direct effects from parental measures to adolescent deviance were found. Specifically, W1 maternal anger was positively associated with developmental changes in W2 father reported marital conflict, but W1 paternal anger was unrelated with developmental changes in W2 mother reported marital conflict. Additionally, W2 father reported marital conflict was positively associated with W2 mother-child conflict, but W2 mother reported marital conflict was unrelated with W2 father-child conflict. Lastly, W2 mother reported marital conflict, but not W2 father reported marital conflict, was negatively associated with developmental changes in W3 deviance.

2.3.2.2 Indirect Effects

The total indirect effects from W1 paternal depression to developmental changes in W3 adolescent deviance were statistically significant: $\beta = 0.028$, se = 0.012, $p = .014$, 95% CI [0.006, 0.051]. However, none of the specific indirect effects through developmental changes in W2 mother or father reported marital conflict and W2 mother- or father-child conflict were significant. W1 maternal anger was indirectly associated with developmental

changes in W3 adolescent deviance through developmental changes in W2 mother-child conflict (β = 0.016, se = 0.007, p = .026, 95% CI [0.002, 0.030]), where more W1 maternal anger was associated with more W2 mother-child conflict (controlling for W1 mother-child conflict), which was then associated with more W3 deviance (controlling for W1 deviance). W2 father reported marital conflict was indirectly associated with developmental changes in W3 adolescent deviance through W2 mother-child conflict (β = 0.015, se = 0.007, p = .026, 95% CI [0.001, 0.029]), where more W2 father reported marital conflict was associated with more W2 mother-child conflict, which in turn was associated with more W3 deviance (controlling for W1 deviance).

2.4 Discussion

The current study examined the longitudinal links between three parental emotional distress problems including depression, anger, and anxiety with adolescent deviance, as well as the underlying mechanisms through interparental conflict and parent-child conflict, guided by the family stress model (Conger & Donnellan, 2007) and the family systems theory (Cox & Paley, 2003). An actor partner interdependence model (APIM) was used to examine the longitudinal interdependence of maternal and paternal measures, including each parent's emotional distress problems, conflict with spouse, and conflict with the child. Tests were also completed to examine differences between mothers and fathers as well as between female and male adolescents in each hypothesized effect. Study hypotheses were partially supported, and results are discussed in the following.

2.4.1 Longitudinal Links Between Parental Emotional Distress and Adolescent Deviance

Based on the family stress model (Conger & Donnellan, 2007), more parental emotional distress problems may lead to more marital conflict, which then may be associated with more parent-child conflict, which is subsequently associated with more child adjustment problems. And based on the family systems theory (Cox & Paley, 2003), spill-over (actor effects) and cross-over (partner effects) effects are likely to exist between maternal and paternal family processes. Results from the current study are consistent with both theories and indicate that parental emotional distress problems were possibly indirectly associated with adolescent deviance through interparental conflict and parent-child conflict. For instance, more maternal anger was associated with more mother-child conflict, which was then associated with more adolescent deviance, even after accounting for prior mother-child conflict and adolescent deviance; the direct effect between maternal anger and adolescent deviance became trivial after accounting for the indirect effect through mother-child conflict, consistent with the family stress model (Conger & Donnellan, 2007).

And interestingly, parent reported emotional distress problems were associated with developmental changes in adolescent deviance not just through their own experiences of marital conflict and parent-child conflict, but also through their spouse's experiences. For example, more paternal emotional distress problems were associated with more self-reported marital conflict, which was then associated with more mother-child conflict (not father-child conflict), which, in turn, was associated with more adolescent deviance. Father reported marital conflict was also predicted by earlier maternal emotional distress

problems. Importantly, all these results accounted for prior level of marital conflict, parent-child conflict, and adolescent deviance. These results are, in general, consistent with findings in previous research that used cross-sectional data or 2-wave longitudinal data (Hou et al., 2017, Ponnet et al., 2014, 2016), and they show that longitudinal effects between mothers' and fathers' emotional distress problems, marital conflict, and conflict with the child intertwined with each other in their associations with adolescent deviance. And these results indicated the importance of taking into account the actor and partner effects by both parents in explaining the longitudinal associations between parental emotional distress problems and adolescent deviance.

2.4.2 Differences Between Mothers and Fathers in the Family Processes

Although no differences were observed between males and females, some differences between mothers and fathers were observed. For instance, maternal anger was associated with more conflict from father, while paternal anger was not associated with conflict from mother. Father initiated marital conflict seemed to be more strongly influenced by mother's anger emotion than mother initiated marital conflict by father's anger emotion. This is consistent with previous finding that as mothers traditionally play a more important role in maintaining the marital relationship, anger in mothers might have more negative impact on marital adjustment and thus trigger more conflict from the father (Baron, 2007; Gottman et al., 1998).

Additionally, more father reported marital conflict was found to be associated with more mother-child conflict, while mother reported marital conflict was not associated with father-child conflict. This might be because although mothers provide primary care and support to the family (Chuang & Tamis-LeMonda, 2009), the normal functioning of a

mother is also dependent upon support from a close relationship, such as the marriage (Burleson, 2003), the lack of which might negatively affect mothers' role as a caretaker and her parenting capability, thus leading to more conflict with the child. On the other hand, father's parenting capability appeared not to be affected by conflict with the mother. This finding is inconsistent with previous research that did not find any cross-over effects between one parent's marital conflict and partner's parent-child conflict (Ponnet et al., 2014, 2016) or had the opposite finding (Hou et al., 2017), possibly due to different cultural backgrounds of the samples. But it importantly shows the potential differences in the effects by maternal and paternal family processes.

In addition, only effects between maternal depression and mother-child conflict, but not paternal emotional distress problems and father-child conflict, with adolescent deviance were found. These results indicate that adolescent adjustment might be more vulnerable to mother's negative emotional and marital adjustment, due to mother's important role in caring and supporting the family (Chuang & Tamis-LeMonda, 2009; Hou et al., 2017).

Finally, the path from mother-father conflict to adolescent deviance differed significantly from the link between father reported marital conflict and adolescent deviance, with mother reported marital conflict being negatively associated with adolescent deviance, while father reported marital conflict was not significantly associated with deviance. Considering the significant indirect effect found between father reported marital conflict and adolescent deviance through mother-child conflict, these findings could mean that mother and father reported marital conflict were simply associated with adolescent deviance in a different way, with one being direct and the other indirect.

However, the fact that mother reported marital conflict was negatively associated with adolescent deviance was quite unexpected and also inconsistent with previous research (e.g., Ponnet et al., 2016), which found the opposite association. It is unclear why this pattern of association emerged, whether it is meaningful or not. Perhaps future research can further investigate on this. Taken together, these findings seemed to suggest that mother's functioning, either in individual emotional control or in the marital relationship, appeared to be more important for adolescent behavioral adjustment than father's functioning.

2.4.3 Study Limitations and Future Research

Although the three parental emotional distress problems were tested in separate models, the models shared paths including the path between marital conflict and parent-child conflict, the path between marital conflict and deviance, and the path between parent-child conflict and deviance. The shared paths did not have the same significance levels across the three models. For example, maternal marital conflict was negatively associated with deviance in the depression model, but the association was not significant in the anger or anxiety model. In this case, the effect was considered as statistically significant and interpreted as such. The three emotional distress problems were added in separate models to avoid suppressor effects due to strong intercorrelations among the three variables (see Table 2.3) and also because the three study constructs are conceptually distinguishable. Thus, effects for the shared paths need to be interpreted with caution.

In addition, the current study only used parent report of adolescent deviance. This was because adolescent self-report was not available at the baseline W1 (Grade 5), and parental report was used both at the baseline and at W3 to be consistent. Future research

should use adolescent self-report of deviance, in addition to parent report or reports from other informants, to obtain a more accurate measure of deviant behaviors and enhance the predictive validity.

Marital conflict and parent-child conflict were measured at the same wave, and therefore, their relationships should be interpreted as cross-sectional in nature. And although W1 baseline mediator and outcome variables were controlled for, the study findings do not have causal implications, and the associations found between two variables should be interpreted as associations between one variable measured at an earlier time and developmental changes in the other variable measured later.

The relationships among parental emotional distress problems, marital conflict, parent-child relationship, and deviance could be bidirectional in nature. For instance, more marital conflict, parent-child conflict, or adolescent deviance could also be related to more parental emotional distress. It was beyond the scope of the current study to test these questions but could be tested in future research.

It is also important to note that the current study focused on what could be considered traditional families, which included the child as well as both biological parents all residing in the same household; this also means that it did not focus on other families types (e.g., single parented families, adoptive families, households headed by grandparents). Thus, study findings are potentially biased based on this sample selection, as these families reported a higher SES, a greater percentage of European Americans, lower levels of maternal emotional distress problems, parental conflict, and parent-child conflict, as well as lower levels of adolescent deviance, as compared with the original full sample of the SECCYD. The extent to which these differences impacted the observed

study findings or relationships tested is unclear as well as unknown, and it would require further inquiry. Of course, the very modeling approach itself, given that it relies on two parents in this case, could not be easily replicated using different family forms, except for ones that also included two relationship partners, for instance. Future work will need to tackle this important issue to bring a greater understanding to the issue.

2.4.4 Conclusion

With a 3-wave national longitudinal data set and utilizing a sophisticated APIM, the current study has produced important findings related to the longitudinal links between parental emotional distress problems and adolescent deviance, in spite of the limitations. Consistent with the family stress model (Conger & Donnellan, 2007), more parental emotional distress problems were associated with more adolescent deviance later, through more interparental conflict and more parent-child conflict. Importantly, more parental emotional distress problems were associated with more adolescent deviance in the long term, not only through each parent's marital conflict and parent-child conflict, but also through the other parent's marital conflict and conflict with the child, indicating the intertwined relationships between maternal and paternal measures in the associations with adolescent deviance and the importance of accounting for both the actor and partner effects of both parents in the model. Differences between parents were also observed with mother's adjustment appearing to be more influential on adolescent behavioral adjustment as well as parental marital relationship. The tested relationships worked the same for male and female adolescents. Study findings will improve our understanding of the longitudinal associations between family processes and adolescent deviance in a traditional nuclear

family. The findings also have important implications for practices that target at family factors in preventing or correcting adolescent deviance.

Table 2.1 Descriptive Statistics of Study Variables

	M/%	*SD*	% Missingness	Reliabilities	Sex Differences (*p*)
Sex			0.0		
Female	49.5				
Male	50.5				
Race/Ethnicity			0.0		.254
White	89.5				
Other	10.5				.663
SES	0.01	0.88	0.2		
Total Family Income					
< $47,5000	19.9				
$47,500 - $ 9,5000	45.9				
> $9,5000	34.2				
Mother Education					
Below College	52.1				
College and Above	47.9				
Father Education					
Below College	43.1				
College and Above	56.9				
M Depression W1	7.29	7.36	0.0	.88	.066
M Anger W1	13.30	3.71	0.0	.88	.273
M Anxiety W1	16.85	4.99	0.0	.86	.173
P Depression W1	7.24	7.02	0.0	.87	.722
P Anger W1	13.21	4.18	0.0	.90	.087
P Anxiety W1	16.42	5.07	0.0	.87	.928
M Marital Conflict W1	17.15	6.81	0.0	.81	.793
P Marital Conflict W1	16.18	6.16	0.0	.77	.090
M Parent-Child Conflict W1	16.09	5.78	0.2	.84	.167
P Parent-Child Conflict W1	15.40	5.13	0.2	.81	.842
Deviance W1	0.82	1.09	0.0		.019
M Deviance W1	0.84	1.20		.50	
P Deviance W1	0.81	1.33		.61	
M Marital Conflict W2	16.42	6.95	0.0	.82	.814
P Marital Conflict W2	14.87	6.15	0.0	.79	.224
M Parent-Child Conflict W2	16.02	5.78	0.0	.85	.084
P Parent-Child Conflict W2	15.44	5.34	0.0	.83	.826
Deviance W3	0.91	1.53	0.7		.713
M Deviance W3	0.84	1.62		.71	
P Deviance W3	0.98	1.79		.73	

Note. M = mother report; P = father report; W = wave. M = mean; SD = standard deviation. P values for sex differences were based on *t* tests comparing mean levels of study variables between males and females. *N* = 457.

Table 2.2 Correlations Among Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. M Depression W1											
2. M Anger W1	.55***										
3. M Anxiety W1	.74***	.54***									
4. P Depression W1	.12*	.08	.14**								
5. P Anger W1	.14**	.16***	.14**	.50***							
6. P Anxiety W1	.10*	.10*	.16***	.71***	.55***						
7. M Marital Conflict W2	.28***	.26***	.27***	.12*	.05	.12**					
8. P Marital Conflict W2	.21***	.15***	.22***	.35***	.28***	.34**	.47***				
9. M Parent-Child Conflict W2	.28***	.33***	.28***	.17***	.15**	.09*	.24***	.25***			
10. P Parent-Child Conflict W2	.14**	.14**	.07	.30***	.27***	.24***	.07	.28***	.51***		
11. Deviance W3	.21**	.13**	.11*	.17***	.21***	.15**	.05	.18***	.30***	.26***	
12. Sex[1]	.09	.05	.06	-.02	-.08	-.00	.01	.06	.08	-.01	-.02
13. Race/Ethnicity[2]	-.09	.01	.00	-.08	.01	-.03	-.11*	-.05	.04	.01	-.01
14. SES	-.16***	-.13**	-.08	-.12*	-.04	-.07	-.01	.07	-.06	-.05	-.10*
15. M Marital Conflict W1	.29***	.26***	.21***	.14**	.12*	.10*	.70***	.38***	.22***	.05	.05
16. P Marital Conflict W1	.16***	.06	.14**	.31***	.26***	.30***	.39***	.64***	.25***	.24***	.17***
17. M Parent-Child Conflict W1	.29***	.33***	.27***	.13**	.17***	.08	.24***	.21***	.76***	.48***	.29***
18. P Parent-Child Conflict W1	.15**	.11*	.11*	.31***	.28***	.23***	.06	.24***	.40***	.71***	.25***
19. Deviance W1	.13**	.16***	.10*	.21***	.25***	.13**	.04	.19***	.35***	.39***	.34***

Note. M = mother report; P = father report; W = wave; SES = socioeconomic status. [1]female = 1; male = 0. [2]White = 1; other = 0.
*$p < .05$. **$p < .01$. ***$p < .001$.

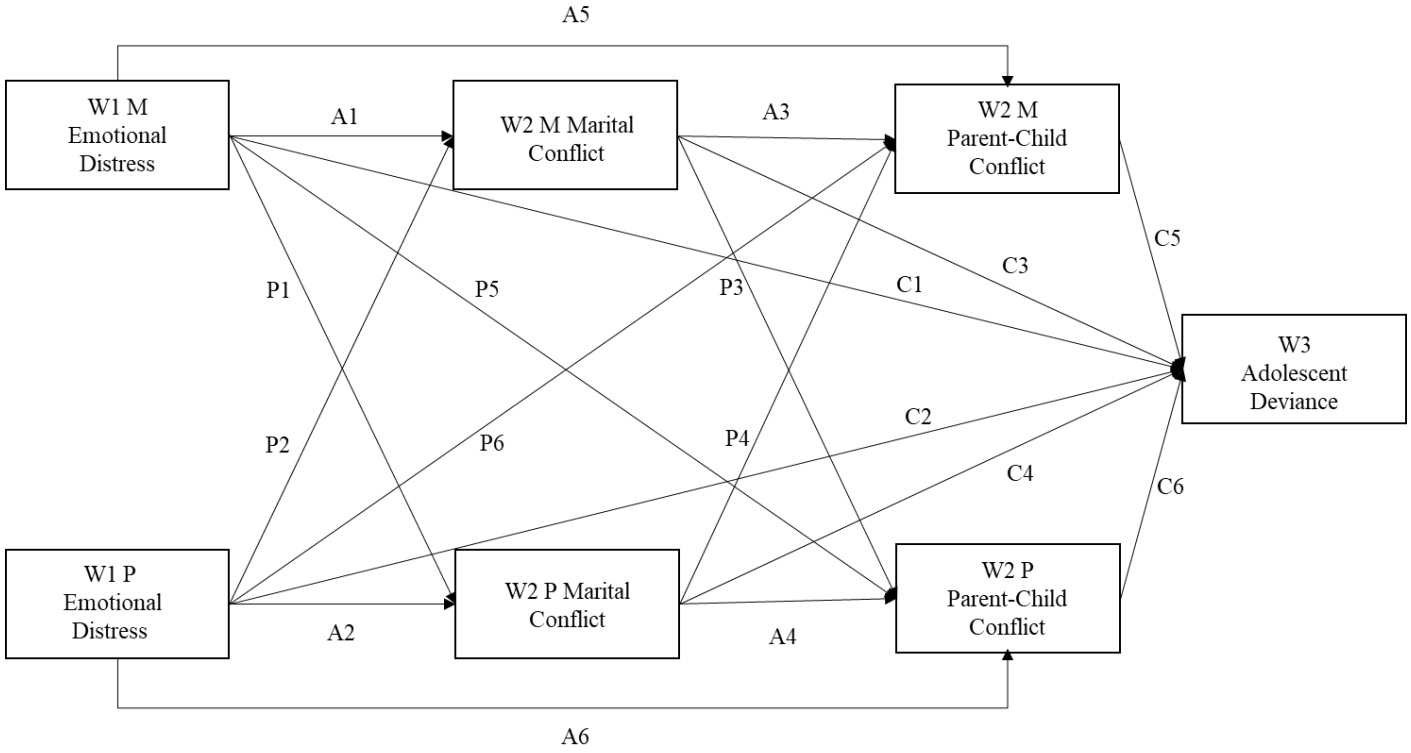
Table 2.3 Standardized Actor, Partner, and Direct Effects, and Differences in Effects Between Mother and Father

	Actor Effects			Partner Effects		
Path	Mother Actor	Father Actor	Wald Test[1]	Mother Partner	Father Partner	Wald Test[1]
Depression Model						
W1 Depression -> W2 Marital Conflict	0.09*	0.17***	1.605(1)	0.11*	0.01	2.132(1)
W1 Depression -> W2 Parent-Child Conflict	0.06	0.06	0.000(1)	0.02	0.06	0.951(1)
W2 Marital Conflict -> W2 Parent-Child Conflict	0.03	0.12**	2.405(1)	-0.03	0.06	2.456(1)
W1 Depression -> W3 Deviance[2]	0.12*	0.06	0.396(1)			
W2 Marital Conflict -> W3 Deviance[2]	-0.09*	0.09	4.142(1)*			
W2 Parent-Child Conflict -> W3 Deviance[2]	0.15***	0.05	1.950(1)			
Anger Model						
W1 Anger -> W2 Marital Conflict	0.10**	0.12**	0.033(1)	0.10*	-0.05	6.835(1)**
W1 Anger -> W2 Parent-Child Conflict	0.09*	0.05	1.752(1)	0.05	-0.00	1.174(1)
W2 Marital Conflict -> W2 Parent-Child Conflict	0.01	0.13**	3.637(1)	-0.04	0.09*	4.746(1)*
W1 Anger -> W3 Deviance[2]	0.01	0.10	1.109(1)			
W2 Marital Conflict -> W3 Deviance[2]	-0.06	0.09	3.232(1)			
W2 Parent-Child Conflict -> W3 Deviance[2]	0.17***	0.04	2.740(1)			
Anxiety Model						
W1 Anxiety -> W2 Marital Conflict	0.14***	0.16***	0.002(1)	0.12**	0.03	2.225(1)
W1 Anxiety -> W2 Parent-Child Conflict	0.07*	0.06	0.186(1)	-0.03	-0.00	0.210(1)
W2 Marital Conflict -> W2 Parent-Child Conflict	0.02	0.13**	3.006(1)	-0.02	0.08*	3.139(1)
W1 Anxiety -> W3 Deviance[2]	0.02	0.08	0.676(1)			
W2 Marital Conflict -> W3 Deviance[2]	-0.07	0.09	3.037(1)			
W2 Parent-Child Conflict -> W3 Deviance[2]	0.17***	0.04	3.254(1)			

Note. W = wave. [1]These columns are for statistics from Wald tests of parameter constraints, including the value and degree of freedom. [2]These paths are for direct effects from parenting measures to deviance; results are presented in Actor Effects columns, with effects from maternal measures under Mother Actor and effects from paternal measures under Father Actor; note these are not actor effects.

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

Figure 2.1 Conceptualized Model for the Associations among Parental Emotional Distress, Interparental Relationship, Parent-Adolescent Relationship, and Adolescent Deviance



CHAPTER 3. LONGITUDINAL ASSOCIATIONS BETWEEN PARENTING PRACTICES, SELF-CONTROL, AND DEVIANCE AMONG EARLY ADOLESCENTS

3.1 Introduction

Adolescent deviance is consequential for individuals, families, and the society in general. Preventing and alleviating this problem continues to be an important task for researchers, practitioners, and policy makers. Self-Control Theory (Gottfredson & Hirschi, 1990; 2020) identifies low self-control as a key probabilistic construct in explaining variance in adolescent deviance. The theory proposes that self-control is largely developed and formed (rank order stability) by late childhood, principally through effective parenting (i.e., parent-child attachment/parental warmth, monitoring, recognition of deviant behavior, and effective discipline) during the first decade of life. The theory has been very widely and thoroughly tested, and the evidence generally supports it (e.g., Gottfredson & Hirschi, 2020; Pratt & Cullen, 2000; Vazsonyi et al. 2017; Vazsonyi et al., 2015). And importantly, this theory and the body of empirical work provides important targets for improving early child-rearing practices and socialization, improving self-control, and subsequently preventing and alleviating child and adolescent deviance and subsequent crime (e.g., Piquero et al., 2010).

Research shows that the importance of parenting in child self-control and deviance continues during adolescence (e.g., Bobbio et al., 2019; Crosswhite & Kerpelman, 2009; Li et al., 2019; Muftić & Updegrove, 2018; Perrone et al., 2004; Stormshak et al., 2018; Vazsonyi et al., 2016; Vazsonyi & Ksinan Jiskrova, 2018). The current study utilized self-

control theory to study longitudinal associations between parenting and developmental changes in deviance through developmental changes in self-control during early adolescence, addressing a number of limitations identified in relevant research. First, previous research has not tested the associations between a measure of parental disciplinary inconsistency, an important component of parental discipline, and adolescent self-control and deviance. Second, previous research that examined the parenting-deviance links through self-control is not able to inform the longitudinal associations between parenting and relative changes in adolescent self-control and deviance due to limitations with the study design. Lastly, research lacks tests of potential similarities or differences in how maternal and paternal parenting processes are associated with self-control and deviance. The current study attempted to address these limitations by (1) testing a measure of parental disciplinary inconsistency (in addition to measures of parental closeness, support, and monitoring), (2) utilizing longitudinal data that provided a temporal order for parenting, self-control and deviance as well as analyses that accounted for baseline levels of self-control and deviance, and (3) included both maternal and paternal measures in tests. More details about the theory, its application, and gaps in extant literature are reviewed in the following sections.

3.1.1 Self-Control Theory

Self-Control Theory developed by Gottfredson and Hirschi's (1990) has been widely tested in the study of crime and deviance over the past three decades. It is regarded as one of the most important and influential theories in criminology (Piquero et al., 2010) and has also generated a substantial body of research in related social and behavioral science disciplines, including psychology, sociology, education, and public health

(Gottfredson & Hirschi, 2020; Moffitt et al., 2013; Vazsonyi et al., 2017). The main tenet of the theory centers on the importance of low self-control in predicting norm and law violating behaviors (Gottfredson & Hirschi, 1990). Self-control is an individual characteristic that differentiates individuals in their tendency to commit criminal acts; such acts satisfy easy and immediate pleasures, provide limited long-term benefits, are risky and yet thrilling, and require minimal skill or planning. Individuals with low self-control are typically impulsive, short-sighted, or insensitive. These individuals have difficulties in refraining themselves from the commission of criminal acts, while individuals with high self-control are much less likely to do so in any circumstances or any developmental time period throughout the lifespan. The key part of self-control theory, like any control theory, is that a lack of or missing self-control effectively frees an individual to engage in norm violations, deviance, and crime. Thus, it focuses on how self-control develops.

Gottfredson and Hirschi (1990) provided a detailed roadmap of how self-control develops. They maintain that self-control develops throughout childhood, with between-individual rank-ordering stabilizing by late childhood. Parental socialization processes are key in the development of self-control. Specifically, such parenting needs to include high warmth and affection towards the child, close monitoring of child behavior, recognition of deviant behavior or behavior that shows low self-control, and effective discipline or punishment of such behaviors. The theory is not clear on what effective discipline includes except for caregiver's direct disapproval of unwanted behavior. But in earlier research, ineffective discipline was defined as being either overly lax or harsh or inconsistent (Snyder & Patterson, 1987). All the parenting elements discussed should work together in developing or not developing adequate self-control, and thus, a lack of or insufficiency of

any element might impact this development (Gottfredson & Hirschi, 1990). With adequate self-control, children are better able to restrain themselves and thus less likely to engage in deviant or criminal behaviors.

3.1.2 Extending Self-Control Theory to the Study of Links Between Parenting and Developmental Changes in Adolescent Self-Control and Deviance

3.1.2.1 The Context of the Czech Republic

The current study applied the self-control theory in the examination of the longitudinal parenting-deviance links in a sample of Czech early adolescents. Located in central Europe, the Czech Republic is a culture that permits much autonomy for adolescents, such as less restricted night curfew or alcohol consumption, as compared to the United States ("Czech Republic," n.d.), for instance. In the family, the mother undertakes the role of taking care of family members and house chores more frequently than the father ("Czech Republic - Family," n.d.), although this may or may not differ from other cultures. But in terms of the relationships between parenting and adolescent psychosocial adjustment, not much difference has been found between the Czech Republic and the United States or oriental countries, such as China and Korea (Dmitrieva et al., 2004). To date, not much research has been conducted particularly on Czech early adolescents to test links between parenting and deviance through self-control, with the exception of Vazsonyi et al. (2016) who tested self-control theory in Roma versus non-Roma Czech adolescents. Focusing on three maternal parenting measures (i.e., monitoring, support, and conflict), this study found direct effect between maternal conflict and adolescent deviance as well as indirect effect between maternal support and adolescent deviance through low self-control; these effects did not differ between Roma and non-Roma Czech adolescents. The current study

extended this previous research by utilizing longitudinal data collected from a group of early adolescents and including both maternal and paternal measures of parenting behaviors (i.e., closeness, support, monitoring, and disciplinary inconsistency).

3.1.2.2 The Self-Control-Deviance Links

The empirical evidence has generally supported the self-control-deviance/crime links, one of the main tenets of self-control theory. This evidence is summarized and aggregated in meta-analytic studies that include two decades of relevant research from 1990 to 2010 (Pratt & Cullen, 2000; Vazsonyi et al., 2017). The links were found across different measures of crime or deviance, different study designs, as well as based on samples from different cultures. These are also supported by more recent evidence (e.g., Fergusson et al., 2013; Kirchner & Higgins, 2014; Meldrum et al., 2013; Moon et al., 2014; Robson et al., 2020; Vazsonyi et al., 2021; Vera & Moon, 2013), with few exceptions (Alvarez-Rivera & Fox; 2010; female subsample in Jo & Zhang, 2014). Thus, the evidence largely consistently shows that self-control is strongly and consistently associated with the commission of deviance and crimes. Although self-control is not the sole predictor of crime or analogous behaviors, it is established as one of the strongest predictors (Pratt & Cullen, 2000; Hay & Forrest, 2006).

3.1.2.3 Development of Self-Control

Based on self-control theory, the development of self-control is expected to happen substantially during childhood, with between-individual differences in levels of self-control or rank ordering largely formed by late childhood or age 10, and subsequently remaining stable (i.e., the stability thesis), although some changes in within-individual levels of self-control might still happen later especially before adulthood (Gottfredson &

Hirschi, 1990; 2020). The empirical evidence is largely supportive of the stability thesis (e.g., Jo & Zhang, 2012; Wikström et al., 2012; Vazsonyi & Huang 2010; Vazsonyi & Ksinan Jiskrova, 2018). Some previous studies have made the claim of inconsistent findings related to the stability thesis (e.g., Burt et al., 2006; Hay & Forrest, 2006; Meldrum et al., 2012; Na & Paternoster, 2012). But in fact, recently Gottfredson and Hirschi (2020) analyzed this work and found that they had mis-conceptualized what constitutes the stability of self-control as indicated by a perfect stability coefficient for between-individual changes or no between-individual changes at all; thus, in fact, findings from these studies that concluded inconsistent support for the stability thesis was in fact consistent with theory.

Although how much within-individual change happens in self-control after childhood is not explicitly discussed in self-control theory, it does imply that it is expected to increase and improve over time (Gottfredson & Hirschi, 1990; 2020). In support of the theory prediction, increases in self-control from adolescence to early adulthood have been found in earlier and more recent studies (Forrest et al., 2019; Shulman et al., 2015; Winfree, 2006; Vazsonyi & Ksinan Jiskrova, 2018; Zondervan-Zwijnenburg et al., 2020). The theory does not discuss how development of self-control happens during the early adolescent developmental period in particular. And to date, not much research has examined the development of self-control particularly during early adolescence, except for Jo and Zhang (2012) who found that self-control declined in 43% of sample, increased in 7% of sample, and remained stable in 50% of sample. The previously discussed studies have examined the development of self-control across a longer life span; for early adolescence in particular, they found both an increasing trend (Forrest et al., 2019; Vazsonyi & Ksinan Jiskrova,

2018; Winfree, 2006), as well as a declining trend (Shulman et al., 2015; Vazsonyi & Ksinan, 2017) of self-control. In spite of the different findings, they all show that the development of self-control continues during early adolescence.

The current study sought to further test longitudinal changes in levels of self-control within individuals during the early adolescent developmental period in a group of Czech early adolescents. It is important to examine developmental changes within individuals because any changes found during adolescence would be important for examinations for potential contributing factors, such as parenting, and thus findings will better inform interventions on improving self-control during adolescence.

3.1.2.4 The Parenting-Deviance Links Through Self-Control

Based on self-control theory, adequate parenting (characterized by high parental warmth, monitoring, recognition of deviant behavior, and effective discipline) during the first decade of life, is key in the development of self-control, a lack of which in turn predicts future deviance/crime (Gottfredson & Hirschi, 1990; 2020). The associations between parenting, self-control, and deviance in child samples have been well supported by evidence from research as well as interventions/experiments (e.g., Piquero et al., 2010; Bradley & Corwyn, 2007; Choe et al., 2013; Sulik et al., 2015; Vazsonyi & Huang, 2010). Among adolescent samples, both direct effects between parenting and deviance and indirect effects between parenting and deviance through self-control have been found (Alvarez-Rivera & Fox, 2010; Bobbio et al., 2019; Brauer, 2017; Burt et al., 2006; Engels & Finkenauer, 2006; Gibbs et al., 1998; Jo & Zhang, 2014; Muftić & Updegrove, 2018; Perrone et al., 2004; Vazsonyi & Belliston, 2007; van Gelder et al., 2018; Vazsonyi, 2004; Vazsonyi et al., 2016; Vera & Moon, 2013; see also review by Stormshak et al., 2018).

The current study extended previous works that tested the theory informed associations among parenting, self-control, and deviance during adolescence in several ways. First, the current study tested a measure of parental disciplinary inconsistency, which has been rarely tested in previous studies, although some studies used measures of parental discipline (Jo & Zhang, 2014; Moon et al., 2014; Perrone et al., 2004; Pratt et al., 2004. Parental disciplinary inconsistency is an important component of effective discipline (Snyder & Patterson, 1987), a key parental behavior for the formation of self-control (Gottfredson & Hirschi, 1990; 2020). Preliminary evidence was found for the longitudinal associations between parental erratic punishment, measured when participants were 15 years in age, and adolescent delinquency two years later, through impulsivity at 15 years, among a group of Swiss middle adolescents (van Gelder et al., 2018).

The studies that examined the associations between parenting and deviance through self-control during adolescence were mostly based on cross-sectional data (e.g., Bobbio et al., 2019; Muftić & Updegrove, 2018; Vazsonyi et al., 2016), or longitudinal data without accounting for previous levels of self-control and deviance or with issues of temporal order for variables (e.g., Brauer, 2017; Burt et al., 2006; van Gelder et al., 2018), but the current study made use of 3-wave longitudinal data that provided a temporal order for measures of parenting, self-control, and deviance, and also controlled for baseline levels of self-control and deviance in analyses. It is important to have a temporal order and partial out baseline outcome variables (i.e., self-control and deviance) because analytically, this would allow for stronger inferences on the developmental or longitudinal dynamics between dependent variables (i.e., parenting) and relative changes in outcomes (i.e., self-control and deviance) (MacCallum & Austin, 2000). Theoretically, although self-control

theory details how development in self-control is expected to happen substantially in childhood, it does not discuss explicitly the development of within-individual self-control during adolescence; therefore, it remains to be learned how much within-individual change would happen during adolescence. Changes/development found in self-control within individuals after childhood would further provide evidence for the malleability of self-control during adolescence and thus the importance of examining contributing factors, such as parenting, as well as the importance of interventions.

Lastly, the current study included both maternal and paternal parenting in tests to examine similarities and differences between maternal and paternal parenting in explaining developmental changes in adolescent self-control and deviance, which have been infrequently tested in previous studies. Self-control theory suggests that the sex of the parent should not matter much in child-rearing as father and mother tend to be similar in "values," "attitudes," and "skills" (Gottfredson & Hirschi, 1990):

The model we are using suggests that, all else being equal, one parent is sufficient. We could substitute 'mother' or 'father' for 'parents' without any obvious loss in child-rearing ability. Husbands and wives tend to be sufficiently alike on such things as values, attitudes, and skills that for many purposes they may be treated as a unit. (p. 103)

Thus, substantial overlaps/similarity between maternal and paternal parenting in explaining self-control and deviance are expected. To date, only a dearth of research has examined this question. Vazsonyi et al. (2004) compared the associations between maternal and paternal parenting processes and a series of problem behaviors among adolescents across Hungary, the Netherlands, Switzerland, and the United States; they found that maternal and paternal measures jointly explained some variance (3% for the US

sample and similar in other samples) in adolescent deviance, and each also explained unique variances (5% for both maternal and paternal measures in the US sample and similar in other samples) in adolescent deviance above and beyond the other. Other research found that maternal parenting appeared to be more strongly associated with adolescent self-control (Boutwell & Beaver, 2010; Miller et al., 2009) and deviance (Miller et al., 2009); but these findings were based on the significance of the study results (i.e., maternal parenting was statistically significantly associated with adolescent self-control and deviance, but paternal parenting was not), and no direct tests were completed to compare the effect sizes of maternal vs. paternal parenting. Research also finds that how maternal and paternal parenting differ is dependent on the sex of the adolescent; both same-sex effects (i.e., mother-daughter, father-son) and opposite-sex effects (i.e., mother-son, father-daughter) were found (e.g., Hoeve et al., 2009; Silverman & Caldwell, 2005). Due to a lack of research that included both maternal and paternal parenting in examinations and compared their effects, it remains unclear how maternal and paternal parenting overlap and differ in the longitudinal associations with adolescent self-control and deviance.

3.1.3 The Current Study

Informed by self-control theory (Gottfredson & Hirschi, 1990; 2020) and with considerations of limitations presented in previous studies that utilized self-control theory in the study of associations between parenting and deviance through self-control in adolescent samples, the current study tested (1) the developmental changes in self-control during early adolescence, (2) whether four measures of parenting (closeness, support, monitoring, and disciplinary inconsistency) were associated with developmental changes

in deviance through developmental changes in self-control, and (3) tested the maternal and paternal parenting behaviors separately and together to ascertain their unique or overlapping effects on self-control and deviance. To be thorough in analyses, the current study also tested differences in the associations by adolescent sex, based on evidence for differences between males and females in perceived parenting as well as levels of deviance and self-control (e.g., Chapple et al., 2010; Hoeve et al., 2009; Silverman & Caldwell, 2005; Wang et al., 2011). Four groups of hypotheses were developed based on the theory and empirical evidence:

H1: Adolescent self-control would increase from W1 to W5.

H2: W1 parental behaviors would be associated with developmental changes in W3 self-control (controlling for W1 self-control):

a. W1 parental closeness, support, and monitoring would be positively associated with developmental changes in W3 self-control;

b. W1 parental disciplinary inconsistency would be negatively associated with developmental changes in W3 self-control;

H3: W3 self-control would be negatively associated with developmental changes in W5 deviance.

H4: W1 parental behaviors would be associated with developmental changes in W3 deviance directly and indirectly through developmental changes in W3 self-control (controlling for W1 self-control and deviance):

a. W1 parental closeness, support, and monitoring would be negatively associated developmental changes in W5 deviance, directly and indirectly through developmental changes in W3 self-control;

b. W1 parental disciplinary inconsistency would be positively associated with developmental changes in W5 deviance, directly and indirectly through developmental changes in W3 self-control.

Whether different patterns of associations between maternal versus paternal parenting and self-control/deviance as well as differences in associations by adolescent sex were exploratory.

3.2 Method

3.2.1 Participants

Data were collected as part of the Brno Longitudinal Study of Youth (BLSY), an accelerated longitudinal study that followed two cohorts of 6th and 7th graders from six schools in Brno, Czech Republic, over the course of three years. At baseline, 570 adolescents enrolled in the study. Data collection (six Waves [W] of assessments) occurred half a year apart for the first 5 assessments from fall 2014 to fall 2016 and one year apart between the last two assessments from fall 2016 to fall 2017. After the 4th assessment, three schools discontinued participating in the study, consistent with the original agreement for four assessments. As a result, W5 assessment only included participants from the remaining three schools. Twelve new participants from the three remaining schools enrolled in the study at W5, leading to a total of 582 adolescents who participated in the study (58.4% female; M_{age}=12.34 years, *SD*=0.89 at baseline): 51.2% (*n* = 298) of the sample were 6th graders, and 48.4% (*n* = 284) 7th graders. The study received IRB approval from a university in the United States as well as a local ethics committee. Both parental consent and adolescent assent were obtained for each study participant. Students completed a 60 to 90-minute paper and pencil survey during regular school hours.

The current study focused on data collected in the first (fall 2014; W1), third (fall 2015; W3), and fifth (fall 2016; W5) time points, with one-year intervals. Self-control measured across the first five waves (W1-W5) were used for examining development of the measure.

3.2.2 Measures

Demographic Information. Participants indicated their birth year and month, which was then used to calculate their age. And they indicated their biological sex by choosing 0 *male* or 1 *female*. They reported family structure by choosing one from eight options: *biological parents*, *biological mother only*, *biological father only*, *biological mother and stepfather*, *biological father and stepmother*, *biological parent and significant other*, *shared custody*, and *other*; responses will be recoded with 1 = two-parent families and 0 = other types of families. In addition, participants indicated both parents' education (six options ranging from *basic education through 9th grade* to *having a graduate degree*) as well as monthly family income (five options ranging from *20,000 Czech Crowns* (about US$ 1,010) *or less* to *100,000 Czech Crowns* (about US$ 5,050) *or more*); a socioeconomic status (SES) score will be calculated as the average of standardized mean parental education and monthly family income.

Maternal and Paternal Closeness were measured by the parental closeness subscale of the Adolescent Family Process measure at W1 (AFP; Vazsonyi et al., 2003). Adolescents rated the same six statements about how close they were with their mother and father separately; example items included "My mother/father gives me the right amount of affection," "My mother/father trusts me," and "I am closer to my mother/father than are a lot of kids my age." Participants responded using a 5-point Likert type scale

ranging from 1 *strongly disagree* to 5 *strongly agree*; scale scores were calculated by averaging responses across the six items with a score range of one to five where a higher score indicated a higher level of parental closeness. Maternal and paternal closeness scale scores were calculated separately. The maternal and paternal measures were internally consistent (mother: $\alpha = .76$; father: $\alpha = .86$).

Maternal and Paternal Support were measured by the parental support subscale of the AFP at W1 (Vazsonyi et al., 2003). Adolescents rated four statements such as "My mother/father sometimes puts me down in front of other people," "Sometimes my mother/father won't listen to me or my opinions," and "My mother/father sometimes gives me the feeling that I'm not living up to his expectations," using a 5-point Likert type scale ranging from 1 *strongly disagree* to 5 *strongly agree*. Scale scores were calculated by averaging reversed responses across the four items with a score range of one to five where a higher number indicated a higher level of parental support. Maternal and paternal support scale scores were calculated separately. The maternal and paternal measures were internally consistent (mother: $\alpha = .76$; father: $\alpha = .73$).

Maternal and Paternal monitoring were measured by the two solicitation items part of the parental monitoring subscale of the Adolescent Family Process measure at W1 (AFP; Vazsonyi et al., 2003). The solicitation items were used instead of the original composite "monitoring" measure as results from Dissertation Study 1 showed that a 2-factor model with a solicitation factor and a knowledge factor fit better than the 1-factor model for the original "monitoring" measure. And the solicitation items were used instead of the knowledge items as solicitation (i.e., active tracking and monitoring) was more consistent with self-control theory (Gottfredson & Hirschi, 1990, 2020). The two items

were “My mother/father wants to know who I am with when I go out with friends or on a date,” and “My mother/father wants me to tell him where I am if I don’t come home right after school.” Adolescents rated the statements separately for the maternal and paternal measures using a 5-point Likert type scale ranging from 1 *strongly disagree* to 5 *strongly agree*; response scores were averaged across the two items with a score range of one to five where a higher score indicated a higher level of parental monitoring. Maternal and paternal solicitation scores were calculated separately. The maternal measure had a reliability of $\alpha = .62$; the paternal measure had a reliability of $\alpha = .77$.

Maternal and Paternal Disciplinary Inconsistency were measured by the parental disciplinary inconsistency subscale at W1, a newly developed parenting subscale for the BLSY project, following the format of the AFP (Vazsonyi et al., 2003). Adolescents rated the same four statements separately about their mother’s and father’s consistency in discipline; example items include “My mother/father often forgets the rules set,” and “My mother/father often threatens punishment than punishing me.” Participants responded using a 5-point Likert type scale ranging from 1 *strongly disagree* to 5 *strongly agree*; scale scores were calculated by averaging responses across the four items with a score range of one to five where a higher score indicated a higher level of disciplinary inconsistency. Maternal and paternal disciplinary inconsistency scale scores were calculated separately. Both the maternal and paternal measures had a reliability of $\alpha = .59$.

Self-control was measured by the Impulse Control subscale of the Weinberger Adjustment Inventory across Waves 1 to 5 (Weinberger & Schwartz, 1990). Participants responded to four items about the frequency of behaviors such as “I say the first thing that comes into my mind without thinking enough about it,” and “I do things without giving

them enough thought," using a 5-point Likert type scale ranging from 1 *almost never* to 5 almost always; scale scores were calculated by averaging reverse coded responses across the five items with a range of one to five where a higher score corresponded to a higher level of self-control. Note that self-control theory describes the construct of low self-control as a predictor of deviance/crime (Gottfredson & Hirschi, 1990; 2020). The current study recoded the measure of low self-control as self-control for the ease of interpretation. The measure was internally consistent across all five waves in the study sample (α = .79 - .84).

Deviance was measured by the Normative Deviance Scale at W1 and W5 (Short Form; Vazsonyi, 2012; Vazsonyi et al., 2001). Participants responded to 21 items about the frequency of their deviant behaviors such as "smashed bottles on the street, school grounds, or other areas," "intentionally damaged or destroyed property belonging to a school," and "used "soft" drugs such as marijuana (grass, pot)," using a 5-point Likert type scale ranging from 1 *never* to 5 *more than 6 times*; scale scores were calculated by averaging responses across the 21 items with a score range of one to five where a higher score corresponded to more deviant behaviors. The measure was internally consistent at both waves in the study sample (W1: α = .74; W5: α = .85).

3.2.3 Plan of Analysis

Descriptive statistics of study variables were calculated first, with distribution and missing data/attrition inspected. Data were considered non-normal if the means of skewness and kurtosis statistics were more than three times larger than their standard errors. The pattern of missingness was also examined using the Little's MCAR test for diagnosis of missing completely at random (MCAR) and an additional sensitivity analysis

for diagnosis of missing at random if not MCAR. In the sensitivity analysis, variables with missing values were recoded into a dummy variable (0 = not missing, 1 = missing), and then correlations between the dummy variable and other variables were calculated; a statistically significant correlation was considered as evidence for MAR (Kline, 2016). Correlations among study variables (scale scores of parenting measures, self-control, and deviance were used) were calculated next. These analyses were conducted using SPSS version 28.

Following the above analyses, a series of tests using structural equation modeling (SEM) were conducted to examine the study hypotheses. First, a latent growth model was tested to examine whether there was significant growth in self-control over the two years during early adolescence and whether the growth was linear or quadratic. Next, following a test of the measurement model with all latent constructs freely correlated, two model tests were conducted to examine the associations among parenting (i.e., parental closeness, support, monitoring, and disciplinary inconsistency), adolescent self-control, and adolescent deviance (see Figures 3.1 and 3.2). In the first test, the parenting measures were entered as individual predictors of self-control and deviance, and self-control as the predictor of deviance, positing self-control as the mediator (Figure 3.1); this test was completed once with maternal parenting measures and repeated with paternal parenting measures to examine if different patterns of associations would emerge. In the second test, maternal and paternal parenting measures were entered in one model to control for each other's effects (Figure 3.2) and also compare strengths of associations by parental sex using a chi-square difference test. Multigroup tests were completed to examine tested associations by adolescent sex. Parceling was used in models with latent constructs based

on recommendations by Little et al. (2002). Specifically, each latent construct was measured by two parcels. To create the parcels, an EFA on each measure was completed first to rank the factor loadings of items in the measure. Next, the item with the highest factor loading was assigned to the first parcel, the item with the second highest factor loading to the second parcel, then the item with the lowest factor loading to the first parcel, and the item with the second lowest factor loading to the second parcel, so on and so forth, so that each parcel had items with balanced factor loadings. Then parcel scores were calculated by averaging scores of items assigned to each parcel. All tested models were evaluated for model fit based on the following criteria: model χ^2 was not statistically significant, CFI > .90, RMSEA < .08 (Hu & Bentler, 1999). Control variables included W1 measures of demographics (i.e., cohort, sex, SES, and family structure), self-control, and deviance; demographics were added based on whether they were associated with the outcome variables in model tests. Model tests were completed in Mplus with maximum likelihood estimation with robust standard errors (MLR). Full information maximum likelihood (FIML) was implemented to handle missing data.

3.3 Results

3.3.1 Attrition and Missing Data

Not all participants completed all five waves of assessments, and as described earlier, half of the participating schools did not continue in the study after W4, resulting in a loss of 195 participants at W5. The number of participants who did not provide data at each wave is as follows (counting the total sample as 582 participants, including 12 newly enrolled at W5): 78 adolescents (13.4%) at W1, 61 (10.5%) at W2, 106 (18.2%) at W3, 111 (19.1%) at W4, and 311 adolescents (53.4%) at W5. A series of *t*/Chi-square tests

were completed to compare youth who did not provide data at each wave with those who did on demographics and main study variables. Compared with youth who provided data, youth who did not do so at W1 were younger ($t(74.904) = -3.520$, $p < .001$); youth who did not provide data at W2 were also younger at W1 ($t(579) = -6.844$, $p < .001$), reported a lower level of paternal support at W1 ($t(498) = -2.930$, $p = .004$), and a lower level of self-control at W3 ($t(39.260) = -2.449$, $p = .019$); youth who did not provide data at W3 were younger at W1 ($t(569) = -3.718$, $p < .001$) and reported a higher level of paternal closeness at W1 ($t(131.033) = 3.782$, $p < .001$); youth who did not provide data at W4 were younger ($t(579) = -4.632$, $p < .001$) and reported a higher level of SES ($t(116.058) = 2.420$, $p = .017$) at W1. As W5 attrition was confounded by schools discontinuing the study, a series of one-way ANCOVA were conducted with the control of school-level participation to compare participants who provided data at W5 with those who did not. Results indicated that adolescents who did not provide data at W5 reported a higher SES ($F(1, 500) = 10.497$, $p = .001$) and a lower level of paternal inconsistency ($F(1, 493) = 7.774$, $p = .006$) in comparison to youth who provided data.

The percentage of missingness on W1 to W4 variables ranged from 0.7% to 16.9%, and W5 variables (W5 self-control and deviance) had 53.8% of missingness due to half of the participating schools discontinuing the study. The Little's MCAR test indicated missing not completely at random. Therefore, an additional sensitivity analysis was conducted, and results indicated that missing was at random, in which case, FIML was an appropriate method to address missing data.

3.3.2 Descriptive Statistics and Correlations

Descriptive statistics are presented in Table 3.1. Sixth graders composed 51.2% of the sample, and 7th graders 48.8%. Sample mean age at W1 was 12.34 years (*SD* = 0.89). There were slightly more females than males in the sample (58.6% vs. 41.4%). About 54.5% of the participants were from a family with a monthly income more than 3,5000 Czech crowns, and about half of the mothers (47.5%) and fathers (54.3%) had a college degree or above. A *t* test comparing male and female adolescents on the study measures indicated that compared with males, females reported a lower SES ($t(501) = 2.264$, $p = .024$), a higher level of W1 maternal solicitation ($t(503) = -3.021$, $p = .003$), a lower level of W1 maternal disciplinary inconsistency ($t(501) = 2.467$, $p = .014$), a high level of W1 paternal support ($t(498) = -2.000$, $p = .046$) as well as solicitation ($t(498) = -2.199$, $p = .028$), and a lower level of deviance at both W1 ($t(292.974) = 3.513$, $p < .001$) and W5 ($t(174.342) = 4.532$, $p < .001$).

Correlations among study variables are presented in Table 3.2. Results indicated that W1 parental closeness, support and solicitation was each positively correlated with W3 self-control and negatively with W5 deviance, while parental disciplinary inconsistency was negatively correlated with W3 self-control and positively with W5 deviance; the correlations showed weak strength ($|rs| = .10 - 23$); W1 paternal closeness was not correlated with W3 self-control. W3 self-control was negatively correlated with W5 deviance; the strength of the correlation was moderate. Maternal measures were each positively correlated with the corresponding paternal measures ($rs = .38 - .48$). And notably, most of the maternal measures were correlated with each other, and all paternal measures were correlated. Specifically, W1 maternal closeness was positively correlated

with maternal support and solicitation, and negatively with disciplinary inconsistency; the strength of the correlations ranged from moderate to strong (|*r*s| = .31 - .50). Maternal support was positively and weakly correlated with maternal solicitation and negatively and moderately with disciplinary inconsistency. Paternal closeness was also positively correlated with paternal support and solicitation, and negatively with disciplinary inconsistency, with the strength of correlations ranging from |*r*s| = .23 - .53. Paternal support was also weakly correlated with paternal solicitation and strongly with disciplinary inconsistency.

3.3.3 Development in Self-Control

Latent growth modeling was first used to test the growth of self-control over the course of two years. Results indicated that both the linear model and the quadratic model had acceptable fit: Linear model: $\chi^2(10) = 14.203$, $p = .164$, CFI = .993, RMSEA = .027, 90% RMSEA CI [.000, .056]; quadratic model: $\chi^2(6) = 6.723$, $p = .347$, CFI = .999, RMSEA = .014, 90% RMSEA CI [.000, .057]. However, the linear model had better fit: $\Delta\chi^2_{S\text{-}B}(4) = 7.480$, $p = .109$. Therefore, results from the linear model were retained. Both the intercept and slope factors of the linear model were statistically significant: intercept = 3.67 (on a scale of 1 to 5; $p < .001$); slope = -0.05 (a decrease of 0.05 unit on a scale of 1 to 5 every half year; $p < .001$). The negative slope coefficient indicated a trend of decreasing self-control over the two years of study, which was not consistent with Hypothesis 1. The intercept and slope were correlated at $r = -.36$ ($p < .001$), indicating that a higher initial level of self-control was associated with a slower decrease in the measure over time. Both the intercept and the slope varied across individuals: intercept variance = 0.55 ($p < .001$); slope variance = 0.03 ($p < .001$).

3.3.4 Associations Between Maternal and Paternal Behaviors, Self-Control, and Deviance

Next, as an initial step of main model tests, a measurement model with latent constructs (W1 parental measures, W3 self-control, and W5 deviance) specified to correlate with each other was tested, and both the models for maternal measures as well as paternal measures had an acceptable fit: the maternal model: $\chi^2(39) = 59.869$, $p = .017$, CFI = .988, RMSEA = .031, 90% RMSEA CI [.013, .045]; the paternal model: $\chi^2(39) = 72.886$, $p < .001$, CFI = .983, RMSEA = .039, 90% RMSEA CI [.025, .053]. Then analyses proceeded where the main model tests were completed, with control variables added (adolescent sex, W1 self-control, and W1 deviance were retained as controls).

The maternal measures model had acceptable fit: $\chi^2(93) = 168.600$, $p < .001$, CFI = .973, RMSEA = .038, 90% RMSEA CI [.028, .047]. The paternal measures model had acceptable fit: $\chi^2(94) = 176.697$, $p < .001$, CFI = .974, RMSEA = .039, 90% RMSEA CI [.030, .048]. Some odd results were present for the maternal model: W1 maternal support was negatively associated with W3 self-control; the indirect effect between W1 maternal support and W5 deviance through W3 self-control was positive: $\beta = 0.09$, $SE = 0.04$, $p = .027$, 95% CI [0.01, 0.18], contrary to the hypotheses as well as the positive correlation between W1 maternal support and W3 self-control and the negative correlation between W1 maternal support and W5 deviance. Additional tests were completed to investigate the possible suppressor effects by other variables in the maternal model. Specifically, maternal variables were entered into the model one at a time, with maternal closeness being the first, then support, solicitation, and finally disciplinary inconsistency. Results suggested that the effects by both maternal closeness and support were affected by the addition of solicitation

and disciplinary inconsistency (adding them flipped the signs of estimates), possibly due to the high correlations among these variables (see Table 3.2), even though a multicollinearity analysis using the scale scores (not the latent constructs) did not flag serious issues with multicollinearity. Thus, the model test results became uninterpretable. To work around issues of suppression of effects and multicollinearity, a decision was made that each parenting measure was included in a separate model. These models included participant sex, W1 self-control, and W1 deviance as controls.

Results from the new tests are presented in Table 3.3. All models achieved acceptable fit: Maternal closeness: $\chi^2(36) = 76.218$, $p < .001$, CFI = .980, RMSEA = .044, 90% RMSEA CI [.030, .058]; paternal closeness: $\chi^2(37) = 77.191$, $p < .001$, CFI = .982, RMSEA = .044, 90% RMSEA CI [.030, .057]; maternal support: $\chi^2(36) = 84.885$, $p < .001$, CFI = .976, RMSEA = .049, 90% RMSEA CI [.035, .062]; paternal support: $\chi^2(37) = 90.354$, $p < .001$, CFI = .974, RMSEA = .050, 90% RMSEA CI [.037, .063]; maternal monitoring: $\chi^2(37) = 86.217$, $p < .001$, CFI = .974, RMSEA = .048, 90% RMSEA CI [.035, .062]; paternal monitoring: $\chi^2(37) = 77.936$, $p < .001$, CFI = .980, RMSEA = .048, 90% RMSEA CI [.030, .058]; maternal disciplinary inconsistency: $\chi^2(36) = 79.208$, $p < .001$, CFI = .978, RMSEA = .046, 90% RMSEA CI [.032, .059]; paternal disciplinary inconsistency: $\chi^2(36) = 69.874$, $p < .001$, CFI = .983, RMSEA = .041, 90% RMSEA CI [.026, .055].

Among the maternal measures, only W1 maternal closeness was negatively associated with changes in W5 deviance. W1 maternal monitoring was only indirectly associated with developmental changes in W5 deviance through developmental changes in W3 self-control: $\beta = -0.03$, SE = 0.02, $p = .033$, 95% CI [-0.063, -0.003]; W1 maternal

monitoring was positively associated with W3 self-control, which in turn was negatively associated with W5 deviance, controlling for W1 self-control and deviance. None of the other tested direct or indirect effects by maternal measures were statistically significant. None of the W1 paternal measures were statistically significantly associated with W3 self-control or W5 deviance, either directly or indirectly. Thus, Hypotheses 2 and 4 were partially supported.

In all models tested, W3 self-control was consistently and negatively associated with W5 deviance: βs ranged from -0.30 to -0.32 (*p*s < .001). Thus, Hypothesis 3 was supported. Participant sex was also consistently and negatively associated with W5 deviance: βs ranged from -0.23 to -0.24 (*p*s < .001), indicating that females reported a lower level of deviance than males. Each model explained 32.4% to 33.4% of variance in W3 self-control and 31.1% to 32.6% of variance in W5 deviance.

3.3.5 Differences Between Parents and by Adolescent Sex

Due to issues encountered in tests of the conceptualized model in Figure 1a, the conceptualized model in Figure 1b was not tested. Instead, each parental behavior was tested independently with both maternal and paternal measures but without the control of other parenting behaviors. The model fit for all tested models was acceptable: parental closeness: $\chi^2(52) = 92.078$, $p < .001$, CFI = .984, RMSEA = .037, 90% RMSEA CI [.024, .049]; parental support: $\chi^2(52) = 178.550$, $p < .001$, CFI = .946, RMSEA = .065, 90% RMSEA CI [.055, .076]; parental monitoring: $\chi^2(52) = 123.986$, $p < .001$, CFI = .969, RMSEA = .048, 90% RMSEA CI [.037, .059]; and parental disciplinary inconsistency: $\chi^2(52) = 160.795$, $p < .001$, CFI = .949, RMSEA = .060, 90% RMSEA CI [.050, .071]. However, effects by each maternal measure and the corresponding paternal measure

basically canceled each other out, and none of the associations between the parental measures with self-control or deviance were statistically significant. This was most likely due to multicollinearity between the maternal and paternal measures, based on the high correlations (see Table 3.2). Thus, no direct comparisons between maternal and paternal measures were carried out.

Multigroup tests were also completed to test the differences by adolescent sex based on the newly specified model with one parenting measure. However, model tests could not be carried out as there were fit and identification issues particularly with the male group. Thus, multigroup tests are not reported.

3.4 Discussion

The current study was framed by self-control theory and tested within- and between-individual changes in self-control during early adolescence, as well as the associations between parenting and developmental changes in adolescent deviance directly and indirectly through developmental changes in self-control, using longitudinal data collected from a sample of Czech early adolescents, with the goals to fill gaps including a missing focus on parental disciplinary inconsistency, insufficient examinations of associations between parenting and relative changes in adolescent self-control and deviance, as well as an unclear picture of how much maternal and paternal parenting behaviors overlap or differ in predicting developmental changes in self-control and deviance. Tests of unique explanatory effects between maternal and paternal measures of parenting and between males and females were not completed successfully due to issues with multicollinearity and model convergence. Therefore, results were only reported separately for the maternal

model and the paternal model on the total sample. Study results are summarized and discussed in the following.

3.4.1 Development of Self-Control

Results indicated that the mean level of within-individual self-control decreased over the two years of study, thus this finding is inconsistent with Hypothesis 1. But it is important to note that self-control theory does not specify whether self-control during early adolescence is expected to increase or decrease within individuals. Therefore, it could not be concluded whether a declining trend of self-control found in the current study is consistent with the theory or not. But it is partly consistent with a previous study that also focused on early adolescents and found that over 40% of the sample experienced a declining self-control (Jo & Zhang, 2012). The current study finding is also consistent with some previous studies that examined a longer time span (Shulman et al., 2015; Vazsonyi & Ksinan, 2017) while inconsistent with others (e.g., Forrest et al., 2019; Vazsonyi & Ksinan Jiskrova, 2018; Winfree, 2006), although the current study and these previous studies cannot be directly compared due to differences in focus. Nevertheless, the finding is not quite surprising. Based on the well-known age-crime relationship (Hirschi & Gottfredson, 1983; see also Carlsson & Sivertsson, 2021; Shulman et al., 2013), deviance increases dramatically during early adolescence and peaks during middle adolescence. If as proposed in self-control theory (Gottfredson & Hirschi, 1990; 2020), low self-control is one factor that drives for deviance/crime, declines in self-control are likely to put early adolescents at more risks for increases in deviance. Thus, the study finding can be explained by both the self-control theory (Gottfredson & Hirschi, 1990; 2020) and the age-crime relationship (Hirschi & Gottfredson, 1983).

3.4.2 Links Between Parenting and Deviance Through Self-Control

Study results indicated that maternal closeness was directly associated with developmental changes in adolescent deviance while maternal monitoring was indirectly associated with developmental changes in adolescent deviance through developmental changes in self-control. Maternal support and disciplinary inconsistency were not associated with developmental changes in adolescent self-control or deviance, and so were not paternal closeness, support, monitoring, and disciplinary inconsistency. Self-control was negatively associated with developmental changes in deviance. Thus, Hypotheses 2 and 4 were partially supported, and Hypothesis 3 was supported.

The effects between maternal closeness and monitoring with developmental changes in self-control and deviance are consistent with predictions of self-control theory (Gottfredson & Hirschi, 1990; 2020) and showed the continuing importance of the two parental behaviors in improving self-control and reducing deviance during early adolescence. These results also indicated that both direct and indirect effects between parenting and adolescent deviance existed, although whether parenting should be directly or indirectly associated with adolescent deviance are not discussed explicitly in self-control theory. The effects between maternal monitoring and developmental changes in self-control was also consistent with previous research that tested the same question in an adolescent sample (Brauer, 2017). However, the effects between maternal closeness and monitoring with developmental changes in adolescent deviance could not be directly compared with previous research due to differences in study design (e.g., Bobbio et al., 2019; Vazsonyi et al., 2016).

The null findings related to effects between other tested parental behaviors (i.e., paternal closeness and monitoring, and both parents' support and disciplinary inconsistency) and developmental changes in adolescent self-control and deviance were unexpected based on theoretical predictions (Gottfredson & Hirschi, 1990; 2020). But it is important to note that self-control theory focuses more on the importance of parenting in the first decade of life to the development of child self-control. It does not specify whether the same parental behaviors in childhood would have the same effects on self-control or deviance during adolescence. Thus, it could be because these parental behaviors are not important factors for growth of self-control or reduction of deviance during early adolescence, which is to be examined further in future research. The null effects by parental disciplinary inconsistency were also inconsistent with previous research that focused on slightly older adolescents (van Gelder et al., 2018), and may be further explained by the measures used that had a low reliability (< .60), which might have attenuated the associations between maternal or paternal disciplinary inconsistency and developmental changes in self-control as well as deviance. Nevertheless, the findings are consistent with predictions of self-control theory and stress the importance of maternal closeness and monitoring of adolescents' activities, such as their companions and whereabouts, to promote a better sense of self-control and reduce deviance in early adolescents.

The association between self-control and developmental changes in deviance was consistent with the theory prediction (Gottfredson & Hirschi, 1990; 2020) as well as extant evidence (e.g., Moon et al., 2014; Pratt & Cullen, 2000; Robson et al., 2020; Vazsonyi et al., 2017; Vazsonyi et al., 2021). Compared with a previous study that tested associations

between maternal monitoring, support, and conflict with deviance through low self-control in Czech adolescents (slightly older adolescents than in the present one) but with cross-sectional data (Vazsonyi et al., 2016), the effect sizes between self-control and deviance are quite similar: standardized estimates ranged from -0.30 to -0.32 in the current study (recall that 8 models each with one parental measure were tested, and thus there were multiple estimates for the same path), and the standardized estimate was 0.36 in the previous study, even though the current study used longitudinal data and controlled for baseline levels of self-control and deviance. Thus, these results indicated that in these two samples of Czech adolescents, self-control appeared to be consistently associated with concurrent or future deviance. These findings from a Czech sample are also supportive of the cultural invariance hypothesis of the self-control theory related to the self-control-deviance link (Gottfredson & Hirschi, 1990; 2020).

As tests with both maternal measures and paternal measures in one model did not work out, it could not be determined whether maternal measures had a stronger or weaker association with self-control and deviance, compared with paternal measures. The fact that as both maternal and paternal measures were entered into the model, all effects became smaller and not statistically significant, might be due to issues with redundancy, based on high correlations between maternal and paternal measures (see Table 3.2). An examination of the standardized effects for tested associations in maternal models and paternal models also indicated that the effects appeared to be rather similar between a maternal measure and the corresponding paternal measure (see Table 3.3), even though only effects by two maternal measures were statistically significant and no direct tests were completed to compare the effects between maternal measures and paternal measures. Taken together,

these findings may suggest considerable overlaps between maternal and paternal parenting behaviors in explaining variance in the developmental changes in adolescent self-control and deviance, in fact entirely consistent with the claim by Gottfredson and Hirschi (1990) that parents tend to be similar in child rearing practices, thus obviating the need to study both in one investigation. Differences in the links by adolescent sex could not be tested, due to model convergence problems.

3.4.3 Study Limitations and Future Research

The current study used a convenience sample, and therefore the findings may not be generalizable to early adolescents in the area or other parts of the Czech Republic. To achieve generalizable findings, future research would need to obtain a representative sample. And even though baseline outcome variables (i.e., self-control and deviance) were controlled for in the current study, study findings are still correlational in nature and do not imply causal associations.

The measures of maternal monitoring, and both parents' disciplinary inconsistency had a reliability less than 0.70, lower than the acceptable criteria. This might have attenuated the observed relationships between parental disciplinary inconsistency with self-control and deviance. Additionally, the parental monitoring measure had only two items and thus may have not been able to capture all facets of parental monitoring/solicitation behaviors. Future research will benefit from using measures that have a higher reliability score as well as more items. With better measures, future research will provide additional information about the associations between the two constructs with self-control and deviance.

Furthermore, data were all self-reported by adolescents, and thus information collected was subject to bias associated with self-reports. Information from multiple informants, such as parent report of parental behaviors, parent report and teacher report of adolescent self-control and deviance, is important for a more comprehensive understanding of the tested associations. However, parent or teacher reports may not be efficient to use or be the most accurate. In fact, in preliminary analyses of the current study, correlations between teacher rated self-control and deviance as well as the parenting measures were examined; the observed associations were weaker and inconsistent in comparison to ones based on self-report measures of self-control. Thus, a decision was made to assess self-control through self-reports rather than teacher ratings.

Moreover, due to multicollinearity and other issues, model tests could not be completed as originally proposed. First, each parenting measure was tested in a separate model without controlling for other parenting variables. Thus, the estimates may not be the cleanest. Second, the current study was not able to complete tests of differences between the mother and the father or between males and females. Only patterns of differences/similarities in associations between maternal measures and paternal measures with adolescent self-control and deviance were discussed in the current study. Lastly, no conclusion could be made on the differences in the strength of effects. Future research may continue to test the differences by parental and adolescent sex.

3.4.4 Conclusion

The current study tested the longitudinal associations between parenting and deviance through self-control, as framed by the self-control theory, in a group of Czech early adolescents. The current study provides a number of important findings. First, a

growth model indicated that self-control decreased over the two years of study; the initial level of self-control and the rate of change varied across individuals, providing evidence of malleability of self-control during early adolescence. Full structural equation modeling tests indicated that maternal monitoring was positively associated with developmental changes in self-control, which in turn was negatively associated with developmental changes in deviance. Additionally, maternal closeness was negatively associated with developmental changes in deviance. No paternal parenting behaviors were found to be associated with developmental changes in adolescent self-control or deviance. The current study was not able to test unique explanatory effects between maternal and paternal measures of parenting and differences in associations by adolescent sex, most likely due to redundancy between maternal and paternal measures, which is in fact supportive of claim by self-control theory related to similarity between maternal and paternal parenting (Gottfredson & Hirschi, 1990). Thus, study findings suggest potential within individual changes in self-control over time, past childhood, during adolescence. They also show the continued importance of maternal closeness and monitoring for explaining variability in self-control as well as deviance during early adolescence, consistent with self-control theory. This evidence provides important avenues for potential prevention efforts, focused on maternal closeness and monitoring behaviors.

Table 3.1 Descriptive Statistics of Study Variables

	n	*Mean*/%	*SD*	% Missingness	Reliabilities	Sex Difference (*p*)
Cohort				0.0		.090
Grade 6	298	51.2				
Grade 7	284	48.8				
Age	581	12.34	0.89	0.9		.996
Sex				0.7		
Female	340	58.4				
Male	242	41.6				
SES	503	-0.02	0.85	14.2		.024
Monthly Family Income						
<35K Czech Crowns	223	45.5				
35K–60K Czech Crowns	169	34.5				
>60K Czech Crowns	98	20.0				
Mother Education						
Below College	228	52.5				
College & Above	206	47.5				
Father Education						
Below College	193	45.7				
College & Above	229	54.3				
Family Structure				13.8		.852
Two Parents	384	76.0				
Other	121	24.0				
W1 M Closeness	505	4.27	0.60	13.8	.76	.211
W1 M Support	505	3.68	0.96	13.8	.76	.092
W1 M Monitoring	505	4.24	0.82	13.8	.62	.003
W1 M Inconsistency	503	2.66	0.84	14.2	.59	.014
W1 P Closeness	500	3.94	0.86	14.7	.86	.767
W1 P Support	500	3.86	0.89	14.7	.73	.046
W1 P Monitoring	500	3.44	1.21	14.7	.77	.028
W1 P Inconsistency	496	2.33	0.82	15.4	.59	.674
W1 Self-Control	495	3.66	0.91	15.5	.79	.692
W2 Self-Control	521	3.61	0.96	11.1	.82	.903
W3 Self-Control	487	3.61	0.96	16.9	.83	.124
W4 Self-Control	496	3.51	0.94	15.4	.84	.446
W5 Self-Control	271	3.49	0.94	53.8	.82	.716
W1 Deviance	499	1.20	0.29	14.8	.74	< .001
W5 Deviance	471	1.36	0.38	53.8	.85	< .001

Note. M = maternal measure. P = paternal measure. W = wave. SD = standard deviation. P values for sex differences were based on *t* tests comparing mean levels of study variables between males and females. *N* = 570.

Table 3.2 Correlations Among Study Variables

	1	2	3	4	5	6	7	8	9	10
1. W1 M Closeness										
2. W1 M Support	.50***									
3. W1 M Monitoring	.31***	.16***								
4. W1 M Inconsistency	-.32***	-.49***	-.05							
5. W1 P Closeness	.46***	.27***	.17***	-.17***						
6. W1 P Support	.23***	.48***	.09	-.33***	.40***					
7. W1 P Monitoring	.30***	.19***	.38***	-.15**	.53***	.14**				
8. W1 P Inconsistency	-.15***	-.26***	-.05	.46***	-.23***	-.50***	-.03			
9. W3 Self-Control	.10*	.12*	.10*	-.22***	.08	.10*	.16**	-.21***		
10. W5 Deviance	-.21***	-.23***	-.18**	.22***	-.21***	-.14*	-.15*	.19**	.38***	
11. Grade[1]	-.12**	-.12*	-.13**	.09	-.06	-.11*	-.10*	.04	-.10*	.08
12. Sex[2]	.06	.08	.13**	-.11*	.01	.09*	.10*	-.01	-.07	-.29***
13. Socioeconomic Status	.14**	.05	-.01	-.02	.18***	.11*	.08	-.03	.00	.16*
14. Family Structure[3]	.02	.04	-.06	-.08	.22***	.04	.13**	.08	.07	-.07
15. W1 Self-Control	.17***	.33***	.04	-.30***	.20***	.26***	.17***	-.29***	.49***	-.34***
16. W1 Deviance	-.25***	-.30***	-.12**	.25***	-.19***	-.15***	-.17***	.22***	-.28***	.44***

Note. M = maternal measure. P = paternal measure. W = wave. [1]Grade 7 = 1; Grade 6 = 0. [2]female = 1; male = 0. [3]two-parent = 1; other =0.
*p< .05. **p< .01. ***p< .001.

Table 3.3 Standardized Estimates for the Associations Between Parental Behaviors, Self-Control, and Deviance

	W3 Self-Control	W5 Deviance		
		Direct Effects	Indirect Effects	
	β(SE)	β(SE)	β(SE)	Confidence Intervals
W1 M Closeness	0.03(0.05)	-0.12(0.05)*	-0.01(0.02)	[-0.041, 0.022]
W1 P Closeness	-0.05(0.05)	-0.10(0.06)	0.02(0.02)	[-0.017, 0.050]
W1 M Support	-0.07(0.06)	-0.09(0.06)	0.02(0.02)	[-0.015, 0.056]
W1 P Support	-0.08(0.07)	-0.09(0.08)	0.03(0.02)	[-0.017, 0.070]
W1 M Monitoring	0.10(0.04)*	-0.04(0.05)	-0.03(0.02)*	[-0.063, -0.003]
W1 P Monitoring	0.09(0.05)+	-0.00(0.07)	-0.03(0.02)+	[-0.063, 0.003]
W1 M Disciplinary Inconsistency	-0.09(0.08)	0.08(0.08)	0.03(0.03)	[-0.022, 0.076]
W1 P Disciplinary Inconsistency	-0.06(0.07)	-0.05(0.06)	0.02(0.02)	[-0.024, 0.064]

Note. Each parenting measure was included in a separate model. Control variables for each model included participant sex, W1 self-control, and W1 deviance. W = wave. M = maternal. P = paternal. β(SE) = standardized estimate(standard error).
+$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Figure 3.1 Conceptualized Model of Associations between Parenting Behaviors, Adolescent Self-Control, and Adolescent Deviance

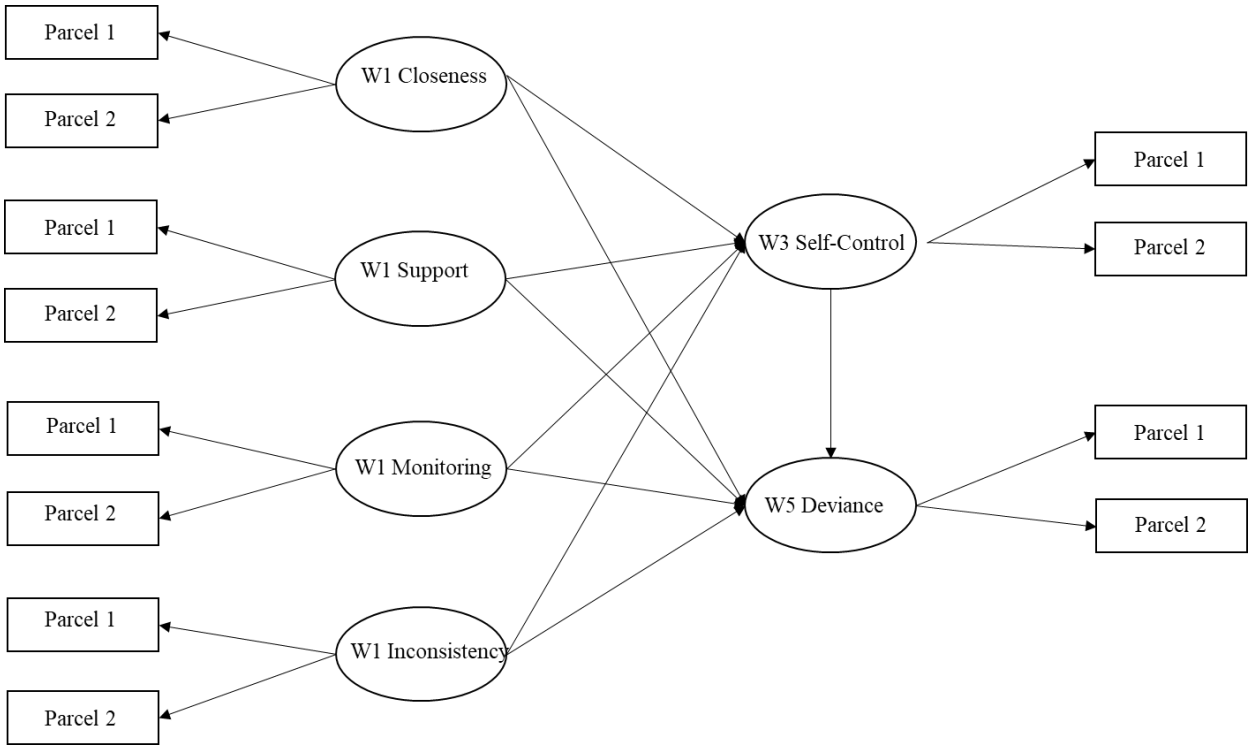
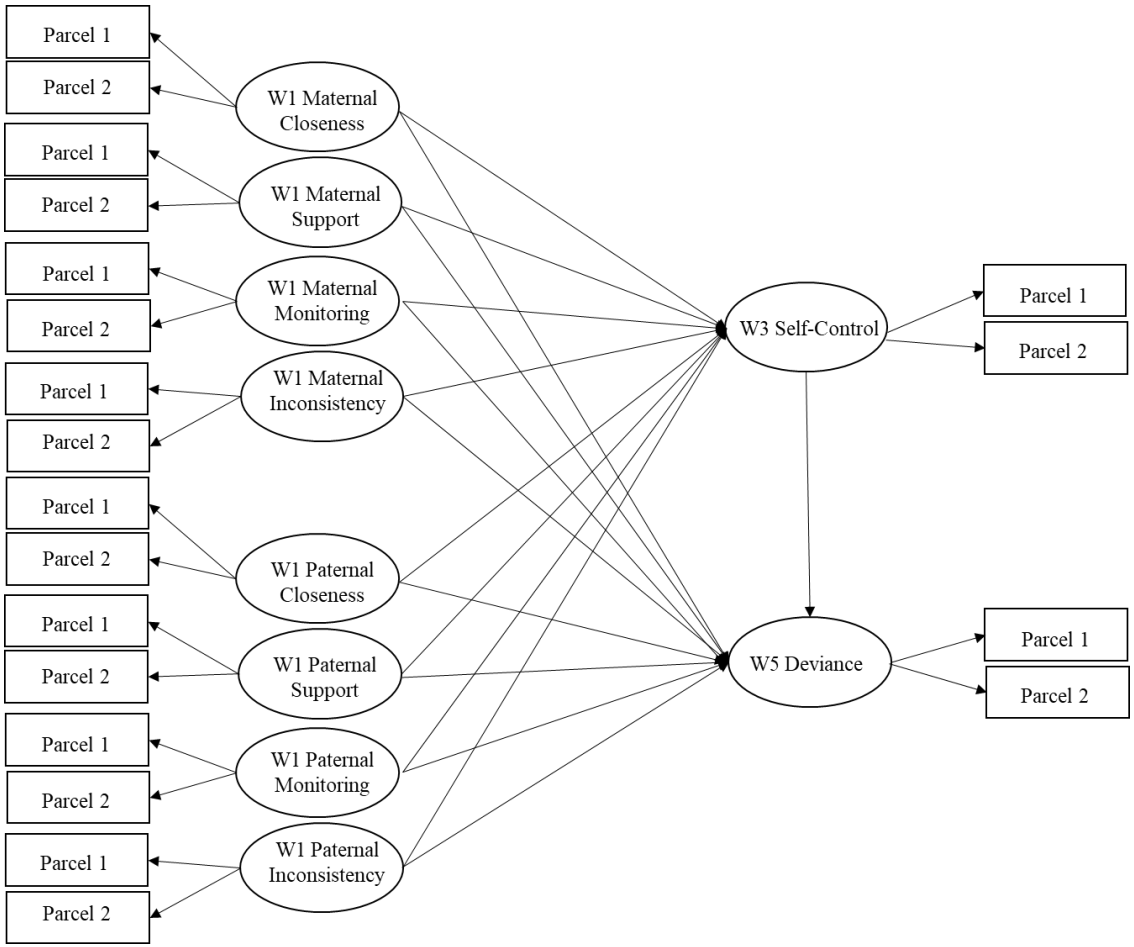


Figure 3.2 Conceptualized Model Comparing Associations between Maternal versus Paternal Parenting, Adolescent Self-Control, and Adolescent Deviance



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