# ONE OF A KIND?

## Unraveling the complexities of parenting adolescents across time(scales) and families

Savannah Boele

# ONE OF A KIND?

## Unraveling the complexities of parenting adolescents across time(scales) and families

**Savannah Boele**

This research was supported by a grant from the Dutch Council for Scientific Research (NWO-VIDI; 452-17-011) awarded to Loes Keijsers.

| | |
|---|---|
| Printed by: | Ridderprint, ridderprint.nl |
| Layout: | Penny Dalladol \| Ridderprint |
| Cover Design: | Joey Roberts \| Ridderprint |
| ISBN: | 978-94-6483-608-0 |

# ONE OF A KIND?

## Unraveling the complexities of parenting adolescents across time(scales) and families

Echt uniek?
De complexiteiten van opvoeden in de adolescentie ontrafelen over verschillende tijdschalen en tussen verschillende families

**Proefschrift**

ter verkrijging van de graad van doctor aan de
Erasmus Universiteit Rotterdam
op gezag van de
rector magnificus

Prof.dr. A.L. Bredenoord

en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
donderdag 15 februari 2024 om 13:00 uur

door

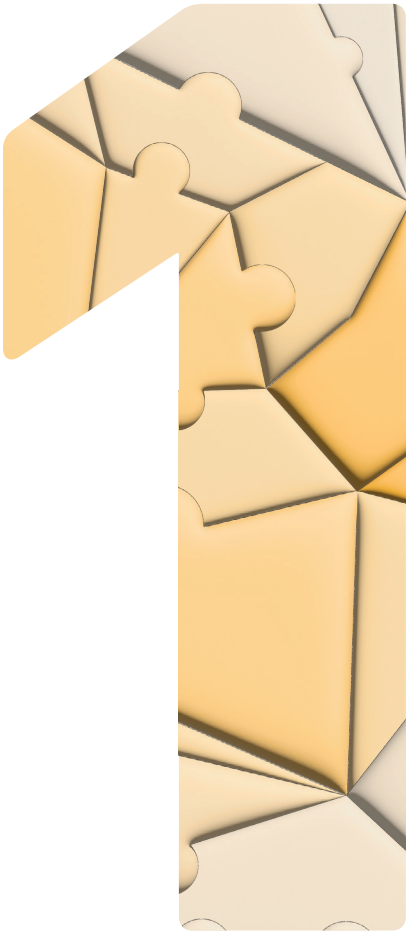
**Savannah Boele**
geboren te Bergeijk.

Erasmus University Rotterdam

## PROMOTIECOMMISSIE:

| | |
|---|---|
| **Promotoren:** | Prof.dr. L.G.M.T. Keijsers |
| | Prof.dr. J.J.A. Denissen |
| **Overige leden:** | Prof.dr. P.W. Jansen |
| | Prof.dr. G.J. Overbeek |
| | Prof.dr. I. Myin-Germeys |
| **Copromotor:** | Dr. A.D. de Haan |

## TABLE OF CONTENTS



# CHAPTER 1

General introduction

> *Each person is like every other person, each person is like some others, and each person is like no other person.*
>
> Adapted from Kluckhohn & Murray (1948)

Each person is a unique human being, *one of a kind*, shaped by many idiosyncratic experiences throughout life. One of the primary contexts in which most humans gain life-changing experiences is the parent-child relationship (Bronfenbrenner, 2005; Sameroff, 2010). While it is universally expected that parents (or other caregivers) have an impact on their children's everyday functioning and long-term development (Bronfenbrenner, 2005; Granic et al., 2008), and vice versa (Kuczynski & Parkin, 2007), the nature of parent-child influences is assumed to vary across families as a function of the characteristics of the child, the parent, the parent-child relationship, and other contexts (Belsky & Pluess, 2009; Darling & Steinberg, 1993; Soenens et al., 2015). Influences between parents and children may even be idiosyncratic, as every family has its own unique set of characteristics (e.g., the personality of the child and the parents, quality of interparental relationship, culture, religion, etc.) (Bronfenbrenner, 2005) and a unique history of interactions (Lollis & Kuczynski, 1998). Thus, how parents and their children influence each other might be unique to each family, fueling a child's individual development.

Adolescence is a period in which parents are considered to still significantly contribute to their children's developmental trajectory, for better or worse. Adolescence is the period roughly between 10 and 25 years (Smetana & Rote, 2019; Steinberg, 2014), and is marked by many physiological (e.g., pubertal changes), physical (e.g., growth spurt), neurological (e.g., gradually maturing prefrontal cortex), social (e.g., stronger peer orientation, more independence from parents), and psychological changes and developments (e.g., heightened emotionality, identity formation) (Smetana et al., 2006; Soenens et al., 2019; Steinberg, 2005). Alarmingly, adolescence also seems to be a sensitive period for developing internalizing (e.g., depressive and anxiety symptoms; Hankin et al., 1998; Shorey et al., 2022) and externalizing problems (e.g., substance abuse; (Kessler et al., 2005; Nivard et al., 2017), which can persist into adulthood (Copeland et al., 2009; Kim-Cohen et al., 2003) and have long-lasting effects on other psychosocial outcomes (Clayborne et al., 2019; Copeland et al., 2009). As one of the primary socialization figures, parents play a significant role in navigating their adolescent child through the challenges and opportunities of growing up (Soenens et al., 2019). However, as parenting

adolescents is understood to be a heterogeneous phenomenon (e.g., Bronfenbrenner, 2005; Grusec, 2008), there are likely no universal parenting instructions that will work for every family. Therefore, to help every parent effectively promote the development of their unique adolescent, it is vital to understand how and why parents and adolescents influence each other over time in heterogeneous ways across families.

Despite the strong theoretical focus and common knowledge that families function in heterogeneous ways, until recently, empirical studies have mostly been dedicated to identifying general parenting principles or patterns (for a review see **Chapter 2**; Boele et al., 2020). In doing so, parenting science has established a solid understanding of how families differ in their stable levels of parenting and adolescent functioning. To illustrate, studies have frequently shown that adolescents who experience relatively high levels of parental warmth exhibit fewer internalizing and externalizing problems than adolescents who experience less parental warmth (Pinquart, 2017a, 2017b). However, such group-level patterns provide little to no information on how the dynamic processes between parenting and an adolescent's functioning unfold over time within the same family (Hamaker, 2012; Molenaar, 2004), let alone how such dynamic parenting processes differ from one family to the next. Therefore, parenting science is still in its infancy in understanding the complexities of parenting adolescents: (I) how parents and adolescents influence each other *within families,* (II) on micro- to macro-*timescales,* and (III) how and why these influences might vary *across families*.

To address these three pressing knowledge gaps, the overarching goal of this dissertation was to provide insights into the complexities of parenting adolescents across timescales and families. To achieve this goal, this dissertation presents five studies (one systematic review and four empirical studies) that examined how key dimensions of parenting are reciprocally linked to adolescent functioning within families on various timescales and how and why these linkages differ across families. The empirically studied key parenting dimensions are warmth, autonomy support, behavioral control, and psychological control, which will be explained later in this introduction. The empirically studied domains of adolescent functioning include aspects of psychological (i.e., depressive and anxiety symptoms and self-esteem) and affective functioning (i.e., positive and negative affect). In this chapter, I elaborate on the contemporary theoretical understanding of parenting adolescents and how generally applied methods have had a mismatch with these theoretical ideas (Richters, 1997, 2021). I end with the aims, which address the methodological gaps and outline of this dissertation.

# 1. THEORETICAL UNDERSTANDING OF PARENTING ADOLESCENTS

## 1.1 Influences between parents and adolescents are proximal processes

Parents play a central role in the lives of adolescents. Though children spend progressively less time with their parents during adolescence (R. Larson & Richards, 1991), the parent-child relationship remains one of the primary and unique contexts in which adolescents amass positive and negative experiences (Laursen & Bukowski, 1997). Different theories have described how such experiences with parents contribute to adolescents' development. That is, **bio(psychosocial) ecological** models view micro-timescale (e.g., real-time) influences between parents and adolescents as one of the proximal processes (i.e., "enduring forms of interaction in the immediate environment"; Bronfenbrenner, 2005, p. 6) that shape the adolescent's longer-term development (Bronfenbrenner, 2005; Sameroff, 2010). Importantly, both the objective quality of these proximal influences and the subjective quality perceived by adolescents are viewed as important drivers of their development (Bronfenbrenner, 2005). Similarly, scholars who have adopted a **dynamic systems perspective** to parenting also propose that reoccurring micro-timescale influences shape long-term developmental changes (Granic et al., 2008; Smith & Thelen, 2003). Hence, according to these macro-developmental theories, the answer to understanding how individual adolescents grow and mature lies hidden in the nature of the proximal influences in the parent-adolescent relationship.

## 1.2 Parenting dimensions that contribute to adolescent functioning

Macro-developmental theories thus assume that the quality of influences within the parent-child relationship drives the course of future development (Bronfenbrenner, 2005; Sameroff, 2010; Smith & Thelen, 2003). But what constitutes good-quality parenting in adolescence? Various more general and specific parenting theories have proposed which key parenting dimensions, composed of clusters of practices, are relevant in terms of hindering or supporting adolescent functioning (e.g., Kerr & Stattin, 2000; Rohner et al., 2005; Soenens et al., 2017). Overall, this broad range of work can be synthesized into four key parenting dimensions: warmth, autonomy support, behavioral control, and psychological control (Smetana, 2017; Soenens et al., 2019). These key dimensions have been theoretically and empirically linked to a wide range of important domains of adolescent functioning, such as psychosocial (mal)functioning, including internalizing problems (e.g., depressive and anxiety symptoms and low self-esteem) and externalizing problems (e.g., aggression, delinquency, and substance use). The definitions and

theorized consequences of these four parenting dimensions in terms of adolescents' functioning and current empirical patterns are described below.

Warmth (also known as emotional support) is one of the most frequently studied dimensions of parenting. Parental warmth involves practices such as providing affection, intimacy, security, and responding to children's emotional needs (Furman & Buhrmester, 1985; Soenens et al., 2017). According to the **interpersonal acceptance-rejection theory** (IPARTheory; Rohner, 2016) and the **self-determination theory** (SDT; Ryan & Deci, 2000; Soenens et al., 2019), experiencing parental warmth can satisfy the universal need to feel loved and appreciated by close others (i.e., called "need for relatedness" by the SDT), which is believed to promote psychosocial functioning, such as a better self-esteem. Meta-analytic work has indicated that parental warmth indeed correlates with many domains of adolescent functioning at the group level. Specifically, a large body of work has established that adolescents from families with higher levels of parental warmth show, *on average*, fewer internalizing (e.g., McLeod, Wood et al., 2007; Pinquart, 2017b; Yap et al., 2014) and externalizing problems (Hoeve et al., 2009; Pinquart, 2017a; Yap et al., 2017) than adolescents from families with lower levels of parental warmth. Whether parental warmth, and all other parenting dimensions described below, exhibits similar associations with adolescent functioning *within families* is yet to be established (for a systematic review, see **Chapter 2**; Boele et al., 2020).

The second parenting dimension is *autonomy support,* which includes respecting adolescents' individuality by recognizing and accepting their perspectives, giving choices, explaining new rules, and encouraging initiative-taking (Soenens et al., 2019). According to the **self-determination theory**, experiencing autonomy-supportive parenting can satisfy the universal human need for autonomy, which is thought to foster adolescents' psychosocial functioning (Ryan & Deci, 2000; Soenens et al., 2019). Although parental autonomy support has not gained as much attention as parental warmth, several meta-analyses have similarly indicated that higher levels of autonomy support relate to lower levels of internalizing (McLeod, Weisz, et al., 2007; Pinquart, 2017b) and externalizing problems in adolescence at the group level (Pinquart, 2017a). In other words, adolescents from families who experience more parental autonomy support show, on average, better psychosocial functioning than adolescents whose parents are less autonomy supportive.

In addition to parental warmth and autonomy support, providing structure and setting boundaries seems key. This third parenting dimension is *behavioral control*, involving practices to supervise and regulate adolescents' behavior, such as rule setting and

actively soliciting information of one's children's whereabouts and activities (Barber, 1996; Stattin & Kerr, 2000). At appropriate levels, behavioral control is thought to protect against adolescent malfunctioning, especially by preventing or reducing externalizing problems, such as delinquency (Stattin & Kerr, 2000) and substance use (Koning et al., 2020). However, in more recent work, behavioral control has also been suggested to undermine adolescents' autonomy and, therefore, hinder adolescents' psychosocial functioning. That is, when parents exert too much behavioral control or when the domain of control touches on personal domains, such as prohibition of friendships (Kakihara & Tilton-weaver, 2009; Keijsers et al., 2012), parental behavioral control may be hindering rather than helping. Therefore, based on the **self-determination theory** (Ryan & Deci, 2000), a conceptual distinction has been made between promotive practices that provide structure (e.g., rule setting, monitoring, and feedback) and hindering, harsh practices (e.g., hostility, criticism, and punishment) (Soenens et al., 2019). Meta-analyses that differentiated between "behavioral control" (i.e., rule setting and monitoring) and "harsh control" indeed show that adolescent internalizing and externalizing problems are negatively associated with behavioral control but positively associated with harsh control at the group level (Pinquart, 2017a, 2017b). Thus, adolescents whose parents provide more structure and are less harsh toward them have shown better psychosocial functioning on average than adolescents whose parents provide less structure and are harsher.

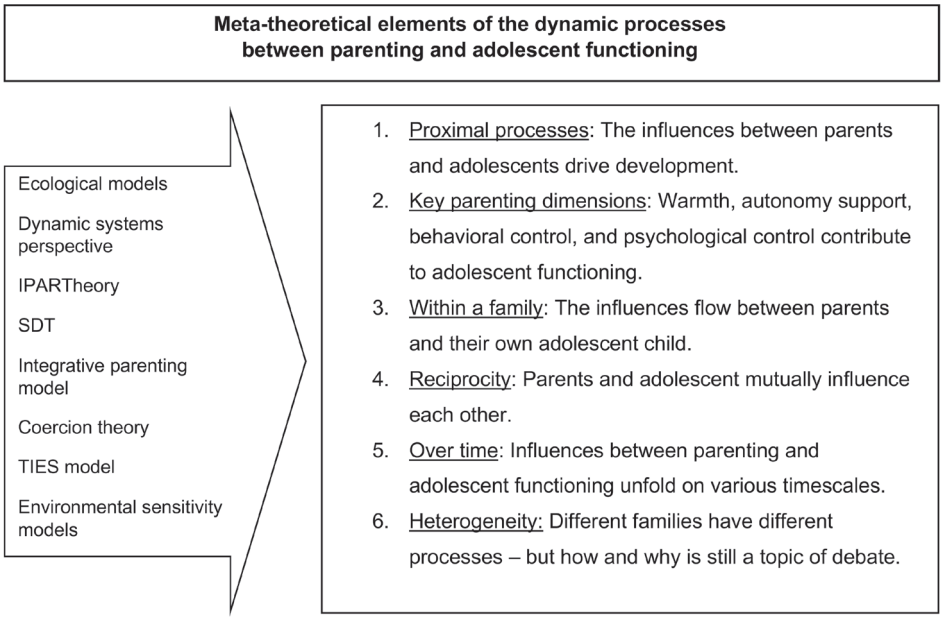
In addition to behavioral control, a second type of parental control has been identified and labeled as *psychological control.* The fourth parenting dimension psychological control involves the regulation of adolescents' thoughts and emotions. This can be done by manipulative parenting practices, including intrusiveness, guilt induction, and love withdrawal (Barber, 1996; Barber et al., 2012). According to the **self-determination theory** (Ryan & Deci, 2000), psychologically controlling parenting is thought to hinder adolescent psychosocial functioning because it undermines adolescents' autonomy and competence (Barber, 1996; Soenens et al., 2019). Indeed, meta-analyses indicate that parental psychological control and related practices, such as withdrawal, rejection, and aversiveness, show one of the strongest links with internalizing (McLeod, Weisz, et al., 2007; Pinquart, 2017b; Yap et al., 2014) and externalizing problems at the group level (Hoeve et al., 2009; Pinquart, 2017a). Hence, adolescents who experience relatively high levels of parental psychological control show worse psychosocial functioning on average than adolescents who experience lower levels of parental psychological control.

Over the past few decades, theoretical parenting work has attempted to understand which parenting dimensions and how they are linked to the development of adolescent (mal)

functioning. These dynamic processes between parenting and adolescent functioning are characterized by complexity, which requires a further specification of the nature of these dynamic parenting processes. That is, the contemporary understanding of the dynamic processes between parenting and adolescent functioning includes several other meta-theoretical elements (i.e., processes unfolding within families, the presence of reciprocity, processes unfolding on various timescales, and heterogeneity of processes across families; see Figure 1) which are elaborated below.

**Figure 1**

*Summary of the theoretical understanding of parenting adolescents*




*Note*. IPARTheory = Interpersonal acceptance and rejection theory. SDT = self-determination theory. TIES model = temporal interpersonal emotions systems model.

## 1.3 Within a family: Influences between a parent and their own child

To understand how parenting relates to adolescent functioning, the linkages between parenting and adolescent functioning have been theoretically described at two distinct levels: between-family differences and within-family processes (Smetana, 2017). Many studies have been focusing on *differences between families*. That is, the groundbreaking work of Baumrind (Baumrind, 1971, 1991) distinguished three stable parenting styles that differed between parents and families. These typologies were based on the two

overarching parenting dimensions of responsiveness and demandingness: authoritative (i.e., high responsiveness and demandingness), authoritarian (i.e., low responsiveness, high demandingness), and permissive (i.e., high responsiveness and low demandingness). Later, Maccoby & Martin (1983) added a fourth style, the neglecting style, which describes parents who score low on both responsiveness and demandingness. These parenting styles are differentially linked to adolescent psychosocial functioning; research often demonstrated that adolescents whose parents exert an authoritative parenting style demonstrate better psychosocial functioning than adolescents whose parents exert other parenting styles (Power, 2013). However, this typology of parenting styles at the aggregated level of stable between-family differences has paid little attention to the underlying dynamic processes that explain how parenting contributes to changes in adolescent functioning.

To explain why adolescents raised by parents with different parenting styles show different levels of functioning, **the integrative parenting model** of Darling and Steinberg (1993) distinguished between stable parenting styles and time-variable parenting practices. Parenting style is conceptualized as the stable emotional climate of the parent-child relationship, which can alter the effectiveness of parenting practices. Parenting practices (e.g., responsiveness, rule setting, and intrusiveness) are thought to vary across time and situations and are conceptualized as the direct mechanisms through which parents influence the functioning of their adolescents. In other words, fluctuations in parenting practices over time are thought to explain the changes in adolescent functioning. Hence, this integrative model of parenting made clear (Darling & Steinberg, 1993), although not explicitly described as such, that theorized socialization influences from parenting to adolescent functioning occur *within a family*, which may differ *between families* due to variations in parenting styles.

Accordingly, different theoretical questions can be formulated regarding the phenomenon of parenting adolescents (see Table 1). One set of questions pertains to stable differences between families, such as differences in parenting styles, and how they relate to inter-individual differences in the levels of adolescent functioning. Another set of questions pertains to the motor behind such differences: The dynamic processes by which parenting and adolescent functioning influence one another over time. Although the latter set of questions represents the core theoretical ideas on parenting adolescents, they have rarely been empirically tested because of methodological gaps in parenting science and in developmental psychology more broadly (which will be explained later in this introduction) (Richters, 1997, 2021). To increase the empirical understanding of parenting adolescents,

this dissertation therefore focused on the dynamic processes between (perceived) parenting and adolescent functioning, introducing novel methodological designs that allowed me to do so (e.g., intensive longitudinal methods).

## 1.4 Reciprocity: Adolescents also influence their parents

Theories of human development, such as **bio(psychosocial) ecological models** (Bronfenbrenner, 2005; Sameroff, 2010) and the **dynamic systems perspective** (Granic et al., 2008; Smith & Thelen, 2003) emphasize the omnipresence of person-environment transactions. Person-environment transactions are dynamic and ongoing, with individuals shaped by and shaping their immediate environment. This highlights the importance of considering both the person and their social environment when aiming to understand human development. When applied to parenting adolescents, adolescents might not merely be a product of their parents' parenting practices, as described in earlier paragraphs (see 1.2 and 1.3), but most likely also exert influences on their parents.

**Table 1**
*Matching theoretical questions with methodological design*

| | **Theoretical questions** | | |
|---|---|---|---|
| **Concepts** | **Parenting styles**<br>Stable levels, trait-like, differences between families | **Dynamic parenting processes**<br>Dynamics, change, over-time fluctuations, time-varying situations | |
| **Research questions (examples)** | What characterizes families in which adolescents show relatively worse or better functioning? | How do fluctuations in parenting and adolescent functioning predict each other on average within families?<br>And which time-invariant or time-varying characteristics moderate these within-family effects? | What are the unique dynamics between parenting and adolescent functioning in a specific family?<br>And how do these family-specific parenting processes vary across families? |
| **Level of analysis** | Between-family level (nomothetic) | Within-family level | Individual-family level (idiographic) |
| | **Methodological design** | | |
| **Design** | Cross-sectional or longitudinal panel study (years) | Longitudinal study (days to years) | Intensive longitudinal study (seconds to weeks) |
| **Sample size** | Large | Medium to large | ≥ 1 (small to large) |
| **Time points** | One or few | Few to many | Many |
| **Analyses (examples)** | Correlation, regression, CLPM | Multi-level regression, RI-CLPM, DSEM | DSEM, GIMME, state space grid |

*Note.* (RI-)CLPM = (random intercept) cross-lagged panel model. DSEM = dynamic structural equation modelling. GIMME = group iterative multiple modelling estimation.

Indeed, the concept of reciprocity between parents and adolescents has been integrated into many (but not all) parenting theories, from early (Bell, 1968; Patterson, 1982) to contemporary theories (Granic et al., 2008; Lougheed & Keskin, 2021; Sameroff, 2010). Hence, scholars generally agree that parenting, especially parenting *adolescents*, can best be operationalized as a two-way street (Kuczynski & Parkin, 2007; Soenens & Vansteenkiste, 2020). Rather than being passive recipients of their parents' behavior, adolescents exhibit agency and actively choose their responses. For example, adolescents have the agency to decide whether to comply with their parents' demands (Darling et al., 2007) or to disclose personal information (Smetana, 2008). Additionally, how adolescents function, such as how they behave or feel, is likely to elicit certain parenting behaviors. For instance, externalizing problems may elicit more controlling and rejecting behavior from parents in an attempt to reduce their adolescent's problem behavior, which may further reinforce the adolescent's externalizing problems (Patterson & Fisher, 2002). Similarly, adolescents who experience negative emotions or depressive symptoms may elicit a supportive parental reaction or even face parental rejection (Rudolph, 2009). Thus, according to the widely acknowledged theoretical principle of reciprocity, the dynamic processes within families flow not only from parenting to adolescent functioning (i.e., parent-driven influence) but also from adolescent functioning to parenting (i.e., adolescent-driven influence), as depicted in Figure 2 below.

## 1.5 Timescales: Processes between parenting and adolescent functioning unfold over time at varying timescales

As previously described (see 1.3), parenting adolescents is understood as a highly dynamic phenomenon. Parenting practices vary over time and across different situations. For instance, parents need to adjust their behavior to the changing needs of their developing adolescent (Darling & Steinberg, 1993). Additionally, parents' own psychological functioning (e.g., experience of stress) fluctuates over time, for example because of work-related experiences, impacting how they behave towards their adolescent (Belsky, 1984). As such, on one day, a parent may behave warmer or more demanding toward their adolescent than on the previous day due to internal or external influences.

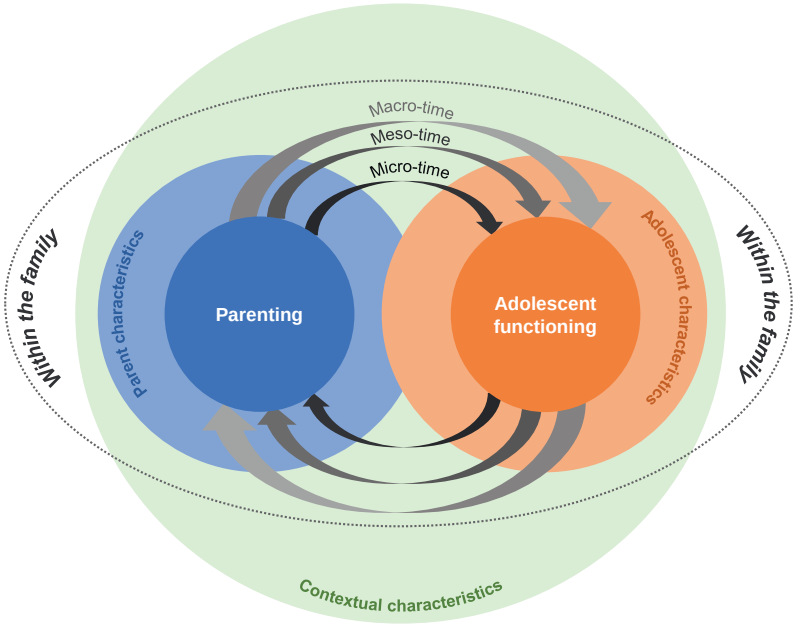
These over-time fluctuations in parenting practices (or in overarching dimensions) are thought to impact the functioning of adolescents, and vice versa. All earlier described theories on human development and parenting (see 1.1 to 1.4) indeed propose that the dynamic processes between parenting and adolescent functioning unfold over time. For example, psychologically controlling parenting is thought to hamper adolescents'

psychosocial functioning, meaning that a (perceived) increase in parental psychological control precedes a decline in the adolescent's functioning (Soenens et al., 2019; Soenens & Vansteenkiste, 2010).

Moreover, several theories acknowledge that these dynamic parenting processes unfold across various timescales, from micro- to macro-timescales. Macro developmental theories, including **bio(psychosocial) ecological models** (Bronfenbrenner, 2005; Sameroff, 2010) and the **dynamic systems perspective** (Granic et al., 2008; Smith & Thelen, 2003), posit that parents and adolescents influence each other on a micro-timescale, such as in real-time face-to-face interaction. Micro-timescale influences may instigate longer-term developmental changes in the adolescent (and in the parent) if these micro-timescale influences "occur on a fairly regular basis over extended period of time" (Bronfenbrenner, 2005, p. 6). However, to my knowledge, the length of this "extended period of time" has not been made explicit. Perhaps micro-timescales influences between parents and adolescents need to persist on at least a meso-timescale (e.g., weeks to months) to have an impact on adolescents' developmental outcomes (e.g., internalizing and externalizing problems).

**Figure 2**

*Theoretical model of the dynamic processes between parenting and adolescent functioning within families*



Such multiple timescale theoretical frameworks have also been applied to parenting theories. For example, the well-known **coercion theory of Patterson** (1982) argues that the repetition of hostile parent-child interactions on a micro-timescale impacts the child's longer-term development of externalizing problem behavior. Furthermore, the recent **temporal interpersonal emotion systems (TIES) model** (Lougheed & Keskin, 2021) theorizes that parents and adolescents influence each other's emotional experiences, expressions, and physical arousal at a micro-timescale (e.g., moments or days). At a longer-term (developmental) timescale (e.g., months or years), they influence each other's psychosocial adjustment, operationalized as stable patterns of emotional or behavioral responses, such as internalizing and externalizing symptoms, or more stable relationship characteristics. Moreover, by means of circular causality, micro-timescale parent-adolescent influences may shape parents' and adolescents' psychosocial adjustment, and their psychosocial adjustment may also shape the micro-timescale influences. Hence, the contemporary TIES model clearly postulates that parent-adolescent influences unfold on different timescales, depending on the timescale at which the involved constructs fluctuate or develop.

## 1.6 Heterogeneity: Different families have different process

### *1.6.1 The quantity of theorized heterogeneity*

Many theories, including **bio(psychosocial) ecological models** (Bronfenbrenner, 2005; Sameroff, 2010), the **dynamic systems perspective** (Granic et al., 2008; Smith & Thelen, 2003), the **integrative parenting model** (Darling & Steinberg, 1993), and **environmental sensitivity models** (Belsky & Pluess, 2009), converge on the idea that the nature of the dynamic processes between parenting and adolescent functioning is likely different between families. Nevertheless, theoretical perspectives differ in terms of *the quantity* of the expected heterogeneity. On the one hand, dynamic parenting processes may vary from subgroup to subgroup due to group-differential characteristics. For instance, due to personality (Belsky & Pluess, 2009), legitimacy beliefs of parental authority (Darling et al., 2007), parenting style (Darling & Steinberg, 1993), or culture (Soenens et al., 2015). Put differently, families who share the same group-differential characteristics (e.g., parenting style) may be influenced in quite similar ways. On the other hand, dynamic parenting processes may be idiosyncratic to each family (Granic et al., 2008; Grusec, 2008). For instance, **bio(psychosocial) ecological models** suggest that the nature of daily influences between parents and adolescents varies not only due to the characteristics of the developing adolescent but also due to the changing characteristics of the context

(e.g., parents and parent-child relationship) and timing of events (Bronfenbrenner, 2005; Sameroff, 2010).

Additionally, there are varying theoretical perspectives on the extent to which *the nature* of dynamic parenting processes differs across families. On the one hand, scholars may hold a view of "universality without uniformity". Such a view means that certain parenting practices are expected to be universally beneficial (e.g., warmth and autonomy support) or detrimental (e.g., overcontrol or psychological control) to adolescents' functioning, although they are not uniform, given that individual differences can exist in the strength of the parenting effect (Soenens et al., 2015). To illustrate this, universality without uniformity is assumed in **environmental sensitivity models**, as some individuals are expected to be more strongly influenced by the same environment than others (Pluess, 2015). On the other hand, scholars may hold a more relativistic perspective, assuming that the effectiveness of parenting practices may depend on each adolescent due to many moderators (Grusec, 2008). In other words, the same parenting practice might have beneficial effects for one adolescent, but harmful consequences for another adolescent. Relativistic accounts of parenting are evident in **bio(psychosocial) ecological models**, postulating that children develop and interact with their parents in unique ways because of the complex dynamic interplay between time-varying contexts and the developing individual (Bronfenbrenner, 2005; Sameroff, 2010). Moreover, according to a dynamic systems perspective, each system (here a family) is viewed as having its own unique characteristics and processes, which also change over time (Granic et al., 2008; Smith & Thelen, 2003). Thus, although heterogeneity is widely acknowledged theoretically, whether the nature of the dynamic processes between parents and adolescents is universal (without uniformity) across families or unique to each family has been a topic of debate.

### *1.6.2 Characteristics which might contribute to heterogeneity*

In addition to the quantity of the expected heterogeneity, theories also propose different characteristics that might explain why the dynamic processes between parenting and adolescent functioning differ from one family to the next. Here, I distinguish between individual characteristics (i.e., characteristics of the adolescent, parent, and their relationship) and contextual characteristics (i.e., characteristics of the immediate and remote environments).

An individual characteristic that has received considerable attention is the adolescent's personality. Personality may play a role in how adolescents differentially perceive,

interpret, cope with, and respond to parenting practices (Soenens et al., 2015; Soenens & Vansteenkiste, 2020). For instance, according to **environmental sensitivity models** (Belsky & Pluess, 2009; Pluess, 2015), some individuals are more sensitive to perceive and more responsive to positive and/or negative environmental influences, including parenting practices. This heightened sensitivity and responsivity is believed to be driven by a (partly) innate and stable high trait level of sensitivity to the environment (Greven et al., 2019). The personality trait neuroticism, which is distinct but related to environmental sensitivity (Greven et al., 2019), has also been linked to greater responsivity to the (social) environment, particularly with respect to negative events (Bolger & Schilling, 1991; Suls & Martin, 2005). Because individuals with higher trait levels of neuroticism seem to interpret negative events more negatively and seem less effective in coping with negative events (Suls & Martin, 2005), high-neuroticism adolescents might particularly be more prone to suffer from negative parenting practices. Thus, the personality of the adolescent is understood as a moderating factor in how parenting practices influence an adolescent's functioning. Although the personality of adolescents has received much attention in the parenting literature, similar arguments also likely apply to the personality of the parent, such that parents with higher levels of environmental sensitivity or neuroticism might be more responsive to the behavior of their adolescent child than parents with lower trait levels.

In addition to differences in personality, two other individual characteristics have received considerable attention. The first is adolescents' legitimacy beliefs of parental authority (Darling et al., 2007; Smetana & Asquith, 1994), which reflect the degree to which adolescents view their parents' exercise of control over a specific domain (e.g., moral, conventional, and personal) as appropriate for their role as caregivers (Darling et al., 2008). Adolescents' legitimacy beliefs might be a moderating factor in how controlling practices impact their functioning, such that adolescents with weak legitimacy beliefs might experience more negative reactions to controlling practices (e.g., monitoring) (LaFleur et al., 2016). The second characteristic is the parenting style, which is believed reflect the overall emotional climate within the parent-adolescent relationship. Parenting style is thought to directly alter the effectiveness of specific parenting practices on adolescent functioning, and indirectly by influencing adolescents' openness to socialization (Darling & Steinberg, 1993). Hence, the stable emotional climate of the parent-adolescent relationship and adolescents' willingness to accept and obey their parental socialization attempts are key factors that are thought to moderate the effects of parenting practices on adolescent functioning.

Besides individual characteristics**, bio(psychosocial) ecological models** also place special emphasis on how contextual characteristics might moderate proximal parenting processes (Bronfenbrenner, 2005; Sameroff, 2010). These moderating contextual characteristics can exist at different levels: meso- (e.g., work of parents), exo- (e.g., neighborhood), and macrolevel (e.g., culture) (Bronfenbrenner, 2005). In the parenting literature, it has been suggested that the context might determine the extent to which a parenting practice is perceived to be appropriate or normative. Controlling parental behavior may be appropriate and therefore more effective in reducing adolescent problem behavior in families who live in high-risk environments, such as neighborhoods with high crime rates, whereas the same behavior may be perceived as intrusive by adolescents who live in low-risk environments (Boykin McElhaney & Allen, 2001). Similarly, a parenting practice might be more promotive of adolescent functioning if it is (perceived to be) culturally normative (Lansford, 2022; Soenens et al., 2015). Thus, parent-adolescent influences are also assumed to vary as a function of characteristics outside the parent-adolescent relationship, including their immediate and remote environment.

## 2. THEORY VERSUS METHODS: IDENTIFIED METHODOLOGICAL GAPS

Even though established theories, as summarized in Figure 1 and visualized in Figure 2, assume that the dynamic processes between parenting and adolescent functioning occur within a family over time and are reciprocal and heterogeneous across families, hitherto, most of these meta-theoretical elements still lack empirical evidence. Despite the thousands of parenting studies (e.g., Pinquart, 2017a, 2017b), methodological gaps have refrained parenting science from truly examining the theorized dynamic processes between parenting and adolescent functioning. Similar to other fields in psychological science (Moeller, 2022; Molenaar, 2004), there is thus a considerable mismatch between theory and the generally applied methods. What these three methodological gaps are and how this dissertation addresses them is explained below.

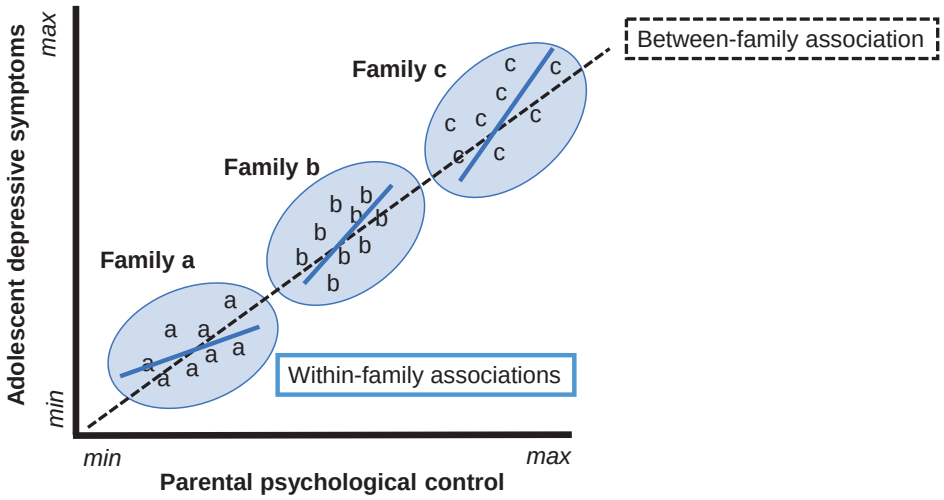
### 2.1 Mind the (first) gap: Between-family methods do not tap into within-family processes

The first methodological gap concerns the ecological level at which the theoretical assumptions and inferences from empirical findings are most commonly drawn. Although the theorized dynamic processes between parenting and adolescent functioning are

understood to take place *within families* (e.g., Darling & Steinberg, 1993), the most common approach to studying these theoretical ideas is with a *between-family design* (Keijsers, 2016). Between-family approaches often include cross-sectional or longitudinal panel studies, in which one or a few data points per family are collected (see Table 1). Based on such cross-sectional or longitudinal panel data, group-level (between-family level) bivariate associations between parenting and adolescent functioning can be estimated, for example with a correlation or regression coefficient. These between-family estimates indicate relative (rank-order) differences between families (Hamaker, 2012; Keijsers, 2016). For instance, a positive between-family correlation between parental psychological control and adolescent depressive symptoms indicates that adolescents who experienced higher levels of psychological control experienced more depressive symptoms on average than adolescents who experienced lower levels of parental psychological control (see Figure 3; Pinquart, 2017b).

**Figure 3**

*A between-family association versus a within-family association*




*Note*. Within-family correlations of three families based on eight measurements, showing a pattern of "universality without uniformity". Between-family correlation based on the aggregate of each family.

By applying a within-family design, it can be tested how parenting and adolescent functioning are associated at the within-family level. Associations at the within-family level show how over-time fluctuations or changes in parenting and adolescent functioning are related within families. To illustrate, a positive within-family correlation between parental

psychological control and adolescent depressive symptoms indicates that increases in psychological control are related to same-time increases in adolescents' depressive symptoms within families (see Figure 3).

To assess such within-family bivariate associations, (intensive) longitudinal data needs to be analyzed using statistical methods that can disentangle stable between-family variance from over-time within-family variance (see Table 1) (Hamaker et al., 2015; Lucas, 2023). In contrast to between-family analyses that can already be conducted with only one "snapshot" per family, within-family analyses need (few to many) repeated measures per family. Applying a within-family approach thus requires a more intensive and expensive data collection. Moreover, analyzing (intensive) longitudinal data at the within-family level requires advanced statistical techniques, many of which had yet to be developed a decade ago (Asparouhov et al., 2018; Hamaker et al., 2015, 2018), and some still have to be released today (Asparouhov et al., 2017). Because of these practical, financial, and statistical drawbacks, empirical studies applying a within-family design are not yet standard practice in the empirical study of parenting adolescents.

Although modern statistical and technological innovations have facilitated the application of within-family designs (Repetti et al., 2015; Van Roekel et al., 2019), within-family studies are still overshadowed by many between-family studies. To illustrate, at the beginning of this PhD project, only 46 studies were available that examined within-family associations between parenting and adolescent functioning (see **Chapter 2**; Boele et al., 2020). These 46 within-family studies stand in stark contrast to the hundreds of studies included in meta-analyses that assessed between-family correlations (e.g., Pinquart, 2017a, 2017b). Therefore, many meta-theoretical ideas about the dynamic processes between parenting and adolescent functioning (for a summary, see Figure 1) have remained untested at the correct ecological level, the within-family level. This dissertation started to fill this gap by conducting four empirical parenting studies at the within-family level by using six datasets from five different samples (**Chapters 3-6**).

## 2.2 The second gap: Dynamics might not generalize across timescales

A second gap in the empirical parenting literature concerns the fact that the dynamic processes between parenting and adolescent functioning are often empirically studied on a macro-timescale. That is, despite modern theories of human development and parenting propose that dynamic parenting processes unfold on various timescales (see Figure 2), the limited work of within-family studies has mostly tested how parenting and adolescent

functioning are associated on a (semi-)annual timescale (see **Chapter 2**: Boele et al., 2020). As both theoretical (e.g., Granic et al., 2008) and methodological work (Voelkle et al., 2018) suggest that associations on one timescale may not generalize to other timescales, whether and how the dynamic processes between parenting and adolescent functioning unfold on different timescales remains still an open question.

To avoid a galloping horse fallacy – infer results from one timescale to another (Keijsers & Van Roekel, 2018) –, within-family studies on parenting adolescents should consider various timescales: micro-, meso-, and macro-timescales. Micro-timescales include momentary or daily processes, which can be investigated using Experience Sampling methods or daily diary studies (Myin-Germeys & Kuppens, 2022; Repetti et al., 2015). Meso-timescales can include weekly or monthly processes, and macro timescales can include (semi-)annual processes. To start filling the gap in how the dynamic processes between parenting and adolescent functioning unfold on various timescales, this dissertation examined these dynamics at five time intervals: daily (**Chapters 3, 5, & 6**), bi-weekly (**Chapters 3 & 4**), three-monthly, annual, and biennial (**Chapter 3**).

## 2.3 The third gap: The dynamics of the average family might not apply to (all) individual families

A third gap in the parenting literature is that theories propose heterogeneous dynamic processes between parenting and adolescent functioning, while most applied within-family methods that model homogeneous processes. That is, most within-family studies on parenting adolescents, thus far, have estimated the *average effects* within the sample (see **Chapter 2**: Boele et al., 2020). For example, studies have estimated average sample effects by applying a random-intercept cross lagged panel model (Hamaker et al., 2015; Keijsers, 2016) or fixed effects in a multilevel regression model (Bai et al., 2017; Coley & Medeiros, 2007). Such average sample effects indicate how fluctuations around the family's typical level of parenting were on average (concurrently or longitudinally) associated with fluctuations around the family's typical level of adolescent functioning. The potential of this method is to identify 'general' parenting processes or the parenting processes in 'the average family'. Moreover, a benefit of this approach is that existing data from longitudinal panel studies can be used to reanalyze data at the within-family level (e.g., Keijsers, 2016). However, because many theories agree that the dynamic processes between parenting and adolescent functioning are heterogeneous across families (see Figure 1), heterogeneity should be tested to avoid a "one-size-fits-all" fallacy: interpreting average sample effects as homogeneous processes while they are not (Keijsers & Van Roekel, 2018).

To illuminate potential heterogeneity, the first approach may be to apply a *group-differential approach*. That is, to test whether the dynamic processes between parenting and adolescent functioning differ between subgroups. This can be done by estimating moderator effects or by a multi-group approach in SEM, for instance, which requires a relatively small number of assessments and moderate sample sizes (e.g., $t$ = 30, with $N$ = 300; see Table 1). By applying this approach, one can assess whether the dynamic parenting processes vary from subgroup to subgroup, as several theoretical perspectives have been proposed (see 1.6). For example, in **Chapter 2**, I assessed whether the average reciprocal time-lagged associations between perceived parental support and adolescent depressive symptoms varied between adolescent boys and girls, or between adolescents with low and high trait levels of neuroticism.

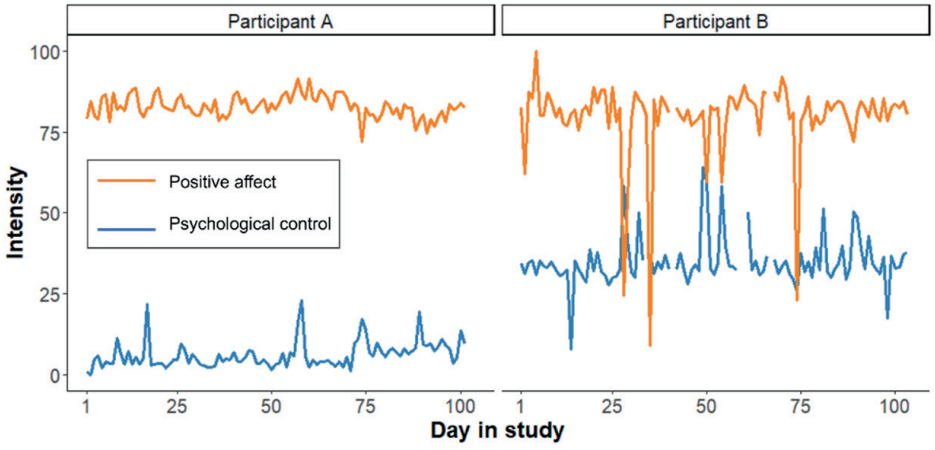
Nonetheless, the dynamic processes between parenting and adolescent functioning may still vary among families that belong to the same predefined subgroup (e.g., female vs. male adolescents) (Moeller et al., 2022). Therefore, a more fine-grained approach is warranted to uncover the heterogeneity that potentially hides behind sub-sample averages. Such a fine-grained approach is an *idiographic approach*. Using an idiographic approach, the dynamic processes between parenting and adolescent functioning are estimated at the individual-family level: for each individual family separately. Although many scholars have stressed that humans function, develop, and interact with their environment in idiosyncratic ways (Bronfenbrenner, 2005; Harris, 2006; Richters, 2021), modeling idiosyncratic dynamic parenting processes in adolescence has rarely been applied in parenting studies. In fact, idiographic studies on parenting adolescents were lacking at the start of this PhD project (see **Chapter 2**: Boele et al., 2020; but see Molenaar & Campbell, 2009), which might be due to the required intensive longitudinal data and the application of state-of-the-art advanced statistical techniques (see Table 1). To start filling this gap and to examine the dynamic processes between key dimensions of parenting and adolescent functioning at the level of the individual family, this dissertation applied an idiographic (or family-specific) approach in three empirical studies (**Chapters 4-6**). Specifically, 26 bi-weekly assessments of 256 Dutch families and 100 daily diaries of 159 Dutch families were collected (for an example time series, see Figure 4 below) and analyzed using DSEM (**Chapters 4 & 5**) and GIMME (**Chapter 6**).

One criticism of the idiographic approach is that it may undermine generalization (Beltz et al., 2016). Because of the detailed family-specific results, it might be challenging to illuminate the extent to which the dynamic parenting processes of individual families are unique or shared by most or some families. However, state-of-the-art methods have

made it possible to search for generalizable principles while using idiographic analysis (Beltz et al., 2016). A so-called bottom-up *idionomic approach* combines the strengths of two complementary research paradigms: first unit-specific effects are estimated, and then recurring generalizable patterns are identified across units (Moeller et al., 2022; Sanford et al., 2022). Recurrent patterns can be identified by simply describing the variation in unit-specific effects; for instance, by summarizing the proportion of participants for which a particular association was found (e.g., Beyens et al., 2021). Recurrent patterns can also be identified using data-driven procedures, such as with Subgrouping Group Iterative Multiple Model Estimate (S-GIMME; Gates et al., 2017; Lane et al., 2019). Hence, by integrating nomothetic and idiographic approaches, generalizable patterns are empirically established and thus powerfully avoids a one-size-fits-all fallacy. This dissertation took the first steps in detecting such recurring generalizable patterns in family-specific dynamic parenting processes, both using a descriptive (**Chapters 4 and 5**) and data-driven idionomic approach (**Chapter 6**). By doing so, this dissertation answered an increasingly loud call for a more differentiated empirical understanding of adolescent development and family functioning (Barbot et al., 2020; Chaku & Beltz, 2022).

**Figure 4**

*Timeseries of two adolescents*




*Note.* Including daily mean scores for positive affect and perceived parental psychological control across 100 days. Response scale ranged from 0 to 100. See also Chapter 5.

## 3. AIMS AND OUTLINE OF THIS DISSERTATION

To address the three described methodological gaps in the parenting literature (i.e., gaps pertaining to the within-family level, timescales, and heterogeneity across families) and to increase the empirical understanding of the dynamic processes between parenting and adolescent functioning within families, this dissertation had three aims.

The first aim was to examine how key dimensions of parenting (i.e., warmth, autonomy support, behavioral control, and ps ychological control) are (on average) reciprocally associated with adolescent functioning at **the within-family level**. The second aim was to examine within-family associations between parenting and adolescent functioning on **various timescales.** The third aim was to **quantify and explain heterogeneity** across families in within-family associations between parenting and adolescent functioning.

To achieve these aims, I conducted five studies: one systematic literature review (**Chapter 2**) and four empirical studies (**Chapters 3-6**; for a visualization of the empirical studies see Figure 5). These five studies are described below and summarized in Table 2.

To obtain an overview of the available empirical insights into the dynamic processes between parenting and adolescent functioning within families, I first conducted a systematic literature review in **Chapter 2**. Here I summarize the small existing body of studies that examined the within-family linkages between parenting and adolescent functioning. This systematic overview exposed significant gaps in the literature, in terms of the studied dimensions, timescales, and heterogeneity. These gaps were further addressed in four empirical studies.

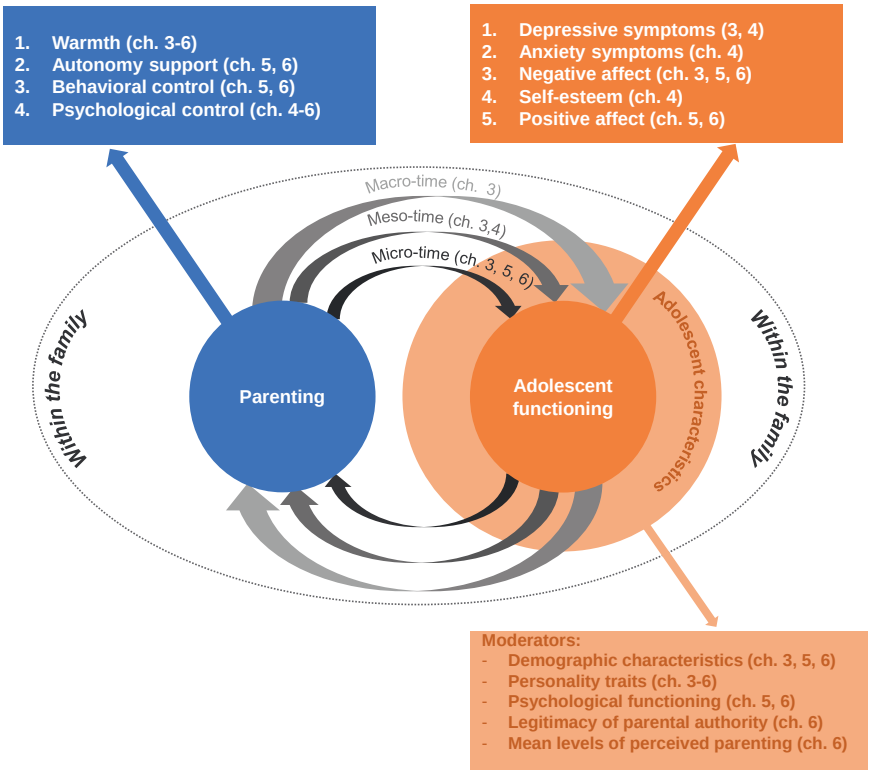
In **Chapter 3**, a multiple-timescale study is presented. Specifically, I investigated whether the average processes between perceived parental support and adolescent depressive symptoms varied across timescales. I used five datasets with different time intervals, from a daily to a biennial time interval, to estimate cross-lagged effects between parental support and depressive symptoms (see Table 2). Additionally, I examined the potential heterogeneity in these effects by studying average subgroup differences based on adolescent characteristics: differences between girls and boys and between adolescents with low and high levels of trait neuroticism.

In **Chapter 4**, I tested environmental sensitivity models at the individual family level. According to these models, some adolescents are more sensitive to supportive and/or unsupportive parenting than others. I tested whether such different responsivity patterns

co-existed in the sample by describing variation in family-specific bi-weekly effects of perceived parental support and psychological control on three aspects of adolescent psychological functioning. Furthermore, I tested whether adolescents with different responsivity patterns varied in their trait levels of environmental sensitivity.

**Figure 5**

*Overview of the empirically studied concepts in Chapters 3 to 6*




In **Chapter 5**, I zoomed into the potential heterogeneity in the directionality of the daily dynamics between parenting and adolescent functioning. By estimating family-specific cross-lagged effects between the four key dimensions of parenting and adolescent affective functioning, I described whether the direction (i.e., parent-driven, adolescent-driven, or reciprocal) of day-to-day effects were heterogeneous across families. Moreover, I tested whether several adolescent characteristics, including demographic characteristics and trait levels of environmental sensitivity and neuroticism, could explain heterogeneity in the strength of these family-specific effects.

**Table 2**

*Overview of studies in this dissertation*

| Systematic literature review of 46 studies | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Study** | **Parenting dimensions** | **Adolescent functioning** | ***t*** | **Time interval** | **Analytical approach** | **Level of analysis** | | | **Tested random slopes** | **Tested moderators** |
| | | | | | | **BF** | **WF** | **IN** | | |
| **#1** | 1. Support<br>2. Control<br>3. Negative interaction<br>4. Time spent together<br>5. Relationship quality<br>6. Differential parenting | 1. Externalizing<br>2. Internalizing<br>3. Affect<br>4. Interpersonal<br>5. Academic<br>5. Physical | 2 to 216 | Seconds to years | Multilevel approaches | | X (*n* = 46) | X (*n* = 2) | Yes (*n* = 6) | Yes (*n* = 20) |
| **Empirical studies** | | | | | | | | | | |
| **Study** | **Parenting dimensions/ practices** | **Adolescent functioning** | ***t*** | **Time interval** | **Analytical approach** | **Level of analysis** | | | **Subgroups** | **Moderators** |
| | | | | | | **BF** | **WF** | **IN** | | |
| **#2** | 1. Support/warmth | 1. Depressive symptoms | 3 to 15 | Daily, bi-weekly, three-monthly, annual, biennial | RI-CLPM | X | X | | Yes, with multi-group analysis | 1. Sex<br>2. Neuroticism |
| **#3** | 1. Support/warmth<br>2. Psychological control | 1. Depressive symptoms<br>2. Anxiety symptoms<br>3. Self-esteem | 26 | Bi-weekly | DSEM (VAR(1)) | X | X | X | Yes, descriptively | 1. Environmental sensitivity |
| **#4** | 1. Warmth<br>2. Autonomy support<br>3. Psychological control<br>4. Behavioral control | 1. Negative affect<br>2. Positive affect | 100 | Daily | DSEM (VAR(1)) | X | X | X | Yes, descriptively | 1. Demographics<br>2. Environmental sensitivity<br>3. Neuroticism |

**Table 2 Continued**

| Empirical studies | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Study** | **Parenting dimensions/ practices** | **Adolescent functioning** | ***t*** | **Time interval** | **Analytical approach** | **Level of analysis** | | | **Subgroups** | **Moderators** |
| | | | | | | **BF** | **WF** | **IN** | | |
| **#5** | 1. Warmth<br>2. Autonomy support<br>3. Psychological control<br>4. Strictness<br>5. Monitoring | 1. Negative affect<br>2. Positive affect | 100 | Daily | hybrid S-GIMME | X | | X | Yes, data-driven | 1. Average levels parenting<br>2. Average levels affect<br>3. Demographics<br>4. Environmental sensitivity<br>5. Neuroticism<br>6. Legitimacy beliefs<br>7. Depressive and anxiety symptoms |

*Note*. BF = between-family level. WF = within-family level. IN = individual-level.

In **Chapter 6,** I again examined all four key dimensions of parenting and adolescent affective functioning. Specifically, I examined whether patterns in the daily dynamics between perceived parenting and adolescents' affect could be generalized across subgroups of adolescents.

To do so, I estimated family-specific temporal networks that included a variety of same-day and next-day parenting-affect associations. Using a data-driven method, I examined whether patterns in these parenting-affect associations were shared by subgroups of adolescents. Additionally, I tested whether a variety of adolescent characteristics were linked to the number of family-specific parenting-affect associations.

The findings of all the studies are integrated and discussed in a general discussion, as I describe in **Chapter 7**.

Across the empirical studies (**Chapters 3-6**), I used six different datasets, two of which were collected during this dissertation. The samples and designs of these adolescent-reported datasets are presented in Table 3.

**Table 3**

*Study designs and samples of the adolescent-reported datasets*

| | **Grumpy or Depressed** | **One size does not fit all**[a] | **Panel Analysis of Intimate Relationships and Family Dynamics (PAIRFAM)** | **Flemish study on Parenting, Personality, and Development (FSPPD)** | **100 days of my life**[b] |
|---|---|---|---|---|---|
| **Chapter** | 2 | 2 & 3 | 2 | 2 | 4 & 5 |
| **T(interval)** | 7 daily diaries & 3 three-monthly surveys | 26 bi-weekly surveys | 3 annual surveys | 3 biennial surveys (2007, 2009, 2012) | 100 daily diaries |
| **Sample size** | 245 | 256 | 1,664 | 503 | 159 |
| **Age (at T1)** | Mean = 13.9 (range 12-16) | Mean = 14.4 (range 12-17) | Mean = 11.1 (range 10-13) | Mean = 13.8 (range 10-16) | Mean = 13.1 (range 12-16) |
| **% female** | 62% | 71% | 49% | 52% | 62% |
| **Nationality** | 98% Dutch | 97% Dutch | Unknown % | 100% Belgian | 89% Dutch |
| **Educational level** | Low 0%<br>Intermediate 45%<br>High 56% | Low 15%<br>Intermediate 33%<br>High 52% | Low 33%<br>Intermediate 24%<br>High 31% | Low 4%<br>Intermediate 16%<br>High 58% | Low 15%<br>Intermediate 30%<br>High 5%<br>Mix 5% |

*Note*. Codebooks and datasets are available at Open Science Framework: https://osf.io/ngxwg/

[a] Pre-registered and collected during the dissertation. I was in charge of the data collection of "One size does not fit all"

[b] I assisted colleague Anne Bülow in the data collection of "100 days of my life".

# CHAPTER 2

## Over-time fluctuations in parenting and adolescent adaptation within families: A systematic review

This chapter is published as:

**Boele, S**., Denissen, J. J. A., Moopen, N., & Keijsers, L. (2020). Over-time fluctuations in parenting and adolescent adaptation within families: A systematic review. *Adolescent Research Review, 5*, 317–339. https://doi.org/10.1007/s40894-019-00127-9

**Supplemental materials** can be viewed in the online version of the article.


**Open science statement:** Data (overview of included studies) is added as supplementary material and can also be found on https://osf.io/6euh2/

**Author contributions**: **SB:** conceptualization, methodology, investigation, formal analysis, writing – original draft. **JJAD:** writing – review & editing, supervision. **NM:** investigation, writing – review & editing. **LK** conceptualization, methodology, investigation, writing – review & editing, supervision.

## ABSTRACT

Parenting theories describe that fluctuations in parenting and adolescent adaptation are linked within the same families. Studies on these so-called 'within-family' effects between parenting and adolescent adaptation are summarized in the current systematic review. Through a database and backward citation search, 46 eligible peer-reviewed studies were found, which were published between 2002 and 2018. The studies assessed a variety of parenting (i.e., support, control, negative interaction, time spent together, relationship quality, and differential parenting) and adaptation dimensions (i.e., externalizing and internalizing problems, affect, and interpersonal, academic, and physical functioning). Concerning the design of the studies, typical measurement intervals were either days ($k$ = 10) or 6 months or longer ($k$ = 30). Moreover, only six studies tested (and mostly found) heterogeneity in random slopes, and 20 studies used a moderation approach to explain heterogeneity. Of the concurrent associations, some (but not all) of the few available studies suggested that increases in parental control and support and decreases in negative interaction within a family were associated with decreases in externalizing and internalizing problems, as well as other indices of adolescent maladaptation. However, with respect to time-lagged associations, there is to date hardly any empirical evidence that parenting and adolescent adaptation predict each other within families. Based on the identified theoretical lacunas and empirical limitations, directions are provided for future within-family parenting studies.


*Keywords*: systematic review, parenting, parent-child relationship, adolescence, within-family, within-person

## INTRODUCTION

A vast amount of research has shown that families differ from each other. In families with more parental monitoring and support, for instance, adolescents are generally better adapted than in other families. Indeed, meta-analyses highlight that adequate parenting is linked to important adolescent outcomes, such as internalizing and externalizing problems (Hoeve et al., 2009; Pinquart, 2017a, 2017b). However, parenting not only has trait-like characteristics, but it is also a dynamic process in which adolescents and parents mutually influence each other (Bell, 1968; Granic & Patterson, 2006; Pardini, 2008). Conceptually, these dynamic parenting processes can manifest themselves as associations between over-time fluctuations in parenting and adolescent adaptation within the same family. For example, adolescents might express less problem behavior after their own parents set up stricter rules, as illustrated in Figure 1. Recently, it has been suggested that existing parenting studies that tap into relative differences between families might not optimally be suited to (also) detect or draw conclusions regarding how changes in parenting affect adolescent adaptation (Berry & Willoughby, 2017; Hamaker, 2012; Keijsers, 2016). Therefore, alternative methods have been proposed for analyzing longitudinal data that better capture these dynamic parenting processes (e.g., Hamaker et al., 2015). The current review summarizes and discusses empirical studies estimating both concurrent and time-lagged within-family associations between parenting and adolescent adaptation. By synthesizing this body of literature, the aim is to obtain an overview of the available studies and to synthesize their findings. Furthermore, recommendations for future directions are provided based on identified limitations and caveats of the studies that have been published so far.

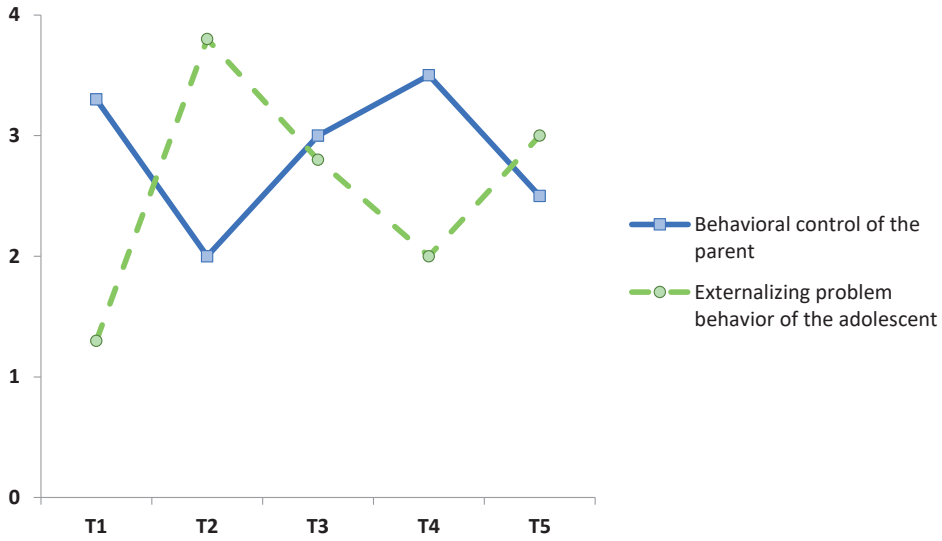
### Theories Describing Parenting Processes

In the seminal integrative macro model of Darling and Steinberg (1993), parenting practices (domain-specific parental behaviors, such as punishment) are conceptualized as the mechanisms through which parents can directly influence their adolescent's adaptation. Because parents fluctuate in their practices over time and situations, parenting practices might explain fluctuations and development in adolescent's adaptation, in contrast to parenting styles (Baumrind, 1971) that are defined by them as a stable contextual characteristic between the parent and the child (Darling & Steinberg, 1993). Therefore, Darling and Steinberg recommended to study parenting practices to understand the processes through which parents influence their adolescent's adaptation. Hence, although not explicitly mentioned, they pro- posed that parenting should be studied at the within-family level, i.e., the level on which fluctuations in parenting can be observed.

Parenting, however, spans different domains and behaviors. For example, in the monitoring literature, it has been theorized that exerting more behavioral control decreases adolescents' externalizing problem behavior (Patterson & Stouthamer-Loeber, 1984, but see Kerr & Stattin, 2000). According to the self-determination theory (Ryan & Deci, 2000), however, an increase in parental psychological control could be followed by a decline in adolescent adaptation via the frustration of the need for autonomy and competence, whereas an increase in parental autonomy support could be followed by an increase in adolescent adaptation because this satisfies the need for autonomy (Soenens et al., 2007). Thus, such parenting theories describe over-time processes through which adolescents' adaptation fluctuate (i.e., showing less aggressive behavior) in concert with fluctuations in their parent's behavior (i.e., being stricter), as illustrated in Figure 1.

**Figure 1**

*Within-Family Link between Control and Externalizing Problems*




*Note*. Hypothetical longitudinal data of one individual family assessed five consecutive times, illustrating a negative within-family link between control and externalizing problems (at times when control was high, externalizing problems were lower).

In recent years, considerable theoretical steps have been taken in the study of how parenting affects adolescent (mal)adaptation. For example, apart from making a stronger theoretical divide between stable relative differences between families versus dynamic

within-family processes (Darling & Steinberg, 1993), it has been recognized that there is reciprocity (Pardini, 2008), operation at different timescales (e.g., Branje, 2018; Granic & Patterson, 2006), and heterogeneity (e.g., Belsky & Pluess, 2009) in these within-family parenting processes. Each of these theoretical concepts is explained in more detail below, as they are defining elements of the current review.

### *Reciprocity in parenting processes*

It is acknowledged by several parenting theories that children are active agents in the within-family socialization processes (for an overview, see Pardini, 2008). As one of the first, Bell (1968) described a continuous cycle of influences between parents and children, wherein both keep adapting to each other's behavior. Another well-known example is the coercion theory (Granic & Patterson, 2006; Patterson, 1982), which proposes a reciprocal cycle between maladaptive parenting and externalizing problem behavior. In this cycle, occurring at relatively short timescales, maladaptive parenting increases the externalizing problem behavior of the child, which in turn is followed by an increase in maladaptive parenting. If such feedback-patterns become stable negative cycles within a family, they could exacerbate the child's externalizing problem behavior in the long-term. Hence, these theories suggest that parenting entails an ongoing dynamic process between parenting and adolescent adaptation, which flows not only from parents to their children, but also from the children to their parents.

### *Timescale of parenting processes*

Parenting processes, as described before, can unfold at different timescales. The coercion theory (Granic & Patterson, 2006; Patterson, 1982), suggests that processes at the micro timescale influence the development at the macro timescale, such that momentary hostile parent-child interactions influence the child's longer-term development of problem behavior (e.g., months or years). Conversely, macro-level development may also influence what happens at the every-day micro timescale (Granic & Patterson, 2006; Smith & Thelen, 2003). This mutual influence can be isomorphic when repeated micro-longitudinal effects translate to the gradual build-up of more persistent macro-longitudinal changes. However, effects can also be countervailing. For instance, prohibiting an adolescent from hanging out with friends on a given evening may effectively reduce adolescent delinquency that day. Nevertheless, through psychological processes of reactance (Brehm, 1966) the child may develop a more rebellious life style in the longer-term (e.g., Keijsers et al., 2012). Thus, although most parenting theories do not explicitly postulate the timescale on which

parenting processes may take place (but see Granic & Patterson, 2006), macro theories in developmental psychology (e.g., dynamic systems theory; Smith & Thelen, 2003) suggest that empirical studies need to assess varying timescales to capture the complex dynamic processes between parents and adolescents.

***Heterogeneity in parenting processes***

Recent theories have also started to challenge the universality of parenting processes. That is, they challenge whether adverse or beneficial effects of parenting on children's adaptation are similar in every family. For instance, dynamic systems theory posits that each system (e.g., parent–child dyad) is unique (Granic & Patterson, 2006; Smith & Thelen, 2003), implying that parent-adolescent dynamics may have unique characteristics in each family. Differences between families in their parenting processes may arise through (a) contextual differences, such as socioeconomic status (e.g., Rekker et al., 2017), as proposed by ecological theories (e.g., Bronfenbrenner, 1986; Sameroff, 2010), (b) individual differences in children's susceptibility to adverse and beneficial parenting due to personality differences and/or temperament (e.g., Belsky & Pluess, 2009; Slagt et al., 2015), or (c) individual differences in children's appraisal of parenting practices or coping strategies (Soenens et al., 2015). Hence, based on these theoretical perspectives, the extent to which universal parenting principles exist can be challenged. To empirically address this challenge, the current review summarizes whether the existing studies tested for heterogeneity in within-family parenting processes, for instance through testing random slopes and/or explaining the random slopes by moderators.

## Studying Parenting Processes: Matching the Methodological Approach to the Research Question

Conceptually, reciprocal, multi-timescale, and heterogeneous parenting processes are operationalized as associations between over-time fluctuations in parenting and adolescent adaptation within the same families (Darling & Steinberg, 1993). For example, the internalizing problems of an adolescent might decrease after his or her own parent heightens their supportive behavior towards the adolescent, but also vice versa, in cases that adolescents' internalizing problems may erode parental support. Nonetheless, until recently, most studies have focused on relative differences between families (e.g., correlation, regression, standard cross-lagged panel model). In such between-family designs, a negative correlation between parental control and externalizing problems indicates that adolescents show less externalizing problem behavior in families in which

parental control is higher compared to families in which parental control is lower (Pinquart, 2017a).

Whether such estimates of relative differences between families can be used as a basis for theoretical inferences regarding parenting processes that occur within families is one of the ongoing discussions in the parenting literature and beyond (see Berry & Willoughby, 2017; Hamaker, 2012; Keijsers, 2016; Molenaar, 2004). One of the most recent insights is that drawing inferences about processes within families, without separating stable difference between families, might lead to less accurate conclusions about the magnitude and/or direction of within-family effects (Hamaker et al., 2015). To illustrate, a recent study by Dietvorst et al. (2018) found evidence of opposing effects between and within families. Comparing families, the authors found that families with higher average levels of adolescent secrecy also had higher average levels of parental privacy invasion compared to families with lower average levels of privacy invasion (positive association). However, when they analyzed the fluctuations within families, they found that in periods with higher levels of adolescent secrecy were followed by periods with lower levels of parental privacy invasion (negative time-lagged effect). In this case at least, if processes in families would be inferred from such between- family findings, it would be mistakenly inferred that adolescents' increased secrecy might result in their parents becoming more invasive, whereas actually a reversed process was observed.

To avoid an ecological fallacy in the interpretation of empirical results when investigating within-family parenting processes, the theoretical question should match the level of analysis (i.e., between-family versus within-family level). When examining hypotheses about parenting processes occurring within families, the matching analytical level is the within-family level. For example, a longitudinal study might apply a multilevel approach that examines within- family effects by separating variance due to stable differences between families in their averages from variance due to the fluctuations around the families' own stable averages (e.g., Hamaker et al., 2015; Keijsers, 2016). Thus, for research questions that explore dynamic family processes that are described by many theoretical perspectives on parenting, some of which are discussed below, the within-family level is the matching empirical level.

## The Current Study

Previous studies on parenting have largely contributed to the understanding how families differ in parenting and adolescent adaptation. For example, these studies

have demonstrated that adolescents show fewer internalizing problems in families with relatively high levels of support, compared to other families (Pinquart, 2017b). However, parenting theories often describe dynamic processes, in which over-time fluctuations in parenting and adolescent adaptation are linked within the same family. To obtain an overview of the available peer-reviewed within-family studies on parenting and adolescent adaptation, a systematic search was conducted, after which the studies were summarized and discussed. Additionally, specific attention was paid to the aforementioned theoretical concerns of reciprocity, timescales of observation, and heterogeneity.

## METHOD

### Search Strategy

To assess all the published longitudinal within-family studies on parenting adolescents, eligible peer-reviewed articles were searched in October 2017 with no restriction on publication date. The following electronic databases were consulted: PsycINFO, PsycARTICLES, Psychological and Behavioral Sciences Collection, MEDLINE, Social Sciences Citation, and ERIC. Keywords were used pertaining to parenting, the age group, the ecological level, and the statistical approach. Hence, it was specified that titles, keywords, or abstracts should contain at least one keyword from each of these four categories:

a. Parenting: parent*, family, caregiv*, mother, father, maternal, and paternal.
b. Age group: adolescen*, teen, youth, middle school, high school, and secondary school.
c. Ecological level: within- or intra- combined with individual, person, adolescent, youth, subject, participant, and family (e.g., within-individual or intra-participant). The terms idiograph*, person-specific, time-varying and single-subject were also used.
d. Analysis: multilevel, random effect, random intercept, random slope, fixed effect, mixed model, hierarchical, and time series.

Moreover, additional studies were searched through scanning the reference lists of eligible studies and emailing experts (12 out of 17 responded) to ask for studies that were (conditionally) accepted. Researchers who were author of at least two eligible publications were considered experts. The search for eligible studies was completed in May 2018.

## Inclusion Criteria

To be included in the review, studies had to meet the following criteria:

1. *Parenting*. To provide a comprehensive summary of all the published studies on within-family parenting processes, studies were included that referred to parenting practices (e.g., monitoring and support), dyadic characteristics of the parent-adolescent relationship quality (e.g., closeness and conflict), and/or differential parenting (i.e., differential parental treatment compared to sibling in all parenting domains). Measures that did not exclusively tap into the processes between parents and their children, such as family conflict (i.e., level of conflict between all family members) or inter-parental conflict, were not included in the review.
2. *Adolescent adaptation*. To obtain a comprehensive overview, various domains of functioning were included and thus there was no exclusion based on adolescent outcomes. Adolescents' interpersonal behavior towards their parents (e.g., disclosure) was labeled as adolescent adaptation and not as a parenting.
3. *Sample*. Adolescence was defined as the period between 10 and 20 years to include studies conducted with late adolescents too. Because longitudinal studies can span a period of multiple years, it was decided to also include studies that carried out their first measurement wave in childhood (< 10 years) and followed children until adolescence.
4. *Multivariate within-family effect of parenting and adolescent adaptation*. The study examined associations between within-family fluctuations in parenting and adolescent adaptation concurrently (e.g., a momentary higher level of X is associated with a momentary higher level of Y within the same family) and over time (e.g., a momentary higher level of X is associated with a momentary higher level at t+1 within the same family). The exclusive focus on within-family estimates required longitudinal data and the use of multilevel analyses with group-mean centering (i.e., centered around a family's own mean). Estimates of associations between slopes of multivariate growth curve models were excluded because they provide between-person associations of estimates of within-family mean level changes (e.g., families with an over-time increase in X show a stronger increase in Y compared to families with an over-time decrease in X) (see also Keijsers & Van Roekel, 2018).

## Screening Eligible Studies

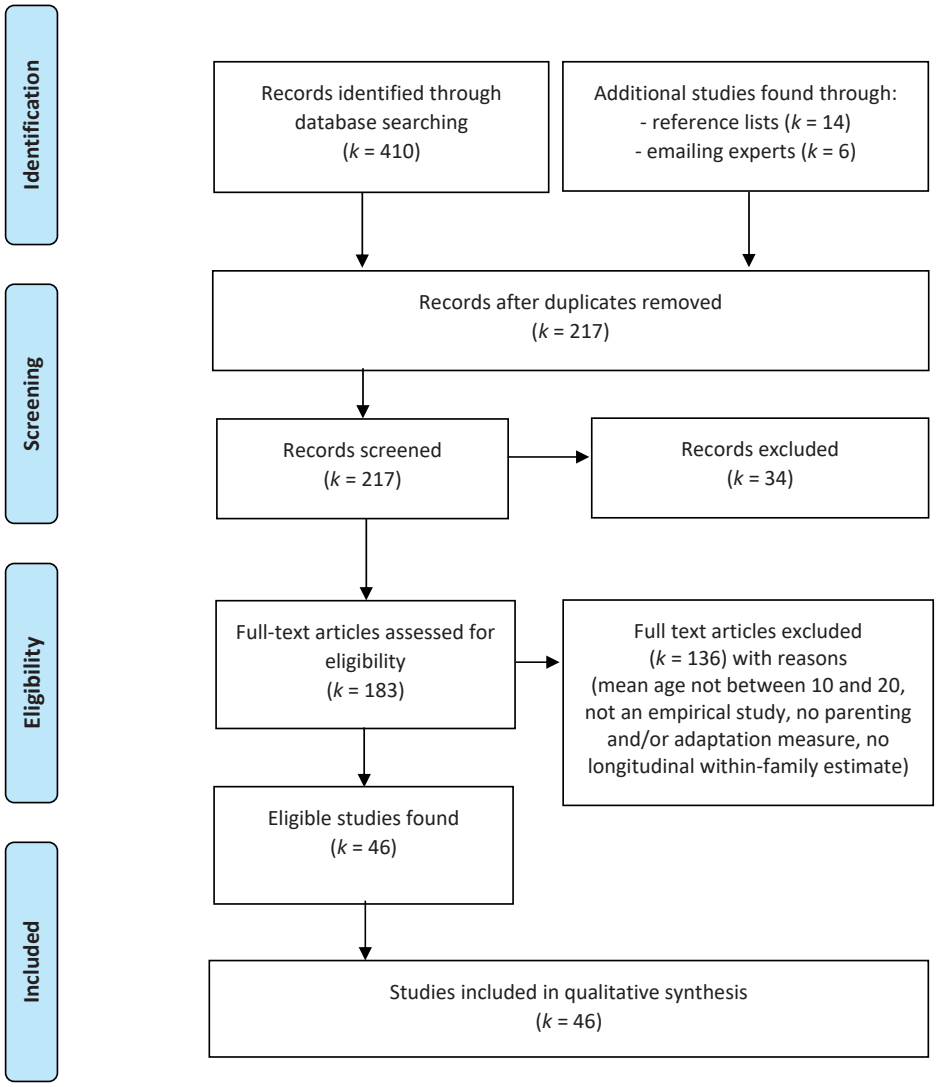
The database search resulted in 197 unique studies (Figure 2 outlines the search). Three raters independently screened the titles and abstracts. They retrieved the full text when a study was potentially eligible (*k* = 163). The inter-rater agreement between the first author (the first coder) and the PI of the project (the second coder) regarding eligibility was high at 95.9% (= .84). The ratings of the first author were also compared to a third coder, but this resulted in lower agreement because the third coder had limited experience with multilevel analyses (89.3% = .57). Disagreements were discussed until the three coders reached consensus. The authors of selected studies were contacted if the information necessary for the purpose of this study was not mentioned in their publication. In total, 26 studies of the database search were deemed eligible. An additional 14 eligible studies were found in the reference lists and six eligible studies were found through emailing experts and ResearchGate (Coley et al., 2009; Cox et al., 2018; Dietvorst et al., 2018; Gottfredson & Hussong, 2011; H. J. Janssen et al., 2017, 2018). Thus, the final selection comprised 46 studies.

## Coding of the Studies

Sample and study characteristics were coded, such as sample size, mean age at T1, gender composition (% male), ethnicity (ethnicity of majority of sample), socioeconomic status (SES; based on education and/or income), family structure (i.e., two- or single-parent, marital status), and the number of measurement waves. In line with earlier studies on parenting (e.g., McLeod, Wood, et al., 2007; Pinquart, 2017a), parenting was post hoc grouped according to the following dimensions: parental support (e.g., warmth, involvement, and attachment), parental control (e.g., punishment, supervision, and knowledge), negative interaction (e.g., conflict, hostility, and poor communication). Moreover, three coding categories were added, namely, time spent together (e.g., parental presence and joint involvement), parent-child relationship quality (i.e., overall quality or satisfaction, or composite scores of positive and negative indicators), and differential parenting (i.e., parental treatment compared to sibling). Indicators of adolescent adaptation were post hoc grouped into the following dimensions, representing key-dimensions in adolescent functioning (Achenbach & Edelbrock, 1987): externalizing behavior (e.g., conduct problems, hyperactivity, and delinquency), internalizing behavior (e.g., depressive symptoms, low self-esteem), interpersonal functioning (e.g., disclosure to parents and peer problems), academic functioning (e.g., academic problems and successes), and physical functioning (e.g., physical activity and cortisol level).

**Figure 2**

*Flowchart of Systematic Literature Search*




Additionally, because adolescent affective functioning (e.g., positive and negative mood) may be related to both internalizing and externalizing behavior (Maciejewski et al., 2019), it was coded as a separate category. Moreover, the type of statistical analysis was coded as fixed effects regression, multilevel regression models, multilevel growth models with time-varying effects, or multilevel structural equation models. The results

were organized into concurrent (i.e., within-time point) or time-lagged effects, and the time- lagged effects were further categorized in parent-to-adolescent and adolescent-to-parent effects. Furthermore, the time interval between measurement occasions was coded. Heterogeneity of within-family effects was assessed by the examination of random bivariate slopes and moderators that explained variation in the random slopes, either at Level 1 (the measurement) or Level 2 (the family)

## RESULTS

### Study and Sample Characteristics

This review included 46 studies (for overview, see Table 1). An extended version of this table can be found in the online supplementary material (Online Resource 1), which also includes a summary of the findings of each study. The studies utilized two to 216 (median 4.5) measurement occasions. Of the 46 studies, 30 studies examined parenting processes at a macro timescale (time-interval of 6 months or longer), three studies at a meso timescale (i.e., intervals between weeks to months), and thirteen at a micro timescale (i.e., from seconds to days), adopting primarily a daily diary design (k = 10). See Figure 3 for a graphical overview.

**Figure 3**

*Frequency of the Time Intervals Between Measurement Occasions of Included Studies*

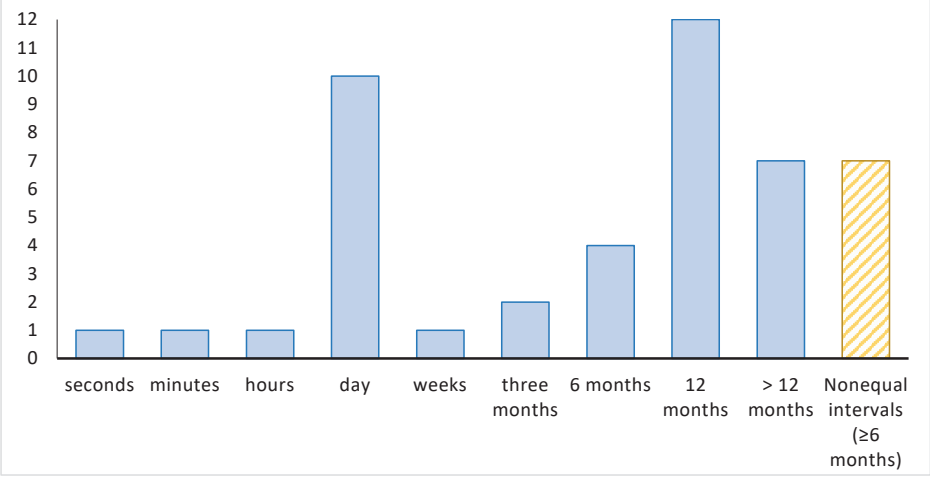


**Table 1**

*Overview of the Study Designs of Included Studies*

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Allen, Kuppens, & Sheeber (2012) | 138 (depressed n = 69; non-depressed n = 69) | 14-18 | 216 | Negative interaction | Physical | Multilevel regression | 5 seconds | yes, significant | Depression (see lagged effects. No main effects were presented) and gender (ns) |
| Bai, Reynolds, Robles, & Repetti (2017) | 47 | 11.3 | 8 | Support, negative interaction, time together | Academic, interpersonal, affect | Multilevel regression | 1 day | - | Positive parental involvement (sig & ns) |
| Besemer, Loeber, Hinshaw, & Pardini (2016) | 489 | 6.9 | 8 | Control, time together, negative interaction | Externalizing | Fixed effects regression | 6 months | - | - |
| Brauer (2009) | 1597 | 13.8 | 5 | Control | Externalizing | Multilevel regression | 1 year | yes, not significant | - |
| Chung, Flook, & Fuligni (2009) | 415 | 9th gr 14.9 / 12th gr 17.8 | 14 | Negative interaction | Affect | Multilevel regression | 1 day | yes, significant | Gender (sig) and ethnicity (ns) |
| Coley & Medeiros (2007) | 647 | 12.6 | 2 | Support | Externalizing | Fixed effects regression | 1,5 year | - | - |
| Coley, Votruba-Drzal, & Schindler (2008) | 3317 | 13.8 | 4 | Control | Externalizing | Multilevel growth model | 1 year | - | - |
| Coley, Votruba-Drzal, & Schindler (2009) | 3206 | 13.8 | 4 | Control | Externalizing | Multilevel growth model | 1 year | - | Gender (ns) |
| Cox et al. (2018) | 1645 | 8$^{th}$ grade | 5 | Control | Externalizing | Latent Curve Model with Structured Residuals | 1 year | - | - |

**Table 1 Continued**

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Crowell et al. (2014) | 75 | 16.1 | 10 | Negative interaction | Physical | Multilevel actor-partner interdependence model | 1 minute | - | Average aversiveness of adolescent (ns) and mother (sig), and depression (ns). |
| Dietvorst, Hiemstra, Hillegers, & Keijsers (2018) | 244 | 13.8 | 3 | (Psychological) Control | Interpersonal | Random intercept cross-lagged panel model (RI-CLPM) | 3 months | - | - |
| Farrington, Loeber, Yin, & Anderson (2002) | 506 | 13.8 | 7 | Control, negative interaction | Externalizing | Within-person Correlation | 6 months and last two waves 12 months | no, but present a distribution | - |
| Gottfredson & Hussong (2011) | 79 | 14.4 | 2 | Support | Externalizing | Multilevel regression | 1,5 year | yes, not significant | Negative affect (ns), transition to high school (sig) |
| Gottfredson, Hussong, Ennett, & Rothenberg (2017) | 6998 | 14.4 | 7 | Support | Externalizing | Multilevel regression | 6 months | - | Gender (ns) and parental smoking (ns) |
| Grundy, Gondoli, & Blodgett Salafia (2010) | 159 | 9.7 | 5 | Control | Externalizing | Multilevel growth model | 1 year | - | - |
| Han & Grogan-Kaylor (2012) | 3263 | 15-16 | 5 | Support, negative interaction, control | Internalizing, Externalizing | Fixed effects regression | 1 year | - | - |

**Table 1 Continued**

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Janssen, Bruinsma, Deković, & Eichelsheim (2018) | 603 | 14.3 | 2 | Control, quality | Externalizing | Multilevel Structural Equation Model (SEM) | 2 years | - | - |
| Janssen, Deković, & Bruinsma (2014) | 603 | 14.3 | 2 | Control, quality | Externalizing | Multilevel regression model | 2 years | - | - |
| Janssen, Eichelsheim, Deković, & Bruinsma (2016) | 615 | 14.3 | 2 | Control, quality | Externalizing | Multilevel SEM | 2 years | - | - |
| Janssen, Weerman, & Eichelsheim (2017) | 603 | 14.3 | 2 | Control, quality | Externalizing | Multilevel regression model | 2 years | - | - |
| Keijsers (2016) | 309 | 13 | 4 | Control | Externalizing | RI-ClPM | 1 year | - | - |
| Keijsers et al. (2016) | 479 | 13.3 | 15 | Control, quality | Affect, interpersonal | Multilevel regression model and multilevel SEM | 3 months | Yes, significant | Distribution of within-person correlations.<br><br>SES (sig) and gender (ns) |
| Kuhlman, Repetti, Reynolds, & Robles (2016) | 47 | 11.1 | 2 | Negative interaction | Physical | Fixed effects | 3 weeks | - | - |
| Laird, Pettit, Bates, & Dodge (2003) | 396 | 14 | 4 | Control | Externalizing | RI-ClPM (without stability paths) | 1 year | - | Gender (sig & ns) |
| Lam, Greene, & McHale (2016) | 402 | 11.8 / 9.2 | 4 | Negative interaction | Internalizing, academic | Multilevel regression model | 1-3 year (1st, 2nd, 5th, and 6th year) | - | - |

**Table 1 Continued**

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Lam & McHale (2015) | 402 | 10.9 / 8.3 | 5 | Time together | Physical | Multilevel regression model | 1-3 year (1st, 2nd, 3rd, 6th, and 7th year) | - | Age (sig; L1) and gender (ns) |
| Lau, Faulkner, Qian, & Leatherdale (2016) | 22909 | 15.4 | 3 | Support | Physical | Multilevel regression | 1 year | - | - |
| Lehman & Repetti (2007) | 79 | Fifth grade | 5 | Negative interaction, support | Internalizing, affect, interpersonal, academic | Multilevel regression model | 1 day | - | Parent (ns) and adolescent gender (ns). |
| Lippold, Davis, McHale, & Almeida (2016) | 132 | 13.4 | 4 | Control | Physical | Multilevel regression model | 1 day | - | ro |
| Lippold, McHale, Davis, Almeida, & King (2016) | 132 | 13.4 | 4 | Support, negative interaction | Physical | Multilevel regression model | 1 day | - | Parent (ns) and adolescent gender (sig & ns), and average positive (ns) and negative experiences with parents (sig & ns). |
| Meldrum, Young, & Weerman (2012) | 667 | 13.0 | 3 | Support | Externalizing | Multilevel regression model | 1 year | - | - |
| Padilla, McHale, Updegraff, & Umaña-Taylor (2016) | 246 | 15.5 / 12.6 | 3 | Differential | Internalizing, externalizing | Multilevel regression model | 2-5 years (3 times in 8 years) | - | Gender (ns), gender constellation (ns), age (sig & ns), birth order (ns), cultural socialization (sig & ns), and familism (ns). |

**Table 1 Continued**

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Papp, Pendry, & Adam (2009) | 45 | 15.8 | 14 | Time together | Physical | Multilevel regression model | Several hours (14 times during two days) | - | Mother cortisol (ns) |
| Rekker, Keijsers, Branje, Koot, & Meeus (2017) | 824 | 12.7 | 6 | Control | Externalizing | Fixed effects regression | 1 year | - | SES (sig & ns) |
| Rekker et al. (2015) | 503 | 8.0 | 10 | Control, time together | Externalizing | Fixed effects regression | 1 year | - | - |
| Reyes, Foshee, Tharp, Ennett, & Bauer (2015) | 2455 | grade 8-9-10 | 4 | Control | Externalizing | Multilevel regression model | 6 months and last wave 12 months | - | - |
| Reynolds, Robles, & Repetti (2016) | 47 | 11.3 | 56 | Negative interaction, support | Affect | Multilevel regression model | 1 day | Yes, significant | (week)day (sig & ns) |
| Richmond, Stocker, & Rienks (2005) | 133 | 10.2 / 7.9 | 3 | Differential | Externalizing, internalizing | Multilevel regression model | 2-4 years | - | - |
| Robles et al. (2016) | 39 | 8-13y | 56 | Negative interaction, support | Affect | Fixed effects regression | 1 day | - | - |
| Shanahan, McHale, Crouter, & Osgood (2008) | 201 | 11.8 / 9.2 | 4 | Support, negative interaction, differential | Internalizing, Interpersonal | Multilevel regression model | Multiple years (1st, 2nd, 5th, 6th) | - | Gender (sig & ns), age (sig & ns), and birth order (sig & ns). |

**Table 1 Continued**

| Study | *N* | Mean age (T1) | Measure-ments | Parenting | Adaptation | Statistical analysis | Time interval | Tested random slope(s)? | Moderators |
|---|---|---|---|---|---|---|---|---|---|
| Svensson, Pauwels, Weerman, & Bruinsma (2017) | 616 | 11-17y | 2 | Support, Control | Externalizing | Fixed effects regression | 2 years | - | - |
| Timmons & Margolin (2015) | 106 | 15.4 | 14 | Negative interaction | Academic, affect | Multilevel regression model | 1 or 2 days | - | Gender (ns), and average levels of anxious (sig & ns), depressive (sig & ns), and externalizing symptoms (sig & ns) |
| Vandewalle, Mabbe, Debeuf, Braet, & Moens (2017) | 55 | 12.4 | 7 | Negative interaction | Internalizing | Multilevel regression model | 1 day | - | - |
| Vaughan, Foshee, & Ennett (2010) | 3444 | 13.4 | 5 | Support | Internalizing | Conditional growth model | 6 months | - | Age (ns), gender (sig), race (sig), peer support (ns; L1), and average level of peer support (ns). |
| Villalobos Solís, Smetana, & Comer (2015) | 102 | 15.2 | 14 | Quality, time together Control | Interpersonal | Multilevel regression model | 1 day | - | - |
| Zhang, Baams, van de Bongardt, & Dubas (2018) | 1126 | 14 | 4 | Quality, negative interaction | Internalizing | Conditional growth model | 6 months | - | Friend conflict (sig & ns; L1) and satisfaction (sig; L1) |

*Note*. ns = nonsignificant. sig = significant. L1 = Level 1 (person-level). Moderators are tested at the group-level (Level 2) unless otherwise noted.

The sample sizes of the studies ranged from 39 to 22,909 (Mean = 1329; median = 409). Mean age during the first measurement wave ranged from 6.9 to 16.1 years (seven studies did not provide the exact mean age), and the percentage of males ranged from 0 to 100% (*M* = 51%; two studies did not provide the sample's gender distribution). Regarding ethnicity, most of the American and Canadian studies used samples of which the majority was European American (*k* = 22 out of 33) and all the Dutch studies used samples of which the majority was Dutch (expect for one study that did not report ethnicity). The other two remaining studies, a Korean and Belgium study, did not report ethnicity. Furthermore, a few studies used low SES samples, whereas the majority of studies had samples that were middle(-to-high) SES (for more details, see Online Resource 1). Moreover, almost all studies that reported about the family structure included two-parent (married) families. Only four studies had somewhat higher rates of single-parent families (between 32% and 40%). Sexual orientation was not reported in the reviewed studies.

Several datasets were identified that were used in multiple studies: the National Longitudinal Survey of Youth 1997 (Chung et al., 2009; Coley et al., 2008, 2009), the Pittsburgh Youth Study (Besemer et al., 2016; Farrington et al., 2002; Rekker et al., 2015), the Research on Adolescent Development and Relationships (Keijsers, 2016; Rekker et al., 2017), the Study of Peers, Activities and Neighborhoods (H. J. Janssen et al., 2014, 2016, 2017, 2018; Svensson et al., 2017), and The Work, Family, Health Network Study (Lippold, Davis, McHale, & Almeida, 2016; Lippold, McHale, et al., 2016). Moreover, based on authors and sample characteristics, two unnamed datasets were identified that were assessed in multiple studies, a daily diary dataset (Bai et al., 2017; Kuhlman et al., 2016; Robles et al., 2016) and macro timescale study (Lam et al., 2016; Lam & McHale, 2015).

## Findings Organized by Parenting Dimension

Tables 2 and 3 provide an overview of the number of nonsignificant and significant concurrent and time-lagged associations between parenting and adolescent adaptation dimensions.

### *Parental support*

Fourteen studies examined links between parental support and adolescent adaptation within families, with six assessing adolescents externalizing behavior on a macro timescale. In three of the six studies, an increase in parental support was linked to a

simultaneous decrease in externalizing behavior (Gottfredson et al., 2017; Meldrum et al., 2012; Svensson et al., 2017). One study also reported a similar time-lagged association, indicating that an increase in parental support was followed by an increase in adolescent self-control (Meldrum et al., 2012). However, another study found that an increase in parental support was related to a simultaneous increase in adolescent externalizing behavior (Coley & Medeiros, 2007). Additionally, Gottfredson and Hussong (2011) found no significant concurrent or lagged associations of parental support with several indicators of externalizing behavior. Thus, macro-longitudinal within-family studies on parental support and adolescent externalizing behavior together showed a somewhat inconsistent picture while studies on micro timescales were missing.

Three of the 14 studies investigated the within-family link between parental support and internalizing behavior, all on a macro timescale. The findings suggested that adolescents reported more parental support at times they reported higher levels of internalizing behavior (Han & Grogan-Kaylor, 2013). When support of mothers and fathers were examined separately, the results showed again a negative concurrent association for maternal support (Shanahan et al., 2008; Vaughan et al., 2010) but not for paternal support (Shanahan et al., 2008). Hence, these findings provided evidence of a negative concurrent link between parental support and internalizing behavior at a macro timescale, but this evidence seems to be stronger for maternal support than for paternal support.

Four of the 14 studies examined associations of parental support with measures of adolescent affective functioning within families, and three of the four studies analyzed the same daily diary dataset. These three studies indicated that the levels of parental support were higher on days when adolescents also reported a more positive mood (Robles et al., 2016) and a less negative mood (Bai et al., 2017; B. M. Reynolds et al., 2016). The fourth study, which was again a daily diary study, did not find a concurrent association of parental sup- port with adolescents' anxious mood (Lehman & Repetti, 2007).

The remaining studies on parental support investigated the associations with a wide range of measures of interpersonal, academic, and physical functioning within families. With respect to interpersonal functioning, micro-longitudinal studies found no concurrent association of parental support with peer problems (Bai et al., 2017; Lehman & Repetti, 2007). A macro-longitudinal study, in contrast, suggested that increasing levels of maternal (but not paternal) warmth were related to simultaneous increases in sibling warmth (Shanahan et al., 2008). Concerning academic functioning, both positive significant and nonsignificant concurrent associations were found between parental support and

academic functioning (Bai et al., 2017; Lehman & Repetti, 2007). Moreover, two studies considered physical functioning, finding that parental support was not related to physical functioning at the micro timescale (Lippold, McHale, et al., 2016), but increasing levels of parental support regarding physical activity were at the same time related to more physical activity at the macro timescale (Lau et al., 2016). Thus, the five remaining studies that assessed various adaptation measures suggested that associations might vary between timescales.

***Parental control***

Twenty-two studies examined the link between parental control and adolescent adaptation within families, of which 18 assessed externalizing behavior on a macro timescale. The results of several studies suggested that higher levels of parental control were simultaneously related to lower levels of externalizing behavior (Grundy et al., 2010; H. J. Janssen et al., 2014, 2016, 2018; Laird et al., 2003; Rekker et al., 2015; Svensson et al., 2017). However, studies have also found the opposite pattern. For example, parental control was higher in low-SES families (but not high-SES families) when adolescent delinquency was higher (Rekker et al., 2017). Additionally, an increase in adolescent risky sexual behavior predicted a subsequent increase in paternal knowledge (Coley et al., 2009). Moreover, a large number of studies reported nonsignificant concurrent and time-lagged associations of parental control with various externalizing behaviors, such as aggression and delinquency (Besemer et al., 2016; Brauer, 2009; Coley et al., 2008, 2009; Cox et al., 2018; Farrington et al., 2002; Han & Grogan-Kaylor, 2013; H. J. Janssen et al., 2014, 2016, 2017, 2018; Keijsers, 2016; Rekker et al., 2015, 2017; H. L. M. N. Reyes et al., 2015). Thus, although many included studies assessed within-family associations between parental control and adolescent externalizing behavior, the results showed mixed findings, even within the same studies and datasets.

Five out of the 22 studies addressed the within-family association of parental control with several adaptation domains. No concurrent association was found between parental knowledge and internalizing behavior on a macro- longitudinal scale (Han & Grogan-Kaylor, 2013). Moreover, three studies assessed interpersonal functioning, with adolescent and/or secrecy in particular. Two of these studies applied a meso timescale (3 months) and reported that higher levels of maternal knowledge and solicitation, but not maternal control, were related to higher concurrent levels of adolescent disclosure (Keijsers et al., 2016), and higher levels of adolescent secrecy were followed by a lagged increase in parent's privacy invasion but not vice versa (Dietvorst et al., 2018). A micro-

longitudinal study again suggested that on days when adolescents reported higher levels of maternal solicitation they also reported higher levels of secrecy, but no lagged effects were found between maternal solicitation and adolescent secrecy (Villalobos Solís et al., 2015). Finally, regarding physical functioning, on days when adolescents reported higher levels of parental knowledge, they also had higher cortisol levels before dinner but not at other times of the day (Lippold, Davis, McHale, & Almeida, 2016). However, because of the relative scarcity of empirical studies examining parental control in relation to other adaptation dimensions than externalizing behavior, most findings have yet to be replicated.

***Negative parent-child interaction***

Seventeen studies assessed a within-family association between negative parent-child interaction and adolescent adaptation. Three studies focused on externalizing behavior on a macro timescale and reported mixed findings. Specifically, more negative parent-child interaction were related to more concurrent externalizing behavior (Farrington et al., 2002; Han & Grogan-Kaylor, 2013). However, other studies found no concurrent or lagged associations with a variety of externalizing problem behaviors (Besemer et al., 2016). The six studies concerning internalizing behavior, both on daily and macro-longitudinal processes, showed more consistent results. Overall, the results of most studies suggested that poorer parent-child interactions were concurrently linked to more internalizing problems, such as depressive symptoms, lower self-esteem, and emotional eating (Han & Grogan-Kaylor, 2013; Lam et al., 2016; Lehman & Repetti, 2007; Shanahan et al., 2008; Vandewalle et al., 2017; Zhang et al., 2018). Nonetheless, also some nonsignificant concurrent links were found between parental hostility and self-esteem (Han & Grogan-Kaylor, 2013), and parent-child conflict about homework and depressive symptoms (Lam et al., 2016).

Similarly as with internalizing behavior, micro-longitudinal studies on negative affect suggested that on days adolescents reported more conflicts with their parents, they reported more negative affect (Bai et al., 2017; Chung et al., 2009; B. M. Reynolds et al., 2016; Robles et al., 2016; Timmons & Margolin, 2015). However, father-child conflict and negative affect (Reynolds et al. 2016) and aversive parental behavior and adolescents' anxious morning mood (Lehman & Repetti, 2007) were not found to be concurrently related, and no time-lagged effects of parent-child conflict on adolescent-reported negative affect have been found (Timmons & Margolin, 2015).

Moreover, two within-family studies on negative parent-child interaction have been conducted with interpersonal functioning and four with academic functioning. Concerning interpersonal functioning, the studies show that negative parent-child interaction was not concurrently associated with peer problems (Lehman & Repetti, 2007) but was concurrently associated with increases in sibling conflict at the macro timescale (Shanahan et al. 2008). Moreover, regarding academic functioning, three micro-longitudinal studies suggested that adolescents reported more academic problems on days with poorer parent-child interaction (Bai et al., 2017; Lehman & Repetti, 2007; Timmons & Margolin, 2015), and an increase in academic problems was related to poorer parent-child interaction the next day, but not vice versa (Timmons & Margolin, 2015). However, a macro- longitudinal study on school performance (i.e., grades) did not find significant concurrent associations with academic functioning (Lam et al., 2016). Hence, so far, there is some preliminary evidence that academic problems might be related to negative parent-child interaction on a micro time- scale, but insufficient evidence is available with respect to the macro timescale.

Four studies assessed the relationship between negative parent-child interactions and physical functioning, all on a micro timescale. In observed interactions, increased father's anger and decreased father's dysphoria predicted increases in the adolescent's heart rate a few seconds later in depressed adolescents but not in non-depressed adolescents. However, in non-depressed adolescents (but not in depressed adolescents) increased mother's anger predicted decreased the adolescent's heart rate a few seconds later (N. B. Allen et al., 2012). Moreover, maternal aversive behavior that was rated every minute for 10 min was unrelated to the adolescent's respiratory sinus arrhythmia reactivity (Crowell et al., 2014). At a daily level, adolescents reported poorer parent-child interaction on days when they also reported more physical health symptoms, such as headaches and allergies. Negative parent-child interaction did not co-vary with adolescents' daily cortisol levels or measures at 3-weekly intervals (Kuhlman et al., 2016; Lippold, McHale, et al., 2016). Thus, the studies reviewed here indicated within-family associations of negative parent-child interaction with adolescents' heart rate and physical symptoms but not with cortisol levels.

***Time spent together***

Six studies have investigated the link between time spent together with parents and adolescent adaptation within families, each of them using a different measure of adolescent adaptation. Starting with the macro timescale, Rekker et al. (2015) found that

adolescents reported more time spent with parents during periods in which they reported less externalizing behavior (i.e., minor delinquency). However, Besemer et al. (2016) revealed that adolescents showed higher levels of externalizing behavior simultaneously when they spent more time with parents. Moreover, more time spent together has been linked to increased levels in adolescents' physical activity (Lam & McHale, 2015). Concerning the micro timescale, adolescents had lower cortisol levels at times their mother was present (Papp et al., 2009), and adolescents reported spending more time with their mother on days that they reported more disclosure about personal behavior, but not bad behavior or secrecy about personal or bad behavior (no time-lagged effects were found; Villalobos Solís et al., 2015). Additionally, on days adolescents spent more time with their father, they reported fewer academic problems but not peer problems (Bai et al., 2017). Hence, these six studies cautiously suggested that more time spent with parents predicts better adaptation in adolescents at the within-family level.

***Parent-child relationship quality***

Seven studies focused on parent-child relationship quality, four of which assessed its association with externalizing behaviors within-families – all using the same dataset with macro time intervals. These studies found that at times during which adolescents reported a higher parent-child relationship quality, they also reported less externalizing behavior (Janssen et al., 2018, 2014, 2016, 2017). The other three studies assessed the within-family link of parent-child relationship quality with several adaptation dimensions, indicating that higher relationship quality was concurrently related to less internalizing behavior (Zhang et al., 2018), less negative affect (Keijsers et al., 2016), and better interpersonal functioning such that they were more open to their parents (Keijsers et al., 2016; Villalobos Solís et al., 2015).

***Differential parenting***

Three studies assessed concurrent within-family links of differential parenting (i.e., differential treatment of siblings). The parental treatment was different in respect to negative interaction and support (Padilla et al., 2016; Shanahan et al., 2008) or control (Richmond et al., 2005) and these differences (rather than the absolute levels of parenting) were linked to adolescent adaptation on a macro timescale. Two studies that focused on the link with externalizing behavior suggested that increases in differential parenting co-varied with simultaneous increases in adolescents' externalizing behavior at the within-family level (Richmond et al., 2005). When differential parenting of mothers and fathers

was examined separately, an increase in differential parenting of the father, but not of the mother, was concurrently associated with an increase in the adolescent's externalizing behavior (Padilla et al., 2016).

All three within-family studies on differential parenting assessed a link with internalizing behavior. Richmond et al. (2005) found that the oldest sibling (but not the youngest) reported more differential parenting at times they also reported more internalizing behavior. Another study suggested that adolescents reported higher levels of maternal and paternal differential parenting in terms of both support and negative interaction at times they also reported more internalizing behavior (Shanahan et al., 2008). However, this was not replicated by Padilla et al. (2016), who found that only increases in maternal differential treatment in support were related to concurrent increases in internalizing behavior within families, but not paternal differential sup- port or maternal/paternal differential negative interaction. Thus, only a handful of longitudinal studies have assessed concurrent associations between differential parenting and externalizing and internalizing behavior within families. Even though some effects have been replicated, the results seem to depend on varying factors (youngest vs. oldest sibling and mother vs. father).

## Heterogeneity in Within-Family Associations

The third key element of this review is the aspect of heterogeneity in the within-family effects. That is, do the within- family estimates vary between families or within the same families? To investigate this, it was coded whether studies estimated variance around the slopes of the bivariate associations as well as whether studies included a moderator of the within-family estimates. Although twenty studies assessed moderators, only six studies mentioned the variation around the within-family estimates. Four of them reported a significant variation (N. B. Allen et al., 2012; Chung et al., 2009; Keijsers et al., 2016), indicating heterogeneity in the within-family effects, and two studies did not find variation in the within-family association (Brauer, 2009; Gottfredson & Hussong, 2011). In addition, some authors reported problems in the statistical estimation of variation around the effects (Lehman & Repetti, 2007; Reynolds et al., 2016).

Moderation effects (for an overview of examined moderators, see Table 1) were mostly assessed at the between- family level by investigating how the within-family associations differed between families, and these moderators typically included adolescent, parental, and family characteristics. Most studies assessed adolescent characteristics, focusing on demographic factors (i.e., gender, age, birth order, ethnicity, and race). For example,

Chung et al. (2009) found that girls experienced more distress on days on which they had more conflicts with their parents compared to boys. A limited number of studies also considered adolescent psychopathology, such as depressive, anxiety, and externalizing symptoms. For instance, Timmons and Margolin (2015) found that adolescents with more depressive or anxiety symptoms reported a more negative mood on days on which they had more conflicts with their parents compared to adolescents with fewer depressive or anxiety symptoms.

Regarding parent characteristics, gender, average levels of parenting behaviors, substance use, and physical functioning were studied. One finding suggested, for example, that only adolescents with highly involved mothers (and not adolescents with less involved mothers) reported more academic problems on days on which they reported less maternal support (Bai et al., 2017). Furthermore, a broader perspective was taken by examining family characteristics, including socioeconomic status, family values, and cultural socialization. For instance, the study of Padilla-Walker et al. (2016) did not find evidence for a moderating effect of familism values in the within-family associations between differential parenting and adolescent externalizing or internalizing behavior. In addition to moderators at the between-family level, a limited number of studies assessed moderators at the within-family level, explaining how associations might differ within the same families, and these moderators typically involved peer functioning and time. For instance, the association between parent- child conflict and depressed adolescents' mood was found to be stronger on days when friend satisfaction was low rather than high (Zhang et al., 2018). Thus, at this point, various moderators have been tested, although mainly at the between-family level.

**Table 2**

*Overview of the Concurrent Associations between Parenting and Adolescent Adaptation Dimensions*

| Parenting dimension | Finding | Adolescent Adaptation Dimension | | | | | | | | | | | | Total *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Externalizing behavior | | Internalizing behavior | | (Negative) Affect | | Interpersonal functioning | | Academic functioning | | Physical functioning | | |
| | | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | |
| Support | ↑ | 1 | 1 | | | | | 1 | 1 | | 1 | 3 | 1 | 13 (11) |
| | ns | 1 | 1 | 1 | 1 | 1 | 1 | 9 | 3 | 7 | 2 | 5 | 2 | |
| | ↓ | 8 | 3 | 4 | 3 | 6 | 3 | | 3 (3) | 1 | 2 (2) | | 2 (2) | |
| | Total | | 5 (5) | | 3 (3) | | 4 (2) | | | | | | | |
| Control | ↑ | 1 | 1 | | | | | 5 | 2 | - | | 1 | 1 | 17 (10) |
| | ns | 23 | 12 | 1 | 1 | 1 | 1 | 3 | 2 | | | 4 | 1 | |
| | ↓ | 13 | 7 | 1 | 1 | | 1 | | 2 (2) | | | | 1 | |
| | Total | | 14 (8) | | 1 | | | | | | | | | |
| Negative interaction | ↑ | 2 | 2 | 6 | 5 | 12 | 6 | | | | | | | 15 (12) |
| | ns | 3 | 1 | 2 | 2 | 2 | 2 | 8 | 2 | 6 | 2 | 4 | 2 | |
| | ↓ | | 3 (2) | | 6 (6) | | 6 (4) | 2 | 1 | 6 | 3 | 1 | 1 | |
| | Total | | | | | | | | 3 (3) | | 4 (4) | | 2 (2) | |
| Time spent together | ↑ | 1 | 1 | - | | | | 1 | 1 | 1 | 1 | 3 | 2 | 6 (5) |
| | ns | 4 | 2 | | | 1 | 1 | 7 | 2 | 1 | 1 | | | |
| | ↓ | 1 | 1 | | | | 1 | | 2 (2) | | 1 | | 2 (2) | |
| | Total | | 2 (1) | | | | | | | | | | | |
| Relationship quality | ↑ | | | 1 | 1 | - | | 5 | 2 | - | | - | | 7 (4) |
| | ns | 6 | 4 | | | | | 3 | 1 | | | | | |
| | ↓ | | 4 (1) | | 1 | | | | 2 (2) | | | | | |
| | Total | | | | | | | | | | | | | |
| Differential parenting | ↑ | 4 | 2 | 6 | 3 | - | | | | - | | - | | 3 (3) |
| | ns | 2 | 1 | 4 | 2 | | | 4 | 1 | | | | | |
| | ↓ | | 2 (2) | | 3 (3) | | | | 1 | | | | | |
| | Total | | | | | | | | | | | | | |

**Table 2 Continued**

| Parenting dimension | Finding | Adolescent Adaptation Dimension | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Externalizing behavior | Internalizing behavior | (Negative) Affect | Interpersonal functioning | Academic functioning | Physical functioning | Total *k* |
| Total *k* | | 19 (13) | 9 (9) | 7 (5) | 5 (5) | 4 (4) | 6 (5) | |

*Note.* A negative association for externalizing behavior, internalizing behavior, and negative affect indicates that a higher score on the parenting dimension was related to better adaptation (e.g., more parental support, less delinquency). A negative association with interpersonal, academic, and physical functioning indicates that a higher score on the parenting dimension is related to poorer adaptation (e.g., less parental support, more delinquency). A higher score on differential parenting is not in favor of the adolescent (e.g., sibling received more emotional support than the adolescent).

Total number between brackets is number of unique samples

↑ = positive association. ↓ = negative association. ns = nonsignificant association. *E* = number of effects. *k* = number of studies.

**Table 3**

*Overview of the Time-Lagged Associations between Parenting and Adolescent Adaptation Dimensions*

| Parenting dimension | Finding | Adolescent Adaptation Dimension | | | | | | | | | | | | Total *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Externalizing behavior | | Internalizing behavior | | (Negative ) Affect | | Interpersonal functioning | | Academic functioning | | Physical functioning | | |
| | | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | |
| Support | $\uparrow_{lag}$ | | | - | | - | | - | | - | | - | | 1 |
| | $ns_{lag}$ | 1 | 1 | | | | | | | | | | | |
| | $\downarrow_{lag}$ | | | | | | | | | | | | | |
| | Total | | | | | | | | | | | | | |
| Control | $\uparrow_{lag}$ | 1 | 1 | - | | - | | | | - | | - | | 8 (7) |
| | $ns_{lag}$ | 23 | 5 | | | | | 7 | 2 | | | | | |
| | $\downarrow_{lag}$ | 4 | 1 | | | | | 1 | 1 | | | | | |
| | Total | | 6 (5) | | | | | | 2 (2) | | | | | |
| Negative interaction | $\uparrow_{lag}$ | | | - | | | | - | | | | 3 | 1 | 4 (4) |
| | $ns_{lag}$ | 6 | 1 | | | 2 | 1 | | | 3 | 1 | 8 | 2 | |
| | $\downarrow_{lag}$ | | 1 | | | | 1 | | | 3 | 1 | 1 | 1 | |
| | Total | | | | | | | | | | 1 | | 2 (2) | |
| Time spent together | $\uparrow_{lag}$ | | | - | | - | | | | - | | - | | 2 (2) |
| | $ns_{lag}$ | 6 | 1 | | | | | 6 | 1 | | | | | |
| | $\downarrow_{lag}$ | | 1 | | | | | | 1 | | | | | |
| | Total | | | | | | | | | | | | | |
| Relationship quality | $\uparrow_{lag}$ | - | | - | | - | | | | - | | - | | 1 |
| | $ns_{lag}$ | | | | | | | 6 | 1 | | | | | |
| | $\downarrow_{lag}$ | | | | | | | | 1 | | | | | |
| | Total | | | | | | | | | | | | | |
| Differential parenting | $\uparrow_{lag}$ | - | | - | | - | | - | | - | | - | | 0 |
| | $ns_{lag}$ | | | | | | | | | | | | | |
| | $\downarrow_{lag}$ | | | | | | | | | | | | | |
| | Total | | | | | | | | | | | | | |

**Table 3 Continued**

| Parenting dimension | Finding | Adolescent Adaptation Dimension | | | | | | | | | | | | Total *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Externalizing behavior | | Internalizing behavior | | (Negative ) Affect | | Interpersonal functioning | | Academic functioning | | Physical functioning | | |
| | | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | *E* | *k* | |
| Total *k* | | 7 (5) | | 0 | | 1 | | 2 (2) | | 1 | | 2 | | |

*Note*. A negative association for externalizing behavior, internalizing behavior, and negative affect indicates that a higher score on the parenting dimension was related to better adaptation (e.g., more parental support, less delinquency). A negative association with interpersonal, academic, and physical functioning indicates that a higher score on the parenting dimension is related to poorer adaptation (e.g., less parental support, more delinquency). A higher score on differential parenting is not in favor of the adolescent (e.g., a sibling received more emotional support than the adolescent).
Total number between brackets is number of unique samples
↑ positive association, ↓ negative association, *ns* nonsignificant association, *E* number of effects, *k* number of studies

## DISCUSSION

Responding to the call for empirical studies to assess how fluctuations in parenting may lead to fluctuations in their own adolescent's adaptation (Keijsers, 2016; Meeus, 2016; Rote & Smetana, 2018), the current systematic review synthesized peer-reviewed studies on within-family associations between parenting and adolescent adaptation. While both between-family studies and within-family studies are necessary to grasp the complex reciprocal links between parenting and adolescent adaptation, the current review highlighted that the number of within-family parenting studies was strikingly limited: Only 46 compared to the hundreds of studies included in the meta-analyses at the between-family level (e.g., Pinquart, 2017a). In the following section, some first insights are identified into whether children are better adapted in or following periods when their own parents are, for instance, more supportive and controlling. Following this, the limitations and caveats of the included studies are evaluated and directions for within-family studies are provided.

### Parenting Processes on Adaptation Dimensions: What Do We Know So Far?

Most studies investigated at least one of the parenting dimensions control ($k$ = 23), negative interaction ($k$ = 17), and support ($k$ = 13). Regarding adolescent adaptation, the dimension externalizing behavior ($k$ = 24) was the most popular outcome variable. Especially the link between parental control and adolescent externalizing behavior was frequently studied ($k$ = 18), although a fair amount of these studies analyzed the same dataset. The results of these studies, of which most of them were concurrent associations and all on a macro timescale, provided some first pieces of evidence that adolescents displayed fewer externalizing problems in years when their own parents were also more controlling or monitoring more intensively. However, in contrast to key parenting theories (Patterson, 1982; Stattin & Kerr, 2000), there was also a substantial amount of studies that did not consistently show such linkages. Two studies even found the opposite of what one would expect: adolescents reported more externalizing problems at times or before they had perceived more parental control (Coley et al., 2009; Rekker et al., 2017). Furthermore, the within-family studies on parental control and adolescent disclosure showed significant con- current associations in the expected direction but found no evidence of time-lagged effects (Keijsers et al., 2016; Villalobos Solís et al., 2015). Thus, even though the idea that parental monitoring is linked to better adolescent adaptation is established with between-family studies, few empirical studies confirm that fluctuations

in parental control are linked to fluctuations in adolescent adaptation within the same families. Hence, evidence for the within- family dynamic nature of parenting processes is still inconsistent, especially because the majority of studies did not find time-lagged effects. Whether these inconsistent results are due to heterogeneity is a question that still remains unanswered. The studies of Rekker et al. (2017) and Keijsers et al. (2016) provide first insights that the dynamic processes within families that link fluctuations in parental control to decreases or increases in adolescent adaptation may be heterogeneous and differ between families.

Furthermore, concerning other parenting dimensions, most of the studies found significant concurrent associations that were in the expected direction (e.g., increases in parental support were related to decreases in externalizing behavior and internalizing behavior) and in line with previous between-family studies (e.g., McLeod, Weisz, et al., 2007; Pinquart, 2017b). In addition, also non-significant associations were found and one unexpected result: a macro-longitudinal study using a lower SES sample found that adolescents reported more delinquency at times their nonresidential father was more involved (Coley & Medeiros, 2007). Moreover, the few studies on time-lagged associations show little evidence of time-lagged effects. Thus, the current review highlights that the evidence for the studied within-family parenting processes is quite limited, because of the inconsistent results and the lack of tested time-lagged associations. Therefore, more research is vital before firmer conclusions can be drawn with the regard to how over-time fluctuations in parenting may affect adolescents' adaptation.

In addition, the systematic review revealed some theoretical caveats in the empirical body of within-family parenting studies. Two links were of particular theoretical interest. First, psychological control or autonomy support are the key dimensions of parenting that have yet to be examined at the within-family level (for an exception, see Dietvorst et al., 2018). The self-determination theory (Ryan & Deci, 2000) provides a solid theoretical foundation to expect that detrimental effects of the lack of autonomy support on adolescent adaptation would replicate at the within-family level. The theory proposes that autonomy supportive parenting satisfies the adolescent's need for autonomy and therefore enhances adolescent adaptation. Thus, in periods when parents are more autonomy supportive, their adolescents are expected to be better adapted. However, this hypothesis remains to be tested. Second, little is known about how parenting affects interpersonal peer functioning of adolescents. In light of the social learning theory (Bandura, 1977), parents' behavior can serve as a model for the child. Hence, it can be expected that parent's behavior toward

their children influences the adolescents' interpersonal behavior within other relationships, such as the peer relationship. Thus far, two daily diary studies have assessed the concurrent association between parent-child interactions and peer problems in general, but these found no supporting evidence that within-family fluctuations in parental support and parent-child conflict were related to fluctuations in adolescents' peer problems (Bai et al., 2017; Lehman & Repetti, 2007). To the best of our knowledge, no studies have incorporated more elaborate indicators of interpersonal peer functioning, such as friendship support or hostility towards peers. Thus, even though parenting theories provide the conceptual frameworks for testing how changes in parenting may lead to improvements in adolescent adaptation, many theoretical ideas await testing at the within-family level where these dynamic parenting processes take place.

## Reciprocity between Parents and Adolescents

Although many of the developmental theories on parenting argue that parenting processes include bi-directional effects between parents and their children (e.g., coercion theory, monitoring literature), only eight out of 46 included studies examined reciprocal time-lagged effects, which allows for a test of such reciprocal patterns. Notably, these eight studies focused primarily on adolescent externalizing behavior. The results appeared to provide little support for some of the well-known theories that operate within families. For example, the results of the study of Besemer et al. (2016), do not support a reinforcing cycle between poor parent-child communication and externalizing behavior, which is proposed by the coercion theory (Patterson & Stouthamer-Loeber, 1984). In contrast, one study even found a reinforcing cycle between higher levels of father *involvement* and adolescent delinquency (Coley & Medeiros, 2007). Moreover, evidence for Bell's theory (1968), which assumes that parents adapt their behavior when children do not show behavior within parental standards, is limited. Aside from one study, which suggested that an increase in adolescents' sexual risk behavior was related to an increase in paternal knowledge 1 year later (Coley et al., 2009), most studies did not find that externalizing behavior predicted changes in parenting related to behavioral control at the within-family level (e.g., Besemer et al., 2016; Cox et al., 2018). Thus, only a few studies have examined reciprocal time-lagged associations but did not provide strong evidence for the hypothesized reinforcing cycles of mutual influence in well-known theories, leaving the direction of the effects an open question for further research.

## Timescale of Parenting Processes

Parenting processes are complex dynamic systems in which the interactions on the micro-longitudinal scale are considered to be the driving mechanisms of longer-term developmental changes (dynamics systems approach; Granic & Patterson, 2006). Yet, from the current systematic review it became evident that longitudinal within-family studies typically assessed associations of parenting with adolescent adaptation on a macro-longitudinal timescale, with intervals of 6 months or longer ($k$ = 30). Some of the included studies assessed processes at a daily timescale ($k$ = 10), but smaller micro timescales or meso timescales that fall between daily and annual processes (e.g., weeks or months) were rare. Specifically, with respect to adolescent externalizing and internalizing behaviors, all studies were performed on a macro timescale, except for one daily diary study on internalizing behavior. Hence, whether findings can be generalized from one timescale to another is still an open question. For instance, according to the reactance theory (Brehm, 1966), exerting behavioral control may result in an immediate reduction of the adolescents' problem behaviors while recurring controlling behavior may intensify problem behavior over time. Therefore, studying parenting at one timescale may lead to erroneous conclusions regarding processes at another timescale, which is referred to as the galloping horse fallacy[1] (Keijsers & Van Roekel, 2018).

To avoid the galloping horse fallacy and to increase the understanding of within-family parenting processes, empirical studies could consider and link different timescales (an overview of the timescales of included studies is provided in Figure 3). For example, by implementing the Experience Sampling Method that includes multiple measurements a day (Csikszentmihalyi et al., 1977; Van Roekel et al., 2019), real-time parent-adolescent interactions can be studied. Moreover, different timescales can be linked, for example, by studying how micro-longitudinal parenting processes, such as real-time parent-adolescent interactions, develop across age and how these micro-longitudinal parenting processes are related to later developmental change. Thus, assessing parenting processes at the micro- and meso-longitudinal time-scale, as well as studying how micro-dynamics change over time and accumulate into longer term developmental growth (e.g., with continuous

[1] The galloping horse fallacy is a metaphor referring to the work of Muybridge in his famous series of pictures 'horse in motion'. Only when he observed a galloping horse at microseconds apart, it was revealed that a galloping horse and a walking horse have a different mechanism of movement. Thus, one cannot observe a walking horse at a slower timescale to draw conclusions about how the mechanisms of galloping function at a faster timescale. Likewise, one cannot observe parenting at a one-year interval and assume that the day-to-day mechanisms follow the same principles.

time modelling to study within-family effects as a continuous function of time; Driver et al., 2017), would be pressing questions for future developmental research.

## Heterogeneity of Parenting Processes

Theories, such as the differential susceptibility theory (Belsky & Pluess, 2009), provide clear ideas about why and how parenting practices may affect adolescents differently. Nonetheless, only a limited number of studies reported the variation or heterogeneity around the average within-family association, and less than half of the studies included moderators as potential explanations. One of the potential reasons why some studies did not assess heterogeneity was their choice to model fixed effects rather than random effects in multilevel regression analyses. Consequently, variance around the slope cannot be estimated using fixed effects, which leaves an interesting aspect of heterogeneity underexplored.

One of the studies carefully highlighted the importance of assessing heterogeneity by presenting a distribution of individual effects, showing that more than half of the families had an effect size that deviated from the average within- family effect not only in strength but also in the direction (Farrington et al., 2002). Hence, the average within-family effect can be misleading when a parenting process is not homogenous and therefore it is recommended that average effects are generalized with caution. Thus, to avoid the “one size fits all fallacy” (considering a process to be homogenous while it is not; Keijsers & Van Roekel, 2018) it is vital for future studies to explore and explain variation in within-family parenting processes.

## Strengths and Limitations

Parenting adolescents is a complex and dynamic process, in which fluctuations in parenting may lead to fluctuations in their adolescent’s adaptation, from a decline in parental support being linked to increases in internalizing problems (e.g., Johnson, 1991), to increases in parental monitoring leading to decreases in externalizing problems (Patterson & Stouthamer-Loeber, 1984). In contrast to the well-established insights into stable differences between families in parenting and adolescent adaptation (Hoeve et al., 2009; Pinquart, 2017b), this review summarizes what is currently known about the associations between fluctuations in parenting on adolescent adaptation. In other words, are adolescents better adapted in or following periods when their own parents are more con- trolling and supportive? By being inclusive in covering parenting and adolescent adaptation constructs, the systematic review offers a comprehensive overview of peer-reviewed studies on within-family associations

between parenting and adolescent adaptation. This review showed an exponential growth in publications within the last years, as more than half of the included studies were published between 2015 and 2018. These within-family studies examine parenting processes at a level that fits better with contemporary parenting theories and demonstrate how different parenting processes sometimes may occur within different families. That is, even though a handful of studies highlighted that adolescents are better adapted in periods when their own parents are more supportive or controlling, other empirical estimates suggested that some adolescents are less well adapted in such periods.

Notwithstanding the strengths, there were also limitations. First, the review did not contain meta-analytic estimates of the included associations, because standardization methods of within-family (or within-person) effect sizes are still developing (Wang et al., 2019). Hence, it was not yet possible to compare within-family effect sizes across studies. Additionally, many associations were studied by a limited number of unique studies and samples, and mostly either on a daily or (semi- or bi-)annual timescale. Therefore, future methodological advances regarding standardization methods of multilevel effect sizes, uniformity among researchers in the use of such standardization practices, and additional studies on similar within-family parenting processes and with different timescales, appear vital for future meta-analytic assessment. Second, many studied samples were from a small number of WEIRD (Western, educated, industrial, rich, and democratic) backgrounds (Henrich et al., 2010). That is, many samples were from the United States or the Netherlands with middle-to-high socioeconomic status. To fully understand how parenting processes work within families across a wide variety of families, it is vital for future research to also study families from non-WEIRD backgrounds and to take into account differences between families in terms of ethnicity and socioeconomic status, but also for example sexual orientation (as no information was provided in the included studies). Third, the systematic search focused on peer-reviewed studies. Research that has not been peer-reviewed, such as book chapters or dissertations, may present additional insights that are not obtained through the included peer-reviewed studies. Nonetheless, it can be expected that peer-reviewed research often has higher quality standards than non-peer reviewed research and is often the knowledge on which researchers further build upon.

## Directions for Future Research

To support the promising trend and forthcoming studies, three aspects seem important to consider when matching theoretical questions about parenting processes to the design of within-family studies. The first aspect is the timescale of observation (i.e., over-time fluctuation

and measurement-timescale fit). The studies utilized various *timescales*, from seconds to years, although most studies focused on macro- longitudinal parenting processes. Carefully designing studies with micro and macro timescales would open up possibilities to assess how real-time and every-day processes between parents and children result in divergent patterns of developmental change in adaptation and ultimately stable differences between individuals (Back et al., 2011). However, which timescale can and needs to be included in the research design is a conceptual and methodological question, the answer to which may vary according to different parenting practices. For example, the extent to which a parent exerts behavioral control may not vary from moment- to-moment but could fluctuate over a longer time, such as from month-to-month. Currently, many parenting theories do not specify the timescale(s) at which processes unfold, let alone how the timescales mutually affect each other through bottom-up and top-down causality (but see Granic & Patterson, 2006). Therefore, the first challenge is to extend parenting theories to derive explicit notions regarding the critical time window in which dynamic parenting processes can be observed. Moreover, the amount of fluctuation within families and the variance that can be observed within families can depend on *the fit of the measurement with the timescale*. For example, when examining moment-to-moment fluctuations, items tapping into concrete behaviors that can appear in momentary states (e.g., my parent listened care- fully to me) might be most appropriate, whereas measures tapping into aggregates of behavior (e.g., my parent was supportive the last 3 months) might be most appropriate at larger timescales. Thus, in addition to extending theoretical ideas, the first methodological challenge is to think carefully about whether measures are sensitive (enough) to pick up the dynamic processes at the timescale of observation.

The second conceptual-methodological factor that warrants more attention is the *reciprocity between children and their parents*. Despite the fact that developmental psychologists acknowledge that parenting is not a one-directional process (Pardini, 2008) and that children play an active role in determining parenting practices (Stattin & Kerr, 2000), the current systematic review indicated that, to date, only a limited number of studies have examined reciprocal processes of parenting and adolescent adaptation. To obtain a more accurate understanding of parenting processes within families, it is crucial to study reciprocal effects that can establish whether it is the parent affecting the child or whether the adolescent triggers changes in parenting or both.

Third, despite the possibility of heterogeneity in how parenting affects adolescent adaptation and vice versa, it is not yet a common practice to *explore and explain heterogeneity in within-family parenting process*es. Through modeling random multivariate slopes,

researchers can obtain insights into whether within-family effects are heterogeneous across different families or even across time within the same families (e.g., Zhang et al., 2018). Moreover, it would the interesting to explain this heterogeneity, guided by relevant theories. For instance, ecological theories (Bronfenbrenner, 1986; Sameroff, 2010) assume contextual factors, whereas differential susceptibility theory (Belsky & Pluess, 2009) assumes personality as a factor that might explain differences between families in within- family parenting processes.

## CONCLUSION

A vast amount of research indicates that families differ from each other in parenting and adolescent adaptation. From between-family research, for instance, it is known that in families with more parental control and support children are generally better adapted than in other families. However, to understand the reciprocal within-family processes that link parenting and adolescent adaptation and that are proposed by contemporary theory, longitudinal studies are recommended to assess how over-time fluctuations in parenting and adolescent adaptation are linked within the same family. By conducting a systematic search, the current systematic review found that, even though such within-family studies have grown exponentially, up until the beginning of 2018 there were only 46 published studies. The results of most of the studies indicated that in periods when parents were more supportive and controlling, and parents and adolescents had less negative interaction, adolescents also reported less externalizing and internalizing behavior and other indices of maladaptation. This could suggest that changes in parent's behavior might be linked to changes in adolescents' maladaptation. Nonetheless, several studies did not find such within-family associations and a few studies even reported findings that were in the opposite direction of what would have been expected. This might be a hallmark of generally small average effect sizes but also of the existence of unmeasured moderator factors. Moreover, there is barely any evidence whether over-time fluctuations in parenting predict time-lagged fluctuations in adolescent adaptation within families or vice versa, leaving the question of reciprocity in parenting processes largely unanswered. Additionally, although a great deal of studies examined moderators, few studies actually tested whether heterogeneity in within- family associations existed. Hence, it is yet to be described to which extent parenting processes can differ from family- to-family. Therefore, to understand how changes in parenting, such as increasing control or becoming more supportive, may lead to changes in adolescents' adaptation over time, more studies are needed that assess the full complexity of these dynamic, reciprocal, and heterogeneous processes at the within-family level.

# CHAPTER 3

## Testing transactional processes between parental support and adolescent depressive symptoms: From a daily to a biennial timescale

This chapter is published as:

**Boele, S**., Nelemans, S. A., Denissen, J. J. A., Prinzie, P., Bülow, A., & Keijsers, L. (2023). Testing transactional processes between parental support and adolescent depressive symptoms: From a daily to a biennial timescale. *Development and Psychopathology, 35*, 1656-1670. https://doi.org/10.1017/S0954579422000360

**Supplemental materials** can be viewed in the online version of the article.


**Open science statement:** The analytical plan was preregistered, and syntaxes and output are shared on https://osf.io/bfyst/.

**Author contributions: SB**: conceptualization, methodology, investigation, formal analysis, writing – original draft. **SAN:** conceptualization, methodology, writing – review & editing. **JJAD**: conceptualization, methodology, writing – review & editing, supervision. **PP**: conceptualization, methodology, investigation, writing – review & editing. **AB**: conceptualization, methodology, investigation, writing – review & editing. **LK**: conceptualization, methodology, investigation, writing – review & editing, supervision, funding acquisition.

## ABSTRACT

Transactional processes between parental support and adolescents' depressive symptoms might differ in the short term versus long term. Therefore, this multi-sample study tested bidirectional within-family associations between perceived parental support and depressive symptoms in adolescents with datasets with varying measurement intervals: Daily ($N$ = 244, $M_{age}$ = 13.8 years, 38% male), bi-weekly ($N$ = 256, $M_{age}$= 14.4 years, 29% male), three-monthly ($N$ = 245, $M_{age}$ = 13.9 years, 38% male), annual ($N$ = 1,664, $M_{age}$ = 11.1 years, 51% male), and biennial ($N$ = 502, $M_{age}$ = 13.8 years, 48% male). Preregistered random-intercept cross-lagged panel models (RI-CLPM) showed negative between- and within-family correlations. Moreover, although the pre-registered models showed no within-family lagged effect from perceived parental support to adolescent depressive symptoms at any timescale, an exploratory model demonstrated a negative lagged effect at a biennial timescale with the annual dataset. Concerning the reverse within-family lagged effect, increases in adolescent depressive symptoms predicted decreases in perceived parental support 2 weeks and 3 months later (relationship erosion effect). Most cross-lagged effects were not moderated by adolescent sex or neuroticism trait level. Thus, the findings mostly support adolescent-driven effects at understudied timescales and illustrate that within-family lagged effects do not generalize across timescales.


*Keywords*: parental warmth, negative affect, depression, longitudinal, within-person

## INTRODUCTION

Depressive symptoms emerge from a complex interplay of biological and psychosocial risk factors (Rudolph, 2009). Depressive symptoms include feelings of sadness, irritability and worthlessness or guilt, loss of pleasure and energy, and problems with sleep, weight, and concentration (American Psychiatric Association, 2013). An important theorized risk factor is the lack of (emotional) support from parents (Cummings & Davies, 1995; Rohner et al., 2005), which includes the provision of affection, intimacy, comfort, and guidance (Furman & Buhrmester, 1985; Rohner, 2016). As experiencing depressive symptoms in adolescence increases the risk for later depressive disorders in adulthood (Pine et al., 1999), unraveling the role of parental support in their etiology warrants attention.

Much research has focused on understanding risk factors for adolescent depression at the population level by assessing differences *between families*, demonstrating that adolescents who perceive lower levels of parental support experience more depressive symptoms compared to adolescents who perceive higher levels of parental support (Pinquart, 2017b). However, theoretically, parental support and depressive symptoms impact each other at the *within-family level*: between an adolescent and his or her own parents (Hamaker, 2012; Keijsers, 2016; Molenaar, 2004). For example, an adolescent might start to experience more depressive symptoms because he or she perceived a drop in his or her parents' supportive behavior (Cummings & Davies, 1995; Rohner, 2016). Hence, when studying the transactional links from parenting to adolescent depressive symptoms, and vice versa, over-time associations within the same families should be assessed (i.e., within-family association).

Extending a small body of empirical studies at the within-family level (Boele et al., 2020; L. H. C. Janssen, Elzinga, et al., 2021; Vaughan et al., 2010), we tested how the potential transactional processes (i.e., bidirectional effects) between perceived parental support and depressive symptoms of adolescents unfold within families at micro- (daily), meso- (bi-weekly and three-monthly), and macro-timescales (annual and biennial). Additionally, we tested whether these potential transactional processes varied due to stable individual differences, that is, adolescents' sex and neuroticism.

### Transactional Processes Between Parental Support and Adolescent Depressive Symptoms

There is a strong theoretical basis to assume that parental support affects adolescents' depressive symptoms. For example, the experience of diminished parental support may

induce feelings of emotional insecurity, which may, in turn, increase depressive symptoms (Cummings & Davies, 1995). The interpersonal acceptance-rejection theory (Rohner, 2016) suggests that it is a universal process that the degree of parental acceptance and rejection predicts their children's mental health, although the way parents express support may vary across cultures, countries, and families. Especially children's and adolescent's *perception* of the supportive and caring behavior of their own parents is an important predictor of their well-being. Hence, when adolescents perceive their own parents as less accepting (e.g., less warmth and affection) and more rejecting (e.g., feeling unappreciated, forgotten, or belittled), they might be more likely to develop depressive symptoms.

Furthermore, interpersonal theories of depression (Coyne, 1976; Rudolph, 2009) emphasize that depressive symptoms of the adolescent may also affect (the perception of their) interpersonal functioning, such as the parent-child relationship. Hence, a transactional perspective (Granic, 2005; Sameroff, 2010) is critical to understand how the adolescent not only reacts to the changes in perceived parental support but may also trigger subsequent changes in their (perception of) parents' supportive behavior.

To study transactional processes, longitudinal designs are needed, as they can disentangle the direction of effects (i.e., parent-to-adolescent and/or from adolescent-to-parent). Although a concurrent empirical link between parental support and depressive symptoms in adolescence is well-established (Pinquart, 2017b; Yap et al., 2014), findings of prior longitudinal studies are inconsistent about the direction of the effects (Branje et al., 2010; Stice et al., 2004). Moreover, most existing longitudinal studies have assessed these bidirectional cross-lagged effects at the between-family level (Branje et al., 2010; Stice et al., 2004; Young et al., 2005). These between-family studies have examined how families differ in their levels of parental support and depressive symptoms. For example, they have demonstrated that in families with higher levels of parental support adolescents show lower levels of depressive symptoms at the next measurement occasion compared to adolescents in families with lower levels of parental support (Branje et al., 2010).

However, methodological concerns have been raised that results from between-family analyses do not by definition generalize to the within-family level, both in terms of the effect size or even the direction of the effect (i.e., positive or negative; Berry & Willoughby, 2017; Hamaker et al., 2015; Keijsers, 2016). Therefore, more recently, studies have also assessed the within-family level to tap into the linkages between overtime fluctuations within individual families – thus the longitudinal processes that unfold between a parent and his or her own adolescent (Hamaker, 2012; Keijsers, 2016). A recent study of related

processes found opposing associations at the between- and within-family level, indicating the need to disentangle both levels. Specifically, the results showed a negative correlation between parental autonomy support and adolescents' social anxiety symptoms at the between-family level, but a positive correlation at the within-family level (Nelemans et al., 2020). Thus, to test the transactional theories of child development (Granic, 2005; Sameroff, 2010) and adolescent depression (Rudolph, 2009), longitudinal within-family studies are vital, but unfortunately still scarce (Boele et al., 2020).

Moreover, the few available within-family studies on this topic have focused on concurrent associations, which limits the opportunity to study how transactional processes unfold within families over time. For example, daily diary studies have shown that adolescents report increased negative feelings on days when they also report a decline in parental support (Bai et al., 2017; L. H. C. Janssen, Elzinga, et al., 2021). Similarly, studies with longer measurement intervals suggest that adolescents report increased depressive symptoms at times when they also report a decline in maternal support (Vaughan et al., 2010), but not in paternal support (Shanahan et al., 2008). Although it is valuable to examine how over-time fluctuations co-exist within families, to study the transactional processes it is also vital to assess 'what comes first'. That is, do fluctuations in perceived parental support predict subsequent fluctuations in adolescent depressive symptoms within the same family, or vice versa? Therefore, this study estimated Random-Intercept Cross-Lagged Panel Models (RI-CLPM). This type of modeling is suitable to assess both concurrent and cross-lagged effects at the within-family level, because it disentangles the stable between-family variance and the overtime within-family variance (Hamaker et al., 2015; Keijsers, 2016).

### Timing of These Transactional Processes

Even though the transactional perspective is now increasingly acknowledged (although hardly ever tested within families), little is known about the timing of these transactional processes. A dynamic systems perspective on adolescent development (Granic, 2005; Lougheed, 2020; Smith & Thelen, 2003) theorizes that transactional processes within families may unfold at various timescales. In fact, there are reasons to assume that the transactional processes between perceived parental support and adolescent depressive symptoms differ in the short term versus long term, such that increased depressive symptoms might evoke more support from parents on the short term (Gottman et al., 1996) but can lead to less parental support by longer-term relationship erosion processes

(Coyne, 1976; Rudolph, 2009). To study both short-term and long-term precedents and consequences of adolescent depressive symptoms, we analyzed several datasets with varying measurement intervals, in which adolescents reported on perceived parental support and their depressive symptoms.



More specifically, at a short timescale, such as a momentary or daily timescale, we expect that parents adapt their behavior to current emotional needs of their adolescent. Accordingly, parents might provide temporarily more support when their adolescent experiences elevated depressive symptoms. According to Gottman's emotion coaching meta-emotion philosophy (1996), a child's display of more negative emotions may be an opportunity for parents to offer more comfort and guidance to help them cope with these negative feelings or help solve underlying problems. In line with this, an observational study showed that parents were more likely to bend a negative parent-adolescent interaction into a positive interaction than reciprocating their adolescent's negativity (Van Bommel et al., 2019). Therefore, at a short timescale (e.g., hours, days), within families, we expect that parents increase their support after their adolescent showed more depressive feelings, and this increase in parental support is expected to be followed by a decline in the depressive feelings of the adolescent.

At a longer timescale, relationship erosion processes might occur, in which parents respond to the elevated adolescent depressive symptoms by providing less parental support (Branje et al., 2010; Coyne, 1976). Interpersonal theories of depression (Coyne, 1976; Hammen, 2006; Rudolph, 2009) highlight that depressed persons are likely to gradually evoke more rejection from others by the accumulation of their frequent aversive interpersonal behaviors, such as excessive reassurance seeking, failure to accept support from others, social disengagement, and irritable behavior. Adolescents' increased depressive symptoms might thus impact their relationships and gradually provoke more negative parent-adolescent interactions over time. Indeed, studies have shown that higher levels of depressive symptoms in adolescents are associated with less supportive and more conflictual parent-adolescent interactions (Bodner et al., 2018; Sheeber et al., 2007). Hence, the quality of the parent-adolescent relationship might slowly erode, including decreasing parental support, through the accumulation of negative interactions and lack of positive interactions. The perception that they receive less parental support than before may be followed with an increase in their depressive symptoms, evoking a maladaptive cycle between decreasing parental support and increasing adolescent depressive symptoms within families in the long term.

To summarize, two qualitatively different transactional cycles between parental support and adolescent depressive symptoms are suggested here, depending on the timescale. In the short term, a decrease in parental support is expected to be followed by a temporary increase in the adolescents' depressive symptoms, which may trigger an adaptive response of parents by providing more support than they would typically do. In the long term, however, we expect a negative reciprocal process. That is, the elevated depressive symptoms of the adolescent following upon the preceding decrease in parental support, might subsequently erode the parent-child relationship and lead to a further decrease in parental support. Thus, the transactional within-family process between parental support and adolescent depressive symptoms might be sensitive to the timescale of study.

The current study examined these hypothesized short-term and long-term transactional processes from the perspective of the adolescent. Although we would theoretically expect that parents actual support fluctuates as a response to changes in adolescents' depressive symptoms, as described above, the question remains whether adolescents also perceive these changes in parental support. Research shows that perceptions of parenting can differ between parents and adolescents: Some adolescent experience similar levels of parental support as their parents, but other adolescents experience more or less parental support than their parents (L. H. C. Janssen, Elzinga, et al., 2021). In the current study, we thus examined whether short-term increases and long-term decreases (indicating relationship erosion processes) in supportive parenting are perceived by adolescents after they experienced an increase in depressive symptoms.

### Methodological Concerns Regarding Timescales

Each time interval between observations may illustrate one snapshot of a continuous time process, which is known to be often non-linearly linked over time (Granic, 2005; Smith & Thelen, 2003). Methodologically, it has also been acknowledged that results on one timescale may not be generalizable to another timescale (Keijsers & Van Roekel, 2018). That is, when the same data-structures are analyzed with varying time intervals, the results, including the direction (i.e., from parental support to depressive symptoms or vice versa), sign (i.e., positive or negative), and the size of the effects, may depend on the arbitrary choice of the time interval (Kuiper & Ryan, 2018; Voelkle et al., 2018). Therefore, to study how the hypothesized transactional processes of parenting unfold within families over time, we need a multitude of "snapshots": from short-term daily studies to long-term panel studies spanning years. To get a first insight into how the transactional processes

between perceived parental support and adolescent depressive symptoms vary across timescales, in this study, we therefore analyzed five longitudinal adolescent-reported datasets, with each a different measurement interval (i.e., daily, bi-weekly, three-monthly, annual, biennial), but with an identical analytical strategy.



### Differences Between Adolescents in Transactional Within-Family Processes

Apart from stressing the dynamic nature of development, modern theories also emphasize heterogeneity between families (Belsky et al., 2022; Belsky & Pluess, 2009; Sameroff, 2010). Indeed, a recent diary study demonstrated that daily decreases in perceived parental support were related to a more negative mood in some adolescents but to a less negative mood in others. This effect heterogeneity was explained by adolescents' stable levels of depressive symptoms (L. H. C. Janssen, Elzinga et al., 2021), illustrating that opposing effects are possible when inter-individual differences are tested. To explain heterogeneity in the transactional processes between perceived parental support and depressive symptoms in adolescents, this study focused on two potential explanatory factors: adolescent sex and trait levels of neuroticism.

First, with respect to sex differences, it has been suggested that adolescent girls show stronger increases in depressive symptoms after experiencing interpersonal stressors, such as diminished parental support, than boys (Hankin et al., 2007; Rudolph, 2002). For instance, because girls place greater value on emotional closeness and harmony, they might experience interpersonal difficulties as more stressful than boys (Cyranowski et al., 2000). However, concurrent within-family associations are inconsistent (L. H. C. Janssen, Elzinga et al., 2021; Vaughan et al., 2010). Hence, we tested whether girls may show stronger increases in depressive symptoms after a decline in perceived parental support on different timescales in comparison to boys. Conversely, we explored – without a priori hypotheses - whether the reverse effects are likewise more pronounced in girls than in boys.

Second, the personality trait neuroticism has been linked to responses to interpersonal difficulties and might explain individual differences in susceptibility to positive and negative parenting effects, including fluctuations in parental support (Belsky & Pluess, 2009). Neuroticism (the opposite of emotional stability) is the tendency to experience and inability to adaptively cope with negative emotions (Caspi et al., 2005). It has been associated with greater exposure and reactivity to interpersonal difficulties, such as conflict and rejection (Bolger & Zuckerman, 1995; Hammen, 2006). Research demonstrated,

for example, that highly neurotic individuals showed a stronger negative association between daily conflict and daily self-esteem than individuals scoring lower on neuroticism (Denissen & Penke, 2008). In our study, we tested whether adolescents scoring high on neuroticism would show stronger increases in depressive symptoms after perceived parental support declined compared to adolescents scoring low on neuroticism. For the reverse effect from depressive symptoms to perceived parental support, we did not have a specific hypothesis.

## The Present Study

In sum, this preregistered within-family study aimed to add three novel insights to the existing literature. First, by disentangling the direction of effects, we examined not only concurrent associations but also longitudinal cross-lagged within-family associations between perceived parental support and depressive symptoms in adolescents, filling an important scarcity in empirical within-family parenting studies (Boele et al., 2020). Second, by considering various timescales (i.e., daily, bi-weekly, three-monthly, annual, and biennial) and applying an identical analytical approach to each dataset, we illuminated and tested potential differences between short-term and long-term cross-lagged effects. Third, to examine whether adolescents differ in their cross-lagged within-family associations, we tested the moderating role of adolescent sex and neuroticism.

All hypotheses and analytical approaches were preregistered. Based on the findings of previous studies at the within-family level (Han & Grogan-Kaylor, 2013; L. H. C. Janssen, Elzinga et al., 2021), we expected that declines in perceived parental support would be concurrently related to increases in adolescent depressive symptoms (H1). Based on the emotional security perspective (Cummings & Davies, 1995) and IPARTheory (Rohner, 2016), we expected that a decline in perceived parental support would be followed by a later increase in adolescent depressive symptoms on all timescales (H2). Conversely, based on interpersonal theories of depression (Coyne, 1976; Rudolph, 2009), we expected that an increase in adolescent depressive symptoms would be followed by an *increase* in perceived parental support at a short timescale (i.e., from day-to-day) (H3a), but followed by a *decline* in perceived parental support at a longer timescale (i.e., from year-to-year or longer), representing relationship erosion (H3b). We explored whether relationship erosion processes were already present at intermediate timescales (i.e., bi-weekly and three-monthly time interval). Moreover, we tested whether girls (H4) and adolescents scoring high on neuroticism (H5) would show a stronger increase in depressive symptoms after declines in perceived parental support, compared to boys and

adolescents scoring low on neuroticism. The moderating effects on the reverse lagged effect (i.e., from adolescent depressive symptoms to parental support) were explored without a priori hypotheses at all timescales.

## METHOD



To study the transactional processes within families at different timescales, we analyzed five datasets with varying measurement intervals. The datasets are composed of four different samples (i.e., Dataset 1 and Dataset 3 are the same sample). For an overview of the demographic characteristics of the samples, see Table 1.

**Table 1**

*Overview of Sample Characteristics*

| | Dataset | | | |
|---|---|---|---|---|
| | **Daily (*N* = 244) and three-monthly (*N* = 245)[a]** | **Bi-weekly (*N* = 256)** | **Annual (*N* = 1,664)** | **Biennial (*N* = 503)** |
| **Adolescent** | | | | |
| Mean age T1 | 13.9 | 14.4 | 11.1 | 13.8 |
| Age range T1 | 12-16 | 12-17 | 10-13 | 10-16 |
| % male | 38% | 29% | 51% | 48% |
| Nationality | 98% Dutch | 97% Dutch | *Unknown* | 100% Belgian |
| Education | Low 0%<br>Intermediate 45%<br>High 56% | Low 15%<br>Intermediate 33%<br>High 52% | Low 33%<br>Intermediate 24%<br>High 31% | Low 4%<br>Intermediate 16%<br>High 58% |
| **Parents** | | | | |
| Marital status | *Unknown* | 76% married<br>19% divorced<br>5% other | 78% married<br>10% divorced<br>12% other | 82% married<br>10% divorced<br>8% other or missing |
| Nationality | *Unknown* | 96% Dutch | 87% German | 100% Belgian |
| Education | Low 12%<br>Intermediate 44%<br>High 44% | Low 15%<br>Intermediate 38%<br>High 28% | Low 13%<br>Intermediate 64%<br>High 24% | Low 34%(F) 27% (M)<br>Intermediate 25%(F) 36%(M)<br>High 15%(F) 11%(M) |

*Note*. F = father. M = mother.

[a] demographic information reported of the largest sample

## METHOD DATASET 1 (DAILY)

### Participants

Adolescents ($N$ = 269) participated in the study "Grumpy or Depressed" (L. H. C. Janssen, Elzinga, et al., 2021; Keijsers et al., 2015). Adolescents were included in the current study if they had at least one score on parental support and adolescent depressive symptoms. Hence, the analytical sample consisted of 244 participants (38.1% male, $M_{age}$ = 13.8 years, $SD_{age}$ = 0.92, age range = 12-16 years). Most of the participants were born in the Netherlands (98.4%) and followed a higher general secondary education (45%) or preuniversity secondary education (55%). Additionally, most of them lived with their biological mother (98.0%) and/or father (91.0%) and most parents were married (82.1%) or living together (8.8%). A minority of the parents were divorced (9.0%), single and never married (1.3%) or widowed (0.9%). Educational level of parents ranged from low (12.0%), middle (43.3%) to high (44.7%). Values of the scales of the study variables were missing completely at random (Little's MCAR test $\chi^2(1400) = 1461.64$, $p = .123$, $\chi^2/df = 1.04$).

### Procedure

Adolescents and parents were recruited at a Dutch high school in 2014. Before the longitudinal data were collected, 604 adolescents participated in a screening (here called T0) during school hours in September 2014, for which adolescents and their parents provided passive content. The screening included an online computer questionnaire that took approximately 45 min, and afterwards, the adolescents and parents were invited to also participate in the longitudinal study. Adolescents and parents provided active informed consent for their participation in the longitudinal study. The longitudinal data were collected through online computer questionnaires (analyzed in Dataset 3) and three Experience Sampling Method (ESM) measurement bursts. In this study, we analyzed the first ESM measurement burst in October 2014, in which 244 adolescents participated. Each ESM measurement burst consisted of micro-questionnaires that took one to two minutes, which were sent through a smartphone app eight times a day (between 8 AM and 10 PM) for seven consecutive days. The school gave permission to send the ESM questionnaires during school hours. For more details about the procedure, including ESM compliance, see Janssen et al. (2021). The study was approved by the psychological ethical committee of the Faculty of Social Sciences of Utrecht University.

### Measures

#### *Parental Support*

One item assessed daily parental support: “My parents were warm and supportive today.” This item was included in the last evening ESM questionnaire. The item was responded on a scale from 1 (*not*) to 7 (*very*). Earlier work demonstrated convergent validity for this 1-item scale (L. H. C. Janssen, Elzinga et al., 2021). In this study, the average score of the 1-item parental support scale correlated moderately-to-strongly with the 5-item Parental Support scale of the Network Relationship Inventory (NRI; Furman & Buhrmester, 1985), assessed at T0 ($r$ = .45, $p$ < .001). On average, adolescents reported on 4.0 out of the 7 days on their parental report (972 observations in total).

#### *Negative Affect*

Six items assessed negative affect (i.e., sad, unhappy, disappointed, angry, nervous, irritability), with a response scale ranging from 1 (*not*) to 7 (*very*). These items were ESM measures (e.g., “I feel sad”) and asked eight times a day for seven consecutive days. We calculated the daily average of the negative affect items, which showed good internal consistency across the 7 days (α range = .88-.93). The average score of negative affect correlated moderately to strongly with the Child Depression Inventory II (CDI-II; Timbremont et al., 2008), which was assessed at T0 ($r$ = .59, $p$ < .001). In total, we had 1,361 daily negative affect scores, which were based on 6,267 ESM assessments. Thus, on average, we had 5.6 daily negative affect scores per adolescent.

#### *Neuroticism*

Neuroticism was measured once at T0 with a subscale of the Ten Item Personality Inventory (TIPI; Gosling et al., 2003) that consists of two items: “I see myself as someone who is: 1) nervous and 2) calm/relaxed”. The items were rated on a 7-point scale from 1 (*not at all true/very true*) to 7 (*very true/not at all true*). A higher mean score indicated a higher level of neuroticism. The two items correlated moderately *(*$r$ = .35, $p$ < .001).

## METHOD DATASET 2 (BI-WEEKLY)

### Participants

Adolescents ($N$ = 259) participated in a preregistered study called “One size does not fit all” (http://osf.io/e2jzk). Data were used of the first 15 bi-weekly measurement waves

and participants were included if they had at least one score on parental support and/or depressive symptoms. Therefore, the current study included 256 adolescents (28.5% male, $M_{age}$ = 14.39 years, $SD_{age}$ = 1.59, age range = 12-17 years). Most adolescents (96.5%) were born in the Netherlands and living with both their parents (79.7%). Moreover, 14.8% followed vocational education, 33.2% higher general secondary education, and 52% a preuniversity secondary education. Their parents were primarily born in the Netherlands (95.7%) and being married/living together (75.8%). Some parents were divorced/separated (19.1%) or 5.1% reported other situations (e.g., a parent died, not married but also not living together). Mothers (80.5%) were typically the primary caregivers (i.e., with whom the adolescents spent most of their time). The educational level of the parent(s) was as follows: 14.8% low, 37.9% intermediate, 27.7% high, and 19.5% of the adolescents did not know the educational level of their parent(s). Values of the scales of the study variables were missing completely at random (Little's MCAR test $\chi^2(2190) = 2770.44$, $p = .094$, $\chi^2/df = 1.27$).

## Procedure

Adolescents (12-17 years) and their parents were recruited at a high school (September-November 2019). Adolescents and parents provided active informed consent. The first batch of participants started in November 2019 ($N = 195$) and the second batch started in February 2020 ($N = 64$). Mean-levels of parental support did not differ before versus during the COVID-19 lockdown in spring 2020 (Bülow et al., 2021). Data were collected through bi-weekly questionnaires that were sent through e-mail every other week for a full year. The study also included a first 'baseline' questionnaire and five longer questionnaires that were implemented every three months. For more details about the procedure see Bülow et al. (2021). The study was approved by the ethical committee of the Faculty of Social and Behavioral Sciences of Tilburg University (Nr. EC-2019.65t).

## Measures

### *Parental Support*

Four items from the Support subscale from the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985) assessed parental support (e.g., "In the last 2 weeks, how much did your mother/father really care about you?"). The items were responded from 1 (*not at all*) to 5 (*very often*). Adolescents could answer the scale for up to two parents, and mainly selected their biological mother and father (93%). A small number of adolescents

filled it in about one parent (2%). These two mean scores ($\alpha_1$ range =.78-.93; $\alpha_2$ range =.86-.95) correlated strongly ($r$ = .74, $p$ < .001) and were combined to assess parental support.

#### *Depressive Symptoms*

Depressive symptoms were assessed with the Reynolds Adolescent Depression Scale 2 Short Form (RADS-2:SF; W. M. Reynolds, 2008), which consists of 10 items (e.g., "I felt sad in the last 2 weeks"). The response scale was from 1 (*almost never*) to 4 (*most of the time*). A sum score was created, and internal consistency of the scale was good (α range = .80-.95).

#### *Neuroticism*

Neuroticism was measured at the first questionnaire, for which the Big Five Inventory-2 XS version was used (Denissen et al., 2020). The Neuroticism scale consists of three items (e.g., "I see myself as someone who worries a lot"). The items were rated on a 5-point scale from 1 (*totally disagree*) to 5 (*totally agree*). Internal consistency was acceptable (α = .75).

## METHOD DATASET 3 (THREE-MONTHLY)

### Participants

Adolescents ($N$ = 269) participated in the study "Grumpy or Depressed" (L. H. C. Janssen, Elzinga et al., 2021; Keijsers et al., 2015), which is the same sample that is analyzed to assess the daily transactional processes (see Dataset 1). The analytical sample included 245 adolescents (38.4% male, $M_{age}$ = 13.9 years, $SD_{age}$ = 0.93, age range = 12-16 years). Most participants were born in the Netherlands (98%) and lived with their mother (97.6%) and/or father (90.6%). The adolescents followed either higher general secondary education (44.5%) or preuniversity secondary education (55.5%). Parents' educational level was more diverse: 12.0% low, 43.6% middle, and 44.4% high. Values of the scales of the study variables were missing completely at random (Little's MCAR test $\chi^2(37)$ = 43.36, $p$ = .218, $\chi^2/df$ = 1.17).

### Procedure

See procedure of dataset 1 (daily) and more detailed in Janssen et al. (2021).

### Measures

#### *Parental Support*

Parental support was assessed with five items from the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985) (e.g., "How much did your mother/father really care about you?"). The response scale ranged from 1 (*little to none*) to 5 (*the most*). The separate mean scores for maternal and paternal support correlated strongly ($r$ = .75, $p$ < .001) and were combined into one score of parental support. Cronbach's alpha of parental support was .92, .93, and .92 for T1, T2, and T3, respectively.

#### *Depressive Symptoms*

The Children's Depression Inventory II (CDI-II; Timbremont, Braet, & Roelofs, 2008) was used to measure depressive symptoms. The CDI-II consists of 28 items (e.g., "I am sometimes sad/I am often sad/I am always sad"), in which each item has three response options. A sum score of all items was created and Cronbach's alpha was .87, .86, and .88 for T1, T2, and T3, respectively.

#### *Neuroticism*

Neuroticism was measured once at T0 with two items (i.e., see Dataset 1) from the TIPI (Gosling et al., 2003), which correlated moderately ($r$ = .37, $p$ < .001). The response scale ranged from 1 (*not at all true/very true*) to 7 (*very true/not at all true*).

## METHOD DATASET 4 (ANNUAL)

### Participants

Data were used from the ongoing study "Panel Analysis of Intimate Relationships and Family Dynamics" (Huinink et al., 2011). In the pairfam study, children are included when they are at least 8 years old but treated as adult participants when 16 years and older. As the current study is about adolescents, our minimum age requirement was 10. Our maximum age requirement derived from the fact that the adolescent survey stopped at the age of 16 years. Because our longitudinal time span was 3 years, we could only include adolescents in the current study if they were between 10 and 13 years old at the age of inclusion in our sample (either T1, T4, or T7). Included adolescents were subsequently followed for three consecutive measurement waves (i.e., T1-T3, T4-T6, and T7-T9). Thus, within the sample, we made three batches of participants who started at different time points but were all measured for three consecutive measurement waves within the age range of 10-15 years.

This led to a total sample of 1,664 adolescents (50.8% male, $M_{age}$ at first measure = 11.11 years, $SD_{age}$ = 0.97, age range T1= 10 - 13). Of the 1,664 adolescents, 21.2% were still in elementary school. Adolescents in secondary school followed vocational education (10.7%), higher general secondary education (23.7%), preuniversity secondary education (31.4%), or mixed (10.9%). Most of them participated with their biological mother (69.0%) or father (26.9%). The parents were on average 38.9 years old (*SD* = 3.90, ranged from 26 to 45 years), and the majority were born in Germany (87.3%) and a minority in, among others, Turkey (2.4%), Russia (2.0%), and Poland (1.6%). Most parents were married (78.3%), and some were never married (11.2%), divorced (9.8%), or widowed (0.5%). On average, parents followed 13 years of education (*SD* = 2.92, ranged from 8 to 20 years). Their educational level was mixed: 12.7% low (i.e., no vocational degree), 63.6% moderate (vocational training), and 23.6% high (i.e., (applied) university). Values of the scales of the study variables were missing at Random (Little's MCAR test $\chi^2(98) = 114.38$, $p = .124$, $\chi^2/df = 1.17$).

## Procedure

In 2008, a nationally representative sample (referred to as anchors) was recruited in Germany that consisted of three cohorts aged 15 to 17, 25 to 27, and 35 to 37. The children of the participants, aged between 7 and 16 years, were included from the second measurement wave onward (here referred to as T1). If the household consisted of multiple children, the youngest child participated. Children become an anchor themselves as soon as they turned 16 during the study. The questionnaires were sent and interviews were held every year. Ethical approval was provided the ethics committee of the Faculty of Management, Economics and Social Sciences of the University of Cologne. More information about this ongoing longitudinal study can be found Huinink et al. (2011) and on the website www.pairfam.de/en.

## Measures

### *Parental Support*

The Emotional Warmth subscale assessed parental support (Jaursch, 2003) of the participating parent. The subscale consisted of three items (e.g., "shows that he or she likes you) and was rated on a 5-point scale, ranging from 1 (*never*) to 5 (*very often*). With the exception at T3 ($\alpha = .65$), internal consistency was sufficient across the measurement occasions and ranged from .71 to .79.

### *Depressive Symptoms*

The subscale Emotional Problems of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) assessed depressive symptoms. This subscale consisted of five items (e.g., “I am often unhappy, depressed, or tearful”) and the response scale ranged from 0 (*not true*) to 2 (*certainly true*). The internal consistency of the scale was moderate to acceptable and ranged from .63 to .71, and a sum score was created.

### *Neuroticism*

Neuroticism was measured at T9, thus this data was only available for Batch 3. It was measured with five items (e.g., “I easily become nervous and insecure”) of a shortened version of the Big Five Inventory (BFI-K; Rammstedt & John, 2005). The response scale ranged from 1 (*absolutely incorrect*) to 5 (*absolutely correct*) and internal consistency was acceptable ($\alpha$ = .72).

## METHOD DATASET 5 (BIENNIAL)

### Participants

Data were used from the fifth (T1, 2007), sixth (T2, 2009), and seventh wave (T3, 2012) of the Flemish Study on Parenting, Personality, and Development (Prinzie et al., 2003). Only in these three waves, the variables of interest were measured. Hence, the time interval between measurement occasions were 2 and 3 years, respectively. The sample consisted of 503 Belgian adolescents at T1 (48.1% male, $M_{age}$ = 13.82 years, $SD_{age}$ = 1.14, age range = 10-16 years). A small group of the adolescents were in elementary education at T1 (15.5%). Adolescents in secondary school followed the following tracks: vocational education (3.6%), higher general secondary education (15.9%), preuniversity secondary education (57.9%), or unknown for 7.2%. All adolescents and parents were native Belgians. Most of their parents were married (81.5%). A minority was divorced (10.3%) or passed away (1.0%), and for 7.2% this information was missing. Parental educational level for fathers (F) and mothers (M) was diverse: elementary school (F: 2.2%, M: 0.4%), secondary school (F: 31.6%, M: 26.5%), higher education nonuniversity (F: 25.1%, M: 36.4%), university (F: 15.1%, M: 10.5%), and unknown (F: 26.0%, M: 26.2%). Values of the scales of the study variables were missing completely at random (Little’s MCAR test $\chi^2(48) = 62.02$, $p = .084$, $\chi^2/df = 1.29$).

## Procedure

The study employed a cohort-sequential design with four cohorts, who were aged 12, 13, 14, and 15 years at the fifth measurement wave in 2007 (in this study referred to as T1). The sample was collected in Flanders (a region of Belgium) in 1999, through a proportional stratified sample of randomly selected elementary-school children. Strata were based on geographical location, age, and sex. Their parents were invited to join the study and provided their informed consent. The families received questionnaires every 2-3 years. Ethical approval was provided by the institutional board of Leuven University.

## Measures

### *Parental Support*

The warmth subscale of the Parenting Practices Questionnaire (PPQ; Olsen et al., 1995) was used to assess adolescent-reported parental support. The subscale consisted of 11 items at T1/T2 and 10 items at T3 (e.g., "Gives comfort when I am upset") and was rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*). The scores for maternal ($\alpha$ = .88, .89, and .91) and paternal support ($\alpha$ = .91, .90, and .92) correlated moderately ($r$ = .51, $p$ < .001) and were combined into one mean score to assess parental support.

### *Depressive Symptoms*

Self-reported depressive symptoms were measured with the anxious/depressed behavior subscale of the Youth Self-Report (YSR; Achenbach, 2007; Verhulst et al., 1996). This subscale consists of 13 items (e.g., "I feel worthless or inferior") were rated from 0 (*not true*), 1 (*sometimes or somewhat true*), to 2 (*often/or very true*). Cronbach's alpha of the scale was high, ranging from .83 to 84, and a sum score was created.

### *Neuroticism*

Adolescents filled out the Neuroticism subscale of the Hierarchical Personality Inventory for Children (HPIC; Mervielde & De Fruyt, 1999) at T1. This scale consists of the subscales anxiety (e.g., "I quickly panic") and self-esteem (e.g., "I feel less than others" (R)), with eight items each. The self-esteem items, of which a higher score indicated a higher level of self-esteem, were recoded such that the overall mean score indicated neuroticism (i.e., emotional instability). Internal consistency was good ($\alpha$ = .87).

## PREREGISTERED STATISTICAL ANALYSES

We conducted the same preregistered Random-Intercepts Cross-Lagged Panel Models (RI-CLPMs; see Hamaker et al., 2015; for graphical representation, see Figure 1) with M*plus* 8.3 (Muthén & Muthén, 2020) for all five datasets. In contrast to a standard CLPM, a RI-CLPM disentangles the within-family variance (i.e., over-time fluctuations within the same family) from the stable between-family variance (i.e., relative mean differences between families) by modeling the between-family variance as latent factors (Hamaker et al., 2015; Keijsers, 2016). Consequently, the remaining residual variances represent the fluctuations of the families around their own stable mean levels, which are used to estimate the carry-over stability paths, within-family correlations at T1 and correlated errors at T>1, and within-family cross-lagged paths. For the preregistration, see https://osf.io/bfyst/.

Prior to the data-analyses, we ran the preregistered checks on our data-structures. We established that within-family variance of parental support and adolescent depressive symptoms was in all cases at least 10%, specifically within the range from 20% to 56% (see Tables A1-A5 in appendix), justifying the use of RI-CLPM. The pattern of the missing data was considered Missing at Random (i.e., $\chi^2/df$ of Little's MCAR test higher than 3). Therefore, full information maximum likelihood (FIML) was used to handle missing data. Moreover, we used maximum likelihood with robust standard errors (MLR estimator) (Kline, 2016) with the daily dataset, because skewness of parental support and adolescent depressive symptoms was higher than 3. In all other cases, Maximum Likelihood estimation (ML estimator) was used.

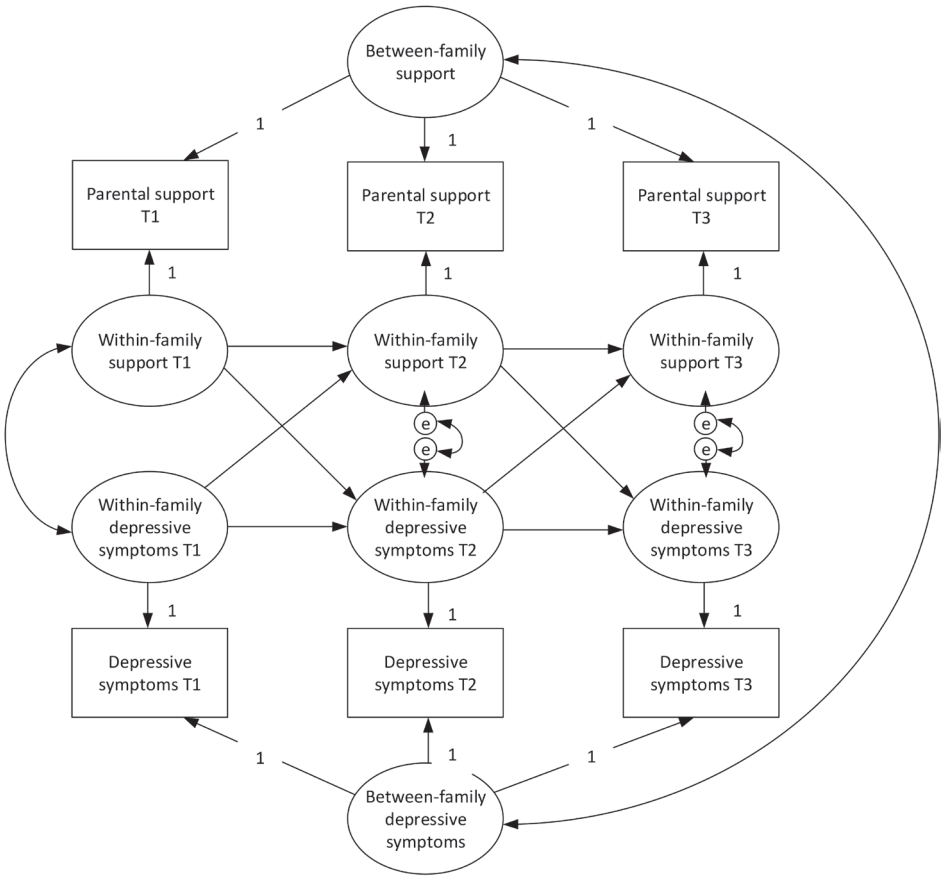
To test H1-3, we applied the preregistered time-constrained models, in which the stability paths, correlated errors at $T_{>1}$, and cross-lagged paths were constrained to be equal across measurement occasions. Because the comparative fit index and the Tucker Lewis index values were all higher than 0.90, and the root-mean-squared error of approximation lower than 0.08 (Schumacker & Lomax, 2016), the model fit of all single-group time-constraint models was acceptable (see Table 2).

Subsequently, we conducted multi-group analyses to test whether girls compared to boys (H4) and adolescents scoring high on neuroticism compared to adolescents scoring low (H5; based on the median-split approach), would differ in lagged effects and thus show different transactional processes between parental support and adolescent depressive symptoms. Specifically, we estimated two types of constrained models, one in which we

constrained the lagged effect from parental support to adolescent depressive symptoms to be equal for both groups (i.e., boys vs. girls, or low- vs. high-neuroticism adolescents) and one in which we constrained the reverse lagged effect. With a chi-square difference test, we tested whether the unconstrained model (i.e., with freely estimated parameters for both groups) fitted better than the constrained model in which a lagged effect was set equal for both groups. If the chi-square difference test was significant, we assumed differences between groups in the specific lagged effect. With all model tests, the Satorra-Bentler scaled chi-square difference tests was used with MLR (i.e., with daily dataset), and a regular chi-square difference test was used with ML.

**Figure 1**

*Graphical Representation of a Random-Intercept Cross-Lagged Panel Model with Three Measurement Waves*



# RESULTS

## Descriptive Statistics

The descriptive statistics for each dataset can be found in Appendix A. Regarding the correlations at the between-family level, perceived parental support correlated negatively with adolescent depressive symptoms in four of the five datasets (*r*s between -.12 and -.50, *p*s < .001; n.s. in the biennial dataset). This indicates that adolescents who perceived lower levels of parental support also experienced more depressive symptoms on average compared to adolescents who experienced higher levels of parental support. Moreover, in all datasets, adolescent neuroticism correlated positively with depressive symptoms (*r*s between .17 and .69, *p*s ≤ .008). Thus, adolescents scoring higher on neuroticism also reported more depressive symptoms than adolescents scoring lower on neuroticism. Adolescent neuroticism correlated negatively with parental support only in the bi-weekly and annual datasets (*r*s -.10 and -.26, *p*s ≤ .022), suggesting that adolescents scoring higher on neuroticism scored on average lower on parental support than adolescents scoring lower on neuroticism. Furthermore, concerning sex differences, girls scored on average significantly higher on perceived parental support, depressive symptoms, and neuroticism in most datasets (see Tables A1-A5 in Appendix A).

Both perceived parental support and adolescent depressive symptoms varied over time within families. The intraclass correlations (ICCs) of parental support ranged from .44 to .80 and for adolescent depressive symptoms from .46 to .79 (see Tables A1-A5 in Appendix A). This indicates for parental support, for example, that 44% to 80% of the variance was due to stable differences between adolescents and 20% to 56% of the variance was due to overtime fluctuations within adolescents.

## Concurrent and Cross-Lagged Within-Family Effects

The model fit of all single-group RI-CLPMs was acceptable (see Table 2) and parameter estimates of each model can be found in Table 3.

Our hypothesis (H1) was that there would be negative within-family correlations between perceived parental support and adolescent depressive symptoms. Such correlated fluctuations were found at a bi-weekly to biennial timescale (*r*s = -.09 to -.76, *p*s ≤ .007). Thus, supporting our first hypothesis, when adolescents perceived declines in parental support, they simultaneously reported increases in depressive symptoms. The only timescale that did not have a significant within-family correlation was the daily timescale.

**Table 2**
*Model Fit Indices of the Single-Group Time-Constrained RI-CLPMs*

| | Model fit indices | | | | |
|---|---|---|---|---|---|
| **Dataset** | **χ2** | ***df*** | **CFI** | **TLI** | **RMSEA** |
| Daily | 140.95 | 82 | .94 | .93 | .05 |
| Bi-weekly | 1044.40 | 426 | .93 | .92 | .08[a] |
| Three-monthly | 6.13 | 6 | 1.00 | 1.00 | .01 |
| Annual | 20.10 | 6 | .99 | .98 | .04 |
| Biennial | 21.72 | 6 | .98 | .94 | .07 |

*Note*. df = degrees of freedom. CFI = comparative fit index. TLI = the Tucker Lewis index. RMSEA = root-mean-squared error of approximation.
[a] Exact RMSEA is .075.

Concerning the cross-lagged effects, our second hypothesis was that declines in perceived parental support would be followed by subsequent increases in negative affect or depressive symptoms in adolescents. However, we found no support for this hypothesis (H2 - see Table 3). That is, fluctuations in perceived parental support did not predict subsequent fluctuations in adolescent depressive symptoms within families at any of the five timescales.

Regarding the reverse lagged effect, we hypothesized a positive effect of adolescent depressive symptoms on perceived parental support at a daily timescale (H3a). This hypothesis was also not supported, as fluctuations in adolescent depressive symptoms did not predict fluctuations in perceived parental support within families 1 day later. Moreover, the hypothesized negative cross-lagged effect of depressive symptoms on perceived parental support (H3b) was not significant at the expected annual and biennial timescales. Instead, we found a negative lagged effect of depressive symptoms on perceived parental support at bi-weekly (βs = -.07 to -.05, $p$ = .007) and three-monthly timescales (βs = -.29 to -.27, $p$ = .010). An increase in adolescent depressive symptoms was thus followed by a decrease in perceived parental support within families 2 weeks and 3 months later. Hence, the latter findings provide support for the relationship erosion hypothesis (H3b), albeit at a shorter timescale than expected. All these within-family effects were found while controlling for stable negative between-family correlations between perceived parental support and depressive symptoms ($r$s = -.52 to -.17, $p$s ≤ .003; n.s. for biennial data).

## Differences between Boys and Girls

We hypothesized sex differences in the within-family lagged effect from perceived parental support to adolescent depressive symptoms, such that we expected that girls would have a stronger negative within-family effect than boys (H4). All models converged,

**Table 3**

*Overview of Parameters of the Single-Group Time-Constrained RI-CLPMs*

| | Time interval of dataset | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Daily[a] | | Bi-weekly[b] | | Three-monthly[c] | | Annual[d] | | Biennial[e] | |
| **Parameter** | **b (se)** | ***r*/β** | **b (se)** | ***r*/β** | **b (se)** | ***r*/β** | **b (se)** | ***r*/β** | **b (se)** | ***r*/β** |
| Between-family correlation | -0.20 (0.07)** | -.37 | -1.38 (0.20)*** | -.52 | -1.32 (0.25)*** | -.48 | -0.09 (0.03)** | -.17 | 0.13 (0.18) | .13 |
| $T_1$ within-family correlation | -0.07 (0.08) | -.14 | -0.28 (0.10)** | -.22 | -.16 (0.15) | -.26 | 0.00 (0.03) | .01 | -0.47 (0.17)** | -.25 |
| $T_{>1}$ within-family correlations | -0.04 (0.02) | -.07 to -.12 | -0.12 (0.01)*** | -.13 to -.25 | -0.62 (0.09)*** | -.49 to -.76 | -0.05 (0.02)* | -.07 | -0.20 (0.11) | -.11 to -.12 |
| Parental support → depressive symptoms | 0.02 (0.02) | .04 to .06 | 0.32 (0.24) | .02 to .03 | -2.10 (1.09) | -.22 | -0.06 (0.12) | -.02 | -0.29 (0.49) | -.04 |
| Depressive symptoms → parental support | 0.13 (0.11) | .04 to .06 | -0.01 (0.00)** | -.05 to -.07 | -0.04 (0.02)* | -.27 to -.30 | 0.00 (0.01) | -.01 | -0.01 (0.01) | -.08 |
| Autoregressive path parental support | 0.11 (0.07) | .10 to .13 | 0.26 (0.02)*** | .20 to .31 | 0.10 (.18) | .08 to .09 | 0.35 (0.05)*** | .29 to .35 | 0.27 (0.13)* | .25 to .28 |
| Autoregressive path depressive symptoms | 0.45 (0.09)*** | .35 to .52 | 0.45 (0.02)*** | .39 to .52 | 0.03 (.21) | .03 | 0.22 (0.05)*** | .22 to .23 | 0.36 (0.09)*** | .34 |

*Note.* [a] $N$ = 244 (38% male, $M_{age}$ = 13.8), $t$ = 7.
[b] $N$ = 256 (29% male, $M_{age}$ = 14.4), $t$ = 15.
[c] $N$ = 245 (38% male, $M_{age}$ = 13.9), $t$ = 3.
[d] $N$ = 1,664 (51% male, $M_{age}$ = 11.1), $t$ = 3.
[e] $N$ = 503 (48% male, $M_{age}$ = 13.8), $t$ = 3.
* $p$ < .05. ** $p$ < .01. *** $p$ < .001.

except for the daily data, and, therefore, H4 could not be tested in this dataset. No differences were found between boys and girls, as indicated by nonsignificant chi-square difference tests (see Table 4). Additionally, we explored sex differences for the reverse within-family lagged effect, but again, no differences were found between boys and girls in the lagged effect from adolescent depressive symptoms to perceived parental support at any timescale. An overview of all model fits can be viewed in Table B1 in Appendix B.



## Differences between Low- and High-Neuroticism Adolescents

We expected that adolescents scoring higher on neuroticism would show a stronger negative within-family effect from perceived parental support to depressive symptoms than adolescents scoring lower on neuroticism (H5). However, we only found group differences in this within-family lagged effect with the annual dataset (see Table 4).

**Table 4**

*Results of Chi-Square Difference Tests on Within-Family Lagged Effects*

| | Within-family lagged effect | | | |
|---|---|---|---|---|
| | PS → DS | | DS → PS | |
| **Dataset** | **Δχ2 (1)** | ***p*-value** | **Δχ2 (1)** | ***p*-value** |
| Daily | | | | |
| Sex | [a] | [a] | [a] | [a] |
| Neuroticism | -0.58 | 0.366[b] | 0.53 | .669[c] |
| Bi-weekly | | | | |
| Sex | 1.34 | .247 | 0.15 | .695 |
| Neuroticism | 0.00 | .975 | 0.06 | .810 |
| Three-monthly | | | | |
| Sex | 1.70 | .192 | 3.68 | .055 |
| Neuroticism | 0.98 | .322 | 3.83 | .050 |
| Annual | | | | |
| Sex | 0.43 | .511 | 2.64 | .104 |
| Neuroticism | 4.80 | .029 | 1.07 | .301 |
| Biennial | | | | |
| Sex | 1.50 | .221 | 0.84 | .360 |
| Neuroticism | 0.07 | .796 | 2.63 | .105 |

*Note*. PS → DS = lagged effect from parental support to adolescent depressive symptoms. DS ◊ PS = lagged effect from adolescent depressive symptoms to parental support.

[a] Chi-square could not be computed due to low covariance coverage.

[b] Santora-Bentler Chi-Square test with scaling factors of 1.14 (constrained model) and 1.13 (free model).

[c] Santora-Bentler Chi-Square test with scaling factors of 1.13 (constrained model) and 1.13 (free model).

Specifically, in contrast to our expectation, a small positive effect was found of perceived parental support on depressive symptoms for adolescents scoring low on neuroticism (βs = .15 and .19, $p$ = .032), but not for adolescents scoring high on neuroticism (βs = -.06 and -.08, $p$ = .312). Thus, the adolescents scoring lower on neuroticism showed an increase in depressive symptoms after they experienced an increase in parental support 1 year earlier. Moreover, we explored group differences in the reverse within-family lagged effect from adolescent depressive symptoms to perceived parental support, but no differences were found.

## Exploratory Analyses

In addition to our preregistered analyses, we ran some exploratory replication analyses. We explored whether we could replicate (1) the three-monthly within-family processes with the bi-weekly data and (2) the biennial within-family processes with the annual data, in which we used the same statistical procedure of the pre-registered RI-CLPMs. The parameters of the two models are summarized in Tables C1 and C2 in Appendix C. Indeed, when a different time interval was chosen within an identical dataset, the lagged effects were different than in the preregistered main models. When analyzing three-monthly intervals with the bi-weekly dataset, we did not find significant within-family lagged effects. When analyzing biennial intervals with the annual dataset, we did find one additional lagged effect, in which increased perceived parental support predicted fewer depressive symptoms in adolescents 2 years later (βs = -.11 and -.13, $p$ = .025). This highlights the key premise of our study: The choice of time intervals in analyses matters and yields different effects even within one and the same dataset (Kuiper & Ryan, 2018; Voelkle et al., 2018).

Moreover, we explored whether adolescents' average level of negative affect moderated their daily within-family lagged effect from negative affect to perceived parental support, as a more negative mood is also related to a more negative appraisal of others (Rudolph, 2009). Therefore, as a reaction to their daily increase in negative affect, adolescents with on average lower levels of negative affect might perceive a subsequent supportive parental response, whereas adolescents with on average higher levels of negative affect might be more negatively biased toward their parents and perceive a subsequent decrease in parental support (relationship erosion effect). To test this moderation, we conducted a multi-group model with a median split on negative affect, in which we compared a freely estimated model (for all parameters, see Table D1 in Appendix D) to a model in which the

daily within-family lagged effect from negative affect to parental support was constrained to be equal for both negative affect groups. The analyses suggested that the two groups showed a different daily within-family lagged effect, $\Delta\chi 2$ (1) = 0.49, $p$ = .038, such that we only found a significant lagged effect for adolescents with lower levels of negative affect. Specifically, a daily increase in negative affect predicted an increase in perceived parental support a day later only for adolescents with lower levels of negative affect (βs = .06 and .15, $p$ = .015) and not for adolescents with higher levels of negative affect (βs = .03 to .05, $p$ = .486).



## DISCUSSION

Interpersonal theories of depression (Coyne, 1976; Hammen, 2006; Rudolph, 2009) describe transactional processes (i.e., bidirectional effects) between parental support and adolescents' depressive symptoms, spanning different timescales. That is, within the same family, diminished perceived parental support may contribute to increased depressive symptoms in adolescents (Cummings & Davies, 1995; Rohner, 2016), and increased adolescent depressive symptoms might either evoke an adaptive supportive parental reaction on the short term (Gottman et al., 1996; Van Bommel et al., 2019) or disturb the parent-child relationship on the long term, with poorer parental support as a consequence (Coyne, 1976; Hammen, 2006; Rudolph, 2009). These dynamic processes occur at the level of the individual family (Hamaker, 2012; Keijsers, 2016): between parents and their own adolescent. To study these bidirectional effects within the average individual family, we estimated Random-Intercept Cross-Lagged Models (RI-CLPMs), which differentiates stable between-family variance from overtime within-family variance (Hamaker et al., 2015; Keijsers, 2016). Applying a uniform preregistered analytical approach, we estimated RI-CLPMs with five datasets that each had a different measurement interval: daily, bi-weekly, three-monthly, annual, and biennial.

### Evidence of Concurrent and Adolescent-Driven Effects

The vast literature of between-family studies consistently showed that parental support and adolescent depressive symptoms are linked, such that adolescents with less supportive parents show on average more depressive symptoms than adolescents who feel more supported by their parents (Pinquart, 2017b; Yap et al., 2014). As one of the very few within-family studies on this topic (Boele et al., 2020), this adolescent-reported study confirms this concurrent association at the within-family level (in four out of the five

datasets), even though the datasets had somewhat different sample characteristics and instruments. Overall, this pattern of findings suggests that adolescents experience more depressive symptoms at times they perceive their own parents as less supportive than they typically are. This concurrent effect may reflect a negative bias on interpersonal relationships that goes hand in hand with increased depressive symptoms (Rudolph, 2009). Of course, it should be noted that this concurrent association, in which more depressive feelings co-exist with the perception of receiving less parental support, may only be true for a subset of adolescents (L. H. C. Janssen, Elzinga et al., 2021).

Yet, an important question in our study pertained the direction of effects. In other words, does diminished perceived support by parents trigger depressive symptoms in adolescents, or vice versa, does elevated adolescent depressive symptoms evoke more perceived parental support in the short term, but erode the perception of the parent-adolescent relationship later on? Based on the emotional insecurity perspective (Cummings & Davies, 1995) and the IPARTheory (Rohner, 2016), we hypothesized that adolescents would report a within-family increase in depressive symptoms when they experienced their parents to be less supportive than before. However, in most datasets we did not find such lagged effect from parental support to adolescent depressive symptoms within families. Only when we ran additional analyses to explore biennial within-family lagged effects with the annual dataset (but not with the preregistered biennial dataset which had a smaller sample), we found that increases in perceived parental support predicted fewer depressive symptoms in adolescents within families 2 years later. Together, our findings seem to suggest that increases in perceived parental support may not directly contribute to subsequent changes in adolescents' depressive symptoms in the short term, but possibly only at a much longer timescale. Nonetheless, a recent ESM study found that increased perceived parental support predicted a decrease in negative affect 3 hours later (Bülow, Van Roekel, et al., 2022). Intriguingly, this ESM study also demonstrated that this lagged effect of perceived parental support on negative affect differed from adolescent to adolescent, not only in size but also in direction. Hence, as an average (null) effect can be misleading when the effect is in fact heterogenous (Bolger et al., 2019; Keijsers & Van Roekel, 2018), future studies that also assess potential effect heterogeneity at other timescales can provide more detailed insights of the role of parental support in adolescents' depressive symptoms.

As interpersonal theories of depression highlight the transactional nature between depressive symptoms and interpersonal functioning (Coyne, 1976; Hammen, 2006; Rudolph, 2009), we also assessed the lagged effect from adolescent depressive

symptoms to perceived parental support within families. In terms of the short-term lagged effect, no evidence was found that changes in adolescent negative affect were followed by subsequent changes in perceived parental support. Hence, on average, adolescents did not perceive that their parent responded to their increased negative feelings at a daily timescale. Nonetheless, as adolescents' perceptions could be biased by their more negative feelings (Rudolph, 2009), it is possible that parents did respond to the emotional needs of their adolescent but that the adolescent perceived their parent as nonresponding. In line with this argumentation, exploratory findings indeed suggested that only adolescents with lower levels of negative affect (and not adolescents with higher levels of negative affect) perceived an increase in parental support after they reported an increase in their negative affect the day before. Additionally, these findings might also suggest that parents are less likely to react supportively to adolescents who show on average higher levels of negative affect because of already ongoing relationship erosion processes (Coyne, 1976; Rudolph, 2009).

With regard to longer-term timescales, the relationship erosion hypothesis received support, although not on the expected macro-timescales of 1 or 2 years. That is, within families, elevated adolescent depressive symptoms predicted declines in perceived parental support 2 weeks and 3 months later. Although interpersonal theories of depression focus on clinical depressive episodes or disorders (Coyne, 1976; Rudolph, 2009), this study suggests that increased depressive symptoms also negatively affect the parent-child relationship in community samples, at least from the perspective of the adolescent.

Together, the key-findings of the current study show that adolescents' depressive symptoms predicted how they perceived their parent's support and not the other way around. Adolescent-driven processes, instead of transactional processes (i.e., bidirectional effects), have also been found in prior within-family parenting studies (Nelemans et al., 2020; Van Lissa et al., 2019). Together, these within-family studies seem to add arguments to the still ongoing and unsettled debate in parenting literature regarding the often overestimated influence that parents have upon adolescent children and the underestimated role of adolescent-driven effects (Harris, 1995; Kerr et al., 2012).

### Towards a Continuous Time Perspective

Integrating datasets with five timescales in one study, our findings raise questions how to view transactions between parents and children from a continuous time perspective, and how to design research which is sensitive to capturing the processes at stake (Voelkle

et al., 2018). Our results and other recent micro timescale studies (Bülow, Van Roekel, et al., 2022), suggest that momentary and daily experiences of increased negative affect could be too small to observe a meaningful impact upon adolescents' perception of parental support, or vice versa. At longer timescales, repeated momentary experiences may accumulate into observable effects. More concretely, our results suggest that lags between 2 weeks and 3 months might be most appropriate to observe this dynamic process between parenting and adolescent depressive symptoms, whereas a lag of 12 months could become too long. Future studies with multiple timescale designs, especially when all timescales are integrated in one design, are urgently needed to obtain more fine-grained insight into such continuous time dynamics between parental support and depressive symptoms in adolescents.

Apart from the possibility of nonlinear continuous time dynamics, another potential explanation for changing effects with varying time intervals lies in inherent changes in how the key concepts can be operationalized. For instance, whereas real-time studies or daily diaries are less strongly affected by recall bias, and therefore more appropriate to tap into concrete behaviors and discrete interactions between parents and adolescents (Keijsers et al., 2022; Repetti et al., 2015), adolescents' perception of parental support over the last year may be an indicator of overall relationship quality instead (Hinde, 1997). Additionally, whereas real-time studies or daily diaries are able to assess fluctuations in negative affect, longer-term studies are able to assess fluctuations in depressive symptoms more broadly, and thus are able to include more than negative affect, such as feelings of worthlessness and loss of pleasure. However, changing concepts most likely do not provide a full explanation: Even when we exploratorily compared lagged effects with different time intervals within the same dataset using identical operationalizations, the results demonstrated different patterns of effects depending on the choice of analytical time interval.

### Heterogeneity in Within-Family Processes

Increasingly, heterogeneity in parenting processes has been acknowledged (Belsky et al., 2022; L. H. C. Janssen, Elzinga et al., 2021; Keijsers et al., 2016). To address the "one size fits all fallacy" (Bolger et al., 2019; Keijsers & Van Roekel, 2018) in terms of the studied within-family effects, we examined the moderation of adolescent sex and neuroticism. We expected that girls and adolescents scoring high on neuroticism would show stronger increases in depressive symptoms after they perceived a temporary drop in parental support in comparison to boys and adolescents scoring low on neuroticism, and

explored whether this was also the case for the reverse lagged effect. Overall, very few group differences in the within-family lagged effects were found. We did find one group difference, such that, contrary to our expectation (H5), increases in perceived parental support were followed by increases in depressive symptoms 1 year later in adolescents scoring low on neuroticism but not in adolescents scoring high on neuroticism. This group difference was only found with the annual dataset and, therefore, this result needs to be interpreted with caution and warrants replication. Several prior parenting studies also failed to indicate sex differences in within-family effects (L. H. C. Janssen, Elzinga, et al., 2021; Timmons & Margolin, 2015; Vrolijk et al., 2020), but did find other moderating variables that explained differences between families (Boele et al., 2020; L. H. C. Janssen, Elzinga et al., 2021; Timmons & Margolin, 2015). Future studies need to explore and explain potential heterogeneity in more detail, for example, by calculating family-specific effect sizes to explore the full range of heterogeneity in within-family processes (Keijsers et al., 2016; Valkenburg et al., 2021).

## Strengths, Limitations, and Future Research

Although this study applied the same preregistered analytical approach to five datasets with varying measurement intervals, including several understudied intervals, the findings need to be interpreted in light of some limitations.

First, there was some heterogeneity between samples in terms of sex composition, age, nationality, and the applied instruments. For example, the micro- and meso timescale datasets had a higher girl/boy ratio than the macro timescale datasets, and the adolescents of the annual dataset were on average younger than the adolescents of the other datasets. Moreover, this multi-sample study included two Dutch samples and one German and one Belgian sample. Hence, even though the analytical approach was uniform, and the studies demonstrate a need to assess within-family effects at different timescales, sample differences could have affected the within-family effects above and beyond differences in measurement interval. For instance, adolescent girls might be more vulnerable for interpersonal difficulties than adolescent boys (Rudolph, 2009), which might be an explanation why we found a negative average effect of depressive symptoms to parental support at the meso timescales and not at the macro timescales because the latter samples have a lower girl/boy ratio. Yet, the idea that the *perception* of poorer support of significant others, including parents, predicts poorer well-being is understood as a universal process that applies to all ages, even though cultural, religious, or family values may affect the way parents *express* their

support (Rohner, 2016; Soenens et al., 2015). However, we did not empirically test this theoretical notion, nor did we explore whether age differences might be present in the transactional processes between perceived parental support and adolescents' depressive symptoms. This thus remains an open question for future research.

In addition to sample differences, design differences could have affected the within-family effects above and beyond the measurement interval, which is also illustrated by the replication analyses of the three-monthly and biennial processes that yielded slightly different findings. For example, in the bi-weekly study (Dataset 2), questionnaires were specifically designed to reflect on experiences of the last 2 weeks, which may be less suited to assess other timescales. Future studies that include a wide range of time intervals within one sample, but also studies using different instruments and more diverse samples, are needed to test the robustness of current findings. In addition, research is needed with multiple informants and clinical samples to assess the generalizability of our findings.

Second, comparing datasets which varied in sample size (from 244 to 1,664) and number of measurements (from 3 up to 15) was challenging. It might be possible that potential within-family lagged effects were not detected because of insufficient statistical power in datasets with smaller samples and/or fewer measurements. Multiple-timescale studies which include many measurements (Orth et al., 2021) as well as large samples, and future meta-analytic work, can provide more precise estimates.

Third, especially the shorter timescale samples were largely composed of highly educated two-parent families. Depression can emerge from a complex interplay of risk factors, of which low socioeconomic status is one of them (L. Allen & Astuto, 2009). The extent to which within-family effects differ across more economically diverse samples, is an important topic of future investigation.

Fourth, both parental support and negative affect or depressive symptoms were reported by the adolescent. As studies have shown discrepancies between the perception of parents and adolescents in parental support and adolescent well-being (L. H. C. Janssen, Verkuil, et al., 2021; Nelemans et al., 2016; A. D. L. Reyes & Kazdin, 2005), future research should also include parental reports to assess whether results generalize to the perspective of the parent. Relatedly, the parent(s) for which parental support was reported by the adolescent differed per dataset. For three of the five datasets, we used a combination score of maternal and paternal support reports. In the other two datasets, it was measured in reference to both parents (e.g., "*My parents* were warm and supportive

today" – daily dataset) or in reference to the parent that also participated, which was often a mother (69% - in biennial dataset). As previous within-family studies found different associations for maternal and paternal support with adolescent depressive symptoms (e.g., Shanahan et al., 2008; Vaughan et al., 2010), it is worthwhile to separate between maternal and paternal support in future studies.



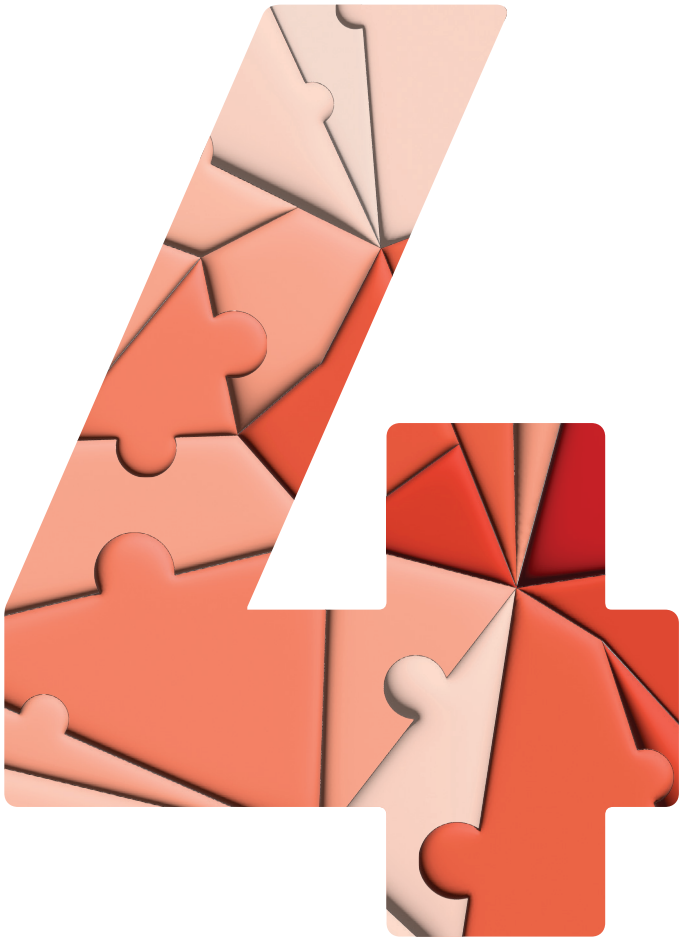
Fifth, other relevant timescales have not been included. The current study underlines the importance of looking beyond the frequently studied daily or annual time interval (Boele et al., 2020), because lagged effects on other timescales could be missed. Which specific timescale is appropriate for which parenting process is much of an open question. However, from a dynamic systems perspective (Granic, 2005; Lougheed, 2020; Smith & Thelen, 2003), development can be observed at different timescales, from seconds or minutes to years. These timescales may also influence each other, such that processes on a micro-timescale (e.g., conflictual parent-child interactions) give rise to processes on a macro-timescale (e.g., development of clinical depressive disorder) and vice versa. Nonetheless, theoretical models about normative family dynamics in adolescence should become more explicit regarding the timescales on which they are expected to take place, to guide empirical research and to prevent that erroneous conclusions might be drawn because relevant timescales are missed in empirical studies.

In light of these limitations, it becomes evident that this study sets one step forward in our understanding of the complex dynamics between how adolescents perceive parenting and their depressive symptoms, by assessing "what goes first". Although the results indicate that it may be adolescents' emotional well-being that drives changes in perceived parenting (and not the other way around), parent-adolescent dynamics might very well be different from family to family (Bolger et al., 2019; Keijsers et al., 2016; Molenaar, 2004). Therefore, future research is urgently needed to assess the potential person-specific effects between parental support and adolescent depressive symptoms to tailor future interventions to the needs of individual families (Bamberger, 2016; Weeland et al., 2021).

## Conclusion

This preregistered study included five datasets with measurement intervals from daily to biennial. The findings demonstrated that perceived parental support and depressive symptoms (or negative affect) of adolescents fluctuated across all timescales, which highlights the need to study how potential transactional processes unfold within families at different timescales. However, in the current study, fluctuations in perceived parental

support did not predict subsequent fluctuations in adolescents' depressive symptoms within families at most timescales. Only when assessed with the annual dataset, and not with the biennial dataset, we found that increased perceived parental support predicted fewer depressive symptoms 2 years later. Furthermore, elevated adolescent depressive symptoms predicted a subsequent within-family decrease in perceived parental support at a bi-weekly and three-monthly timescale. Moreover, almost no sex differences or differences between adolescents scoring low or high on neuroticism were found in the cross-lagged effects. Hence, the findings mainly support adolescent-driven effects at meso timescales, suggesting that within-family lagged effects might not necessarily generalize to different timescales. Therefore, to guide future research about the interpersonal dynamics of adolescent depressive symptoms, this study suggests that theoretical models are urgently needed that explicitly hypothesize about the timescale(s) of family dynamics.



# CHAPTER 4

## For better, for worse, or both? Testing environmental sensitivity models with parenting at the level of individual families

This chapter is published as:

**Boele, S**., Bülow, A., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). Better, for worse, or both? Testing environmental sensitivity models with parenting at the level of individual families. *Development and Psychopathology*. Advance online publication. https://doi.org/10.1017/S0954579422001493

**Supplemental materials** can be viewed in the online version of the article.


**Open science statement:** The preregistered analytical plan, data, syntaxes and output (https://osf.io/8egxf/), and codebook of the data (https://osf.io/e2jzk/) are shared on OSF.

**Author contributions: SB**: conceptualization, methodology, investigation, formal analysis, writing – original draft. **AB**: conceptualization, methodology, investigation, writing – review & editing. **AdH**: conceptualization, methodology, writing – review & editing, supervision. **JJAD**: conceptualization, methodology, writing – review & editing, supervision. **LK**: conceptualization, methodology, writing – review & editing, supervision, funding acquisition.

## ABSTRACT

According to environmental sensitivity models, children vary in responsivity to parenting. However, different models propose different patterns, with responsivity to: primarily (1) adverse parenting (adverse sensitive); or (2) supportive parenting (vantage sensitive); or (3) to both (differentially susceptible). This preregistered study tested whether these three responsivity patterns coexist. We used intensive longitudinal data of Dutch adolescents ($N$ = 256, $M_{age}$ = 14.8, 72% female) who bi-weekly reported on adverse and supportive parenting and their psychological functioning ($t_{mean}$ = 17.7, $t_{max}$ = 26). Dynamic Structural Equation Models (DSEM) indeed revealed differential parenting effects. As hypothesized, we found that all three responsivity patterns coexisted in our sample: 5% were *adverse sensitive*, 3% *vantage sensitive*, and 26% *differentially susceptible*. No adolescent appeared *unsusceptible*, however. Instead, we labeled 28% as *unperceptive,* because they did not perceive any changes in parenting and scored lower on trait environmental sensitivity than others. Furthermore, unexpected patterns emerged, with 37% responding contrary to parenting theories (e.g., decreased psychological functioning after *more* parental support). Sensitivity analyses with concurrent effects and parent-reported parenting were performed. Overall, findings indicate that theorized responsivity-to-parenting patterns might coexist in the population, and that there are other, previously undetected patterns that go beyond environmental sensitivity models.


*Keywords*: environmental sensitivity, parenting, adolescence, effect heterogeneity, intensive longitudinal data

## INTRODUCTION

Raising a happy, confident, and resilient adolescent is not always easy (Putnick et al., 2010; Twenge et al., 2019), as evidenced by the many parenting self-help books on the market (e.g., Steinberg, 2014). Parents experience that general parenting principles described in parenting books may not apply to their own unique adolescent children (e.g., Bülow, Van Roekel, et al., 2022; Mabbe et al., 2019). Environmental sensitivity models explain why children (including adolescents) may be differently affected by the same parenting influences (Greven et al., 2019; Pluess, 2015). That is, some children perceive and process environmental influences more intensely than others, which could make some children more sensitive and responsive to parenting (Belsky et al., 2007; Belsky & Pluess, 2009). However, different models describe different patterns, with responsivity to primarily: (1) adverse parenting ("for worse"; e.g., Monroe & Simons, 1991; Zuckerman, 1999); or (2) supportive parenting ("for better"; Pluess, 2017); or (3) to both ("for better and for worse"; Belsky et al., 2007; Belsky & Pluess, 2009). It has been suggested, but never tested, that these three sensitivity types co-exist (Pluess, 2015), rather than being mutually exclusive. In line with this theorizing, the current study tested whether adolescents responded differently to adverse and supportive parenting. Hence, this study aimed to increase the understanding of heterogeneity in parenting effects, and whether this heterogeneity can be explained by environmental sensitivity models. To achieve this, we took an innovative approach in which individual adolescents, rather than (sub)group averages, are the key unit of observation.

### For Better, for Worse, or for Both?

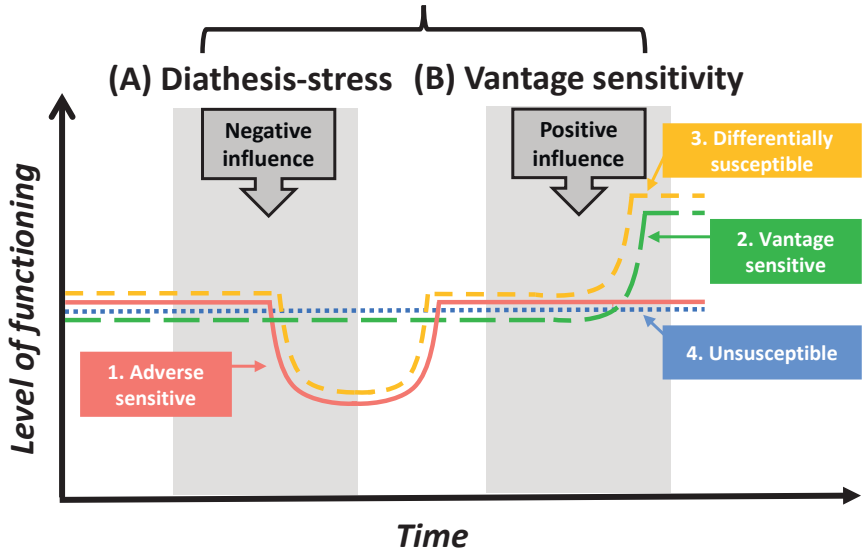
Environmental sensitivity models assume that humans vary in their ability to perceive, processes, and respond to environmental influences (Pluess, 2015; Tillmann et al., 2021). Currently, three different theories propose different ideas about the type of environmental influences more environmentally sensitive individuals respond more strongly to (see Figure 1). The classic (1) *diathesis-stress* (or *dual-risk*) model suggests that some individuals are primarily adverse sensitive and therefore show stronger responsivity to adverse environmental influences ("for worse"; Monroe & Simons, 1991; Zuckerman, 1999). Adverse sensitive children are for instance assumed to suffer more (e.g., internalizing problems) from psychologically controlling parenting (Nelemans et al., 2020; Van Der Kaap-Deeder et al., 2017). In contrast, the (2) *vantage sensitivity* model emphasizes primarily reactions to positive environmental qualities, such as emotionally supportive parenting (e.g., Han & Grogan-Kaylor, 2013; Lippold, Davis, et al., 2016). This model thus specifies that some individuals benefit more strongly from positive,

supportive environments (Pluess, 2017; Pluess & Belsky, 2013). Finally, there are (3) "for better and for worse" models, including the sensory processing sensitivity (Aron & Aron, 1997), biological sensitivity to context (Boyce & Ellis, 2005; Ellis & Boyce, 2008), and differential susceptibility models (Belsky, 1997; Belsky et al., 2007; Belsky & Pluess, 2009). The latter set of theoretical models offer an alternative explanation and propose that sources of environmental sensitivity (e.g., temperamental and genetic variants) not only makes individuals more prone to suffer from adverse environments but also more likely to benefit from supportive environments. Although the three theories converge in their ideas to which type of environmental influences highly sensitive individuals respond more strongly, they all agree that there is another subgroup who is much less or not at all responsive to environmental influences ("for neither").



**Figure 1**

*Illustration of Four Different Responsivity Patterns*




*Note.* The "coexisting responsivity patterns hypothesis" proposes that the three different environmental sensitivity models coexist. The models describe either a subgroup showing responsivity (1) "for worse" (diathesis-stress, left panel), (2) "for better" (vantage sensitivity, right panel), or (3) "for better and for worse" (differential susceptibility, left & right panel). All models describe another subgroup showing (4) no responsivity, thus "for neither". Based on Figure 1 in "Individual Differences in Environmental Sensitivity," by M. Pluess, 2015, Child Development Perspectives, 9, pp. 138–143.

After the formulation of "for better and for worse" models, empirical parenting research tried to establish which of the three theoretical models best describes the empirically

observed responsivity patterns by person × environment interactions (Belsky et al., 2007, 2013; Jolicoeur-Martineau et al., 2019; Roisman et al., 2012). That is, studies competitively evaluated whether the pattern of moderation effects were consistent with either the diathesis-stress, vantage sensitivity, or differential susceptibility models. Nonetheless, systematic reviews highlight inconsistent findings across studies. Evidence for all three theories have been presented, depending on the studied parenting practice, child outcome, sensitivity marker, age group, assessment method, and so forth (for reviews see, Rabinowitz & Drabick, 2017; Rioux et al., 2016; Slagt et al., 2016). Hence, to date, there seems to be inconclusive evidence for either one of the theoretical models, which raises the possibility that all models may co-exist and that differences in empirical findings are due to methodological factors (Pluess & Belsky, 2012, 2013).

Indeed, Pluess (2015) hypothesized the coexistence of different *sensitivity types*. He theorized that individuals can become sensitive to either adverse or supportive influences or to both influences, because of the interaction between genetic disposition and experiences in early development. For example, children who carry genes for environmental sensitivity may become particularly sensitive to adverse influences when growing up in very stressful conditions, whereas others may become particularly sensitive to supportive influences when growing up in very supportive conditions. Children who carry sensitivity genes and grow up in a more neutral environment (which is neither very stressful or supportive), may remain sensitive to both adverse and supportive influences. Being more sensitive in perceiving and processing adverse and/or supportive influences can manifest in a heightened responsivity to those influences (Pluess, 2015).

Accordingly, different responsivity patterns – adverse sensitive, vantage sensitive, and differentially susceptible – may coexist and apply to different subgroups of individuals (Pluess, 2015; Pluess & Belsky, 2012, 2013). When applying to parenting, this "coexisting responsivity patterns hypothesis" implies that: (a) some children may primarily experience negative effects of adverse parenting; (b) others may primarily experience advantageous effects of supportive parenting; and (c) some others may experience both. And finally, (d) some experience neither such positive nor negative effects, as consistent with all three models (see Figure 1). To test this hypothesis, an approach is needed that allows to examine which responsivity pattern applies to each individual (Pluess & Belsky, 2013). In the current study, we investigated this hypothesis in adolescence, by using intensive longitudinal data of families who bi-weekly reported on both adverse (i.e., psychological control) and supportive (i.e., warmth/support) parenting, and varying indicators of

adolescents' psychological functioning as outcomes (i.e., self-esteem, depressive symptoms, and anxiety symptoms).

## Effect Heterogeneity in Within-Family Parenting Effects

Parenting takes place within a family (i.e., within-family level), such that parents impact their *own* children (Belsky & Pluess, 2009; Darling & Steinberg, 1993; Sameroff, 2010). Nonetheless, until recently few empirical studies have conceptualized parenting effects as a phenomenon at the within-family[2] level (Boele et al., 2020; Hamaker, 2012; Keijsers, 2016). Instead, most of what is currently known of how parenting relates to adolescent functioning comes from research describing differences between families in their average levels of parenting and adolescent functioning (between-family level; e.g., McLeod, Weisz, et al., 2007; Pinquart, 2017b). Studies examining differential parenting effects have followed the dominant approach and established how between-family parenting effects differ among subgroups of adolescents (e.g., Chavez Arana et al., 2021; Olofsdotter et al., 2018; Tung et al., 2019). However, parenting is not set in stone and fluctuates and changes over time within the same family (Boele, Nelemans et al., 2023; Darling & Steinberg, 1993; Keijsers et al., 2022). Additionally, the effects that parents have upon their own adolescent may also be unique to each family (i.e., effect heterogeneity; Bolger et al., 2019; Grusec, 2008; Keijsers & Van Roekel, 2018). According to environmental sensitivity theories for example, some adolescents respond more strongly to parenting because they are more environmentally sensitive than others (Pluess, 2015). Thus, to understand how parenting effects unfold over time within different families, the current study employs a within-family design.

To be able to make inferences about parenting effects within families, a multilevel approach is needed that disentangles stable between-family differences and over-time within-family effects (Hamaker, 2012; Keijsers, 2016). Doing so, several studies have now, for example, demonstrated that how parenting relates to adolescents' functioning at the between-family level can sometimes be in opposite direction as the effects at the within-family level (e.g., Dietvorst et al., 2018; Nelemans et al., 2020; Villalobos Solís et al., 2015b). In the current study we applied dynamic structural equation modelling (DSEM; Asparouhov et al., 2018), which is a type of multilevel modelling that is especially suited for intensive longitudinal data. DSEM combines the strengths of multilevel modelling,

[2] In the parenting literature, the term "within-family" sometimes also refers to differences between family members, for example when studying differential parental treatment of siblings. We use the term within-family to refer to processes that occur within individual families.

SEM, and *N* = 1 time series. Hence, DSEM allowed us to estimate within-family parenting effects for each individual adolescent in the sample separately (for other examples, see Beyens et al., 2021; Bülow, Neubauer, et al., 2022).

## The Current Study

The aim of this preregistered within-family study[3] was to increase the understanding of heterogeneity in parenting effects, and whether this heterogeneity can be explained by environmental sensitivity models. Therefore, we tested per individual adolescent whether they suffered from adverse parenting (*adverse sensitive*), benefited from supportive parenting (*vantage sensitive*), experienced both (*differentially susceptible*), or neither of the two (*unsusceptible*). To do so, we intensively followed families for 26 bi-weekly measurement occasions, thus spanning a full year.

To follow guidelines of Belsky & Pluess (2009) and Pluess & Belsky (2013), we examined the responsiveness of individual adolescents to over-time changes in both adverse and supportive parenting. In line with prior studies (e.g., Slagt et al., 2016; Weyn et al., 2022) and recommendations (e.g., Belsky & Pluess, 2009; Pluess & Belsky, 2013), adverse parenting was measured as psychological control and supportive parenting as emotional support (rather than treating the absence of adversity as a supportive condition). Parental psychological control includes behaviors such as intrusiveness, criticism, and manipulation (Barber et al., 2012; Soenens & Vansteenkiste, 2010). Parental emotional support (hereafter called support) includes warmth, affection, companionship, and intimacy (Furman & Buhrmester, 1985; Soenens et al., 2017). According to the Self-Determination Theory (SDT), parental psychological control actively thwarts children's psychological functioning, whereas parental support actively promotes children's psychological functioning (Soenens et al., 2017). Accordingly, parental psychological control can be understood as a risk factor, with more psychological control hindering children's psychological functioning, whereas a lack of psychological control is not necessarily fostering better functioning. Parental support can be understood as a promotive factor, with more support promoting better psychological functioning, whereas a lack of support is not necessarily hindering children's functioning (Farrington et al., 2016; Soenens et al., 2017; Stouthamer-Loeber et al., 2002). Hence, we examined whether changes (in relation to an individual's average) in parental psychological control and/or support predicted within-family changes in adolescents' psychological functioning. In prior within-

[3] For preregistration hypotheses and analytical approach see https://osf.io/8egxf/

family studies, parental psychological control (Mabbe et al., 2019; Nelemans et al., 2020; Van Lissa et al., 2019) and parental support (for review see Boele et al., 2020, 2022) have not consistently predicted adolescent psychological functioning, perhaps because some adolescents are more affected than others as environmental sensitivity theories suggest.

Moreover, recently it has been gained attention that one's environmental sensitivity might not generalize to different outcomes (Belsky et al., 2022). Additionally, in (developmental) psychology it has been stressed that that the same influence may lead to different outcomes depending on the child (i.e., the principle of multi-finality; Cicchetti & Rogosch, 1996) and that absence of dysfunction is not by itself an indicator of good functioning (Belsky & Pluess, 2009; Keyes, 2014; Ryff et al., 2006). Therefore, we examined three different indicators of adolescents' psychological functioning, including one positive (i.e., self-esteem) and two negative indicators (i.e., depressive symptoms and anxiety symptoms). In sum, the responsivity-to-parenting patterns were based on two parenting dimensions and three adolescent outcomes.



As a last step, to test whether adolescents with different responsivity patterns can also be detected using a theory-based sensitivity marker (Greven et al., 2019; Pluess, 2015; Pluess et al., 2018), we compared empirically derived subgroups on trait levels of environmental sensitivity. We used a self-report measure of the Highly Sensitive Child Scale to examine these individual differences in environmental sensitivity (HSC; Pluess et al., 2018; Weyn et al., 2021).

***Hypotheses***

First, we expected that, *on average*, increases in parental psychological control are followed by decreases in adolescents' self-esteem (H1a) and by increases in adolescents' depressive and anxiety symptoms (H1b), whereas increases in parental support are followed by increases in adolescents' self-esteem (H1c) and decreases in adolescents' depressive and anxiety symptoms (H1d). Second, based on the aforementioned environmental sensitivity models (for overview, see Greven et al., 2019 and Figure 1) as well as the first studies on parenting effect heterogeneity (Bülow, Van Roekel, et al., 2022; L. H. C. Janssen, Elzinga et al., 2021), we expected differential parenting effects across families; Hence, we hypothesized between-family variance around these average within-family parenting effects (H2).

Third, our main hypothesis was the "coexisting responsivity patterns hypothesis", in which we expected that three environmental sensitivity theoretical models coexist in the sample

and apply to different subgroups of adolescents (H3) (Pluess & Belsky, 2012, 2013). To test this, we described how many adolescents in our sample demonstrated one of the following responsivity patterns: *adverse sensitive* ("for worse"), *vantage sensitive* ("for better"), *differentially susceptible* ("for better and for worse") or *unsusceptible* ("for neither"). A description of the pattern of parenting effects for each responsivity pattern is described in Table 1. For example, an adolescent was considered *adverse sensitive* if parental psychological control, but not parental support, predicted decreased psychological functioning (i.e., lower self-esteem and/or more depressive symptoms and/or more anxiety symptoms). We preregistered that H3 is confirmed if we would find more than one responsivity pattern in our sample. We did not have a priori hypotheses regarding to how many adolescents in our sample would show these responsivity patterns.

**Table 1**
*Hypothesized Coexisting Responsivity Patterns*

| Responsivity pattern | Parenting effects on adolescent psychological functioning | |
|---|---|---|
| | Psychological control (adverse parenting) | Support (supportive parenting) |
| Adverse sensitive ("for worse") | - | 0 |
| Vantage sensitive ("for better") | 0 | + |
| Differentially susceptible ("for both") | - | + |
| Unsusceptible ("for neither") | 0 | 0 |

*Note*. Effect on adolescent psychological functioning pertains an effect on self-esteem and/or depressive symptoms and/or anxiety symptoms.
0 = null effect (-.05 > β < .05), + = positive effect (β ≥ .05), - = negative effect (β ≤ -.05).

Fourth, we hypothesized that trait levels of environmental sensitivity (i.e., sensory processing sensitivity; Aron et al., 2012) would be linked to the empirically derived responsivity patterns, because the trait environmental sensitivity captures the general ability to perceive, processes, and respond to environmental influences (Pluess, 2015; Tillmann et al., 2021). The HSC is suggested to be marker for a "for better and for worse" responsivity pattern (Pluess et al., 2018; Slagt et al., 2018). However, because it has not been tested how the HSC predicts within-family parenting effects, we tentatively formulated the following hypothesis (H4): *Differentially susceptible* adolescents (see H3) would be more environmentally sensitive than other adolescents, especially more than *unsusceptible* adolescents, but possibly also more than *adverse sensitive* and *vantage sensitive* adolescents.

## METHOD

### Participants

Adolescents ($N$ = 259) participated in a longitudinal study called "One size does not fit all" (http://osf.io/e2jzk). Data, of which 256 adolescents ($M_{age}$ = 14.4, $SD_{age}$ = 1.59, age range = 12-17 years, 71.5% female) contributed data on our study constructs. Most of these adolescents (97%) and their parents (95%) were born in the Netherlands. Concerning adolescents' educational level, 15% followed (pre-)vocational secondary education, 36% higher general secondary education, and 49% pre-university secondary education. Their primary caregivers were mostly their mothers (81%; with whom they spend most of their time), although for 19% their father was their primary caregiver. Most parents were married/living together (76%), some were divorced or separated (21%), and a few deceased (3%). Highest educational level of (one of) their parents were primary education (1%), secondary education (1%), vocational training (13%), university of applied sciences (38%), university (28%). We had insufficient information about parental education of 51 adolescents (20%). Many adolescents had siblings (92%), such as one (52%) or two siblings (34%), with a maximum of five (1%).

Adolescents could participate with at least one parent. In total, 188 parents ($M_{age}$ = 46.89, age range = 36-76, 90% Dutch) participated in this longitudinal study. These parents were the biological mothers (78%) or fathers (22%). Most of the participating parents finished post-secondary education: vocational training (35%), university of applied sciences (35%), or university (18%). Forty-six percent of the parents were religious (and in those cases mainly Christian, 88%).

### Procedure

From September to November 2019, adolescents between 12 and 17 years old and their parents were recruited at a Dutch high school through parent-evenings, class visits, and the school's newsletter. Adolescents and parents could register and provide their active consent through an online form. For adolescents under 16 years old, parents also provided their informed consent for the participation of their adolescent child. A first batch of participants ($N_{adolescent}$ = 195; $N_{parent}$ = 163) started in November 2019, while we continued to recruit more families to increase the sample size. In February 2020, a second and last batch of participants started ($N_{adolescent}$ = 64; $N_{parent}$ = 25), which led to a total of 259 adolescents and 188 parents. The study was approved by the ethical committee of the Faculty of Social and Behavioral Sciences of Tilburg University (Nr. EC-2019.65t).

For a full year, adolescents and their parents received 26 bi-weekly questionnaires by e-mail and text message. Both adolescents and parent reported bi-weekly on parenting and adolescent-well-being. The questionnaires took approximately 10 min to complete. Moreover, participants filled out a baseline questionnaire (ca. 35 to 50 extra minutes) and some additional measures every 3 months (plus 10 min). For an overview of the study design and included measures, see http://osf.io/e2jzk.

In (intensive) longitudinal research, compliance is a quality marker and payment is a strong motivator (Van Roekel et al., 2019; Wrzus & Neubauer, 2023). Therefore, adolescents received one euro per completed bi-weekly questionnaire, two euro per three-monthly questionnaire, and five euro for the baseline questionnaire. Moreover, adolescents earned five euros extra if they completed the final 5 bi-weekly questionnaires (i.e., surveys 22-26). Additionally, adolescents participated in bi-weekly raffles in which six adolescents won 10 euro. Thus, in total, adolescents could receive a maximum of 51 euro, excluding the raffles.

## Missing Data

On average, adolescents completed 17.7 of the 26 bi-weekly questionnaires (68%). The majority of the adolescents (58%, $n$ = 148) completed at least 20 of the 26 bi-weekly questionnaires and 31% ($n$ = 80) completed all 26 questionnaires (for a full overview of the compliance, see Table B1 in Appendix B). Across measurement occasions, compliance ranged between 52% to 98%, with 61% at the last measurement (T26). These compliance rates are typical for intensive longitudinal studies with adolescents (Van Roekel et al., 2019). The missing data were completely at random (MCAR), as indicated by Little's MCAR test ($\chi^2$ (6) = 11.16, $p$ = .084). All available data were used for the analyses, including partially completed bi-weekly questionnaires, which led to an average of 18.8 observations per adolescent (median = 23, mode = 26). The total number of observations per variable ranged from 4,612 to 4,659.

## Instruments

### *Parental Psychological Control*

To assess adverse parenting, psychological control was bi-weekly measured with adolescent-reports of the Psychological Control-Disrespect Scale (Barber et al., 2012). This scale conceptualized psychological control as parental behaviors that disrespect the individuality of the child, such as ridiculing, embarrassing in public, and violation

of privacy. Compared to an older version of the scale (Barber, 1996), the 2012 version showed to be a stronger predictor of adolescent functioning (Barber et al., 2012). Based on the highest factor loadings in a prior study (Barber et al., 2012), we included four of the original eight items to decrease participate burden. These four items are: In the last 2 weeks, my parents: (1) ridiculed me or put me down (e.g., by saying I was dumb or useless); (2) embarrassed me in public (e.g., in front of my friends); (3) did not respect me as a person (e.g., not letting me talk, favoring others over me, etc.); and (4) tried to make me feel guilty for something I've done or something s/he thinks I should do. We translated these items to Dutch and items were scored from 1 (*never*) to 5 (*always*). Our shortened 4-item version had good reliability at both the between-family ($\omega_b$ = .95) and within-family level ($\omega_w$ = .74) (Geldhof et al., 2014). Multilevel confirmatory factor analysis (MCFA; Geldhof et al., 2014) indicated a good fit for a one-factor model (CFI = .97, TLI = .94, RMSEA = .03), with standardized factor loadings > .52 at the within-family level and >.74 at the between-family level. Additionally, our 4-item version correlated strongly with the full eight-item scale administered at T1 ($r$ = .90, $p$ = .000).

***Parental Support***

To assess supportive parenting, we included parental emotional support, which was bi-weekly measured using adolescent-reports of a four-item version of the Support subscale of the Network of Relationships Inventory (Furman & Buhrmester, 1985). A Dutch version has been used and validated in earlier work (Dietvorst et al., 2018; Keijsers et al., 2015). The four items are: In the last 2 weeks, how much: (1) did your parent care about you? (2) did your parent appreciate the things you had done? (3) did your parent admire and respect you? and (4) did you care about your parent? Adolescents rated each item on a 5-point scale (1 = *not at all*; 5 = *very often*). Parental support was examined separately for the primary and secondary caregiver. In the current study, we focused on parental support of the primary caregiver. The reliability of parental support was good at the between-family ($\omega_b$ = .96) and within-family level ($\omega_w$ = .75). The MCFA indicated sufficient fit for a one-factor model (CFI = .91, TLI = .81, RMSEA = .06), with standardized factor loadings above .55 at the within-family level and above .85 at the between-family level.

***Adolescent Self-Esteem***

Adolescents rated their self-esteem on the Rosenberg Self-Esteem Scale Short (RSE-S; Rosenberg, 1965) every other week. To reduce participant burden, five of the 10 items were selected, which were selected based on the factor loadings in a prior study about

a Dutch version of the scale (Franck et al., 2008). The five item are: In the last 2 weeks: (1) I took a positive attitude towards myself; (2) I felt that I am a person of worth, at least on an equal plane with others; (3) I felt that I do not have much to be proud of; (4) I wish I could have had more respect for myself; and (5) I was inclined to feel that I am a failure. The items were rated on a scale from 1 (*totally disagree*) to 5 (*totally agree*). The reliability of our five-item version was excellent at the between-family level ($\omega_b$ = .90) and reasonable at the within-family level ($\omega_w$ =.59). MCFA (CFI = .74, TLI = .56, RMSEA = .07) suggested that the two positively formulated items did not load optimally (within-family: .15 and .18, between family: .28 and .55), whereas all three negatively formulated items had high factor loadings (within-family level: .49, .62, and .78; between-family level: .81, .95, and .98). Moreover, our 5-item version correlated strongly with the original 10-item scale which was measured once at T7 ($r$ = .96, $p < .001$. A higher mean score indicated higher self-esteem.

### *Adolescent Depressive Symptoms*

Adolescents' depressive symptoms were bi-weekly measured with a self-report of the Reynolds Adolescent Depression Scale Short Form (RADS-2:SF; W. M. Reynolds, 2008). The RADS-SF consists of 10 items, which we translated to Dutch. Adolescents answered each item on a 3-point scale (1 = *never;* 3 = *always*). Example items are: In the last 2 weeks: (1) I felt sad; (2) I felt lonely; and (3) I was angry about things. The internal consistency of the scale was good at both the between-family ($\omega_b$ = .88) and within-family level ($\omega_w$ = .74). MCFA indicated marginal fit for a unidimensional structure (CFI = .87, TLI = .84, RMSEA = .05). Most standardized factor loadings at the within-family level were between .40 and .68, with one exception of .21 (Item 9: "I was bored"). At the between-family level, standardized factor loadings were between .69 and .94, with one exception of .41 (again Item 9). Earlier work demonstrated that the RADS-2:SF is a reliable and valid measure to screen for depressive symptoms in a community adolescent sample (Ortuño-Sierra et al., 2017).

### *Adolescent Anxiety Symptoms*

Anxiety symptoms were self-reported every other week with the Dutch version (Wijsbroek & Hale, 2005) of the General Anxiety Disorder (GAD) symptoms subscale of the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997). The nine items were rated on a 3-point scale from 1 (*never*) to 3 (*always*). Example items are: In the last 2 weeks: (1) I was worried about how well I was doing things; (2) I was

worried about the future; and (3) I was nervous. The internal consistency of the scale was good at the between-family ($\omega_b$ = .87) and sufficient at the within-family level ($\omega_w$ = .71). Moreover, MCFA indicated good fit for a one-factor model of the GAD subscale (CFI = .92, TLI = .90, RMSEA = .04) and sufficiently high factor loadings: between .34 and .66 at the within-family level and between .71 and .97 at the between-family level. Meta-analytic work has shown that the SCARED is a valid self-report to screen for anxiety symptoms in adolescents (Hale et al., 2011).



#### *Adolescent Environmental Sensitivity*

Environmental sensitivity of the adolescent was assessed at T1 with the 12-item Highly Sensitive Child Scale (12-item HSC; Pluess et al., 2018; Weyn et al., 2021). The HSC aims at measuring trait environmental sensitivity, specifically sensory processing sensitivity, which is characterized by greater awareness of subtle environmental cues, behavioral inhibition, deeper cognitive processing, higher emotional and physiological responsivity, and ease of overstimulation (Aron et al., 2012; Pluess, 2015). The scale consists of three subscales: Ease of Excitation (5 items, e.g., "I get nervous when I have to do a lot in little time"), Aesthetic Sensitivity (4 items, e.g., "I notice when small things have changed in my environment"), and Low Sensory Threshold (3 items, e.g., "I don't like loud noises") (Weyn et al., 2021). The 12 items of the scale were rated on a scale from 1 (*not at all*) to *7* (*extremely*). In line with earlier work showing good psychometric properties in adolescent samples (Weyn et al., 2021), the internal consistency in the current sample was good ($\alpha$ = .80). Moreover, a CFA of a bifactor model (i.e., a general sensitivity factor and three group factors) showed a good fit (CFI = .96, TLI = .94, RMSEA = .05), with the general factor loadings between .23 and .72. In the current study we used the total scale score, in which a higher score indicates higher sensitivity to both negative and positive environmental influences.

### Preregistered Statistical Analyses

To estimate parenting effects for each adolescent separately, in addition to the average effects in the sample, Dynamic Structural Equation Modelling (DSEM; Asparouhov et al., 2018; Muthén & Muthén, 2020) was employed, which combines the strengths of SEM, multilevel, and *N* = 1 timeseries. We preregistered our hypotheses and analytical approach (https://osf.io/8egxf/), which was based on similar preregistrations of (Beyens et al., 2021) and Bülow, Van Roekel et al. (2022).

First, we checked whether the mean-level structure of the data was stationary. Because measurement occasion explained less than 10% of the variance (0.7% to 2.4%) in

adolescent psychological functioning, we assumed stationarity. Subsequently, we estimated six ML-VAR(1) models with *M*plus 8.5 (Muthén & Muthén, 2020), combining 2 parenting variables (psychological control/support) with 3 types of adolescent outcomes (self-esteem/depressive symptoms/anxiety symptoms). At the within-family level, we estimated the concurrent and bidirectional lagged effects as well as the autoregressive effects. At the between-family level, we estimated the variance around the within-family effects (i.e., random effects) and the associations between all random effects and with the random intercepts. To account for unequal time intervals between measurements due to missing data, we set TINTERVAL to 1. Moreover, to account for convergence issues, we simplified two out of six models by removing the between-family associations between the random lagged and autoregressive effects. Still the model with parental psychological control and adolescent anxiety symptoms did not converge, which left us five models to test our hypotheses. An overview of the model specifications and settings for each final interpreted ML-VAR(1) model can be found in Table A1 in Appendix A.

### *Inference Criteria and Hypothesis Testing*

The hypothesized average parenting effects (H1) were derived from fixed within-family lagged effects from parenting to adolescent psychological functioning (significant when Bayesian credible intervals did not include zero). Subsequently, between-family variance around these average within-family lagged effects (H2) was investigated. To investigate which theoretical responsivity patterns would emerge in the sample (H3), we summarized how the five standardized within-family lagged effects combine within an individual adolescent (using STDYX standardization and using the R package "M*plus* Automation"; Hallquist & Wiley, 2018). Individual effect sizes were interpreted based on a smallest effect size of interest of .05 (SESOI; Beyens et al., 2021; Lakens et al., 2018), which can be considered a small to medium lagged within-family effect according to recent guidelines (Adachi & Willoughby, 2015; Orth et al., 2022). Hence, we considered effect sizes smaller than .05 as null effects ($-.05 > \beta < .05$), effects with a size of $\beta \geq .05$ as positive effects, and effects with a size of $\beta \leq -.05$ as negative effects. Table 1 shows an overview of the inference criteria per responsivity pattern. Finally, to test H4, we compared the subgroups on their mean scores of the HSC, using a two-sided alpha of .05.

### *Deviations From Preregistration*

We followed our preregistered plan in almost each step, with the following exceptions. In contrast to our preregistered plan, we included participants who had no over-time variance

in their constructs to improve between-family estimates. Moreover, regarding H2, we could not use credibility intervals to test significance of variances because the priors excluded negative values (McNeish & Hamaker, 2019). Instead, we followed recent recommendations to look at the ratio of the standard deviation versus the fixed effect (Bolger et al., 2019; Bülow, Neubauer, et al., 2022). Furthermore, to test H4, we could not compare all found subgroups on their mean score of trait environmental sensitivity because most subgroups were too small (*n*s ≤ 17). Therefore, we combined several subgroups.



## RESULTS

### Descriptive Statistics and Correlations

Descriptive statistics and correlations are reported in Table 2. The ICCs indicated that 64% to 76% of the variance in the bi-weekly measures was due to stable between-family variance. The remaining 24% to 36% was due to over-time within-family changes. Within-family (*r*s = -.43 to .52) and between-family (*r*s = -.80 to .82) correlations were in the same direction but different in strength. Additionally, with respect to the between-family correlations, adolescents with higher trait levels of environmental sensitivity reported less parental support (*r* = -.22), more parental psychological control (*r* = .32), lower self-esteem (*r* = -.34), and more depressive and anxiety symptoms (*r*s = .42 and .44), compared to adolescents with lower trait levels.

**Table 2**
*Descriptive Statistics and Within- and Between-Family Level Correlations*

| Variables | Correlations | | | | | |
|---|---|---|---|---|---|---|
| | 1. | 2. | 3. | 4. | 5. | 6. |
| 1. Parental psychological control | - | -.29* | -.16* | .22* | .16* | - |
| 2. Parental support | -.68* | - | .15* | -.17* | -.10* | - |
| 3. Adolescent self-esteem | -.54* | .46* | - | -.50* | -.43* | - |
| 4. Adolescent depressive symptoms | .63* | -.51* | -.80* | - | .52* | - |
| 5. Adolescent anxiety symptoms | .45* | -.33* | -.78* | .82* | - | - |
| 6. Trait environmental sensitivity | -.32* | .22* | -.34* | .42* | .44* | - |
| *M* | 1.33 | 4.59 | 3.69 | 1.69 | 1.60 | 4.44 |
| *SD* | 0.56 | 0.54 | 0.81 | 0.61 | 0.53 | 0.73 |
| Range | 1.0-5.0 | 1.0-5.0 | 1.0-5.0 | 1.0-4.0 | 1.0-3.0 | 1.0-6.7 |
| ICC | .64 | .75 | .71 | .74 | .76 | - |
| *N* | 256 | 256 | 255 | 255 | 255 | 252 |
| $T_{total}$ | 4,659 | 4,648 | 4,617 | 4,612 | 4,612 | 252 |

*Note*. Correlations above the diagonal line represent within-family correlations and below the diagonal line represent between-family correlations. *M* = mean. *SD* = standard deviation. ICC = intraclass correlation. *N* = sample size. *T* = number of observations.
* $p < .001$

## Average Effects of Parenting on Adolescent Psychological Functioning (H1)

The results of the ML-VAR(1) models demonstrated that three of the five average parenting effects were significant and small in effect size. H1a and H1b were supported: Increased levels of parental psychological control predicted, on average, decreases in adolescent self-esteem (β = -.13) and increases in depressive symptoms (β = .05; see Table 3). In other words, on average, adolescents reported lower self-esteem and more depressive symptoms after having perceived more parental psychological control 2 weeks earlier. However, parental support did not predict changes in adolescents' self-esteem (rejecting H1c). H1d was partly supported: Although parental support did not predict adolescent depressive symptoms, it did predict fewer anxiety symptoms (β = -.06).

All lagged parenting effects were controlled for the reverse lagged effect from adolescent psychological functioning to parenting (see Table 3). On average, adolescent self-esteem had a significant negative effect on parental psychological control (β = -.12) and a positive effect on parental support (β = .09), and adolescent anxiety symptoms had a significant negative effect on parental support (β = -.07).

## Effect Heterogeneity: Differences between Families in Parenting Effects (H2)

Each of the within-family effects showed meaningful variance as indicated by a standard deviation fixed effect of at least ratio of 0.25 (see Table 3; Bolger et al., 2019). Thus, as expected (H2), adolescents varied substantially in how perceived changes in parenting predicted subsequent changes in their psychological functioning. For example, individual effect sizes of the lagged effect from parental support to depressive symptoms ranged from β = -.48 to .31 across families (see Figure 2). For 21%, this effect was negative (β ≤ -.05), as expected (see H1d). Others (51%) had a null effect (β between -.05 and .05), and 27% had a positive lagged effect (β ≥ .05). This parenting effect heterogeneity is illustrated in Figure 3 and 4, showing that the strength and sign of the effects differed between families.

## Coexisting Responsivity Patterns (H3)

The study's main hypothesis was that theoretical responsivity patterns (i.e., *adverse sensitive*, *vantage sensitive*, *differentially susceptible*, and *unsusceptible* pattern) would coexist in the sample and thus apply to different subgroups of adolescents.

**Table 3**

*DSEM analyses with Parenting and Adolescent Psychological Functioning (APF)*

| | Models with parental psychological control (PPC) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Self-esteem | | | Depressive symptoms | | | Anxiety symptoms | | |
| **Fixed lagged effects (within-family average)** | **Est.** | **Est. St.** | **95% CI** | **Est.** | **Est. St.** | **95% CI** | **Est.** | **Est. St.** | **95% CI** |
| PPC → PPC | 0.37 | .36* | [.30, .44] | 0.32 | .31* | [.25, .38] | - | - | - |
| APF → APF | 0.41 | .40* | [.35, .46] | 0.49 | .48* | [.43, .54] | - | - | - |
| **PPC → APF (H1a-b)** | **-0.15** | **-.13*** | **[-.22, -.07]** | **0.04** | **.05*** | **[.01, .08]** | - | - | - |
| APF→ PPC | -0.10 | -.12* | [-.14, -.06] | 0.06 | .06 | [-.00, .12] | - | - | - |
| Random effects (between-family variance) | $\sigma^2$ | *SD*/Est | 95% CI | $\sigma^2$ | *SD*/Est | 95% CI | $\sigma^2$ | *SD*/Est | 95% CI |
| PPC → PPC | .10 | 0.85 | [.07, .14] | .07 | 0.83 | [.05, .10] | - | - | - |
| APF → APF | .09 | 0.73 | [.07, .12] | .08 | 0.58 | [.06, .10] | - | - | - |
| **PPC → APF (H2)** | **.07** | **1.76** | **[.03, .14]** | **.02** | **3.54** | **[.00, .03]** | - | - | - |
| APF → PPC | .05 | 2.24 | [.03, .07] | .12 | 5.77 | [.08, .16] | - | - | - |
| | **Models with parental support (PS)** | | | | | | | | |
| | **Self-esteem** | | | **Depressive symptoms** | | | **Anxiety symptoms** | | |
| **Fixed lagged effects (within-family average)** | **Est.** | **Est. St.** | **95% CI** | **Est.** | **Est. St.** | **95% CI** | **Est.** | **Est. St.** | **95% CI** |
| PS → PS | 0.27 | .27* | [.21, .34] | 0.29 | .28* | [.23, .35] | 0.29 | .28* | [.23, .35] |
| APF → APF | 0.39 | .38* | [.33, .44] | 0.49 | .48* | [.43, .54] | 0.50 | .49* | [.44, .55] |
| **PS→ APF (H1c-d)** | **0.06** | **.04** | **[-.04, .16]** | **0.02** | **.01** | **[-.04, .00]** | **-0.06** | **-.06*** | **[-.11, -.01]** |
| APF → PS | 0.06 | .09* | [.03, .09] | -0.04 | -.05 | [-.08, .07] | -0.07 | -.07* | [-.13, -.01] |
| Random effects (between-family variance) | $\sigma^2$ | *SD*/Est | 95% CI | $\sigma^2$ | *SD*/Est | 95% CI | $\sigma^2$ | *SD*/Est | 95% CI |
| PS → PS | .08 | 1.05 | [.05, .11] | .08 | 0.98 | [.05, .11] | .08 | 0.98 | [.06, .12] |
| APF → APF | .09 | 0.77 | [.06, .12] | .07 | 0.54 | [.05, .10] | .07 | 0.53 | [.05, .09] |
| **PS→ APF (H2)** | **.12** | **5.77** | **[.07, .20]** | **.06** | **12.25** | **[.03, .09]** | **.05** | **3.73** | **[.03, .08]** |
| APF → PS | .03 | 2.89 | [.02, .04] | .05 | 5.59 | [.03, .07] | .08 | 4.04 | [.05, .12] |

*Note*. Parameters whose 95% credible interval does not contain zero are shown with an asterisk. Model with parental psychological control and adolescent anxiety symptoms did not converge. PPC = parental psychological control. PS = parental support. APF = adolescent psychological functioning. Est = unstandardized estimate. Est. St. = standardized estimate (i.e., STDYX standardization). *P* = one-sided *p*-value. 95% CI = Bayesian Credible Intervals. *SD* = standard deviation. *SD*/Est. = standard deviation fixed effect ratio, to inspect whether variance is meaningful, with a criterium of ≥ 0.25 (Bolger et al., 2019). Not all parameter estimates are reported here and for full output see (https://osf.io/8egxf/).

Although the results supported this hypothesis of coexisting responsivity patterns, we also found unexpected patterns. An overview of all patterns and their descriptive statistics is shown in Table 4 (for a more detailed description see Table C1 in Appendix C).

Around one-third of the sample showed a predicted responsivity pattern: 5% was *adverse sensitive* (*n* = 13), 3% *vantage sensitive* (*n* = 8) and 26% *differentially susceptible* (*n* = 67). However, no adolescent showed the hypothesized *unsusceptible* pattern. Unexpectedly, around one in four adolescents (*n* = 73, 29%) demonstrated a negative effect of parental support on their psychological functioning (see "Opposing effect of PS" in Table 4), a small minority (*n* = 6; 2%) reported better psychological functioning following more psychologically controlling parenting or reported both unexpected responses (*n* = 17, 7%). Finally, 28% (*n* = 72) did not perceive over-time changes in parenting and/or their psychological functioning (see "Unperceptive" in Table 4) and could not be assigned a responsivity pattern for this reason.

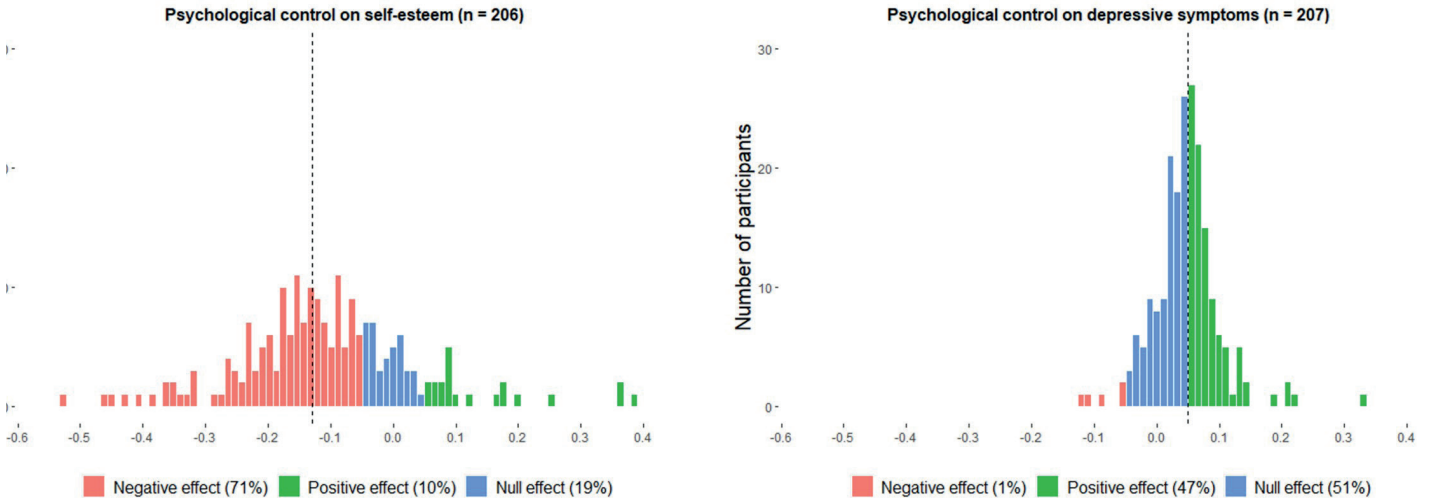
**Table 4**
*Overview of Responsivity Patterns in the Sample*

| **Responsivity pattern** | ***n*** | ***%*** | **HSC *M (SD)*** | **Age *M*** | **% girls** | ***T* *M (SD)*** |
|---|---|---|---|---|---|---|
| **Predicted patterns (H3)** | **88** | **34.4%** | | | | |
| 1. Adverse sensitive ("for worse") | 13 | 5.1% | 4.4 (0.61) | 14.7 | 61.5% | 17.4 (10.1) |
| 2. Vantage sensitive ("for better") | 8 | 3.1% | 5.0 (0.38) | 13.9 | 75.0% | 18.1 (7.8) |
| 3. Differentially susceptible ("for better and for worse") | 67 | 26.2% | 4.4 (0.77) | 14.3 | 74.6% | 19.4 (7.7) |
| 4. Unsusceptible ("for neither") | 0 | 0% | - | - | - | - |
| **Unpredicted patterns** | **168** | **65.6%** | | | | |
| 5. Opposing effect of PPC | 6 | 2.3% | 4.9 (0.77) | 15.3 | 66.7% | 17.5 (9.8) |
| 6. Opposing effect of PS | 73 | 28.5% | 4.6 (0.63) | 14.5 | 76.7% | 20.0 (7.4) |
| 7. Opposing effect of PPC and PS | 17 | 6.6% | 4.8 (0.67) | 14.8 | 58.8% | 19.7 (6.2) |
| 8. Unperceptive[a] | 72 | 28.1% | 4.1 (1.12) | 14.2 | 68.1% | 17.0 (8.9) |
| Total | 256 | 100.0% | 4.4 (0.86) | 14.4 | 71.5% | 18.8 (8.1) |

*Note*. *n* = number of participants. HSC = Highly Sensitive Child Scale. *M* = mean. *SD* = standard deviation. *T* = number of bi-weekly observations.
[a] Of the 72 adolescents, 2 showed changes in parenting but not in their psychological functioning.

**Figure 2**

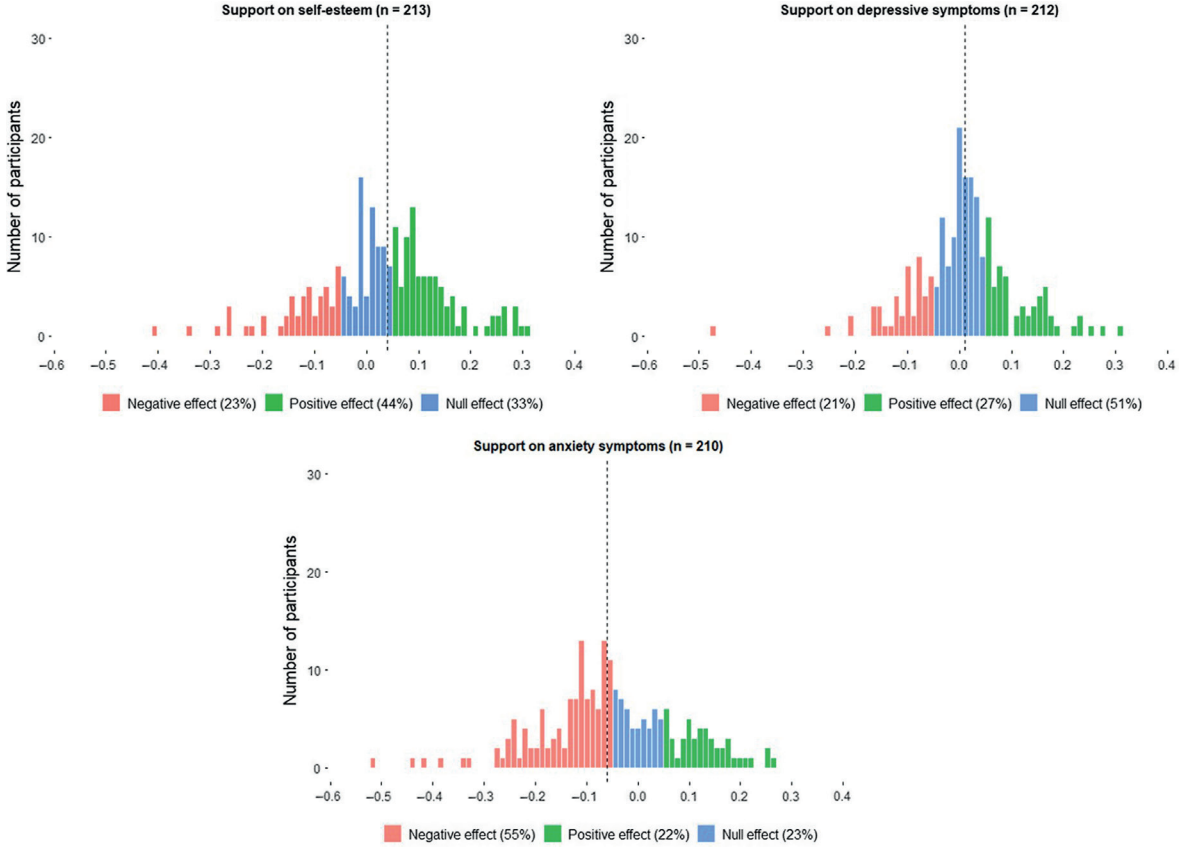
*Parenting Effect Heterogeneity for Psychological Control: Distribution of Individual Effect Sizes*




*Note.* Dashed line is the average within-family effect (see Table 3). Effect sizes with self-esteem as outcome ranged from β = -.53 to .38 and with depressive symptoms from β = -.12 to .33.

**Figure 3**

*Parenting Effect Heterogeneity for Parental Support: Distribution of Individual Effect Sizes*




*Note.* Dashed line is the average within-family effect (see Table 3). Effect sizes with self-esteem as outcome ranged from β = -.41 to β = .33, with depressive symptoms from β = -.48 to β = .31, and with anxiety symptoms from β = -.51 to β = .27

## Trait Environmental Sensitivity and Responsivity Patterns (H4)

Because the (theorized and expected) *unsusceptible* adolescents were not found in our sample, and the other subgroups were too small to allow comparisons (*n*s ≤ 17; see Table 4), we combined subgroups of adolescents. When comparing *differentially susceptible* adolescents ($M$ = 4.41; $n$ = 66) to all other adolescents ($M$ = 4.45; $n$ = 186), no differences in trait levels of environmental sensitivity were found, as measured with the HSC[4], $W$ = 5743.5, $p$ = .439. We ran exploratory models to further investigate the link of trait environmental sensitivity to within-family parenting effects.

### *Exploratory Analyses (Not Preregistered)*

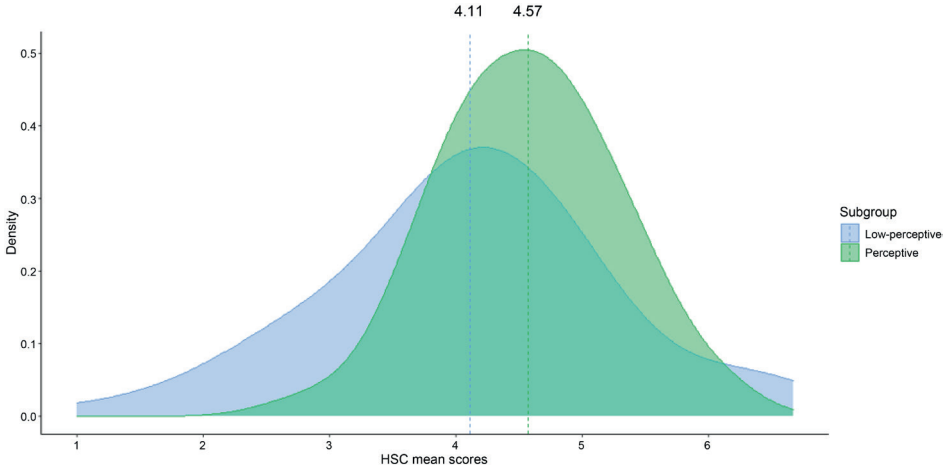
Potentially, trait environmental sensitivity could be related to how strongly adolescents are affected by perceived changes parenting (i.e., absolute effect sizes), regardless of their pattern of effects. However, we found no compelling evidence for this; of the five absolute effect sizes, only one parenting-outcome effect size significantly correlated with trait levels of environmental sensitivity (see Table D1 in Appendix D). Specifically, adolescents who scored higher on trait environmental sensitivity reported stronger responses to changes in parental support in terms of their depressive symptoms, indicated by a positive correlation between the HSC and the individual effect sizes of parental support on depressive symptoms ($r$ = .20, $p$ = .015).

Another plausible explanation might be that trait environmental sensitivity reflects individual differences in the ability to perceive subtle changes in parenting rather than responsivity (Pluess, 2015). As depicted in Figure 5, exploratory analyses indeed showed that *unperceptive* adolescents who did not perceive bi-weekly changes in parenting ($n$ = 70, $M$ = 4.11) scored lower on trait environmental sensitivity than adolescents who did perceive changes ($n$ = 182, $M$ = 4.57), $t$ = -3.19, $p$ = .002, $d$ = -.49. In support of this idea, adolescents who scored higher on trait environmental sensitivity perceived greater over-time changes in parenting, as indicated by significant correlations between the within-family standard deviation of parental psychological control or support and trait environmental sensitivity ($r$s = .21 and .23, $p$ ≤ .001). Together, these exploratory findings indicate that adolescents scoring higher on trait environmental sensitivity tended to perceive (greater) over-time changes in parenting but were not more responsive to them.

[4] We conducted a Mann-Whitney U test instead of a *t*-test, because of the non-normal distribution of the HSC ($W$ = 0.98, $p$ = .003).

**Figure 4**

*Distribution of Mean Scores of the Highly Sensitive Child Scale (HSC) for Low-Perceptive and Perceptive Adolescents*




*Note*. Low-perceptive adolescents (*n* = 70) did not perceive bi-weekly changes in parenting (and some also in their psychological functioning). Perceptive adolescents (*n* = 182) perceived and were affected (in all possible manners) by these changes in parenting.

## Sensitivity Analyses

### *Multi-informant Model with Parent-Reported Parenting (Preregistered)*

To replicate main findings (H1-H4) across multiple informants, we conducted the analyses with parent-reported parenting and adolescent-reported psychological functioning (subsample of *n* = 177; for sample and descriptive statistics see Table E1 in Appendix E). Although, on average, adolescent's psychological functioning could not be predicted by parent-reported parenting (H1a-d not confirmed, see Table E2), again all lagged effects showed meaningful effect heterogeneity (H2 confirmed; for sample distributions, see Table E3). With respect to the responsivity patterns, we did find all four predicted responsivity patterns, including the *unsusceptible* pattern (H3 confirmed; see Table E4), in which the group size of the patterns ranged from 9% to 19%. Agreement between responsivity patterns based on parent-reported versus adolescent-reported parenting ranged from 0% (*adverse sensitive* and *unsusceptible* patterns) to 36% (*unperceptive* pattern) (for more details see, Table E5). Similar as in the main analyses, H4 was not confirmed, as adolescents with a *differentially susceptible* pattern based on parent-reported parenting did not show higher trait levels of environmental sensitivity than the other adolescents, $t(172) = -0.04$, $p = .965$.

***Concurrent Effects (Exploratory)***

As exploration, we tested whether the main findings (i.e., lagged effects) would replicate with concurrent parenting associations, produced by ML-AR(1) models including adolescent-reported parenting as a time-varying covariate (see Table F1 in Appendix F). Different than the main findings, all hypothesized average parenting effects were found with the concurrent models (H1a-d confirmed; see Table F2 in Appendix F). Moreover, similar as the main findings, all parenting associations showed meaningful between-family variance (H2 confirmed), although effect heterogeneity was smaller. Regarding the responsivity patterns, we found similar patterns for the concurrent associations as for the lagged effects (H3 confirmed; for full overview, see Table F3), including no *unsusceptible* adolescents. Nevertheless, based on concurrent effects, the majority of the sample (61% vs. 26% with lagged effects) was classified as *differential susceptible* and a small percentage as *adverse sensitive* (2%) and *vantage sensitive* (1%). Notably, 93% of adolescents who had a *differentially susceptible* pattern with lagged effects had a similar pattern with concurrent effects (for a detailed comparison, see Table F4). However, 63 of the 156 adolescents who had *differentially susceptible* pattern with concurrent models showed an *unexpected* responsivity pattern (i.e., opposing parenting effects) with lagged models. Moreover, fewer adolescents showed opposing parenting effects (36% vs. 66% with lagged effects). Furthermore, again H4 was not confirmed, as *differentially susceptible* adolescents did not differ in trait environmental sensitivity compared to all others, $W = 8358$, $p = .150$.

***Additional Sensitivity Analyses (Exploratory)***

To further assess the robustness of the findings concerning the responsivity patterns, we additionally conducted sensitivity analyses. We explored to what extent: (a) the classification was influenced by the effect size cut-off by raising the cut-off to .10 (see results in Table G1 in Appendix G); (b) the classification was influenced by participants who had five or less observations ($n = 23$; see Table G2); and (c) the estimation of individual effect sizes was influenced by the inclusion of participants who had no over-time variation ($n = 72$; see Table G3). Although group sizes slightly varied across analyses, we found the same predicted and unpredicted responsivity patterns as in the main analyses, in which *differential susceptible* (20% to 28%), “opposing effect of parental support” (24% to 30%), and *unperceptive* (25% to 28%) were again the three largest subgroups. Hence, we conclude that the main findings were robust across the abovementioned methodological factors as the results remained in line with our main hypothesis that different responsivity patterns coexist.

***Summary of Predicted Responsivity Patterns (H3): Main Analysis vs. Sensitivity Analyses***

Across studied time interval (lagged vs. concurrent) and informant (adolescent vs. parent), differences emerged in the sample distribution of the predicted responsivity patterns (H3). That is, 2% to 14% of adolescents demonstrated an *adverse sensitive* pattern, 1% to 19% a *vantage sensitive* pattern, 13% to 61% a *differential susceptible* pattern, and 0% to 18% an *unsusceptible* pattern. Moreover, in the adolescent-reported models, considerably more adolescents were classified as *differential susceptible* (26% to 61%) than *adverse sensitive* (2% to 5%) or *vantage sensitive* (1% to 3%), especially in the concurrent models. In the parent-reported parenting models, these predicted patterns were more equally distributed in the sample (9% to 19%). Furthermore, although we found little evidence for the predicted *unsusceptible* pattern with adolescent-reported data, we did find this pattern with parent-reported parenting in 18% of the sample. Notwithstanding the differences, we repeatedly found that different adolescents demonstrated different predicted (but also unpredicted) responsivity patterns.

## DISCUSSION

One of the ongoing debates in the parenting literature is the extent to which parenting has universal or heterogeneous effects upon child functioning (Grusec, 2008; Rohner et al., 2005; Soenens et al., 2015). Environmental sensitivity models assume parenting effect heterogeneity, such that children's responses to parenting depend on their general sensitivity to environmental influences (Greven et al., 2019; Pluess, 2015). Three theoretical models (see Figure 1) posit a subgroup of highly sensitive children who are more responsive to either (1) adverse parenting ("for worse", *diathesis-stress model*; (Monroe & Simons, 1991; Zuckerman, 1999) or (2) supportive parenting ("for better", *vantage sensitivity model*; (Pluess, 2017), or (3) to both ("for better and for worse", *differential susceptibility model*; (Belsky et al., 2007; Belsky & Pluess, 2009). In all three models, highly responsive children are compared against a subgroup of non-responsive unsusceptible children. In the current study, we tested the "coexisting responsivity patterns hypothesis" among adolescents, proposing that the models complement each other and each explain a different subgroup in the population (Pluess, 2015; Pluess & Belsky, 2012, 2013). We applied a preregistered within-family approach, using intensive longitudinal (bi-weekly) data. By applying this approach, we could estimate parenting effects for each individual adolescent in the sample separately, which enabled us to assess individual differences in parenting effects. Our main findings indeed demonstrate

evidence that the different responsivity patterns coexist. Yet, a "for better and for worse" responsivity pattern was more common than a "for worse" or "for better" pattern. However, no adolescent appeared *unsusceptible*. Instead, a subgroup appeared not responsive because they did not perceive any changes in parenting, who scored meaningfully lower on trait environmental sensitivity (i.e., sensory processing sensitivity) than all others. Finally, a substantive number of adolescents responded in opposite way from what is expected from universal parenting theories (Rohner et al., 2005; Soenens et al., 2017), whom did not fit in hypothesized responsivity patterns.



### Effect Heterogeneity: Parenting Effects Differ Between Families

At the core of environmental sensitivity models (Greven et al., 2019; Pluess, 2015) is effect heterogeneity (Bolger et al., 2019): individuals do not similarly respond to similar environmental influences. In line with some first empirical studies (Bülow, Van Roekel, et al., 2022; L. H. C. Janssen, Elzinga et al., 2021; Keijsers & Van Roekel, 2018), there was indeed meaningful variation around *all* average within-family parenting effects, both around significant and nonsignificant average effects. When zooming into the individual effect sizes, effect sizes varied in both size and sign across the adolescents in our study. Parenting effect heterogeneity was replicated with parent-reported parenting and concurrent associations (though heterogeneity was larger in lagged effects). Hence, although the links between the studied parenting dimensions and adolescent outcomes are well established at the group-level (Pinquart, 2017b; Pinquart & Gerke, 2019), effects at the individual level suggest otherwise. How adolescents respond to parenting influences is heterogeneous, just as many other psychological processes across the lifespan (Bolger et al., 2019; Richters, 2021). As such, this study adds to an emerging body of literature that stresses how average effect sizes do not describe each individual and that ignoring heterogeneity may lead to invalid conclusions (Bryan et al., 2021; Fisher et al., 2018; Grice et al., 2020; Hamaker, 2012).

### For Better, for Worse, for Both, and for Neither: Coexisting Responsivity Patterns

In earlier work, the diathesis-stress, vantage sensitivity, and differential susceptibility model have been mostly theorized and tested as competing models (Belsky et al., 2007, 2013; Roisman et al., 2012). Empirical studies have found support for each model, with inconsistencies in findings being related to the studied parenting practice, child outcome, developmental period, and sensitivity marker, for example (Rabinowitz & Drabick, 2017;

Rioux et al., 2016; Slagt et al., 2016). One explanation for these inconsistent findings is that all distinct theorized subgroups of *adverse sensitive*, *vantage sensitive*, and *differentially susceptible* adolescents coexist in the population. Indeed, Pluess (2015) theorizes that individuals vary in their sensitivity to adverse and/or supportive influences, which can again manifest in some individuals being highly responsive to either unsupportive or supportive influences, or to both influences. Our study is the first, to our knowledge, to assess whether different responsivity-to-parenting patterns coexist.

In support of this hypothesis, around one third of the 256 adolescents in the sample showed one of the theorized responsivity patterns. Specifically, 5% appeared *adverse sensitive*, 3% *vantage sensitive*, and 26% *differentially susceptible*. Although these proportions varied across sensitivity analyses, overall the findings suggest that the three different environmental sensitivity models may coexist. Yet, more adolescents seemed responsive to both adverse and supportive parenting than to only one of the two. Hence, as suggested earlier by scholars, determinants of heightened environmental sensitivity (e.g., temperamental traits or genetic variants) might indeed mostly result in responsivity to both positive and negative parenting influences (Boyce & Ellis, 2005; Pluess, 2015).

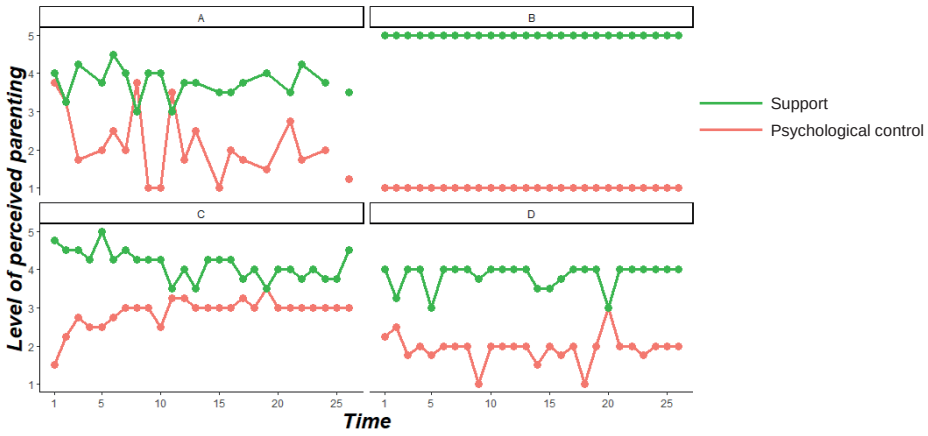
Moreover, in all three environmental sensitivity models, responsive adolescents (either adverse, vantage or differentially susceptible) are theoretically compared against a subgroup of non-responding unsusceptible adolescents (Belsky et al., 2007; Belsky & Pluess, 2009; Slagt et al., 2016). However, unexpectantly, no adolescent in the sample appeared *unsusceptible* (i.e., not responding to perceived changes in parenting). Instead, 28% appeared not responsive because they did not perceive changes in parenting (for an example see participant B in Figure 5) and scored lowest on trait environmental sensitivity (i.e., sensory processes sensitivity). These findings highlight the differentiation between sensitivity and responsivity, and indeed suggest that low sensory processing sensitivity could lead to low responsivity to the environment because of an inability to perceive subtle changes (Pluess, 2015).

To further understand our findings, it is helpful to link them to so-called proposed “weak” and “strong” versions of environmental sensitivity models (Belsky et al., 2013; Jolicoeur-Martineau et al., 2019). Weak versions assume continuous differences between individuals in responsiveness, with some being more responsive than others. Strong versions, in contrast, describe a clear dichotomy with individuals either being responsive or not at all. In line with weak versions: perceived changes in parenting predicted changes in psychological functioning in all adolescents, although some appeared more strongly

affected than others. Nonetheless, we also found a distinction between responsive and unresponsive adolescents, which is in line with strong versions. Our findings further illuminate that the unresponsive adolescents in our sample did not perceive any over-time changes in parenting (labeled as unperceptive, e.g., individual B in Figure 5). This unpredicted *unperceptive* responsivity pattern – not responding because not perceiving – differed from our predicted subgroup of *unsusceptible* adolescents (for illustration, see Figure 1), who we conceptualized as individuals who not respond to perceived changes in parenting. Hence, our findings indicate that weak and strong versions of environmental models can perhaps be integrated: Whereas a distinct subgroup of individuals do not perceive and therefore not respond to environmental influences, others perceive environmental changes and respond to these environmental influences in varying degrees.

**Figure 5**

*Perceived Parenting Fluctuates in Most Families: Data of Four Participants*




*Note.* Time represents a bi-weekly timescale

To assess whether the main findings replicate to immediate responsivity, we also explored concurrent associations. In line with previous work (Bülow, Van Roekel, et al., 2022), concurrent associations were less heterogeneous than lagged parenting effects (i.e., from perceived parenting to adolescent functioning). Whereas the concurrent associations provide predominantly evidence for a *differential susceptible* responsivity pattern (Belsky & Pluess, 2009), the lagged parenting effects were in line with our hypothesis that different responsivity patterns coexist (and thereby possibly different sensitivity types, see Pluess,

2015). In other words, perceived parenting and psychological functioning seemed to co-fluctuate similarly within individual adolescents. However, when disentangling the direction of effects to assess "what comes first" (Hamaker et al., 2015; Keijsers, 2016), adolescents indeed seemed to respond differently to preceding changes in perceived parenting in terms of their psychological functioning. Our findings thus highlight the necessity to also consider lagged effects when aiming to unraveling heterogeneity in parenting effects.

In addition to adolescent-reported parenting, we also explored adolescents' responses to changes in parent-reported parenting. In line with prior work (Hou et al., 2019; L. H. C. Janssen, Verkuil, et al., 2021), we found differences in adolescents' and parents' reports of parenting. For instance, some adolescents had perceived no changes in parenting while their parent did report changes. Moreover, adolescents' reports of parenting were more often predictive of their psychological functioning than parent-reported parenting (see also Bülow, Neubauer, et al., 2022), which is in accordance with developmental theories emphasizing that subjective experiences are the driving forces of well-being (Rohner, 2016; Sameroff, 2010; Soenens et al., 2015). Hence, although we did find similar co-existing responsivity patterns, thereby again confirming our main hypothesis, the classification of adolescents' responsivity patterns differed between informants. As environmental sensitivity theories posit that individual differences in sensitivity (i.e., how stimuli are perceived and processed) are accountable for differences in responsivity patterns (Greven et al., 2019; Pluess, 2015), our main findings based on self-reports may be more meaningful in light of environmental sensitivity theories.

### Some Are More Sensitive in Perceiving Changes in Parenting

One of the key elements of the environmental sensitivity models is that effect heterogeneity can be explained by individual differences in trait environmental sensitivity. We examined environmental sensitivity as sensory processing sensitivity, which is characterized by greater awareness of subtle environmental cues, behavioral inhibition, deeper cognitive processing, higher emotional and physiological responsivity, and ease of overstimulation (Aron et al., 2012; Pluess, 2015). Due to limited subgroup sizes and no observed unsusceptible adolescents in our main findings, we were unable to test whether *differentially susceptible* adolescents demonstrated the highest trait levels of environmental sensitivity. Instead, we checked how the five parenting effects were related to trait environmental sensitivity. The results showed that only the effect of parental support on depressive symptoms was stronger for adolescents who reported higher trait levels

of environmental sensitivity, which relates to prior work suggesting that more sensitive children in families with low-quality parenting are at higher risk for internalizing problems (Lionetti et al., 2021, 2022). In light of interventions targeting parenting, it is crucial to further identify which adolescents are more responsive to perceived changes in adverse parenting, supportive parenting, or to both.

Because we unexpectantly observed adolescents who perceived parenting as stable during the full study year, we looked at this subgroup in more detail. Findings revealed that this subgroup showed lower trait levels of environmental sensitivity compared to adolescents who perceived changes in parenting and seemed affected by it – in all possible ways. Overall, our findings indicate that individual differences in trait levels of environmental sensitivity reflect differences in the ability to perceive subtle environmental changes and not per se differences in responsivity to environmental changes (Aron et al., 2012; Pluess, 2015).



### Unpredicted Responsivity Pattern: When Supportive Parenting is Unsupportive

One intriguing and unexpected finding was that 37% of the sample responded contrary to parenting theories (Soenens et al., 2017) and therefore did not match with one of the hypothesized responsivity patterns. Most of these adolescents reported lower psychological functioning after parental support increased 2 weeks earlier. With the appearance of intensive longitudinal work on parenting, such unexpected effects of parental support have been reported in a recent experience sampling study (Bülow, Van Roekel, et al., 2022) but not consistently in daily diary studies (Bülow, Neubauer, et al., 2022; L. H. C. Janssen, Elzinga et al., 2021).

One explanation for these unexpected findings is that parental support can backfire in some families, for instance based on characteristics of the parent, the adolescent, or the parent-adolescent relationship (L. H. C. Janssen, Elzinga, et al., 2021; Rote et al., 2020). For some, supportive parenting might be experienced as overinvolvement, hindering their psychological functioning by age-inappropriate restriction of their autonomy, for instance (Padilla-Walker & Nelson, 2012; Rote et al., 2020; Schiffrin et al., 2014). Likewise, less support and warmth from parents may be experienced as granting more independence and less intrusion (Dietvorst et al., 2018; Van Petegem et al., 2015), which could actually promote better functioning. Earlier work suggests that mainly adolescents who score higher on depressive symptoms might be more vulnerable for the negative effects of parental

support (L. H. C. Janssen, Elzinga et al., 2021). However, no moderating effects have been found for other adolescent characteristics, such as age, gender, and neuroticism (Boele, Nelemans et al., 2023; Bülow, Neubauer, et al., 2022; L. H. C. Janssen, Elzinga et al., 2021). Thus, parenting effects might thus not always be universal (Grusec, 2008), but under which circumstances and for whom needs to be unraveled.

### Responsivity to Parenting Might be Outcome Specific

A question that recently gained more attention is whether environmental sensitivity is specific to the outcome (Belsky et al., 2007, 2021). To account for this, we included different outcomes, both positive and negative indicators of adolescents' psychological functioning (Keyes, 2014; Ryff et al., 2006). Hence, our responsivity patterns were based on a combination of three adolescent outcomes. Despite that the adolescent outcomes correlated within the same individuals, the two parenting practices did not predict all three outcomes in all adolescents. To illustrate, 12 of the 67 *differentially susceptible* adolescents were affected in a for-better-and-for-worse manner in all three outcomes, whereas the others were affected in one or two outcomes. Hence, our results suggest that the specific outcome of parenting might still depend on the person. Even though future studies need to replicate the found responsivity patterns to parenting, both theorized and unexpected patterns, findings emphasize the importance of considering multiple outcomes. This corresponds to the broader multifinality principle in developmental psychology that the same influence can lead to different outcomes in different children (Cicchetti & Rogosch, 1996).

### Limitations and Future Research

While being one of the first within-family study to assess heterogeneity in parenting effect in such detail, it is not without limitations. First, the number of assessments per person was insufficient to test for $N = 1$ significance (Voelkle et al., 2012), and therefore we assigned adolescents to different responsivity patterns based on a subjective effect size cut-off ($\beta \geq .05$) (Beyens et al., 2021; Lakens et al., 2018; Orth et al., 2022) rather than significance levels. Hence, the hypothesis was tested with descriptive data. Methods that can estimate data-driven subgroups, for instance DSEM-mixture models (Asparouhov et al., 2017), Markov modelling (de Haan-Rietdijk et al., 2017), or Subgrouping Group Iterative Multiple Model Estimation (S-GIMME; Lane et al., 2019), is a promising direction for future research to replicate current findings and further study individual differences

in parenting processes. Relatedly, the sample-level reliabilities of the family-specific lagged effects were rather low: between .43 and .53 (with one exception of .28) (within-person coupling reliability (WPCR index; see Neubauer et al., 2020), which might have attenuated the statistical power to detect parenting effects within each individual family. A higher number of assessments per person may lead to more reliable and detectable individual estimates (Voelkle et al., 2012), and therefore, findings need replication with higher-powered intensive longitudinal studies to optimally apply an idionomic approach (i.e., detecting subgroups by using idiographic, $N = 1$ data; Chaku & Beltz, 2022; Sanford et al., 2022). Nonetheless, prior work has found no substantial differences in the sign (i.e., positive or negative) and strength of individual parenting effect sizes when 25, 50, or 100 data points were analyzed (Bülow, Neubauer, et al., 2022).



Second, the sample included a homogenous community adolescent sample, with the majority being female and following higher secondary education tracks. Therefore, there is a possibility that some subgroups might be underrepresented in our sample. For instance, highly sensitive individuals are more prevalent in clinical samples (Greven et al., 2019). Future studies with larger, more heterogeneous (e.g., clinical) samples are required to replicate (the size of) coexisting responsivity patterns. Moreover, the question remains whether the found responsivity patterns are specific to adolescence. The substantial subgroup who did not perceive changes in parental behavior might consist of adolescents who spend little time with their parents, which is an important developmental task in adolescence (R. W. Larson et al., 1996). Future research should investigate to what extent responsivity-to-parenting patterns replicate to other developmental periods such as childhood.

Third, shortcomings of the measures need to be mentioned. Concerning parenting, whereas psychological control was measured in reference to both parents (i.e., *My parents* were …), parental support concerned support of the primary caregiver (for 81% it was their mother and for 19% their father). Although most adolescents in the sample indicated that they spent most time with their mother, it remains uncertain whether changes in psychological control were driven by maternal and/or paternal behavior. Hence, future studies that make a clear distinction between maternal and paternal parenting behavior (Mabbe et al., 2019; Vrolijk et al., 2020) can examine whether adolescents show a similar responsivity pattern to both maternal and paternal parenting. Concerning the adolescent outcomes, the reliability of self-esteem was somewhat low, with the three negatively formulated items explaining most variance of the construct, which limited our ability to

capture changes in positive psychological functioning. Hence, future studies including a more reliable measurement of positive adolescent functioning are desired.

Fourth, we examined bi-weekly parenting effects. Because (heterogeneity in) parenting effects may not generalize to other timescales (Boele, Nelemans et al., 2023; Lerner & Schwartz, 2009; Voelkle et al., 2018), future research that can disentangle the direction of effects at multiple timescales should clarify for whom and when certain parenting practices are rather hindering than helping. Nonetheless, we also call for enriched parenting theories that specify the timescale(s) of the parenting processes to guide future research (Boele, Nelemans et al., 2023).

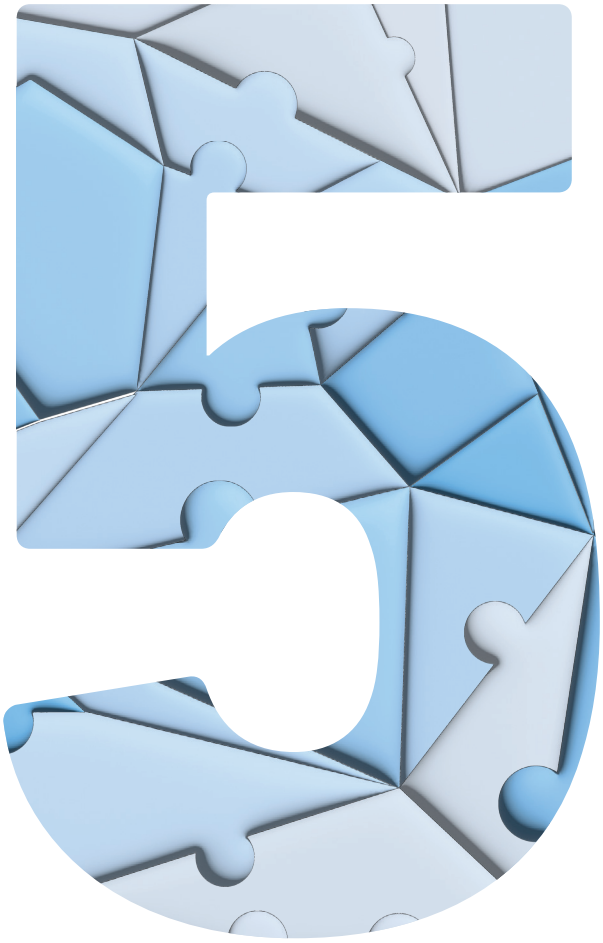
Fifth, although parenting processes are bidirectional in nature (Soenens & Vansteenkiste, 2020), we focused on heterogeneity in parent-driven effects (i.e., from parenting to adolescent functioning). Yet, heterogeneity in adolescent-driven (i.e., from adolescent functioning to parenting) effects might also exist, for example due to differences in parents' environmental sensitivity. As sensory processing sensitivity is a heritable trait (Greven et al., 2019), it is likely that in some families both adolescents and parents are more responsive to each other than in other families. Therefore, an important direction for future research is to uncover heterogeneity in both parent-driven and adolescent-driven effects.

Sixth, with a focus on the primary socialization context: the family, the current study did not address whether findings generalize to different important environmental influences, such as peer relationships (Belsky et al., 2022; Sayler et al., 2022). The extent to which the same children are differently affected by different environmental influences can only be answered with a more integrated cross-contextual, longitudinal approach.

## Conclusion

According to environmental sensitivity models (Belsky & Pluess, 2009; Pluess, 2015), individuals differ in how responsive they are to environmental influences, such as parenting influences (e.g., Slagt et al., 2016). Three dominant theoretical models describe such individual differences in responsivity, describing either responsivity to primarily adverse influences (diathesis-stress; Monroe & Simons, 1991), primarily supportive influences (vantage sensitivity; Pluess & Belsky, 2013) or to both (differential susceptibility; Belsky & Pluess, 2009). Our findings demonstrate that these three theoretical models likely complement each other and coexist, but our findings also illuminate previously undetected

responsivity patterns. That is, one third of the sample responded in correspondence to one of the three models: some adolescents appeared *adverse sensitive*, others appeared *vantage sensitive* or *differentially susceptible*. However, completely *unsusceptible* adolescents, as predicted by all three models, were not found. Instead, we detected a substantial group of *unperceptive* adolescents who did not perceive any over-time changes in parenting, who also scored lower than others in trait levels of environmental sensitivity (i.e., sensory processing sensitivity). Furthermore, a substantial subgroup of adolescents unexpectantly responded contrary to universal parenting theories (Rohner et al., 2005; Soenens et al., 2017) and did therefore not fit in one of the hypothesized coexisting responsivity patterns. In sum, these findings suggest that general parenting principles may not apply to all adolescents and coexisting environmental sensitivity models partly explains such effect heterogeneity. Therefore, findings highlight the need for tailoring parenting interventions to the individual family, as adolescents differ in whether and how they react to changes in parenting.



# CHAPTER 5

## The direction of effects between parenting and adolescent affective well-being in everyday life is family specific

This chapter is published as:

**Boele., S**., Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). The direction of effects between parenting and adolescent affective well-being is family specific. *Scientific Reports, 13*, 16106, https://doi.org/10.1038/s41598-023-43294-5

**Supplemental materials** can be viewed in the online version of the article.


**Open science statement:** The preregistered hypothesis and analytical approach, code, output, and data (https://osf.io/7n2jx/), and codebook of the data collection (https://osf.io/a9g7c/) are shared on the Open Science Framework.

**Author contributions: SB**: conceptualization, methodology, investigation, formal analysis, writing – original draft. **AB**: conceptualization, methodology, investigation, data curation, writing – review & editing. **ABM**: conceptualization, methodology, writing – review & editing. **AdH**: conceptualization, methodology, writing – review & editing, supervision. **JJAD**: conceptualization, methodology, writing – review & editing, supervision. **LK**: conceptualization, methodology, writing – review & editing, supervision, funding acquisition.

## ABSTRACT

Numerous theories and empirical studies have suggested that parents and their adolescent children reciprocally influence each other. As most studies have focused on group-level patterns, however, it remained unclear whether this was true for every family. To investigate potential heterogeneity in directionality, we applied a novel idiographic approach to examine the effects between parenting and adolescent well-being in each family separately. For 100 days, 159 Dutch adolescents ($M_{age}$ = 13.31, 62% female) reported on affective well-being and four parenting dimensions. The family-specific effects of pre-registered (https://osf.io/7n2jx/) Dynamic Structural Equation Models (DSEM) indeed revealed that a reciprocal day-to-day association between parenting and adolescent affective well-being was present only in some families, with the proportion of families displaying a reciprocal association varying across the four parenting dimensions (11%-55%). In other families, either parenting predicted the adolescent's affective well-being (8%-43%) or vice versa (10%-27%), or no day-to-day associations were found (16%-60%). Adolescents with higher trait levels of environmental sensitivity and neuroticism were more strongly affected by parenting. Thus, findings suggest that the ways in which parents and adolescents influence each other in everyday life are unique, stressing the need to move towards an idiographic parenting science.

*Keywords*: parenting, adolescence, within-person, dynamic structural equation modeling, intensive longitudinal data

## INTRODUCTION

A long-standing question in parenting research has been the direction of effects: Who influences whom (the most)? (Bell, 1968; Pardini, 2008) Typically, this question has been studied by asking follow-up questions, such as: Is the parent mainly affecting their adolescent child? Or is the adolescent the most active agent and driving changes in parenting? Or are influences equal, with parents and adolescents reciprocally affecting each other? Reciprocity in the parent-adolescent relationship is now an established concept in many theories (Pardini, 2008; Sameroff, 2010; Soenens & Vansteenkiste, 2020), but could this contemporary theoretical consensus be inaccurate – at least for some families? (Richters, 2021)

Although theories have stated that influences within the family may be inherently reciprocal (Soenens & Vansteenkiste, 2020), there are also theoretical notions and empirical studies suggesting that the direction of influence might differ from family to family. For example, theories on environmental sensitivity posit that people vary in their responsiveness to contextual influences, including the behavior of others (Greven et al., 2019; Pluess, 2015). This idea is supported by various empirical studies showing that individuals with higher trait levels of environmental sensitivity (i.e., ability to perceive, process, and respond to stimuli) and neuroticism (i.e., tendency to experience and inability to cope with negative emotions) respond more strongly to interpersonal experiences (Greven et al., 2019; Lionetti et al., 2019; Pluess et al., 2018). Additionally, adolescent girls are believed to be more sensitive to interpersonal experiences than adolescent boys (Rudolph, 2002). Furthermore, studies have shown that some adolescents reject their parents' authority, leading to disobedience and possibly non-responsiveness to parental demands (Darling et al., 2007), and theories suggest that controlling and supportive parenting might only be effective in promoting adolescent well-being if such styles align with the (developmental) needs of the adolescent (Eccles et al., 1991). Thus, it is likely that parent-adolescent dyads are differentially responsive to each other and might be (a) characterized by reciprocal influences in some families, (b) largely driven by parental influences in other families (parent-driven), (c) largely driven by adolescent influences in still other families (adolescent-driven), and (d) occasionally non-existent (see Fig. 1).

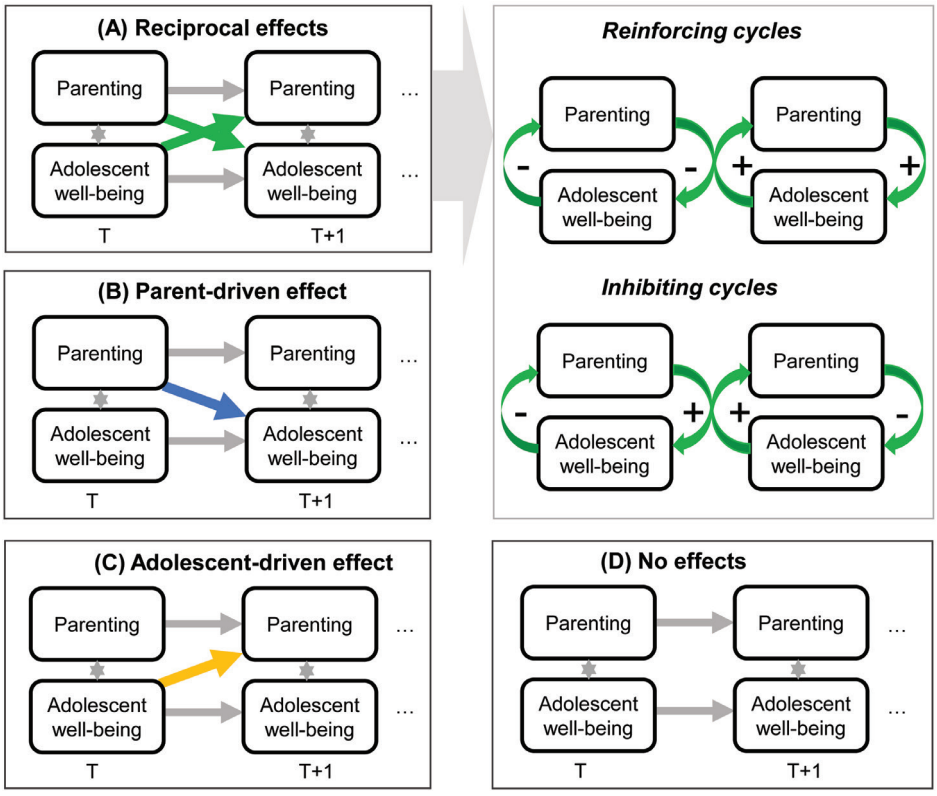
### Heterogeneity in the Nature of Reciprocal Dynamics

Even among families with reciprocal parent-adolescent influences, it is possible that the nature of these influences varies. To illustrate, when an adolescent feels sad, a parent in one family may make the adolescent feel better by providing more affection, whereas a

parent in another family may instead (unintentionally) amplify the adolescent's negative feelings by showing less affection, as the parent themselves withdraws from the expressed sadness. In dynamic systems and related theories, such phenomena are called inhibiting and reinforcing processes, respectively (Kunnen et al., 2019). An inhibiting process is the driving force behind maintaining stability, whereas a reinforcing process may trigger a change. As these processes are meaningful, it is important to examine potential heterogeneity in the nature of reciprocal parent-adolescent dynamics.

**Figure 1**

*Theoretical Different Directions of Effects Between Parenting and Adolescent Well-Being Within a Family*




*Note.* (A) Reciprocal effects: fluctuations in parenting and adolescent well-being predict each other from one time point (e.g., day) to the next. These reciprocal effects can differ in nature, such that reinforcing and inhibitory cycles are possible, including positive (+) and/or negative effects (-). (B) Parent-driven effect: fluctuations in parenting predict later adolescent well-being but not vice versa. (C) Adolescent-driven effect: fluctuations in adolescent well-being predict later parenting but not vice versa. (D) No effects: fluctuations in parenting and adolescent well-being do not predict each other over time.

## Methodological Advancements: From Group-Level Patterns to the Dynamics of Individual Families

Most empirical parenting studies employ nomothetic methods to establish general principles (Molenaar, 2004; Molenaar & Campbell, 2009), often by examining group-level patterns (Boele et al., 2020; Keijsers, 2016). Such examinations have indicated, for example, that adolescents whose parents display higher levels of support have better psychological well-being (e.g., fewer depressive symptoms) – on average – than adolescents whose parents display lower levels of support (Pinquart, 2017a, 2017b). Meta-analytic work on group-level associations highlights these bidirectional associations between parenting and adolescent well-being (Pinquart, 2017a, 2017b), which initially seems to support theoretical notions of reciprocal parent-adolescent influences (Soenens & Vansteenkiste, 2020). At the same time, however, it has been increasingly purported that group-level patterns do not necessarily align with dynamic processes that unfold within individual families (Hamaker, 2012; Molenaar, 2004). That is, relations between *average* parenting and *average* adolescent well-being may not describe *family-specific* relations between parenting and well-being, especially if these processes are expectedly heterogeneous across families (Hamaker, 2012; Moeller, 2022). Therefore, the heavy reliance on nomothetic methods in parenting science (Boele et al., 2020), and in other fields of psychological science (Bolger et al., 2019; Bryan et al., 2021), is problematic for the accuracy and implementation of scientific findings. Group-level patterns suggesting reciprocal associations between parenting and adolescent well-being (Pinquart, 2017a, 2017b; Willoughby & Hamza, 2011) could obscure the direction of the effects at the level of the individual family. Additionally, translating group-level patterns into nomothetic parenting advice might unintentionally harm families if they are not described well by the group average. Thus, to promote the well-being of adolescents (Shorey et al., 2022), there is an urgent need to gain empirical insights into how parents and adolescents impact each other within individual families. This may ultimately help practitioners develop and apply interventions tailored to a family's dynamics and needs.

To gain these insights into how heterogeneous parents and adolescents influence each other within *individual* families, an idiographic approach is needed (Beltz et al., 2016; Molenaar, 2004). One increasingly popular method, but lacking in parenting research (Boele et al., 2020; Keijsers et al., 2022), is to use intensive longitudinal data (e.g., experience sampling or daily diary data). The very first idiographic parenting studies provided evidence that parenting effects on adolescent well-being indeed varied from family to family in both magnitude (Bülow, Neubauer, et al., 2022) and in nature (i.e.,

positive or negative effect) (Boele, Bülow, de Haan, et al., 2023; Bülow, Van Roekel, et al., 2022). For instance, some adolescents benefited from supportive parenting, whereas others did not respond to it or were even negatively impacted by it. Heterogeneity in parent-driven *and* adolescent-driven effects (see Fig. 1) has not yet gained much scientific attention, though, leaving important questions unanswered: How heterogeneous is the direction of effects?

### The Present Study

In the present idiographic study, 159 Dutch families were meticulously followed up for 100 consecutive days to investigate the *family-specific* day-to-day dynamics between perceived parenting and adolescent affective well-being. The main aim was to test a pre-registered hypothesis (https://osf.io/7n2jx/) that some families would show reciprocal effects, whereas others would show either a parent-driven effect, an adolescent-driven effect, or no effects at all (see Fig. 1). This hypothesis was tested across eight distinct parenting-affect associations: four key dimensions of parenting with two dimensions of adolescent affective well-being. We explored whether families showed a similar direction of effects across those distinct associations and whether heterogeneity in directionality could be explained by attributes of the adolescent (i.e., demographic factors and personality traits). Furthermore, we examined whether families showed qualitatively different reciprocal effects (i.e., inhibiting and reinforcing cycles).



## METHOD

### Participants

A total of 159 adolescent-parent dyads participated in the “100 days of my life” study (https://osf.io/5mhgk/). The adolescents were between 12 and 16 years old ($M_{age}$ = 13.1, $SD_{age}$ = 1.22), and 62% were female (36% male, 2% neither female nor male). Most were born in the Netherlands (89%), and some in other European countries (6%), or counties in Asia (2%), North America (1%), South America (1%), or Africa (1%). Moreover, 15% of the adolescents followed pre-vocational secondary education or vocational training, 30% higher general secondary education, 51% pre-university secondary education, and 5% a mixed educational track.

Adolescents reported on one participating primary caregiver of choice: biological mothers (79%), fathers (19%), or other caregivers (*n* = 1 adoption mother, *n* = 1 second mother, *n* = 1 stepfather) – hereafter called parents. Parents were on average 45.3 years old (*SD* =

4.54, Range = 33 – 55), and most were born in the Netherlands (87%). Some were born in other European countries (6%), Asia (3%), North America (1%), South America (1%), Africa (1%), and Australia (1%). Ten percent of the parents completed up to high school, 25% completed vocational/technical training, 62% graduated from college or university, and 3% gave insufficient information to determine their educational level.

## Procedure

Most parent-adolescent dyads were recruited via two high schools in the Netherlands, which offered low to high secondary educational tracks to 1,300 and 2,000 students, respectively. Families were informed about the study through class visits, email, and posters. Other families were informed through personal communication, social media, and a newsletter to participants of a former project. Interested families received a detailed briefing via a video call, after which both parents and adolescents signed an online informed consent form. Parents also provided informed consent for the participation of their underage adolescent. One dyad (i.e., composed of an adolescent between 12 – 16 years old and one parent with whom they had daily contact) could participate per family. Both members of the dyad needed to own a smartphone in order to participate.

For 100 consecutive days (Oct 26, 2020 until Feb 2, 2021), adolescents and parents answered one daily questionnaire via the Ethica Data app, which they installed on their own smartphone. The questionnaires took approximately 3 to 5 minutes to complete. Participants were prompted in the evening between 7PM and 10PM, depending on their preference. They received a maximum of four automatic reminders in the evening and one final call at 7AM the next morning. Most of the daily diaries (86%) were completed before this final call.

To ensure high compliance, we added several motivational features. First, participants received a monetary reward for each completed questionnaire and bonuses if they completed 10 questionnaires in a row and 100 questionnaires in total. Adolescents could receive up to €100 (≈US$ 121). Second, every day, €10 was raffled off to two adolescents who completed the daily questionnaire. Third, participants could compensate for missing questionnaires by extending their participation by another 25 days, which led to an average participation length of 107 days.

During their 107 days of participation, adolescents completed an average of 87% of the prompted diaries, resulting in 93 completed diaries per adolescent (range: 24 – 108). All available data, including incomplete diaries, were used. The total number of

observations per variable ranged from 14,512 to 14,819. This study was approved by the Ethical Committee of Tilburg University (RP250), and all methods were performed in accordance with the relevant guidelines and regulations. More detailed information about the procedure can be found online: https://osf.io/5mhgk/

## Measures

All items were scored on a visual analogue scale (VAS) ranging from 0 (*Not at all*) to 100 (*Very much*).



### *Parental Psychological Control*

Parental psychological control involves regulating others' thoughts and emotions through manipulative behaviors, including (a) constraining verbal expression, (b) guilt induction, and (c) love withdrawal (Barber, 1996). To measure these parenting behaviors, adolescents rated three items that were adapted from an existing 4-item daily diary scale (Van Der Kaap-Deeder et al., 2017). The items were: "When I wanted to say something, my parent started to talk about something else" (constraining verbal expressions), "My parent blamed me for the problems at home" (guilt induction), and "My parent was less affectionate towards me when I did not see things his/her way" (love withdrawal). Multilevel confirmatory factor analysis indicated moderate internal consistency at the within-family level ($\omega$ = .61) and excellent internal consistency at the between-family level ($\omega$ = .83) (Geldhof et al., 2014).

### *Parental Behavioral Control*

Parental behavioral control involves regulating others' behavior through (a) rules, regulations, and restrictions and (b) actively monitoring whereabouts and activities (Kerr et al., 2012). To capture both facets, adolescents rated two items, which were adapted from prior work (Dietvorst et al., 2018; Stattin & Kerr, 2000). The items were "My parent was strict" (rule setting) and "I had to tell my parent what I did, with whom and where" (monitoring). Internal consistency, measured with the inter-item correlation, was insufficient at the within-family level ($r$ = .11, $p$ < .001) and good at the between-family level ($r$ = .50, $p$ < .001). Hence, although the two items co-fluctuated to some extent, the items likely reflected different parenting practices. We report the pre-registered analyses of the subscale in the main text and then examined differences using each item separately in sensitivity analyses (see Supplementary Table S7).

### *Parental Autonomy Support*

Parental autonomy support is defined by (a) the provision of choice and allowance of independent decision-making and (b) acknowledgment and interest in the adolescent's perspective (Soenens et al., 2017). To capture both components, adolescents rated two items adapted from a 4-item daily autonomy support scale (Van Der Kaap-Deeder et al., 2017). The items were: "My parent allowed me to make my own plans" (independent decision-making) and "My parent took my point of view into account" (acknowledgment of perspective). Internal consistency of the 2-item scale was sufficient at the within-family ($r$ = .46, $p$ < .001) and good at the between-family level ($r$ = .76 $p$ < .001).

### *Parental Warmth*

Parental warmth includes (a) provision of affection and (b) parental care and responsiveness (Soenens et al., 2017), which were rated by adolescents with two items. The items were adapted from a Dutch daily diary study (Keijsers et al., 2016). The items were: "The relationship with my parent was enjoyable" and "My parent showed me that she/he cares for me." Internal consistency of the two items was good at both the within-family ($r$ = .64, $p$ < .001) and between-family levels ($r$ = .85, $p$ < .001).

### *Adolescent Affective Well-Being*

Affective well-being can be defined by high levels of positive affect (i.e., pleasant, desirable feelings) and low levels of negative affect (i.e., unpleasant, undesirable feelings)(Diener et al., 2018). Therefore, to measure daily affective well-being, we used five items from the Positive and Negative Affect Schedule for Children (PANAS-C) (Ebesutani et al., 2012). These items were chosen based on the psychometric properties of the Dutch scale in an adolescent sample from previous work (Bülow, Van Roekel, et al., 2022). Positive affect was measured with two items ("joyful" and "happy"), and negative affect with three items ("mad", "afraid", and "sad"). Internal consistency of the positive affect scale was good at both the within-family ($r$ = .76, $p$ < .001) and between-family level ($r$ = .95, $p$ < .001). The internal consistency of the negative affect scale was good at the within-family level ($\omega$ = .71) and excellent at the between-family level ($\omega$ = .92).

## Preregistered Analytical Approach

To assess how perceived parenting and adolescent affect predicted each other in each family, we used Dynamic Structural Equation Modelling (DSEM) (McNeish & Hamaker,

2019) in M*plus* 8.5. This relatively novel analytical technique combines the strengths of structural equation modeling, multilevel modeling, and *N* = 1 time series analyses – and can yield both insights into within-family effects at the group level (i.e., averaged effects) as well as at the level of the individual family (i.e., family-specific effects). Preliminary analyses confirmed that the data met the assumption of weak stationarity because time (i.e., days in the study) explained little-to-no variance (0.0%–0.1%) in the parenting and affect variables. Eight lag-1 multilevel vector autoregressive (ML-VAR(1)) models (see Fig. 4) were estimated: 4 (parenting dimensions) × 2 (affect dimensions). The within-family bi-variate cross-lagged effects were specified as random effects to estimate these (family-specific) effects for each individual family separately. The within-person coupling reliability (WPCR) of the family-specific parenting-affect couplings ranged between .72 and .97 for the couplings concerning positive affect, and between .45 and .75 for couplings concerning negative affect(Neubauer et al., 2020). To account for unequal time intervals between measurements due to missing data, the option TINTERVAL was set to 1 (i.e., 1 day). All data points were placed in this equal day-to-day time interval and missing data were inserted into time intervals without data. Due to the Kalman filter implemented in DSEM, all available observations were used in the DSEM analyses (Hamaker et al., 2018; McNeish & Hamaker, 2019)



Model convergence was inspected using two criteria: (1) PSR lower than 1.1 (potential scale reduction factor) and (2) whether the trace plots of the parameters look like fat caterpillars, especially the plots of the cross-lagged parameters (Hamaker et al., 2018). We used 40,000 iterations and a thinning factor of 10 in our final models. If the models did not converge with all random effects, fixed autoregressive effects were estimated.

***Inference Criteria***

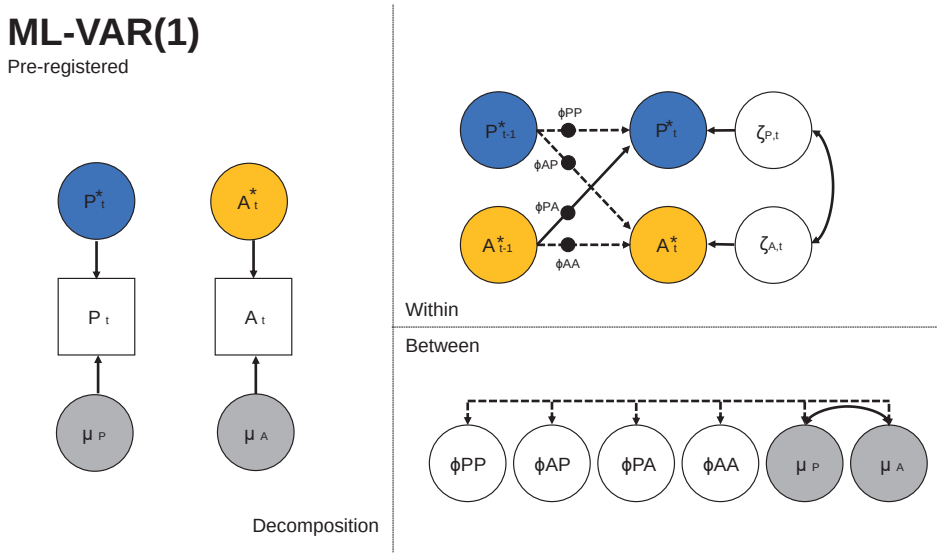
We extracted the family-specific standardized cross-lagged effects (i.e., STDYX standardization) from the ML-VAR(1) models by using the R package "M*plus* Automation"(Hallquist & Wiley, 2018). As pre-registered (https://osf.io/7n2jx/), these standardized effects were interpreted based on the smallest effect size of interest (SESOI) of .05 (Boele, Bülow, de Haan et al., 2023; Lakens et al., 2018). A standardized within-family cross-lagged effect of .05 can be considered a small(-to-moderate) effect according to recent guidelines (Orth et al., 2022). Hence, we interpreted standardized family-specific cross-lagged effects smaller than .05 as null effects ($-.05 > \beta < .05$), effects with a size of $\beta \geq .05$ as positive effects, and effects with a size of $\beta \leq -.05$ as negative effects.

## Additional (Non-Preregistered) Analyses

We additionally explored whether the proportions of families showing reciprocal, parent-driven, adolescent-driven, and null effects were different from what would be expected by chance (i.e., 25% of families showing each type of effect). To do so, we used chi-square tests, reviewing standardized residuals (≥ |1.96|) to interpret which effects were significantly more or less prominent in our sample. Moreover, we tested whether demographic factors and the two personality traits could explain differences in terms of (absolute) effect sizes. Specifically, we tested for sex differences (*t*-test), differences between adolescents with varying educational levels (ANOVA), and correlations with age and trait levels of environmental sensitivity and neuroticism.

**Figure 4**

*Specification of Dynamic Structural Equation Model*




*Note*. P = Parenting. A = Adolescent affect. Left: Variables are decomposed in a between-family (μ = family-specific mean) and within-family part (P*t and A*t = time-specific score of parenting and adolescent affect, respectively). Top right: Estimates at the within-family level, including the random (family-specific) cross-lagged (ϕAP and ϕPA) and autoregressive effects (ϕPP and AA) and the correlation between the innovations (ζ). Bottom right: Between-family level correlations between the random effects and means.

# RESULTS

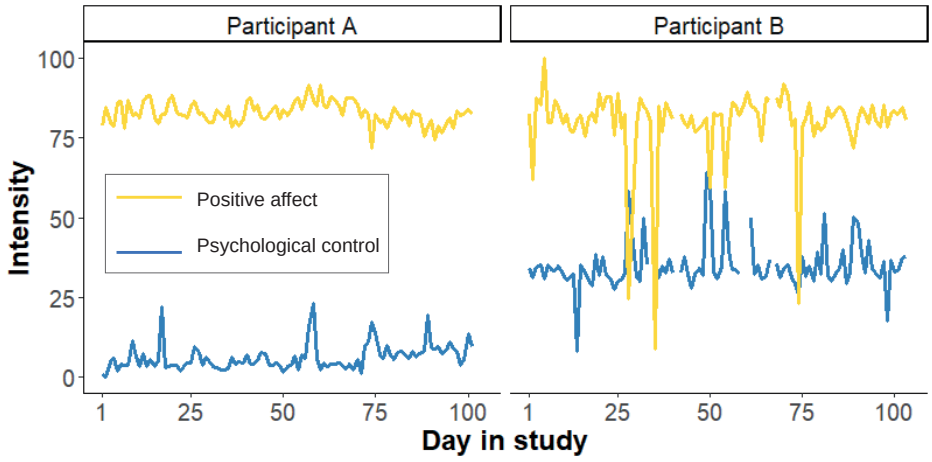
## Descriptive Statistics and Correlations

Both perceived parenting and adolescent affect fluctuated from one day to the next (for two examples, see Fig. 2). The intraclass correlations (ICCs) for the parenting variables indicated that 56% to 67% of the variance was due to stable between-family differences and 33% to 44% due to daily fluctuations within families. For adolescent positive and negative affect, 62% and 47% of the variance was due to stable between-family differences, respectively, and the remaining 38% to 53% was due to daily fluctuations within families (Table 1).



**Figure 2**

*Daily Fluctuations in Parental Psychological Control and Adolescent Positive Affect Reported by Two Participating Adolescents*




*Note*. Timeseries of two participants, including their daily mean scores on their level of positive affect and perceived parental psychological control across 100 days. Response scale ranged from 0 to 100.

Most parenting dimensions correlated weakly with adolescent affect at the within-family level (*r*s between -.23 and .20; see Table 1), with the exception of the moderate correlation between parental warmth and adolescent positive affect ($r = .33$, $p < .001$). These within-family correlations indicate that, on average, adolescents reported more parental psychological control on days when they experienced less positive affect ($r = -.13$, $p < .001$) and more negative affect ($r = .17$, $p < .001$). More adolescent-perceived

parental autonomy support and warmth co-fluctuated with more positive affect (*r*s ≥ .20, *p* < .001) and less negative affect (*r*s ≤ -.14, *p* < .001). Furthermore, adolescents reported more behavioral control on days they experienced more negative affect (*r* = .10, *p* < .001) but not less positive affect (*r* = -.03, *p* = .226). The correlations at the between-family level were similar to the within-family correlations in sign (i.e., positive or negative), but were larger in magnitude, with all between-family correlations being moderate in size (*r*s between -.38 and .41; see Table 1).

**Table 1**
*Descriptive Statistics and Correlations (N = 159)*

| | Correlations | | | | | |
|---|---|---|---|---|---|---|
| | **1.** | **2.** | **3.** | **4.** | **5.** | **6.** |
| 1. Psychological control | - | .29** | -.27** | -.34** | -.13** | .17** |
| 2. Behavioral control | .51** | - | -.11** | -.17** | -.03 | .10** |
| 3. Autonomy support | -.40** | -.27** | - | .39** | .20** | -.14** |
| 4. Warmth | -.45** | -.30** | .69** | - | .33** | -.23** |
| 5. Positive affect | -.16 | -.17* | .41** | .51** | - | -.50** |
| 6. Negative affect | .41** | .37** | -.30** | -.38** | -.66** | - |
| *M* | 6.69 | 16.89 | 83.31 | 74.57 | 76.49 | 10.99 |
| *SD* | 11.92 | 20.94 | 17.39 | 24.97 | 20.68 | 14.94 |
| ICC | .61 | .67 | .56 | .59 | .62 | .47 |
| $T_{total}$ | 14,516 | 14,512 | 14,520 | 14,531 | 14,819 | 14,784 |

*Note. M* = sample mean. *SD* = standard deviation. ICC = intraclass correlation coefficient. *T* = number of observations. All items ranged from 0 – 100. Correlations at the within-family level are presented above the diagonal and at the between-family level under the diagonal.
** *p* < .001, * *p* < .05

## The Average Daily Dynamics between Parenting and Adolescent Affect

Results from the models for positive affect had fixed effects indicating that, on average, reciprocal effects were found with parental autonomy support and warmth (see Table S1 in the Supporting Information). Specifically, increases in autonomy support and warmth predicted increased positive affect the next day (β = .05 and .09). Vice versa, increased positive affect predicted more autonomy support and warmth (βs = .07). However, fluctuations in adolescents' positive affect were not preceded or followed by fluctuations in parental psychological or behavioral control (on average).

Results from the models for negative affect (see Supplementary Table S2) showed that, on average, there were parent-driven effects for parental psychological control and behavioral control, such that increases in psychological and behavioral control predicted

more next-day negative affect within the average adolescent (β = .04 and .05). However, no significant average lagged effects were found for parental autonomy support and warmth. Although these results show the average day-to-day effects in the sample, they do not provide information on how perceived parenting and adolescents' affective well-being are linked in each individual family.

## Family-Specific Effects: Heterogeneity in Direction of Effects

In line with our hypothesis, models for both positive and negative affect revealed that the direction of effects for parenting-affect associations was heterogeneous across families. Depending on the combination of parenting and affect dimensions, 11.4% to 54.7% of families demonstrated a reciprocal effect, 8.2% to 43.4% a parent-driven effect, 10.1% to 27.0% an adolescent-driven effect, and 15.7% to 60.1% (close to) null effects (see Table 2). The family-specific estimates thus suggest that the direction of effects in day-to-day parent-adolescent dynamics varied across families and across dimensions of parenting and adolescent affective well-being.



**Table 2**
*Direction of Effects Within Families Across Parenting-Affect Associations*

| Cross-lagged association | Direction of effects | | | | Total *N*[a] |
|---|---|---|---|---|---|
| | Reciprocal *N* (%) | Parent-driven *N* (%) | Adolescent-driven *N* (%) | No effects *N* (%) | |
| ***Positive affect*** | | | | | |
| 1. Psychological control | 36 (23.2%) | 53 (34.2%)↑ | 24 (15.5%)↓ | 42 (27.1%) | 155 |
| 2. Behavioral control | 36 (22.9%) | 44 (28.0%) | 26 (16.6%)↓ | 51 (32.4%)↑ | 157 |
| 3. Autonomy support | 58 (36.7%)↑ | 29 (18.3%) | 37 (23.4%) | 34 (21.5%) | 158 |
| 4. Warmth | **87 (54.7%)**↑ | 31 (19.5%)↓ | 16 (10.1%)↓ | 25 (15.7%)↓ | 159 |
| ***Negative affect*** | | | | | |
| 5. Psychological control | 28 (18.1%)↓ | 15 (9.7%)↓ | 31 (20.0%) | **81 (52.3%)**↑ | 155 |
| 6. Behavioral control | 28 (17.8%)↓ | 68 (43.3%)↑ | 17 (10.8%)↓ | 44 (28.0%) | 157 |
| 7. Autonomy support | 18 (11.4%)↓ | 24 (15.1%)↓ | 21 (13.3%)↓ | **95 (60.1%)**↑ | 158 |
| 8. Warmth | 29 (18.2%)↓ | 13 (8.2%)↓ | 43 (27.0%) | 74 (46.5%)↑ | 159 |

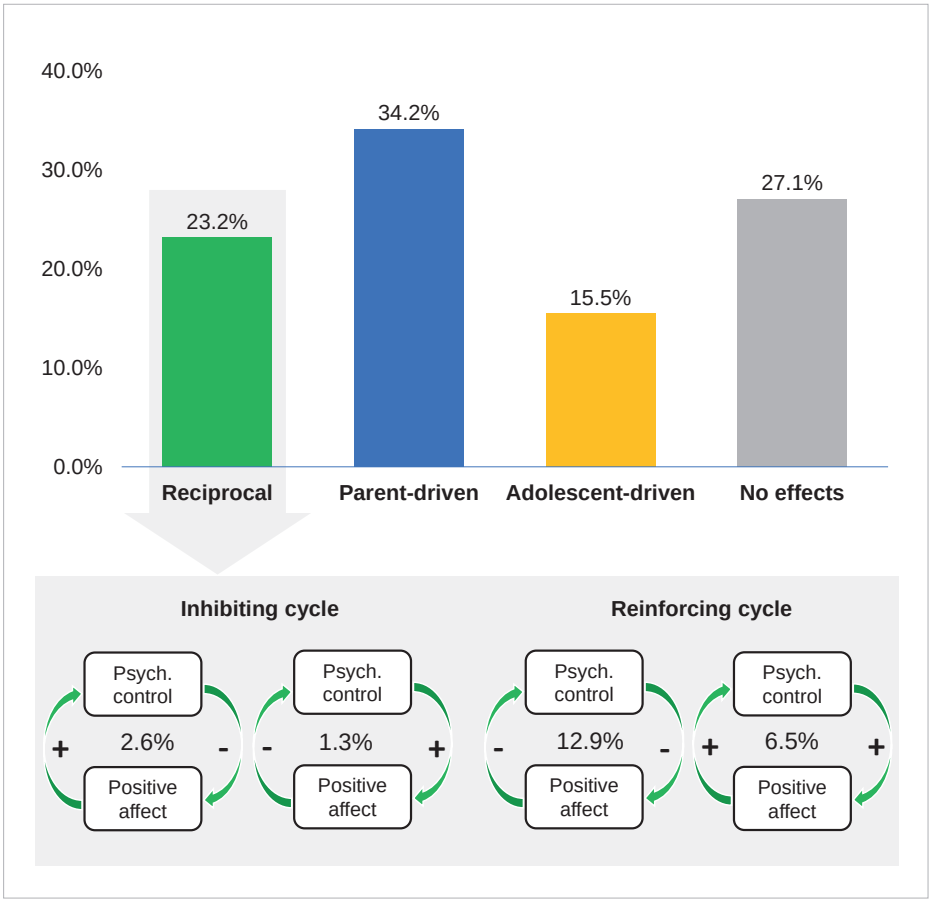
*Note***.** Group size in bold is a majority of the sample in the given association.
[a] A few families had no over-time variance in the parenting dimension, and therefore, had no lagged estimates for that given association.
↑ Proportion greater than expected by chance (i.e., 25%)
↓ Proportion less than expected by chance (i.e., 25%)

We illustrate the heterogeneity in the direction of effects with one association (see Fig. 3). Fluctuations in parental psychological control and adolescent positive affect reciprocally predicted each other the next day in 23.2% of families (*n* = 36). In 34.2% (*n* = 53),

perceived parental psychological control predicted adolescents' positive affect the next day, but not vice versa (parent-driven effect). Conversely, in 15.5% (*n* = 24), adolescent positive affect predicted parental psychological control, but not the other way around (adolescent-driven effect). In the remaining 27.1% (*n* = 42), no day-to-day effects were found between parental psychological control and adolescents' positive affect.

**Figure 3**

*Family-Specific Effects for Parental Psychological Control and Adolescent Positive Affect*




*Note.* Displayed are the percentage of families (*n* = 155, see also Table 2) who showed different directions of effects for the association between parental psychological control and adolescent positive affect. Among the families with reciprocal effects (23.2%), displayed is the number who showed one of the four qualitatively different cycles. + = positive effect size. - = negative effect size.

We then explored whether the proportions of families showing reciprocal, parent-driven, adolescent-driven, and null effects were different from what would be expected by chance (i.e., 25% of families showing each type of effect). Most of the proportions (22 of 32; see Table 2) were significantly different (standardized residuals ≥ |1.96|) from expectations. In other words, some directions of effects were more prominent in the sample than other directions of effects. Two findings merit attention. First, more families than expected showed reciprocal effects between adolescent positive affect and parental warmth and autonomy support. Second, daily associations with parental control were often parent-driven: more families than expected showed parent-driven effects between psychological control and positive affect, and between behavioral control and negative affect.



Moreover, heterogeneity in directionality was also found within families, such that the direction of effects depended on the specific parenting-affect association. As shown in Table 3, no single family consistently demonstrated only reciprocal effects, parent-driven effects, adolescent-driven effects, or no effects. When examining homogeneity across the models for either adolescent positive or negative affect, a few families (0% to 11.1%) demonstrated a similar direction of effects across associations. Thus, the direction of effects often did not generalize across the eight different parenting-affect associations for a given family.

**Table 3**
*Direction of Lagged Parenting-Affect Effects Summarized per Family*

| Direction of effects | Associations with PA & NA | Associations with PA | Associations with NA |
|---|---|---|---|
| | ***N* (%)** | ***N* (%)** | ***N* (%)** |
| 1. Completely reciprocal | 0 (0.0%) | 6 (3.9%) | 1 (0.7%) |
| 2. Completely parent-driven | 0 (0.0%) | 2 (1.3%) | 0 (0%) |
| 3. Completely adolescent-driven | 0 (0.0%) | 1 (0.7%) | 1 (0.7%) |
| 4. No lagged effects at all | 0 (0.0%) | 3 (2.0%) | 17 (11.1%) |
| 5. Mix of lagged and no effects | 153 (100.0%) | 141 (89.8%) | 135 (88.2%) |
| Total | 153 (100.0%) | 153 (100.0%) | 153 (100.0%) |

*Note*. PA = positive affect. NA = negative affect.

### *Sensitivity Analyses*

We conducted several sensitivity analyses to investigate the robustness of the findings regarding heterogeneity in the direction of effects (H1). First, we conducted pre-registered

analyses excluding participants with fewer than 50 observations (see Supplementary Table S5) and excluding outliers (see Supplementary Table S6). The results of both sensitivity analyses were in line with the main hypothesis. Again, more families than expected showed reciprocal effects between adolescent positive affect and parental autonomy support and warmth, although the proportion of families varied slightly. Second, because the two items of the behavioral control scale correlated weakly ($r$ = .11), we ran separate models for each item, with the results shown in Supplementary Table S7. Again, more families than expected by chance did not have lagged effects between the separate behavioral control items and adolescent affect. There was, however, one interesting finding: more families than expected showed parent-driven effects with adolescent negative affect and Item 2 (strictness), but not with Item 1 (monitoring).

## Explaining Heterogeneity in the Direction of Effects

Theoretical work suggests that parenting effects depend on the characteristics of the child (Bronfenbrenner, 2005; Sameroff, 2010). Hence, to explore whether heterogeneity in directionality can be explained by adolescent attributes, we examined via non-preregistered analyses whether demographic characteristics (i.e., sex, education, and age) and two theoretically relevant personality traits (according to environmental sensitivity theories (Lionetti et al., 2019; Pluess, 2015)) were related to the magnitude of the *absolute* family-specific effect sizes. No clear correlations were found with adolescent sex (0/16 significant) and educational level (2/16 significant; see Table 4). Correlations with adolescent age indicated that fluctuations in negative affect predicted both next-day psychological and behavioral control more strongly in younger (versus older) adolescents. Regarding personality traits, environmental sensitivity (4/16 significant) and neuroticism (7/16 significant) were correlated with several family-specific effects. Overall, these correlations suggest that adolescents with relatively higher environmental sensitivity had positive affect that was more affected by parenting, and that adolescents with relatively higher neuroticism had stronger daily linkages between perceived parenting and negative affect. Information about the measurements of environmental sensitivity and neuroticism can be found in the Supplementary Information.

## Heterogeneity in the Nature of Reciprocal Effects

The results of our exploratory analyses show that the sign (i.e., positive or negative) of the effects varied across families (for sample distributions of the family-specific

effects, see Supplementary Table S3 and Supplementary Fig. S1). Both inhibiting and reinforcing reciprocal cycles were observed across families. However, inhibiting cycles were generally found in fewer families (than would be expected by chance), whereas reinforcing cycles were more prominent in the sample (than would be expected by chance; see Supplementary Table S4).

**Table 4**
*Moderators to Explain Heterogeneity in (Absolute) Effect Sizes*

| Family-specific lagged effect | Mean differences | | Correlations | | |
|---|---|---|---|---|---|
| | Sex (*t*-test) | Education (ANOVA) | Age | Environmental sensitivity[c] | Neuroticism |
| ***Psychological control (PC)*** | | | | | |
| PC → PA | -.14 | .06*[a] | .04 | .25** | .17* |
| PA → PC | -.22 | .01 | -.09 | .08 | .03 |
| PC → NA | -.04 | .00 | -.07 | -.01 | .19* |
| NA → PC | .02 | .00 | -.18* | -.03 | .13 |
| ***Behavioral control (BC)*** | | | | | |
| BC → PA | -.10 | .06 | .13 | .16* | .13 |
| PA → BC | -.23 | .03 | -.14 | .08 | .11 |
| BC → NA | -.12 | .01 | .08 | .11 | .28*** |
| NA → BC | -.29 | .01 | -.18* | .11 | .21** |
| ***Autonomy support (AS)*** | | | | | |
| AS → PA | -.29 | .03 | .02 | .14 | .22** |
| PA → AS | .13 | .01 | -.08 | -.18* | -.08 |
| AS → NA | -.31 | .02 | -.05 | .13 | .18* |
| NA → AS | .22 | .01 | -.14 | -.12 | .06 |
| ***Warmth (WA)*** | | | | | |
| WA→ PA | -.15 | .03 | -.04 | .16* | -.03 |
| PA → WA | -.06 | .02 | -.09 | .00 | -.06 |
| WA→ NA | -.04 | .04*[b] | .00 | .02 | .05 |
| NA → WA | -.24 | .00 | .01 | .13 | .29*** |

*Note*. Cohen's *d* is reported for sex (1 = male, 2 = female). Eta squared is reported for education (1 = low, 2 = moderate, 3 = high). PA = adolescent positive affect. NA = adolescent negative affect.
[a] Adolescents with a moderate education level showed stronger effects than those with high education levels
[b] Adolescents with a low education level showed stronger effects than those with high education levels
[c] Correlations between self-reported environmental sensitivity and the initial family-specific effect sizes are shown in Supplementary Figures S2-S9.

We illustrate the heterogeneity in reciprocal effects with the association between parental psychological control and adolescent positive affect. As depicted in Figure 3, 20 families (12.9% of the sample) demonstrated a *negative* reinforcing cycle, meaning that both the

parent- and adolescent-driven effects were negative in sign. In other words, in these families, increases in psychological control predicted decreases in positive affect, which in turn predicted an increase in psychological control. A *positive* reinforcing cycle was present in 10 families (6.5%); thus, in these families, psychological control predicted increases in next-day positive affect, and vice versa. A small number of families showed inhibiting cycles: in 2.6%, psychological control predicted decreases in positive affect, which predicted increases in psychological control; in 1.3%, psychological control predicted increases in positive affect, which predicted decreases in psychological control.

## DISCUSSION

An enduring inquiry in developmental science concerns whether parents act in response to the well-being of their adolescent child, or whether adolescent well-being is the direct result of parenting practices (Bell, 1968; Pardini, 2008). Although reciprocity in parenting and adolescent well-being is now widely-accepted (Pardini, 2008; Sameroff, 2010; Soenens & Vansteenkiste, 2020), questions persist about the extent to which reciprocity findings – based on group-level or average patterns – accurately reflect individual-level parent-adolescent dynamics (Hamaker, 2012; Molenaar, 2004). Therefore, in the current study, we examined whether different dyads demonstrate effects with different directions (i.e., reciprocal, parent-driven, adolescent-driven, or no effects; see Fig. 1) (Richters, 2021). To do so, we adopted a novel idiographic approach and investigated 159 Dutch families' unique 100-day dynamics between perceived parenting and adolescent affective well-being.

In line with our pre-registered hypothesis, different families (i.e., parent-adolescent dyads) demonstrated different directions of effects between perceived parenting (i.e., psychological control, behavioral control, autonomy support, and warmth) and adolescent affective well-being (both positive and negative) in everyday life. Whereas some families showed reciprocal day-to-day effects between dimensions of parenting and affective well-being, others showed only a parent-driven or an adolescent-driven effect, or no effects at all (for example, see Fig. 3). Importantly, even within the same family, the direction of effects did not generalize across associations among parenting and affective well-being dimensions. For instance, a family could demonstrate reciprocal effects between parental warmth and adolescent positive affect but a parent-driven effect between parental behavioral control and adolescent positive affect. Thus, although many developmental (Bronfenbrenner, 2005; Sameroff, 2010) and parenting theories (Soenens

& Vansteenkiste, 2020) propose that influences between parents and adolescents are reciprocal, our findings suggest that this conclusion may only hold for a subgroup of families, and for certain sets of behaviors and emotions. In other words, every family has their own unique way of interacting in everyday life. This means that there may be potential drawbacks of a "one-size-fits-all" approach to family interventions, and that it may be important to move toward tailoring interventions to the specific dynamics and needs of a family (August & Gewirtz, 2019; Weeland et al., 2021).

We found several meaningful adolescent attributes that explained the heterogeneity in directionality, and thus, speak to why parents and adolescents might differentially influence each other across families. First, heightened negative affect seemed to exhibit a stronger influence on parents' controlling behaviors among younger adolescents. As parents generally exert less control as adolescents become older (Lionetti et al., 2018), they might be more inclined to give older adolescents more space to deal with negative emotions than younger adolescents. Second, the positive affect of adolescents who reported higher trait levels of environmental sensitivity, specifically sensory processing sensitivity (SPS) (Pluess et al., 2018), seemed more strongly influenced by parenting behaviors. This finding is consistent with environmental sensitivity theories, which propose that an underlying phenotypic trait, such as SPS, leads to a higher responsivity to the environment (Belsky & Pluess, 2009; Greven et al., 2019). Third, daily fluctuations in parenting were more strongly tied to daily fluctuations in negative affect among adolescents with higher neuroticism, converging with prior work indicating that neuroticism is associated with enhanced negative feelings, especially in reaction (negative) events in daily life (Suls & Martin, 2005).

In addition to the direction of effects, our findings reveal insights into the nature of everyday parent-adolescent dynamics. Overall, we found that reinforcing cycles (e.g., more warmth → more positive affect → more warmth) are more prominent than inhibiting cycles (e.g., more warmth → more positive affect → less warmth). From a dynamic systems perspective, reciprocal influences can result in either change or growth by reinforcing feedback loops or stabilization by inhibiting feedback loops (Kunnen et al., 2019). This is consistent with our findings highlighting the prominence of these reinforcing reciprocal cycles during periods of change (i.e., adolescence). Indeed, adolescence is a period in which parent-child relationships need to be realigned (Smetana & Rote, 2019). A second COVID-19 lockdown, however, started halfway through the study (De Vries et al., 2023), which could have destabilized the family system. Examining non-linear dynamics,

preferably while linking short-term dynamics to longer-term development, is a promising avenue for future work, as it may help unravel how everyday family dynamics become a driving force in developmental trajectories.

This pre-registered idiographic study examined day-to-day parent-adolescent dynamics at the individual family level by rigorously analyzing more than 14,000 daily diaries of 159 adolescents. Despite these strengths, our findings must be considered in light of several limitations. First, different inference criteria could have revealed different effects; this is important to consider in emerging idiographic research, as strong precedents for such criteria are lacking. Here family-specific inferences were based on the smallest effect size of interest (SESOI; $\beta \geq .05$) rather than significance levels (Beyens et al., 2021; Boele, Bülow, de Haan et al., 2023). Preferably, future intensive longitudinal studies with more data points per family will combine a SESOI with a threshold of statistical significance (Lakens et al., 2018). Second, we studied adolescent-perceived parenting, and prior research has shown discrepancies between parents and adolescents in their perception of daily parenting behavior (Janssen et al., 2021). Future work is needed to explore the heterogeneity in how parents perceive daily parent-adolescent dynamics. Third, the current day-to-day findings might not generalize across timescales, so other timescales also warrant attention in future studies, such as a momentary (instead of a daily) timescale (Keijsers et al., 2022). Fourth, the sample consisted of more female than male adolescents, and the majority were highly educated, which might have limited our ability to detect sex and educational differences. Future studies with larger and more diverse samples are needed to gain more insight into individual factors that might explain heterogeneity among adolescents.

In conclusion, most contemporary parenting theories posit that parents and children mutually affect one another (Pardini, 2008; Sameroff, 2010), especially during adolescence, when children become more active agents within the parent-child relationship (Soenens & Vansteenkiste, 2020). Our findings, however, point towards a more nuanced understanding that was achieved by adopting a novel idiographic approach to the investigation of families' unique daily dynamics: The direction of day-to-day influences between parenting and adolescent well-being depends on the family and on the parenting behaviors and adolescent emotions under consideration. Environmental sensitivity and neuroticism appear to be promising traits for understanding why some adolescents are more strongly affected by parenting than are others. Hence, rather than being a homogeneous phenomenon, the ways in which parents and adolescents influence each

other in everyday life is unique to each family. Moving towards an idiographic parenting science, with a focus on individual families, is needed to unravel the complex reality of parenting adolescents. This, in turn, may ultimately inform interventions tailored to the unique dynamics and needs of unique families.

# CHAPTER 6

## Like no other? A family-specific network approach to parenting adolescents

This chapter is accepted for publication:

**Boele., S**., Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., De Moor, M. H. M., & Keijsers, L. (in press). Like no other? A family-specific network approach to parenting adolescents. *Journal of Youth and Adolescence*. https://osf.io/preprints/psyarxiv/a6gn3

**Supplemental materials** can be viewed in the online version of the preprint.


**Open science statement**: The preregistered analytical plan, script, output, and data (https://osf.io/a4rzm), and codebook of the data collection (https://osf.io/a9g7c/) are shared on the Open Science Framework.

**Author contributions: SB**: conceptualization, methodology, investigation, formal analysis, writing – original draft. **AB**: conceptualization, methodology, investigation, data curation, writing – review & editing. **ABM**: conceptualization, methodology, writing – review & editing. **AdH**: conceptualization, methodology, writing – review & editing, supervision. **JJAD**: conceptualization, methodology, writing – review & editing, supervision. **MHMdM**: writing – review & editing. **LK**: conceptualization, methodology, writing – review & editing, supervision, funding acquisition.

## ABSTRACT

Numerous theories suggest that parents and adolescents influence each other in diverse ways; however, whether these influences differ between subgroups or are unique to each family remains uncertain. Therefore, this study explored whether data-driven subgroups of families emerged that exhibited a similar daily interplay between parenting and adolescent affective well-being. To do so, Subgrouping Group Iterative Multiple Model Estimation (S-GIMME) was used to estimate family-specific dynamic network models, containing same- and next-day associations among five parenting practices (i.e., warmth, autonomy support, psychological control, strictness, monitoring) and adolescent positive and negative affect. These family-specific networks were estimated for 129 adolescents ($M_{age}$=13.3, $SD_{age}$ = 1.2, 64% female, 87% Dutch), who reported each day on parenting and their affect for 100 consecutive days. The findings of S-GIMME did not identify data-driven subgroups sharing similar parenting-affect associations. Instead, each family displayed a unique pattern of temporal associations between the different practices and adolescent affect. Thus, the ways in which parenting practices were related to adolescents' affect in everyday life were family specific.

*Keywords:* parenting, adolescence, intensive longitudinal data, heterogeneity, idiographic, person-specific

## INTRODUCTION

Parenting adolescents involves a dynamic interplay between a variety of parenting practices and adolescents' well-being (Bronfenbrenner, 2005; Darling & Steinberg, 1993). While it is widely theorized that parent-adolescent dynamics vary across families (e.g., Belsky & Pluess, 2009; Smith & Thelen, 2003), there are divergent ideas about how and why these dynamics might vary. On one hand, it has been suggested that the nature of parent-adolescent dynamics varies from subgroup to subgroup; for instance, due to the child's personality (Pluess, 2015), legitimacy beliefs of parental authority (Darling et al., 2007), a parent's stable parenting style (Darling & Steinberg, 1993), or culture (Soenens et al., 2015). In other words, it has been implicitly assumed that families that share the same *group-differential* characteristics tend to be influenced in quite similar ways. On the other hand, other theoretical accounts have adopted an *idiosyncratic* view, suggesting that how parents and adolescents influence each other is unique to each family (Granic et al., 2008; Grusec, 2008). For example, according to ecological models, the nature of parent-adolescent dynamics varies not only due to the characteristics of the developing adolescent, but also because of the changing characteristics of the context and timing of events (Bronfenbrenner, 2005; Sameroff, 2010). To date, it has not yet been empirically determined whether subgroups of families function similarly or whether each family functions in their own idiosyncratic way. The primary reason why is that it has rarely been tested how parents and adolescents influence each other in a diverse range of behaviors and emotions at the level of the individual family (for reviews see Boele et al., 2020; Keijsers et al., 2022). To advance empirical knowledge, this 100-day diary study examined the daily dynamics between various parenting practices and adolescent affect in individual families and explored whether data-driven subgroups of families emerged that exhibited similar dynamics.

### The Study of Subgroups with Stable Parenting Styles

Previous research has extensively examined the role of parenting styles in explaining differences in the way parents raise adolescents. Parenting styles represent typologies based on combined parenting dimensions, with a focus on the two dimensions of parental support and behavioral control (Baumrind, 1991). Studies have provided valuable insights into how average levels of combined parenting dimensions and adolescent outcomes differ between subgroups of families. For example, adolescents raised by authoritative parents (i.e., high in both support and control) display better psychosocial functioning than those raised by parents with different parenting styles (e.g., Kuppens & Ceulemans, 2019). However, it has been increasingly stressed that group-level (between-family) associations

convey little to no information on the dynamic processes that unfold *within families,* that is, how parents and adolescents of the same family influence each other over time (Hamaker, 2012; Molenaar & Campbell, 2009). Accordingly, it remains an open question whether families also differ in their everyday parent-adolescent dynamics, including different kind of parenting behaviors. As everyday influences between parents and their children are believed to be "the primary engines of development" (Bronfenbrenner, 2005, p. 6), it is vital to understand how daily parent-adolescent dynamics unfold (differently) within families.

## Towards Studying Heterogeneous Parent-Adolescent Dynamics in Everyday Life



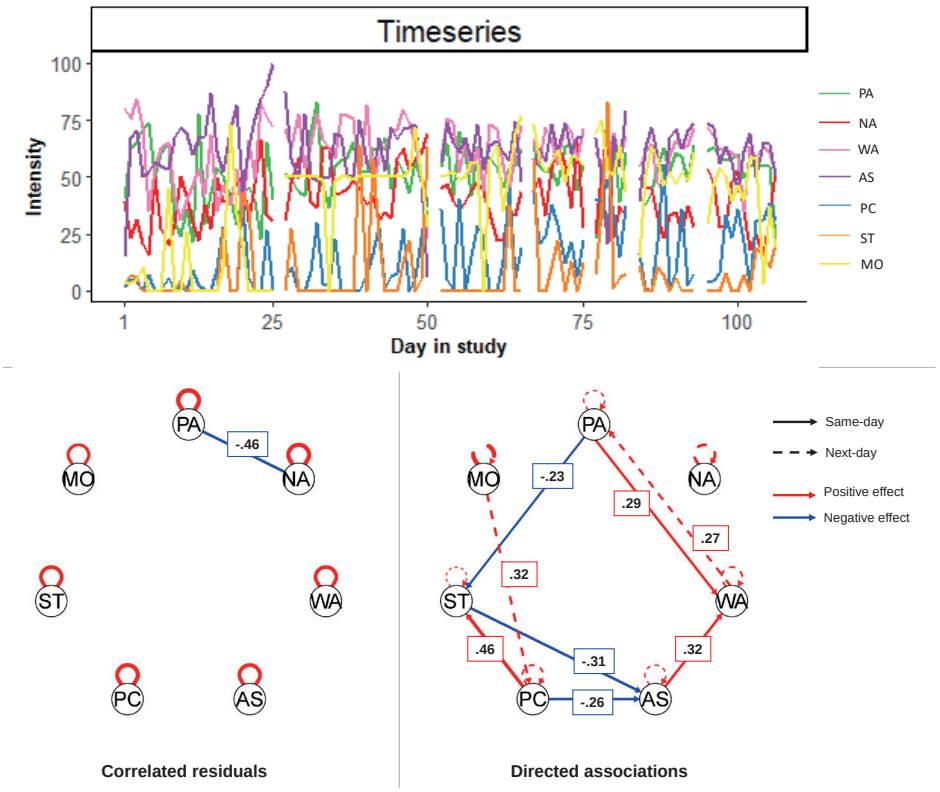
In addition to more stable styles, parents express a wide range of more specific behaviors, also called practices (e.g., warmth, strictness), which fluctuate across time and situations (Darling & Steinberg, 1993). Fluctuations in parenting practices are believed to have a direct impact on adolescent well-being (Darling & Steinberg, 1993) and vice versa (Kuczynski & Parkin, 2007). Such daily influences between parents and adolescents are believed to vary across (subgroups of) families, due to individual factors (e.g., personality; Pluess, 2015), contextual factors (e.g., culture; Soenens et al., 2015), or a family's unique interplay between various factors at multiple levels (Bronfenbrenner, 2005; Van Geert & Lichtwarck-Aschoff, 2005). Hence, to understand how parenting practices affect the everyday well-being of adolescents, it is vital to investigate (a) how daily fluctuations in the two are associated within individual families (see Figure 1 for an example of such daily fluctuations) and (b) how such associations differ across these individual families.

With the increasing technological possibility of collecting intensive longitudinal data (e.g., experience sampling and daily diary), an increasing number of intensive longitudinal studies on parenting adolescents are being conducted (for a review see Boele et al., 2020). These studies have provided several insights. First, different kinds of parenting practices indeed fluctuate across time, such as from moment to moment or day to day (for example, see Figure 1). Second, such over-time fluctuations in parenting practices are associated with fluctuations in adolescents' well-being within "the average family" (Boele et al., 2020). For example, more daily parental warmth than typical is related, *on average*, to a more positive affect in adolescents (e.g., Bülow, Neubauer, et al., 2022; Xu & Zheng, 2022). Third, initial studies suggest, however, that daily parenting effects within the average family are unlikely to apply to each and every individual family. That is, the nature of the bivariate associations between parenting and adolescent functioning and

well-being has been found to vary substantially across families (e.g., Keijsers et al., 2016; Mastrotheodoros et al., 2022). For instance, some adolescents (more than others) show improved well-being when experiencing more parental warmth (Bülow, Neubauer, et al., 2022; Bülow, Van Roekel, et al., 2022), whereas others show worse well-being (Boele, Bülow, de Haan et al., 2023; Janssen et al., 2021). Thus, recent work has provided the first evidence that daily influences between parenting and adolescents' well-being differ across families. The next step is to untangle how the effects of diverse parenting practices converge within a family and how families differ therein, and to what extent.

**Figure 1**

*Example of family-specific time series and corresponding temporal network model*




*Note*. Network includes (clockwise direction): adolescent positive (PA) and negative affect (NA), and parental warmth (WA), autonomy support (AS), psychological control (PC), strictness (ST), and monitoring (MO). Line thickness reflects magnitude of the association. Beta's displayed in the boxes. Hybrid-GIMME allowed to model undirected same-day associations (i.e., correlated residuals) and directed same- or next-day associations. Family-specific model fit: $\chi^2(54) = 639.50$, $p = .167$, RMSEA = .04, SRMR = .07, NNFI = .94, CFI = .97.

Various studies have tried to illuminate why families differ in their everyday parenting effects, with some studies detecting meaningful differences, whereas others did not (Boele et al., 2020). For instance, one study found that daily increases in parent-child conflict and adolescent emotional distress were more strongly linked in female adolescents than in male adolescents (Chung et al., 2009); while other studies found no sex differences (e.g., Janssen et al., 2021; Timmons & Margolin, 2015). Daily parent-child conflict and parental support co-fluctuated more strongly with negative affect among adolescents with more depressive and anxiety symptoms (Janssen et al., 2021; Timmons & Margolin, 2015), and higher trait levels of environmental sensitivity and neuroticism in adolescents have been linked to stronger same-day associations between parental support and adolescent affect (Bülow, Neubauer, et al., 2022). Hence, empirical studies suggest that adolescent characteristics such as sex, psychological functioning, and personality may contribute to differences across families in how parents and adolescents influence each other in everyday life.



## Advancing the Field: A Bottom-Up Idiographic Network Approach

While recent studies have provided valuable empirical insights, prior studies bear two limitations. A first key limitation is the wide application of a top-down approach. That is, studies have typically clustered families into pre-determined subgroups based on trait-like characteristics such as adolescents' sex, and subsequently, assessed whether these subgroups show average differences in bivariate associations between parenting and adolescent well-being (i.e., aggregate, *then* analyze; e.g., Chung et al., 2009). Hence, much of previous research has operated under the assumption that families placed within the same subgroup function quite similarly. To address this limitation, a novel approach can be adopted: a bottom-up approach. With a bottom-up approach, it can be tested whether families can be grouped based on similarities in their parent-adolescent dynamics (i.e., analyze, *then* aggregate), for example by using data-driven subgrouping procedures (Gates et al., 2017).

Another limitation of prior research is the focus on how families differ in *bivariate* associations between parenting and adolescent well-being. As the parenting style literature emphasizes (Baumrind, 1991), parenting adolescents entails various practices, which may even be displayed at the same time and may influence each other (Darling & Steinberg, 1993). Moreover, underlying individual and contextual characteristics might define the entire nature of a family's parent-adolescent dynamics. For instance, some

adolescents may be more responsive to both positive and negative parenting practices because of their general heightened sensitivity to the environment (Pluess, 2015). As such, it is crucial to explore how multiple parenting practices are intertwined with an adolescent's well-being, for example by adopting a dynamic network approach (Beltz & Gates, 2017), and to explore how such *patterns* of associations vary among families.

To overcome aforementioned limitations and enhance the empirical understanding of parenting adolescents, the current study applied Group Iterative Multiple Model Estimation (GIMME; Gates et al., 2017). GIMME is a data-driven method for estimating idiographic (in this application, family-specific) dynamic network models of contemporaneous and lagged directed associations among the many included variables. Here, same-day and next-day associations were estimated among five parenting practices (i.e., warmth, autonomy support, psychological control, strictness, and monitoring; Smetana, 2017), which are widely regarded as universally influential in shaping adolescents' well-being (Soenens et al., 2017), and two dimensions of adolescent affective well-being (negative and positive affect; Diener et al., 2018). A visualization of a family-specific network model is shown in Figure 1, including the underlying time-series data. The Subgrouping GIMME algorithm can additionally detect whether the temporal associations in the family-specific networks are shared by the entire sample, shared by a specific subgroup, or are unique to an individual family (Lane et al., 2019).

## The Current Study

Although numerous theories suggest that parents and adolescents influence each other in diverse ways, valid empirical evidence is still needed to determine the degree to which these influences vary across families. Therefore, the main aim of the current study was to examine whether daily parent-adolescent dynamics are shared by subgroups of families (i.e., group-differential) or are unique to each family (i.e., idiosyncratic). To achieve this, this family-specific dynamic network study investigated how five key parenting practices interplayed with adolescents' affect in each family's everyday life, and whether data-driven subgroups of families exhibited similar patterns of associations. If subgroups emerged, an additional aim was to identify adolescent attributes that potentially explained differences between families of different subgroups (i.e., average levels of daily parenting and affect, adolescent psychological functioning, demographic characteristics, legitimacy beliefs of parental authority, and personality traits).

## METHOD

### Participants

A total of 159 adolescent-parent dyads participated in the 100-day diary study "100 days of my life" (https://osf.io/5mhgk/; Bülow, Neubauer, et al., 2022). Adolescents were included in the current study if they completed at least 80 daily diaries and showed variance in all the included daily variables, leading to a final sample of 129 adolescents ($M_{age}$=13.3 years old; $SD_{age}$ = 1.2, range 12-16). Of these 129 adolescents, 64% were female (36% male, 2% identified as neither male nor female), and most were born in the Netherlands (87%). A minority were born in other European countries (6%), or counties in Asia (2%), North America (1%), South America (1%), or Africa (1%). Their educational levels varied between pre-vocational secondary education or vocational training (14%), higher general secondary education (29%), and pre-university secondary education (51%). Some of the participants followed a mixed educational track (5%). Moreover, 55% of the adolescents reported to be nonreligious and not baptized, 22% reported to be nonreligious but baptized, and 22% reported being religious, with most affiliating with Christianity (93%). The majority of adolescents lived together with both of their parents (74%) and a minority lived with both parents but in different homes (19%) or reported other living situations (e.g., living only with mother). Almost all the adolescents had at least one sibling (95%), with the majority having one (50%) or two siblings (35%). Among these adolescents with siblings, the distribution of birth order was as follows: 52% were the eldest, 32% were the second child, 15% were the third, 1% were the fourth, and 1% were the fifth.



Adolescents reported on one participating primary caregiver of choice: biological mother (78%), biological father (20%), or other (*n* = 1 adoption mother or *n* = 1 other mother). The parents were on average 45.2 years old (*SD* = 4.59, range = 33 – 55). Most were born in the Netherlands (91%) and a minority in other European countries (5%), Asia (2%), North America (1%), and Africa (1%). Additionally, 12% of the parents only completed high school, and 26% completed vocational/technical training and 59% college or university, and 2% provided insufficient information. The majority of the parents reported to be nonreligious (60%). Parents who reported to be religious mostly affiliated with Christianity (86%).

### Procedure

Most parent-adolescent dyads were recruited via two high schools in the Netherlands, which offered all secondary educational tracks to 1,300 and 2,000 students, respectively. Adolescents and their parents were informed by class visits, email, and posters. Interested

families received a detailed briefing via a video call, after which they received online informed consent forms. Parents also provided informed consent for the participation of their underaged adolescent. One dyad (i.e., composed of an adolescent between 12 – 16 years old and one parent with whom they had daily contact) could participate per family. Both members of the dyad needed to own a smartphone in order to participate. When multiple children in a household were eligible, the family themselves could decide who would participate in the study.

For 100 consecutive days (October 26, 2020, until February 2, 2021), adolescents received daily surveys (ca. 3-5 min) via the Ethica Data smartphone app. The surveys were prompted between 7 PM and 10 PM, depending on their preference. A maximum of four automatic reminders were sent in the evening and one final reminder at 7AM the following morning. To ensure compliance, several motivational features were added. Specifically, adolescents received a monetary reward for each completed survey and bonus if they completed 10 surveys in a row and 100 surveys in total. Overall, adolescents could receive up to €100 (approximately US$121), and €10 was raffled off daily to two adolescents who completed the daily survey. Missed surveys could be compensated by extending the participation period to a maximum of 25 days. This resulted in an average of 93 completed (*SD* = 15.7, range = 24 – 108) and 13 missing daily diaries (*SD* = 16.6, range = 0 – 76) per person, with most completed in the evening (80%). This study was approved by the Ethical Committee of Tilburg University (RP250). More detailed information about the procedure can be found online: https://osf.io/5mhgk/. Parts of the data were analyzed in prior work (Boele, Bülow, Beltz, et al., 2023; Bülow, Neubauer, et al., 2022; De Vries et al., 2023).

## Measures

All daily diary items were scored on a visual analogue scale (VAS) ranging from 0 (*Not at all*) to 100 (*Very much*).

## Parenting Practices

### *Warmth*

Parental warmth includes (a) provision of affection and (b) parental care and responsiveness (Soenens et al., 2017), which were rated by adolescents with two items. The two items were adapted from a Dutch daily diary study (Keijsers et al., 2016), which was, in turn, based on the widely used Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985). The items were: “The relationship with my parent was enjoyable”

and “My parent showed me that she/he cares for me.” The internal consistency of the two items was acceptable at the within-family level ($r$ = .63, $p$ < .001) and good at the between-family level ($r$ = .83, $p$ < .001). The 100-day average of daily warmth was strongly correlated ($r$ = .60, $p$ < .001) with a support/warmth subscale of the well-established Network Relationship Inventory (NRI), with the latter measured once during the study (for more information about the study design, see https://osf.io/5mhgk/), providing evidence for convergent validity for the novel daily parental warmth scale.

***Autonomy Support***

Parental autonomy support is defined by (a) the provision of choice and allowance of independent decision-making and (b) acknowledgment and interest in the adolescents’ perspective (Soenens et al., 2017). To capture both components, two items were used that were adapted from a 4-item daily autonomy support scale (van der Kaap-Deeder et al., 2017), which was based on the Perception of Parents Scale (POPS; Grolnick et al., 1991). The items were “My parent allowed me to make my own plans” (independent decision-making) and “My parent took my point of view into account” (acknowledgment of perspective). Internal consistency of the 2-item scale was good at both the within-family ($r$ = .45, $p$ < .001) and between-family level ($r$ = .71, $p$ < .001), indicated by moderate to strong inter-item correlations. The 100-day average of daily autonomy support was strongly correlated ($r$ = .67, $p$ < .001) with a once measured POPS subscale (more information about the study design, see https://osf.io/5mhgk/), suggesting convergent validity for the daily parental autonomy support scale.

***Psychological Control***

Psychological control involves regulating children’s thoughts and emotions through manipulative behaviors, including (a) constraining verbal expression, (b) guilt induction, and (c) love withdrawal (Barber, 1996). To measure these parenting behaviors, three items adapted from an existing 4-item daily diary scale were used (van der Kaap-Deeder et al., 2017), which was in turn based on the widely used Psychological Control Scale (Barber, 1996). The items were: “When I wanted to say something, my parent started to talk about something else” (constraining verbal expressions), “My parent blamed me for the problems at home” (guilt induction), and “My parent was less affectionate towards me when I did not see things his/her way” (love withdrawal). Multilevel confirmatory factor analysis (Geldhof et al., 2014) indicated moderate reliability at the within-family level (ω = .59) and good reliability at the between-family level (ω = .83). Regarding convergent

validity, the 100-day average of daily psychological control was strongly correlated ($r$ = .53, $p$ < .001) with the established Psychological Control-Disrespect Scale (Barber et al., 2012) that was measured once during the study.

### *Strictness*

Parental strictness and rule setting are aimed at controlling the behavior of their adolescent children (Kerr et al., 2012). The current study measured this with one item: "My parent was strict." This item was adapted from a previous work (Stattin & Kerr, 2000). The 1-item measures of daily strictness and monitoring correlated weakly across days within persons ($r$ = .10, $p$ < .001), which indicates that the items might indeed have measured different parenting practices. Hence, although strictness and monitoring are both components of the parenting dimension 'behavioral control' (Smetana, 2017), the low correlation suggests the necessity of distinguishing these practices in daily life.

### *Monitoring*

In addition to strictness, parents can actively monitor their adolescents' whereabouts and activities to control their behavior (Kerr et al., 2012). To measure parental monitoring, adolescents responded to the following item: "I had to tell my parent what I did, with whom, and where." This item was adapted from a parental monitoring questionnaire (Stattin & Kerr, 2000). The 100-day average of the single-item monitoring scale correlated moderately ($r$ = .39, $p$ < .001) with the behavioral control scale of a commonly used questionnaire (Stattin & Kerr, 2000) that was measured once.

### *Adolescent Affective Well-Being*

Affective well-being can be defined as high levels of positive affect (i.e., pleasant and desirable feelings) and low levels of negative affect (i.e., unpleasant and undesirable feelings) (Diener et al., 2018). To measure daily affective well-being, five items from the Positive and Negative Affect Schedule for Children were used (PANAS-C) (Ebesutani et al., 2012), which were chosen based on the psychometric properties of the Dutch scale in an adolescent sample in a previous study (Bülow, Van Roekel, et al., 2022). That is, positive affect was measured with two items ("joyful" and "happy"), and negative affect with three items ("mad", "afraid", and "sad"). Internal consistency of the 2-item positive affect scale was good at the within-family level ($r$ = .75, $p$ < .001) and excellent at the between-family level ($r$ = .95, $p$ < .001). Similarly, the internal consistency of the 3-item negative affect scale was good at the within-family level ($\omega$ = .71) and excellent at the between-family level ($\omega$ = .92).

## Pre-registered Analytical Approach

### *S-GIMME*

To answer the research question whether subgroups of families exist who share similar daily parent-adolescent dynamics, a pre-registered (see https://osf.io/a4rzm) Subgrouping Group Iterative Multiple Model Estimation (S-GIMME; Gates et al., 2017; Lane et al., 2019) was conducted, by using the R package *gimme* version 0.7-10 (Gates & Molenaar, 2012). Figure 1 visualizes how this study used GIMME, a data-driven statistical technique, to estimate sparse unit-specific (here: family-specific) temporal networks. GIMME is particularly well-suited for estimating the heterogeneity of associations in intensive longitudinal data from heterogeneous samples (Gates & Molenaar, 2012).

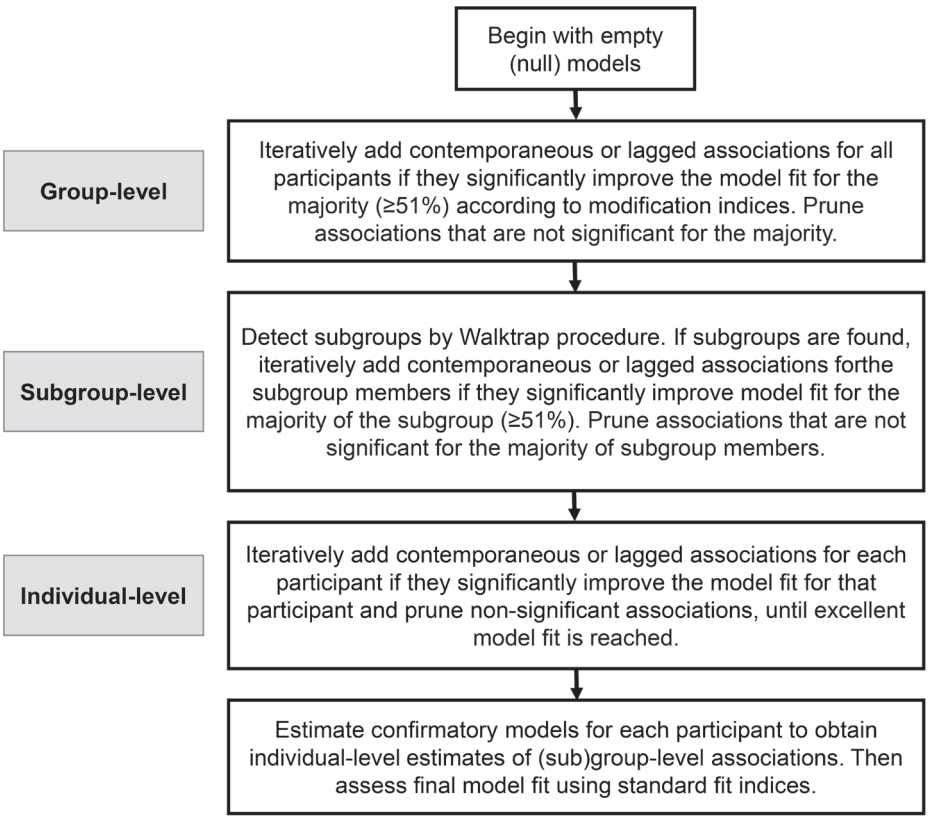
To estimate a family-specific network, as well as (sub)groups of similarly functioning families, GIMME implements family-specific unified structural equation models (see Gates et al., 2010). These models are a type of structural vector autoregressive (VAR) model that combines traditional VAR and structural equation models (SEM) to simultaneously estimate directed lagged (i.e., first-order next-day) and contemporaneous (i.e., same-day) associations. GIMME implements these family-specific models within a grouping algorithm that prioritizes the estimation of relationships that are common across participants (if any exist). All technical steps are summarized in Figure 2. GIMME handles missing data using full information maximum likelihood (FIML; Beltz & Gates, 2017).

To achieve this, GIMME begins with empty "null" network models. Then, *group-level associations* are iteratively added to all empty family-specific networks if they significantly (after Bonferroni correction of .05/*N,* thus the alpha level here was .004) improve the model fit for the majority of the sample (here, 51%; see Gates et al., 2020) according to Lagrange multiplier equivalence tests (i.e., modification indices; Sörbom, 1989). To improve path recovery, autoregressive effects were estimated for every family-specific network, by default (Lane et al., 2019). Subsequently, the *subgrouping option* within the GIMME algorithm clusters individual families using Walktrap community detection, based on similarities in family-specific estimates of (1) group-level associations and (2) associations that are likely to emerge at the individual family level. Subgroup-level associations are iteratively added to the family-specific networks of the subgroup members if they significantly (Bonferroni corrected) improve the model fit for the majority of the subgroup members (again 51%; Gates et al., 2017; Lane et al., 2019) according to modification indices. Finally, *individual-level associations* (i.e., associations unique to each family) are iteratively added to a family's network by evaluating whether they significantly ($p < .01$) improve model fit. At the group,

subgroup, and individual levels, iterations stop if the model fits well (i.e., if two of the four criteria are met: RMSEA ≤ .05, SRMR ≤ .05, CFI ≥ .95, and NNFI ≥ .95). The model will also be pruned, with non-significant associations. Hence, S-GIMME allowed us to identify general (sample-level), subgroup-specific (subgroup-level), and family-specific (individual-level) associations, all of which had family-specific magnitudes.

**Figure 2**

*Summary of model fitting with the S-GIMME algorithm*




*Note.* In the current study, same-day (contemporaneous) and next-day (lagged) associations are estimated among 5 parenting practices and 2 adolescent affect network nodes.

Notably, the hybrid-GIMME option was used to enable the estimation of data-driven undirected contemporaneous associations that likely exist because of a shared exogenous influence (Luo et al., 2022). These *undirected* contemporaneous (here same-day) associations reflect the correlations among the variable residuals. They are ideal for

mapping relations among variables that share measure or method variance (e.g., positive and negative affect or associations among parenting practices).

***Explaining Differences between Subgroups and Individual Families***

In the second step of the pre-registered analysis, differences between subgroups were explored in terms of personal and family characteristics. That is, subgroups were compared based on several variables: average levels of parenting and affect variables, indicators of adolescent psychological functioning (i.e., depressive and anxiety symptoms, and self-esteem), adolescent demographic characteristics (i.e., age, sex, educational level), legitimacy beliefs about parental authority, and personality traits (i.e., environmental sensitivity, neuroticism). More information about these measures is provided in the online Supplementary Information. To test for group differences in these variables, *t*-tests (with continuous variables, e.g., age) and chi-square tests (with categorical variables, e.g., sex) were conducted.



If no subgroups were identified that shared similar parent-adolescent dynamics, it was pre-registered to describe differences between individual families instead. Specifically, the correlation between the density of parenting-affect associations and the variables described above was calculated. Density was calculated for each family by dividing the number of parenting-affect associations by the total number of associations in their family-specific network model (excluding autoregressive effects). Parenting-affect density thus reflects the extent to which temporal associations between perceived parenting and adolescent affect contribute to the overall family-specific network.

## RESULTS

### Intraclass and Bivariate Correlations

To assess the extent to which parenting practices and affect fluctuated from day to day, intraclass correlation coefficients were calculated (ICCs; see Figure 1 for an example of the data). The ICCs ranged between .49 and .64 (see Table 1). In other words, 49–64% of the variance in perceived parenting practices and adolescent affective well-being was due to stable differences between families. Day-to-day fluctuations within families accounted for the remaining 36%–51% of the variance.

Descriptive statistics and bivariate correlations among parenting and adolescent affect variables are provided in Table 1. Perceived parenting practices and adolescents' affective well-being were weakly to moderately correlated at the within-family level. On average,

adolescents perceived more parental warmth and autonomy support on days they also experienced more positive affect (*r*s ≥ .18, *p* < .001) and less negative affect (*r*s ≤ -.13, *p* < .001). More parental psychological control and strictness correlated with less positive affect (*r*s ≤ -.11, *ps* < .001) and more negative affect (*r*s = .16, *ps* < .001) within families. More parental monitoring correlated with more same-day positive affect (*r* = .06, *p* = .003) but not with less negative affect (*r* = .00, *p* = .823). Compared to these average within-family correlations, between-family correlations were similar in sign, but stronger in magnitude.

**Table 1**
*Descriptive Statistics and Correlations (N = 129)*

| | Descriptive statistics | | | Correlations | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***M*** | ***SD*** | **ICC** | **1.** | **2.** | **3.** | **4.** | **5.** | **6.** | **7.** |
| ***Parenting dimension*** | | | | | | | | | | |
| 1. Warmth | 83.34 | 17.02 | .56 | - | .39*** | -.33*** | -.30*** | .00 | .32*** | -.23*** |
| 2. Autonomy support | 74.61 | 23.99 | .55 | .64*** | - | -.26*** | -.26*** | .07** | .18*** | -.13*** |
| 3. Psy. control | 6.77 | 11.93 | .62 | -.42*** | -.41*** | - | .42*** | .06* | -.12*** | .16*** |
| 4. Strictness | 13.08 | 21.33 | .60 | -.37*** | -.37*** | .64*** | - | .10*** | -.11*** | .16*** |
| 5. Monitoring | 21.61 | 29.76 | .59 | -.16* | -.13 | .28*** | .52*** | - | .06* | .00 |
| ***Adolescent affect*** | | | | | | | | | | |
| 6. Positive affect | 76.27 | 20.93 | .64 | .46*** | .39** | -.11 | -.19* | -.09 | - | -.50*** |
| 7. Negative affect | 11.11 | 15.17 | .49 | -.36*** | -.33*** | .39*** | .49*** | .20* | -.66*** | - |

*Note. M* = sample mean. *SD* = standard deviation. ICC = intraclass correlation coefficient. Psy. control = psychological control. All items ranged from 0 – 100. Within-family correlations are presented above the diagonal and between-family correlations under the diagonal.
*** *p* ≤ .001, ** *p* < .01, * *p* < .05

## Family-Specific Temporal Network Models

Rather than focusing on the average within-family associations in this study, it was examined how individual families function. The data were well-suited to assess these dynamics: 127 of 129 family-specific network models showed excellent model fit, according to the mean RMSEA = 0.04 (range:0.00-0.10), SRMR = .07 (range: .04 - .15), CFI = .97 (range:0.95 – 1.00), and NNFI = .99 (range:0.92 – 1.00). Two family-specific networks that failed to achieve a satisfactory model fit (RMSEA ≥ 0.11, SRMR ≥ 0.08, CFIs ≤ 0.93, NNFI ≤ 0.88) were removed from the subsequent analyses.

### *Associations Shared by All Families (Group Level)*

Before answering the research question about the existence of subgroup dynamics, it was explored whether 'group-level' associations existed, i.e., those that were estimated

for all families. One data-driven group-level association existed, which was an exogenous association between adolescent positive and negative affect (see Figure 2). For most adolescents ($n$ = 116, 91%), increased positive affect co-fluctuated with decreased negative affect across days. In 11 adolescents (9%), increased positive affect co-fluctuated with *increased* negative affect across days. No same-day or next-day associations between parenting practices and adolescent affective well-being were found at the group level (i.e., shared by the majority of families). The current data thus do not provide evidence of the existence of 'general' parent-adolescent dynamics in daily life.

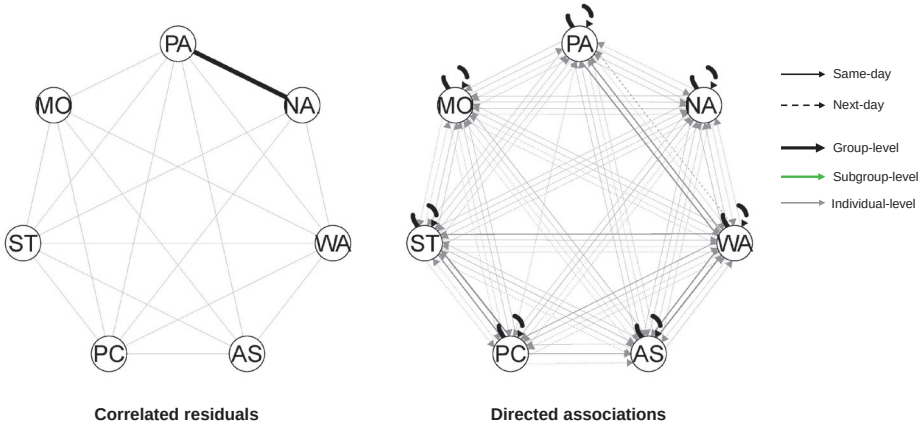
### *Associations Shared by Subgroups (Subgroup Level)*

Seven data-driven subgroups were identified. The two subgroups were comprised of 77 and 45 families, respectively. Families in Subgroup 1 ($n$ = 77; see Figure 3) had no subgroup-specific associations and thus only shared a group-level association between adolescent positive and negative affect, with 70 families showing a negative association.



**Figure 3**

*Summary plots of Subgroup 1 (n = 77)*

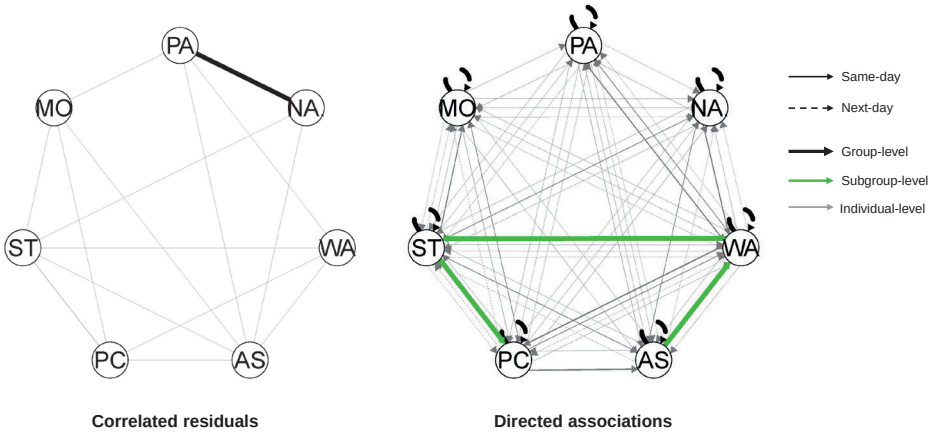



*Note*. Hybrid-GIMME allowed to model undirected same-day associations (on the left) and directed same- or next-day associations (on the right). Black line between adolescent positive and negative affect in the left figure is a same-day association estimated for everyone in the sample, and thus also in this subgroup. No subgroup-specific associations were found and therefore no green lines were depicted in either figure. The grey lines in both figures are individual-level associations found for one or some individual families in this subgroup, with line thickness corresponding to the number of families for which that association was estimated. The arrows indicate the directionality of the association. PA = positive affect. NA = negative affect. WA = warmth. AS = autonomy support. PC = psychological control. ST = strictness. MO = monitoring.

Families in Subgroup 2 (*n* = 45; see Figure 4) showed three subgroup-specific same-day parenting-to-parenting associations: strictness → psychological control (positive effect: *n* = 41, negative effect: *n* = 4), warmth → autonomy support (positive effect: *n* = 42, negative effect: *n* = 3), and warmth → strictness (positive effect, *n* = 43; negative effect, *n* = 2).

**Figure 4**

*Summary plots of Subgroup 2 (n = 45)*




*Note*. Hybrid-GIMME allowed to model undirected same-day associations (left figure) and directed same- or next-day associations (right figure). On the left: Black line between adolescent positive and negative affect is a same-day association estimated for everyone in the sample and thus also in this subgroup. On the right: The green lines are subgroup-specific associations estimated for everyone in this subgroup. The grey lines in both figures are individual-level associations found for one or some individual families in this subgroup, with line thickness corresponding to the number of families for which that association was estimated. The arrows indicate the directionality of the association. PA = positive affect. NA = negative affect. WA = warmth. AS = autonomy support. PC = psychological control. ST = strictness. MO = monitoring.

### *Associations Unique to Families (Individual Level)*

Although no parenting-affect associations were detected for the full sample or subsample, many unique associations were found within individual families. In fact, 109 (86%) of the 127 family-specific network models contained at least one significant ($p < .05$) association between one of the five parenting practices and adolescent positive or negative affect. Of the 109 families, 51 families had only same-day associations, eight families had only next-day associations, and 50 families had same-day as well as next-day associations. Of the total 264 estimated parenting-affect associations, 179 (68%) were same-day associations, of which 154 were directed, 25 were undirected (i.e., correlated residuals), and 85 (32%)

were next-day associations. On average, the families displayed 2.4 parenting-affect associations (*SD* = 1.3, range = 1-7). Parenting-affect associations accounted for 9% to 75% of the total associations in the family-specific networks (excluding autoregressive effects).

To provide more in-depth insights into these family-specific dynamics, the parenting-affect associations found at the individual level were elaborated upon. As summarized in Table 2, each of the five parenting practices was associated with adolescents' affective well-being across families. However, which parenting practices were related to adolescent positive or negative affect, how strong, and at which timescale (i.e., same-day and/or next-day) were heterogeneous across families. To illustrate, the association shared by the greatest number of families was a positive same-day association between parental warmth and adolescent positive affect, found in 49 families. All other parenting-affect associations were shared by a maximum of 17 families, with several associations detected in only a handful of families. Thus, although parenting practices were associated with adolescent affective well-being in almost all families, *which* practices were associated with the adolescent's affective well-being was family specific.



**Table 2**
*Number of Families with Same-day and Next-day Associations between Parenting Practices and Adolescent Affect*

| | Same-day | | Next-day | |
|---|---|---|---|---|
| | - | + | - | + |
| Warmth with PA | 2 | 49 | 1 | 14 |
| Warmth with NA | 25 | 1 | 3 | 5 |
| Autonomy support with PA | 0 | 17 | 2 | 7 |
| Autonomy support with NA | 11 | 3 | 3 | 4 |
| Psychological control with PA | 2 | 1 | 2 | 3 |
| Psychological control with NA | 2 | 12 | 3 | 7 |
| Strictness with PA | 8 | 8 | 4 | 2 |
| Strictness with NA | 2 | 21 | 3 | 4 |
| Monitoring with PA | 2 | 7 | 8 | 3 |
| Monitoring with NA | 2 | 5 | 2 | 5 |

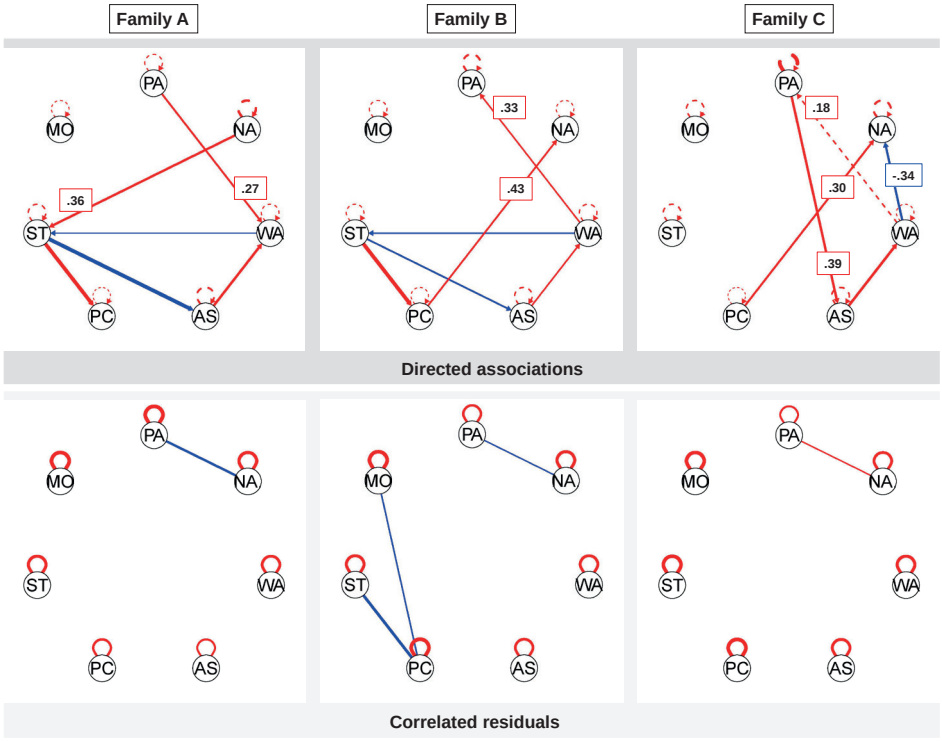
*Note.* - = negative association. + = positive association. PA = positive affect. NA = negative affect. Some families were counted double if they had reciprocal same-day or next-day directed associations (e.g., warmth predicted PA the same day *and* vice versa).

To further illustrate the idiographic nature of the daily dynamics between parenting practices and adolescents' affective well-being, Figure 5 depicts the temporal networks of three individual families. In Family A, more positive affect predicted more parental warmth and

more negative affect predicted more parental strictness on the same day. In Family B, more parental warmth predicted more same-day positive affect and more parental psychological control predicted more same-day negative affect. Family C showed both same-day and next-day associations. Specifically, more positive affect predicted more parental autonomy support, and more parental psychological control and less parental warmth both predicted more negative affect on the same day. More parental warmth also predicted more positive affect the *next* day. The temporal networks of all 127 families, including the model fit and family-specific path estimates, can be viewed at https://osf.io/a4rzm.

**Figure 5**

*Network Plots of Three Heterogeneous Families*




*Note*. Hybrid-GIMME allowed to model undirected contemporaneous associations (lower figures) and directed contemporaneous or lagged associations (upper figures). The solid lines reflect contemporaneous (same-day) associations, dashed lines lagged (next-day) associations, red lines positive associations, and blue lines negative associations. Betas are provided of the parenting-affect associations. Model fit: Family A ($\chi^2(56) = 661.12$, $p = .167$, RMSEA = .04, SRMR = .07, NNFI = .96, CFI = .98), Family B ($\chi^2(54) = 674.13$, $p = .104$, RMSEA = .05, SRMR = .08, NNFI = .93, CFI = .96), Family C ($\chi^2(57) = 661.18$, $p = .191$, RMSEA = .04, SRMR = .07, NNFI = .94, CFI = .97). PA = positive affect. NA = negative affect. WA = warmth. AS = autonomy support. PC = psychological control. ST = strictness. MO = monitoring.

***Sensitivity Analyses***

In the main findings, five family-specific networks showed temporal associations with low or high beta (< -1.0 or > 1.0) and high corresponding standard error (> 1.0). To assess the extent to which the data of these five families affected the main findings, S-GIMME was again performed while excluding these five families. Similar to the main findings, daily associations between parenting and adolescent affect were found only at the individual level (i.e., found in one or some families), and thus not at the group or subgroup level. The summary network plots of these sensitivity analyses can be found in the online Supplementary Information (see Figures S2-S4).

### Explaining Differences between Subgroups and Individual Families

First, it was tested whether families of subgroups 1 and 2 differed from each other in the following pre-registered variables: mean levels of daily parenting and adolescent affect, adolescent psychological functioning (i.e., depressive and anxiety symptoms, and self-esteem), demographic characteristics (i.e., sex, age, and educational level), legitimacy beliefs, and personality traits (i.e., environmental sensitivity and neuroticism). However, no significant group differences were found (see Table S1 in the online Supplementary Information).

Second, because parenting-affect associations were unique to families, it was also explored whether differences between individual families could be explained. However, the above-described variables were not significantly related to parenting-affect density (see Table S2 in the online Supplemental Information), which reflects the extent to which the temporal parenting-affect associations contributed to the overall family-specific network (excluding autoregressive effects). Hence, the means of the daily assessments and adolescent characteristics did not explain why some families demonstrated more daily associations between perceived parenting practices and adolescent affective well-being than other families.

## DISCUSSION

There is a theoretical consensus among human development (e.g., Bronfenbrenner, 2005; Smith & Thelen, 2003) and parenting theories (e.g., Darling & Steinberg, 1993; Granic et al., 2008) that parents and adolescents influence each other heterogeneously across families. However, different ideas have been formulated regarding the expression of heterogeneity. On the one hand, scholars have assumed that some families are like

some others: families sharing certain group-differential characteristics (e.g., personality, parenting style, and culture) could show similar dynamics (e.g., Belsky & Pluess, 2009; Darling & Steinberg, 1993; Soenens et al., 2015). On the other hand, scholars have assumed that each family is like no other family: Everyone has unique experiences, shaped by many interacting and dynamic individual and contextual factors, family dynamics are potentially idiosyncratic to every family (e.g., Bronfenbrenner, 2005; Van Geert & Lichtwarck-Aschoff, 2005). Determining whether subgroups of families function similarly or whether each family functions uniquely is crucial for informing future parenting interventions because these empirical insights will help to determine whether tailored or personalized parenting interventions are needed (August & Gewirtz, 2019; Yap et al., 2019).

Aided by a novel research design in which 127 families were followed for 100 consecutive days, the current study examined whether daily parent-adolescent dynamics were either group-differential or idiosyncratic to each family. That is, a data-driven temporal network procedure was applied to examine whether subgroups of families could be identified that share similar temporal (i.e., same-day and next-day) associations between five perceived parenting practices and adolescent positive and negative affect (Gates et al., 2017). The current findings suggest that parenting and adolescent affective well-being were associated in almost all families (86%). However, no data-driven subgroups of families emerged that shared similar parent-adolescent dynamics. Instead, same-day or next-day associations between parenting practices and adolescent affect were found only at the individual family level, meaning that daily parenting-affect associations were specific to only one or a few families.

## Daily Idiosyncratic Parent-Adolescent Dynamics were Observed in Most Families

Theories of human development postulate that parenting is an important proximal factor shaping an individual's development (Bronfenbrenner, 2005; Sameroff, 2010). Indeed, the current 100-day diary study rigorously demonstrated that perceived parenting practices are linked to adolescents' affective well-being in almost all families. That is, in the majority of families (109 out of 127), daily associations were identified between perceived parenting practices and adolescent affect. Going beyond previous studies demonstrating daily linkages between parenting and adolescent affect within the 'average family' (e.g., Chung et al., 2009; Schacter & Margolin, 2019), the current family-specific study revealed that such daily linkages could also be observed in most individual families.

Despite the omnipresence of daily dynamics between parenting practices and adolescent affect, no evidence was found of general dynamics (i.e., shared by the whole sample). That is, whether and how the five parenting practices were intertwined with the adolescents' positive and negative affect varied considerably among the families. It is, however, noteworthy that a substantial portion of the adolescents reported feeling more positive (36%) and less negative (20%) on days when they perceived increased parental warmth. This suggests that parental warmth contributes to the daily affective well-being of many adolescents, though not universally.

Furthermore, no subgroup-specific (i.e., shared by a subgroup of families) parent-adolescent dynamics were found. In other words, the nature of daily parent-adolescent dynamics did not generalize to subgroups of families. Although two data-driven subgroups were found (*n*s = 77 and 45), families in these subgroups did not share similar daily associations between parenting and affect. Instead, the first subgroup shared a same-day association between positive and negative affect (which was also shared with other families outside this subgroup) and the second subgroup exhibited similar same-day associations between distinct parenting practices. A potential explanation for the same-day parenting-parenting associations in the latter subgroup might be that these adolescents were less capable of differentiating between distinct practices. Thus, despite group-differential effects have been theorized, for instance, due to shared individual characteristics (e.g., personality, parenting style; Pluess, 2015; Darling & Steinberg, 1993) or contextual characteristics (e.g., culture; Soenens et al., 2015), the current findings do not support the notion that subgroups of families that exhibit homogenous parent-adolescent dynamics in everyday life exist.



### Understanding Parenting as an Idiosyncratic Phenomenon

Many theories focus on the unique (subjective) experiences of an individual child, shaped by many interacting individual and contextual factors (e.g., Bronfenbrenner, 2005). Thus far, however, the existing paradigm of group-based patterns (i.e., variation between families) has not allowed scholars to understand the unique dynamics of individual families (i.e., over-time variation within families; Molenaar & Campbell, 2009). By examining how daily fluctuations in perceived parenting practices and adolescent affect were related across 100 days in each single family separately, the current study demonstrated that daily parent-adolescent dynamics were highly idiosyncratic. That is, it depended on the family *which* of the parenting practices (i.e., warmth, autonomy support, psychological control, strictness, and monitoring) were linked to the adolescent's affective well-being (for example, see Figure 5). Although all five practices showed associations with adolescent

affect across the whole sample, individual families demonstrated on average 2.4 temporal associations between parenting practices on the one hand and adolescent positive or negative affect on the other. For instance, in one family, the adolescent experienced more negative affect when perceiving their parent to be stricter that day, whereas in another family, the adolescent experienced more negative affect when perceiving their parents to be more psychologically controlling (and not when stricter; see Figure 5).

Additionally, *how* perceived parenting was related to adolescent affective well-being also varied across families. Family-specific associations differed in strength, sign (i.e., positive versus negative), and timescale (i.e., on the same or the following day). For example, increased parental strictness predicted more negative affect on the same day in 10 families, with family-specific effect sizes ranging from .26 to .63, and increased parental strictness predicted *more* next-day negative affect in two families but *less* next-day negative affect in two other families. Thus, the findings are consistent with the developmental principle of multifinality (Cicchetti & Rogosch, 1996), such that the same parenting practice showed differential effects on adolescent affect. Together, the present study and other idiographic studies in the broader field of psychology (e.g., Bouwmans et al., 2018; Kelly et al., 2020) offer empirical evidence for the widely held assumption that psychological heterogeneity is an inherent and universal characteristic of human functioning (Richters, 2021).

To understand why the nature of daily parent-adolescent dynamics was heterogeneous across families, a variety of moderators were tested. Specifically, it was tested whether the extent to which parenting-affect associations contributed to the overall family-specific network (i.e., parenting-affect density) could be predicted by mean levels of daily parenting and affect, demographic (i.e., age, sex, education), psychological functioning (i.e., depressive and anxiety symptoms, and self-esteem), legitimacy beliefs of parental authority, and personality traits (i.e., environmental sensitivity and neuroticism). However, none of the moderators were significantly related to parenting-affect density. One explanation for the lack of moderator effects might be that it is the complex interplay of numerous characteristics at multiple levels that shape a family's unique dynamics (Bronfenbrenner, 2005). Future studies should investigate whether family-specific dynamics can be explained by the interplay between a broad range of individual and contextual characteristics.

## Practical Implications

This family-specific study is another demonstration of the methodological concern that between-family patterns, such as research on parenting styles (Kuppens & Ceulemans,

2019), provide little to no information on how single, unique families function (Molenaar & Campbell, 2009). This study provides evidence that adolescents from different families vary in terms of the parenting practices they respond to and how they respond. While further research is needed to determine to what extent such parent-child dynamics are also dissimilar between siblings from the same family, the current findings already hold significant implications for the formulation of general parenting guidelines and for intervention (and prevention) efforts aimed to improve family dynamics and adolescent well-being. That is, universal guidelines and approaches (e.g., all parents are told that they should be more autonomy-supportive to improve their adolescents' everyday feelings) might not work similarly for every family. Consequently, parenting scholars might want to be careful in providing generic parenting guidelines to the general public. Parents who attempt to adhere to general advice that misaligns with their unique family dynamics and needs could unintentionally jeopardize their adolescent's well-being and might experience feelings of incompetence and parenting stress when such generic advice is not working for them.



The current findings, as well as studies demonstrating that some families benefit more from parenting programs than others (e.g., Weeland et al., 2023), indicate that tailoring parenting inventions may be an important future direction to improve their efficacy (August & Gewirtz, 2019). Parenting interventions may want to learn from contemporary approaches in clinical psychology and psychiatry (Myin-Germeys et al., 2018), and could, for example, implement self-monitoring by using experience sampling methods or daily diaries (Swendeman et al., 2020). Tracking a dyad's dynamics in their day-to-day lives can enhance the understanding of the dyad's idiosyncratic dynamics, including their maladaptive dynamics, which again can be used to tailor the intervention to the specific needs of the dyad. Also tracking parent-adolescent dyads during and after an intervention can be useful in evaluating whether the dyadic dynamics have indeed been changing in the desired direction (Bamberger, 2016).

## Limitations and Future Directions

This pre-registered study applied a novel family-specific network approach to the study of parenting adolescents. Although work is needed to replicate current findings, this study rigorously demonstrated the idiosyncratic nature of how perceived parenting practices were intertwined with adolescent affect over 100 days in 127 individual families. However, this study has several limitations. First, this study may have underestimated the heterogeneity. Although participants were sampled from a rural area and all educational

levels were present in the data, the study included more adolescents from relatively well-functioning families drawn from a community sample. To further unravel how parenting and adolescent well-being interact within diverse families, future studies should encompass larger and more diverse samples, including various ethnic backgrounds and psychopathology.

Second, due to the design of the study, which permitted the participation of only one parent-adolescent dyad per family, the findings thus reflect how dyads of different families uniquely interact in daily life. Therefore, it remains an open question whether the dynamics between parenting and adolescent well-being are truly idiosyncratic to each dyad or potentially exhibit common patterns within the same family. Future studies exploring the extent to which parent-adolescent dynamics generalize within families (e.g., siblings interacting with the same parent) could offer a more stringent test whether these dynamics are truly idiosyncratic. Such studies might also provide more insights into the role of shared environmental and genetic factors in shaping the nature of daily parent-adolescent dynamics.

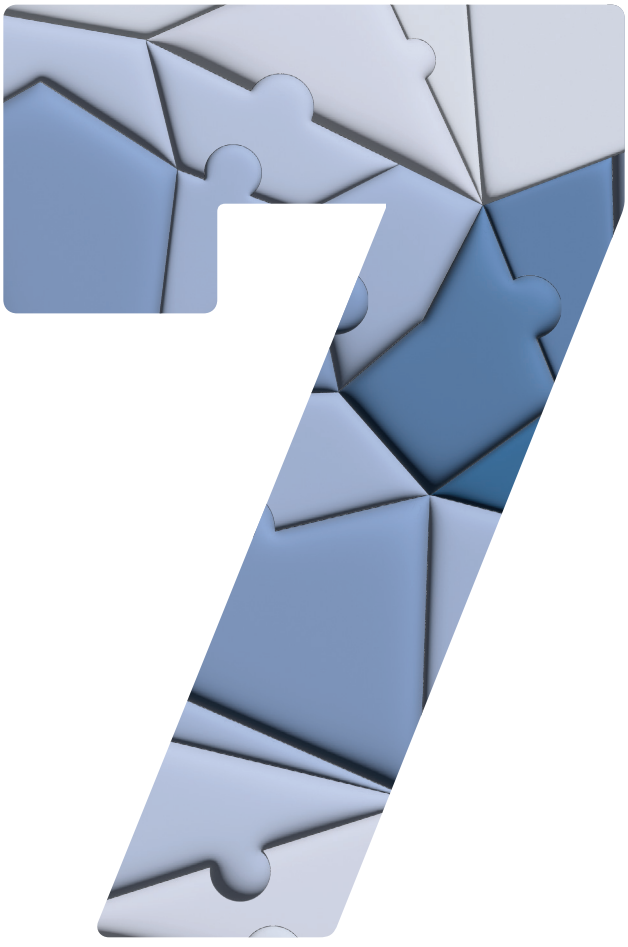
Third, because intensive longitudinal methods are still in their infancy in parenting research (Keijsers et al., 2022), it is likely that the observed within-family fluctuations in this 100-day diary study also include measurement errors (Schuurman & Hamaker, 2019). Although methodological work suggests that 60 observations per family are sufficient for S-GIMME (Lane et al., 2019), larger individual time series might increase the precision of the estimated family-specific effects and identify more true heterogeneity (Hoekstra et al., 2022). Therefore, pursuing even more than 100 observations per family in future intensive longitudinal studies might be required to comprehend idiosyncratic family dynamics.

Fourth, as this study was among the first to apply GIMME to parenting data, the direction of contemporaneous (same-day) associations needs to be interpreted with caution; this is a limitation of ‘standard’ GIMME. GIMME multiple solutions (GIMME-MS) have been developed to more robustly examine the directionality of contemporaneous (and even lagged) associations (Beltz & Molenaar, 2016). However, GIMME-MS cannot yet be combined with the subgrouping option. Hence, future research is also recommended to unravel how the direction of influences between parenting practices and adolescent well-being differs across individual families (e.g., Boele, Bülow, Beltz et al., 2023). This piece of information about parent-adolescent dynamics – who influences whom – (e.g., is the adolescent mainly reacting on the parent or is the parent mainly reacting on their adolescent child) is important for interventions, as it indicates who should be targeted to enable desired change.

Fifth, although the study examined five key parenting practices and both positive and negative aspects of adolescents' affect, it may have overlooked other practices or well-being indicators that are also relevant in families' everyday life. Future research might also want to include other practices, such as overprotection (Van Petegem et al., 2022), and other adolescent well-being indicators, such as loneliness (Soenens et al., 2017), to gain a more comprehensive understanding of how and why parent-adolescent dynamics are (dis)similar across families and to adequately inform future practice.

## Conclusion

In almost every family, adolescent-perceived parenting practices were intertwined with the adolescent's affective well-being in everyday life. However, the findings revealed no evidence of homogeneity in the nature of these daily parent-adolescent dynamics, either at the sample or subgroup level. Instead, daily parent-adolescent dynamics appeared idiosyncratic: *Which* parenting practices were intertwined with the adolescent's affective well-being, and *how*, was specific to the family. Although future studies with longer time series per family and larger samples are needed to replicate the idiosyncratic findings demonstrated here, the current results suggest that future translational efforts may benefit from tailoring interventions to the specific dynamics of the family.



# CHAPTER 7

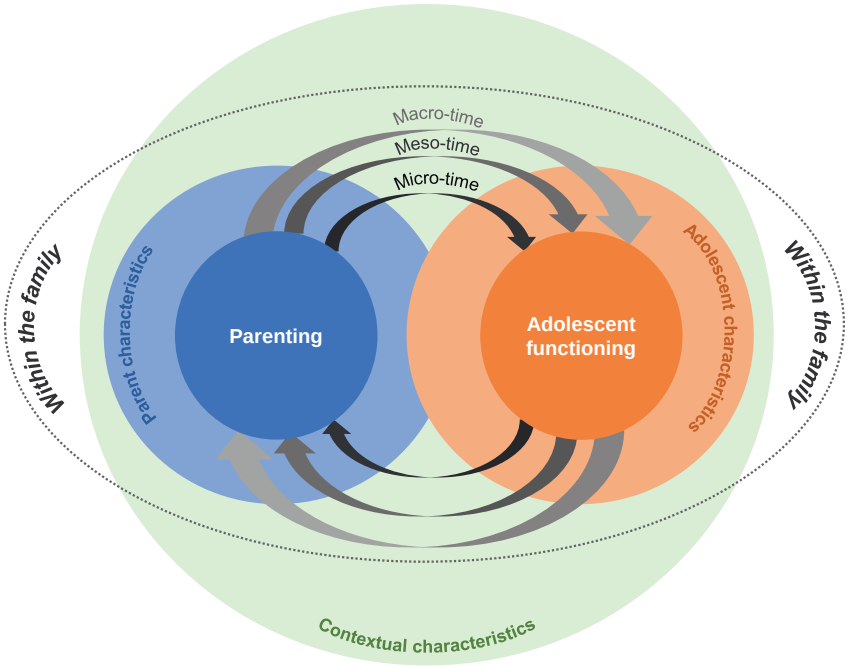
Summary and general discussion

## SUMMARY AND GENERAL DISCUSSION

Few people are as important for an adolescent's development as their parents – for better or worse. Numerous theories on human development (Bronfenbrenner, 2005; Sameroff, 2010; Smith & Thelen, 2003) and parenting (Darling & Steinberg, 1993; Soenens et al., 2019) highlight that parenting has a significant impact on adolescents' everyday functioning and longer-term development. Moreover, how an adolescent feels and behaves is also thought to influence their parents' behavior (Kuczynski & Parkin, 2007). These dynamic processes between parenting and adolescent functioning (see Figure 1) flow within families on various timescales, from micro- to macro-timescales (Granic et al., 2008; Lougheed & Keskin, 2021), and are likely to vary across families as a function of various individual (e.g., gender and personality of the adolescent) and contextual characteristics (e.g., culture, religion) (Belsky & Pluess, 2009; Darling & Steinberg, 1993).

**Figure 1**

*Theoretical model of the dynamic processes between parenting and adolescent functioning within families*



Most of these meta-theoretical ideas (see Figure 1) about parenting adolescents still lack sufficiently rigorous empirical evidence, however. That is, up until now, most empirical studies applied between-family approaches (for review, see **Chapter 2**; Boele et al., 2020), estimating parenting effects at the group level. These group-level (between-family) estimates tap into the relative (rank-order) differences between families and have therefore been criticized for conveying little to no insight in the way parents and adolescents within a single family influence each other over time (Hamaker, 2012; Molenaar, 2004). Therefore, many meta-theoretical ideas about the phenomenon of parenting adolescents (i.e., reciprocal dynamics within a family, on various timescales, and varying between families) have remained untested at the right ecological level: *the within-family level*. Hence, similar as in other fields of psychology (Moeller, 2022), there is an evident mismatch between theory and applied methods in the scientific parenting literature (Richters, 1997, 2021). This theory-method mismatch is problematic because empirical insights of how parenting and adolescent functioning are related at the within-family level are vital for properly translating science to practice.

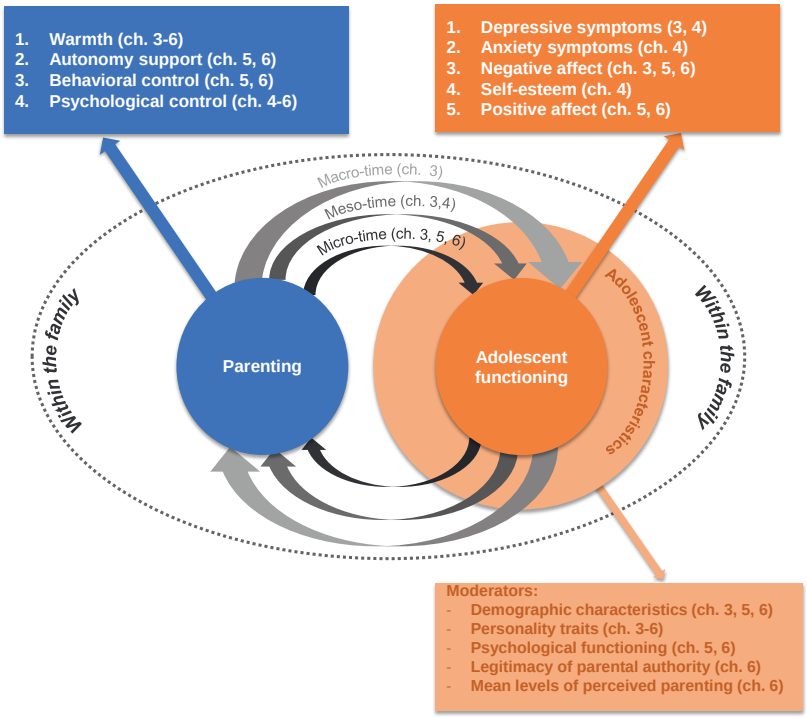


Therefore, the overarching goal of this dissertation was to provide novel insights into the complexities of parenting adolescents by applying a within-family approach. To do so, three aims were formulated: (1) to examine how key parenting dimensions are (on average) reciprocally associated with adolescent functioning at the within-family level, (2) to examine such associations on various timescales, and to (3a) quantify and (3b) explain heterogeneity across families in these associations. These aims were addressed by conducting one systematic literature review (**Chapter 2**) and four empirical studies (**Chapters 3-6**; for visualization see Figure 2).

Here I discuss the main findings of each study (for a summary, see also Table 1) and provide an integrated view, including theoretical and practical implications. I end with a reflection of the strengths and limitations of the studies and provide directions for future research.

**Figure 2**

*Overview of the empirically studied concepts in Chapters 3 to 6*



## SUMMARY AND INTEGRATION OF MAIN FINDINGS

**Table 1**

*Summary of Main Findings per Chapter*

| Chapter | Aim | Findings |
|---|---|---|
| 2 | 1 | Up until the beginning of 2018, 46 studies were published on within-family associations between parenting and adolescent functioning. |
| | 1 | Parental support, behavioral control, and negative interaction were the most studied parenting dimensions, and adolescent externalizing behavior was the most studied indicator of adolescent functioning. |
| | 1 | Most of the within-family studies examined concurrent associations and only a few examined (reciprocal) lagged associations. |
| | 2 | The results of some within-family studies were in line with parenting theories, whereas others found unexpected associations or no associations at all. |
| | 2 | Within-family associations were typically assessed on a daily or an annual timescale. |
| | 3 | Few studies examined heterogeneity in the within-family associations. |
| 3 | 1 | Within families, increases in perceived parental support correlated on average with decreases in adolescent depressive symptoms across a bi-weekly to a biennial timescale. |
| | 1 | Perceived parental support on average did not predict adolescent depressive symptoms within families on varying timescales. |
| | 2 | Increases in adolescent depressive symptoms predicted on average decreases in perceived parental support two weeks and three months later, but not one day, one year or two years later within families. |
| | 3b | Limited evidence was found for sex differences or differences between adolescents scoring low vs. high on neuroticism in the lagged effects. |
| 4 | 3a | Different co-existing responsivity-to-parenting patterns were found at the individual level: Some adolescents demonstrated better psychological functioning after perceived decreases in parental psychological control (diathesis stress), others after perceived increases in parental support (vantage sensitive), and some others after perceiving both (differentially susceptible). |
| | 3a | In contrast to theoretical expectations, still some other adolescents demonstrated worse psychological functioning after perceived increases in parental support or perceived no bi-weekly changes in parenting. |
| | 3b | Trait scores on environmental sensitivity (i.e., sensory processing sensitivity) were unrelated to the responsivity patterns but were instead related to the perception of greater bi-weekly changes in parenting. |
| 5 | 3a | The direction of effects in day-to-day associations between perceived parenting and adolescent affective functioning was heterogeneous across families: Some showed a reciprocal day-to-day effect, whereas others showed only a parent-driven, an adolescent-driven effect, or no effects at all. |
| | 3a | Also within the same family, the direction of effects varied across parenting dimensions. |

**Table 1 Continued**

| Chapter | Aim | Findings |
|---|---|---|
| | 3b | Adolescents scoring higher on environmental sensitivity showed stronger effects from parenting to positive affect, whereas adolescents scoring higher on neuroticism showed stronger associations between parenting and negative affect. |
| 6 | 3a | Patterns of daily associations between perceived parenting practices and adolescent affective functioning were not shared by the whole sample nor by subsample but were instead unique to each family. |
| | 3a | Which of the five parenting practices were associated with adolescent affect, and the strength, the sign (positive or negative), and timescale (same-day or next-day) of these associations was specific to the individual family. |
| | 3b | Various adolescent characteristics were unrelated to the number of associations between parenting practices and adolescent affect in the family-specific network models. |

## AIM 1: Examine How Key Dimensions Of Parenting Are (On Average) Reciprocally Associated With Adolescent Functioning At The Within-Family Level

Based on an abundance of between-family studies, numerous meta-analyses have shown that the four key dimensions of parenting (i.e., warmth/support, autonomy support, behavioral control, and psychological control) (Smetana, 2017; Soenens et al., 2019) are related to various indicators of adolescent functioning at the group level (McLeod, Weisz, et al., 2007; Pinquart, 2017a, 2017b; Yap et al., 2014). The application of within-family designs is not yet as common as between-family designs, however. Therefore, at the start of this PhD project, no systematic overview of how key parenting dimensions and adolescent functioning relate at the within-family level was available. To provide a first overview of both the available and lacking empirical insights, I started my PhD project with a systematic review of studies that examined within-family linkages between parenting and adolescent functioning (**Chapter 2**).

The systematic review showed that only 46 within-family studies had been published until the beginning of 2018 (Boele et al., 2020). These studies focused mostly on how the parenting dimensions support ($n$ = 14), negative interaction ($n$ = 17), and behavioral control ($n$ = 22) were, on average, related to adolescents' functioning. Most attention was specifically given to how parental behavioral control was related to adolescents' externalizing problem behaviors within families ($n$ = 18). Surprisingly, no within-family studies had yet been conducted on the parenting dimension autonomy support. Moreover, most studies examined how parenting

was concurrently (and not longitudinally) related to adolescent functioning. If studies found concurrent associations, they often (but not always) provided evidence for theories such as the interpersonal acceptance and rejection theory (IPARTheory; Rohner, 2016) and self-determination theory (Ryan & Deci, 2000; Soenens et al., 2019). For instance, when "the average adolescent" perceived more parental warmth, involvement, and limit setting (Gottfredson et al., 2017; Han & Grogan-Kaylor, 2013; H. J. Janssen et al., 2016), and more rejection and aversiveness than usual (Lehman & Repetti, 2007; Vandewalle et al., 2017), the adolescent simultaneously reported better functioning (e.g., fewer internalizing and externalizing problems). Overall, by summarizing this small body of work, I demonstrated that associations between parenting and adolescent functioning can be observed at the within-family level. Nonetheless, the systematic review made also evident that little was yet empirically known about how parenting and adolescent functioning are *reciprocally* related within families, because the study of longitudinal time-lagged associations at the within-family level was still severely lacking.



### 1.1 A mix of average parent-driven, adolescent-driven, and reciprocal associations

To advance the empirical study of parenting adolescents, I therefore examined the average *cross-lagged* effects between the four key dimensions of parenting on the one hand and the psychological and affective functioning of adolescents on the other hand (**Chapters 3-5**). In total, I examined 17 cross-lagged effects (see Table 2). For more than half of the associations (i.e., 10 of 17), I found significant average (first-order) lagged effects between parenting and adolescent functioning at the within-family level. The direction of these lagged effects were parent-driven (3x), adolescent-driven (4x), or reciprocal (3x), varying by dimension of parenting and adolescent functioning. To illustrate, increased psychological control was *on average* reciprocally related to decreased adolescent self-esteem within families, whereas I found a parent-driven effect of increased psychological control on increased adolescent depressive symptoms. No average lagged effects were found for the other seven associations. Hence, although the findings of this dissertation (see also Table 2) and other work (e.g., Bülow, Van Roekel, et al., 2022; Kapetanovic et al., 2019) indicate that theorized key dimensions of perceived parenting wax and wane with adolescent functioning within families, they do not suggest that dynamic parenting processes are fundamentally reciprocal (Lollis & Kuczynski, 1998; Sameroff, 2009; Soenens & Vansteenkiste, 2020). Instead, how parenting and adolescents' functioning reciprocally influence each other within families might be a dimension-specific process - at least in the average family.

Moreover, the findings of this dissertation and other research (e.g., Visscher et al., 2023; Vrolijk et al., 2020) suggest that cross-lagged effects between parenting and adolescent functioning are not homologous across levels (Hamaker, 2012). That is, the average time-lagged effects at the within-family level deviate from the between-family lagged effects found in earlier work, especially in terms of the strength and thereby also in the presence of effects. For example, although meta-analytic work has found negative reciprocal between-family lagged effects between parental warmth and adolescent internalizing symptoms (Pinquart, 2017b), I found a negative adolescent-driven lagged effect (but not vice versa) from elevated adolescent depressive symptoms on decreased parental support within families (see Table 2).

Accordingly, it is crucial that the previously examined lagged effects at the between-family level are re-examined at the within-family level (e.g., Keijsers, 2016). For instance, prior studies on parenting adolescents have widely applied a standard cross-lagged panel model (CLPM). The CLPM has been criticized for not purely tapping into within-person variation (Hamaker et al., 2015; Lucas, 2023), resulting in underestimated or spurious lagged effects (Lucas, 2023). Given sufficient power, previous findings of CLPMs (Branje et al., 2010; Willoughby & Hamza, 2011) should therefore be assessed again with alternative statistical models, which disentangles between-family variation from within-family variation, such as a random intercept cross-lagged panel model (RI-CLPM; Hamaker et al., 2015) applied in **Chapter 3** of this dissertation.

## 1.2 Concluding remarks of aim 1

To conclude, the average sample effects found in this dissertation provide evidence that perceived parenting co-varies on average with adolescent functioning at the same time within families. However, no compelling evidence was found that the dynamic processes between parenting and adolescent functioning are inherently reciprocal (Soenens & Vansteenkiste, 2020). Whether perceived parenting and adolescent functioning affect each other over time within the average family might depend on the key parenting dimensions, however. Importantly, as dynamic parenting processes might unfold differently on various timescales (e.g., Granic et al., 2008; Lougheed & Keskin, 2021) and across families (e.g., Belsky & Pluess, 2009; Bronfenbrenner, 2005), more detailed empirical insights are necessary to understand *when* and *for which* adolescents certain parenting dimensions and practices are helping or hindering.

**Table 2**

*Overview of Found Fixed (Average) Effects at the Within-Family Level in this Dissertation*

| Parenting dimension | Time interval | Ch. | Adolescent functioning | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depressive symptoms | | | Anxiety symptoms | | | Negative affect | | | Self-esteem | | | Positive affect | | |
| | | | *r* | Cross-lagged | | *r* | Cross-lagged | | *r* | Cross-lagged | | *r* | Cross-lagged | | *r* | Cross-lagged | |
| | | | | P → A | A → P | | P → A | A → P | | P → A | A → P | | P → A | A → P | | P → A | A → P |
| **Warmth** | Day | 3 | | | | | | | 0[a] | 0[a] | 0[a] | | | | ++[b] | ++[b] | ++[b] |
| | | 5 | | | | | | | -[b] | 0[b] | 0[b] | | | | | | |
| | 2W[c] | 3&4 | - | 0 | - | - | - | -- | | | | + | 0 | ++ | | | |
| | 3M[d] | 3 | --- | 0 | --- | | | | | | | | | | | | |
| | Annual[e] | 3 | - | 0 | 0 | | | | | | | | | | | | |
| | Biennial[f] | 3 | - | 0 | 0 | | | | | | | | | | | | |
| **Autonomy support** | Day | 5 | | | | | | | - | 0 | 0 | | | | + | + | ++ |
| **Behavioral control** | Day | 5 | | | | | | | + | + | 0 | | | | - | 0 | 0 |
| **Psychological control** | Day | 5 | | | | | | | + | + | 0 | | | | - | 0 | 0 |
| | 2W | 4 | + | + | 0 | + | | | | | | - | --- | --- | | | |

*Note*. Ch. = chapter. *r* = correlation. P→A = time-lagged effect from parenting to adolescent functioning. A → P = time-lagged effect from adolescent functioning to parenting. 2W = bi-weekly time interval. 3M = three-monthly time interval. 0 is a non-significant effect. - or + = small effect ($r < .30$; β lagged < .07). - - or ++ = moderate effect ($.30 \geq r < .50$; β lagged $.07 \geq < .12$). - - - or +++ = large effect ($r \geq .50$; β lagged: ≥ .12). For effect size guidelines for correlations and lagged effects, see Cohen (1992) and Orth et al. (2022), respectively.

[a] Grumpy and Depressed daily dataset ($N = 244$, $t = 7$, $M_{age} = 13.9$, 65% female)

[b] 100 days of my life dataset ($N = 159$, $t = 91$, $M_{age} = 13.1$, 62% female)

[c] One size does not fit all ($N = 256$, $t = 26$, $M_{age} = 14.4$, 71% female)

[d] Grumpy and Depressed three-monthly dataset ($N = 245$, $t = 3$, $M_{age} = 13.9$, 65% female)

[e] Panel Analysis of Intimate Relationships and Family Dynamics ($N = 1{,}664$, $t = 3$, $M_{age} = 11.1$, 49% female)

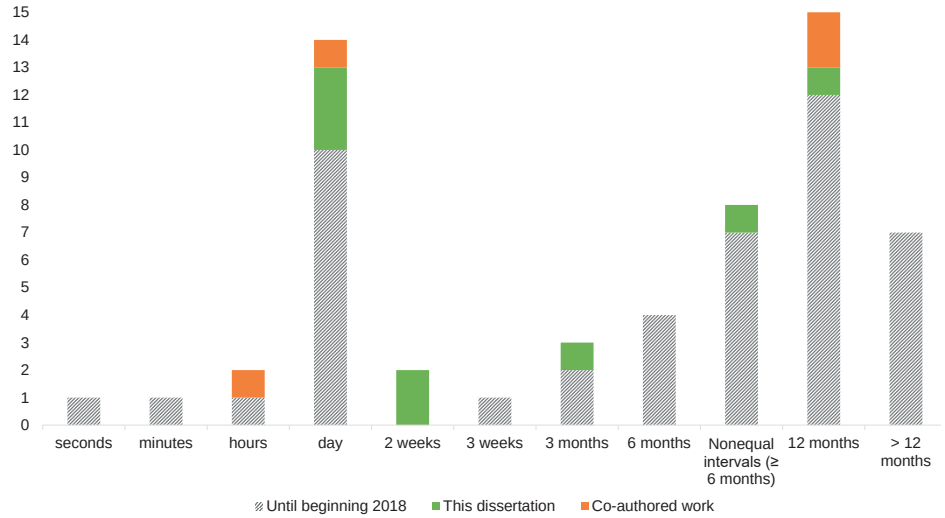
[f] Flemish study on Parenting, Personality, and Development ($N = 503$, $t = 3$, $M_{age} = 13.8$, 52% female)

## AIM 2: To Examine Within-Family Associations Between Parenting And Adolescent Functioning On Various Timescales

Various theories on human development (Bronfenbrenner, 2005; Sameroff, 2010; Smith & Thelen, 2003) and parenting (Lougheed & Keskin, 2021; Patterson, 1982) postulate that the influences between parents and their adolescents unfold on varying timescales, from micro- to macro-timescales (see Figure 1). Nonetheless, most of the empirical understanding thus far has been about how parenting and adolescent functioning influence each other within families on a macro-timescale. That is, the systematic literature review at the start of this PhD project (**Chapter 2**), demonstrated that a (semi-)annual time interval, or longer, has been the most common within-family design (*n* = 30 of 46; see Figure 2). The study of micro- (e.g., momentary or daily) and especially meso-timescales (e.g., weekly or monthly) were less common or even entirely overlooked, even though such timescales are part of contemporary theories (Granic & Patterson, 2006; Lougheed & Keskin, 2021).

**Figure 2**

*Number of studies using different time intervals (all earlier studies vs. this dissertation)*




*Note*. In the multiple-timescale study in Chapter 2, parent-adolescent dynamics at a biennial timescale were examined by using a dataset collected in 2007, 2009, 2012 (here noted as nonequal interval of ≥ 6 months).

To start expanding the empirical knowledge of how parenting and adolescents' functioning influence each other within families on micro- to macro-timescales, the four empirical

studies in this dissertation (**Chapter 3-6**) included five different timescales (see Table 2). In two of the studies (**Chapter 3 & 4**), I introduced a novel intensive longitudinal design that applied a bi-weekly time interval. Figure 2 shows how my dissertation, and other work to which I contributed (Bülow, Neubauer, et al., 2022; Bülow, Van Roekel, et al., 2022; Kapetanovic et al., 2019; Visscher et al., 2023), expanded the worldwide body of empirical work on the within-family processes between parenting and adolescent functioning. Below I summarize per timescale (i.e., micro-, meso-, and macro-timescale) what empirical insights this dissertation has provided and how that builds upon previous work.

## 2.1 Micro-timescale processes

In this dissertation, I studied how all four key parenting dimensions were related to adolescents' affective functioning in everyday life (see Table 2). To study these daily dynamic parenting processes, I used novel data of 159 Dutch adolescents who completed daily diaries for at least 100 consecutive days (see also Bülow, Neubauer, et al., 2022; De Vries et al., 2023).



The two parenting dimensions *warmth* (**Chapters 3 & 5**) and *autonomy support* (**Chapter 5**) were, on average, most strongly intertwined with adolescents' everyday affective functioning, particularly with positive affect. Specifically, I found that when adolescents perceived more warmth or autonomy-supportive parenting than typical, they experienced on average better affective functioning the same day (i.e., less negative affect and more positive affect) and even the following day (i.e., more positive affect). Additionally, when adolescents were in a better mood than typical (i.e., more positive affect) they also perceived their parents to be warmer and more autonomy-supportive the next day. These findings are in line with several other recent daily diary studies examining similar within-family linkages in adolescence (e.g., Neubauer et al., 2021; Schacter & Margolin, 2019; Xu & Zheng, 2022). Therefore, the findings of this dissertation and others provide increasing evidence for the theorized importance of perceived parental warmth in relation to adolescents' functioning, as proposed by the IPARTheory (Rohner, 2016) and self-determination theory (Ryan & Deci, 2000; Soenens et al., 2019). Though these theories are not explicit about the relevant timescales, empirical findings thus indicate that perceived parental warmth and autonomy support might already contribute to a better functioning in adolescents by brightening their everyday mood.

Moreover, I was among the first to study the average daily dynamics between parental *behavioral control* and adolescents' affective functioning within families (**Chapter 5**). Typically, macro-timescale studies assume that behavioral control is an adaptive parenting behavior, especially by reducing adolescents' externalizing problems (H. J. Janssen et al., 2016; Kapetanovic et al., 2019). Interestingly, I found some average *negative* micro-timescale effects of behavioral control (which included the practices monitoring and strictness). That is, when adolescents perceived their parents to be more behaviorally controlling than typical, they reported on average worse affective functioning the same day (i.e., more negative affect and less positive affect) and the following day (i.e., more negative affect). Although meta-analytical work with between-family correlations (Yap et al., 2014) and a recent meso-timescale within-family study (Pelham et al., 2022) suggest that parental monitoring might mitigate adolescents' depressive symptoms, the findings in this dissertation suggest that behaviorally controlling parenting, which included monitoring, may have negative consequences for adolescents' affective functioning in daily life by eliciting negative emotions. Future research may want to assess whether non-linear processes might be at play, such that behaviorally controlling practices might evoke an oppositional reaction from the adolescent in the short term (Brehm, 1966; Van Petegem et al., 2015), demonstrated by more negative emotions, for instance, but might lead to better functioning (e.g., fewer depressive symptoms) in the longer term through effective monitoring of adolescents' problematic activities and whereabouts (Yap et al., 2014).

Additionally, I found that *psychologically controlling* parenting had on average a negative effect on adolescents' everyday affective functioning (**Chapter 5**). Similar to behavioral control, when adolescents perceived their parents to be more psychologically controlling than typical, they reported on average worse affective functioning the same (i.e., more negative and less positive affect) and following day (i.e., more negative affect). Though this is one of the first studies showing the effects of parental psychological control on adolescents' daily functioning, the findings are similar to two diary studies including school-aged children (Aunola et al., 2013; Van Der Kaap-Deeder et al., 2017). Hence, building upon group-level studies showing that psychological control is one of the parenting dimensions showing the strongest links with internalizing problems in adolescence (Pinquart, 2017b), my novel empirical insights at the within-family level shed light on the potential influence of psychologically controlling parenting on adolescents' daily emotions.

It is important to note that most of the average day-to-day effects of parenting on adolescents' affective functioning found in this dissertation were small in size (see Table

2). For example, the effect size of parental psychological control predicting next-day adolescent negative affect was .04 (**Chapter 5**), which is a small effect according to recent guidelines (Orth et al., 2022). Some researchers argue that such small effects may not have a practical impact on adolescent functioning (Pelham et al., 2022). However, bio(psychosocial) ecological models (Bronfenbrenner, 2005; Sameroff, 2010) and dynamic system theories (Granic et al., 2008; Smith & Thelen, 2003) argue that repeated daily effects parenting might accumulate over time, resulting in meaningful effects on adolescent functioning in the longer term. Thus, although the micro-timescale effects of perceived parenting on adolescent functioning, and vice versa, appear weak at first glance, repeated effects may accumulate into more substantial, meaningful effects in the long run.

### 2.2 Meso-timescale processes

Theories on human development thus highlight that the daily influences between parents and their adolescents accumulate across time, instigating longer-term changes in adolescents' development (Bronfenbrenner, 2005; Sameroff, 2010; Smith & Thelen, 2003). Though most theories do not explicitly describe the length of this timeframe, such accumulation might occur on a meso-timescale, including weeks and months (Bronfenbrenner, 2005; Thelen & Smith, 1994). However, as the systematic review in **Chapter 2** shows, meso-timescales have been largely neglected in longitudinal parenting studies. Therefore, this dissertation introduced a new intensive meso-longitudinal study design to examine the potential existence of *meso-timescale* processes between parenting and adolescent functioning within families. Specifically, I followed 256 Dutch adolescents every other week for a full year. With this data, I was able to examine how adolescent-perceived parental warmth and psychological control were on average related to adolescents' psychological functioning (i.e., depressive and anxiety symptoms and self-esteem) within families on a *bi-weekly timescale* (**Chapters 3 & 4**). Moreover, I examined how parental warmth was related to adolescents' depressive symptoms on a *three-monthly timescale* by using an existing dataset of 244 Dutch adolescents (**Chapter 3**; see Table 2).

Indeed, the findings suggest that parenting and adolescent functioning may influence each other within families on a bi-weekly and three-monthly timescale (see Table 2). Interestingly, these meso-timescale parenting processes differed to some extent to the previously described micro-timescale processes (see 2.1). That is, in contrast to the daily

effects, the bi-weekly effects are not in line with the dual-pathway perspective of SDT (Vansteenkiste & Ryan, 2013); Increased parental warmth was on average related to fewer anxiety symptoms but *not* to better self-esteem two weeks later, and increased parental psychological control was on average related to more depressive symptoms but *also* to worse self-esteem two weeks later. Hence, changes in how parents behaved toward their adolescents across a two-week period seems to impact various important aspects of adolescents' psychological functioning. Whether these bi-weekly parenting effects are the result of accumulating daily parenting effects on adolescents' everyday emotions (as described under 2.1) is an interesting direction for future research.

Moreover, several within-family effects at the meso-timescales were moderate to strong in effect size (see Table 2), indicating that this might indeed be a relevant timescale to empirically capture the dynamic processes between parenting and adolescent functioning within families. One finding that especially stands out are the strong negative reciprocal bi-weekly dynamics between parental psychological control and adolescent self-esteem. In accordance with the self-determination theory (Ryan & Deci, 2000; Soenens et al., 2019), these findings suggest that parental psychological control might undermine adolescents' feelings of competence, leading to worsened self-esteem. Moreover, a worsened self-esteem seems to evoke more psychologically controlling parenting, possibly because parents aimed to control their adolescents' feelings in a maladaptive way. Hence, this dissertation thus provides compelling evidence that such need-thwarting processes with parental psychological control may already occur within families on a novel bi-weekly meso-timescale.

### 2.3 Macro-timescale processes

Like many other longitudinal studies (see **Chapter 2**), I also examined how parenting and adolescent functioning were related within families on *macro-timescales* (**Chapter 3**). However, I did not find that perceived changes in parental warmth were on average related to changes in adolescents' depressive symptoms one or two years later (see Table 2). These findings are similar to many other macro-timescale studies finding no or few average time-lagged effects between parenting and adolescent functioning within families (e.g., Nelemans et al., 2020; Visscher et al., 2023; Vrolijk et al., 2020). Together, the findings of this dissertation and other work suggest that a macro-timescale might be too long to capture the dynamic processes between parenting and adolescent functioning within families (as raised by Keijsers & Van Roekel, 2018). Therefore, future research may want to more frequently employ micro- and meso-timescales designs to

more effectively capture the fine-grained dynamic processes between parenting and adolescents' functioning within families.

### 2.4 Concluding remarks of aim 2

To conclude, this dissertation provides novel empirical evidence that the dynamic processes between parenting and adolescents' functioning within families can indeed be observed on different timescales, particularly on micro- and meso-timescales. Because, to date, micro-timescale but especially meso-timescale within-family studies on parenting adolescents are scarce, future studies are recommended to also focus on these timescales. However, refined theoretical ideas are also needed that explicitly hypothesize about the timescales of interest to guide the design of future studies. Furthermore, my findings indicate that utilizing different timescales can also yield qualitatively different results, especially in terms of the strength of cross-lagged effects between parenting and adolescents' functioning within families. Therefore, future research is warranted to cautiously, or perhaps not at all, generalize timescale-specific findings to other timescales. Nonetheless, as the dynamic processes between parenting and adolescents' functioning are generally assumed to be heterogeneous across families (e.g., Bronfenbrenner, 2005; Granic et al., 2008), how parenting and adolescent functioning are intertwined on various timescales might possibly even differ across families.



## AIM 3: Quantify And Explain Heterogeneity Across Families In Within-Family Parent-Adolescent Dynamics

Many developmental and parenting theories converge on the idea that the nature of the dynamic processes between parenting and adolescent functioning is likely heterogeneous across families. However, there are different theoretical perspectives on the extent to which the nature of these influences varies across families. On the one hand, so called 'group-differential' theories (implicitly) propose that influences differ between subgroups of families because of variation in group-differential characteristics (e.g., parenting style, personality, culture) (Belsky & Pluess, 2009; Darling & Steinberg, 1993; Soenens et al., 2015). On the other hand, bio(psychosocial) ecological models (Bronfenbrenner, 2005; Sameroff, 2010) and dynamic systems theories (Smith & Thelen, 2003; Van Geert & Lichtwarck-Aschoff, 2005) propose that influences between parenting and adolescent functioning are likely unique to each family due to the complex dynamic interplay of many individual and contextual characteristics.

Despite this theoretical consensus, empirical knowledge on the heterogeneity across families in their dynamic processes between parenting and adolescent functioning is lacking considerably. That is, my systematic review (**Chapter 2**) revealed that less than half of the within-family studies (20 of the 46) that were published until the beginning of 2018 examined heterogeneity, mainly by assessing whether associations between parenting and adolescent functioning were moderated. To increase the empirical understanding of how parenting differentially impacts adolescents' functioning across families and vice versa, I examined (**aim 3a**) the degree to which the dynamics between perceived parenting and adolescent functioning within families vary across families and (**aim 3b**) which adolescent characteristics could explain the observed heterogeneity.

## 3.1 Quantifying heterogeneity: Evidence that dynamic parenting processes are idiosyncratic.

To understand to which extent dynamics between parenting and adolescent functioning within families differ across families, I examined whether these dynamics differed for subgroups of families or were either idiosyncratic. As a first step, in **Chapter 3,** I examined whether pre-defined subgroups of adolescents differed on average in their dynamic processes between parental support and depressive symptoms (i.e., first aggregate, *then* analyze). However, I found little evidence that the perceived dynamics between parental support and adolescent depressive symptoms were, on average, different for adolescent boys or girls and for subgroups of adolescents with low versus high trait levels of neuroticism.

The lack of average subgroup differences found in **Chapter 3** and in work of others (e.g., Vrolijk et al., 2020), might suggest that the dynamics between parenting and adolescent functioning are homogeneous across families. However, another possibility might be that large heterogeneity exists even within these pre-defined subgroups (Moeller, 2022). Comparing *average subgroup-dynamics* might thus be insufficient to understand how the dynamics of *individual* families differ from each other. Accordingly, more fine-grained analyses seem necessary to reveal heterogeneity that is potentially hiding behind subsample averages.

To better understand the extent to which families differ in their dynamic parenting processes, I moved to an *idionomic approach* (i.e., first analyze, *then* aggregate; Moeller, 2022; Sanford et al., 2022). An idionomic approach combines a nomothetic (i.e., identifying generalizable patterns) and an idiographic approach (i.e., estimating effects for each

individual family separately) (Beltz et al., 2016; Molenaar & Campbell, 2009). Specifically, in **Chapter 6,** I combined an idiographic (family-specific) network approach (Gates & Molenaar, 2012) with a data-driven subgrouping procedure (Gates et al., 2017; Lane et al., 2019), by using the 100-day diary data of 129 adolescents. The findings indicated, however, no data-driven subgroups of families who shared similar daily associations between perceived parenting practices (i.e., warmth, autonomy support, psychological control, monitoring, and strictness) and adolescents' affective functioning. Instead, which of the five investigated parenting practices were intertwined with an adolescent's affect, and in which manner, was unique to each family. Thus, the dynamic processes between parenting and adolescents' affective functioning may not vary from subgroup to subgroup but could instead be idiosyncratic.

Moreover, by applying a family-specific approach in **Chapters 4 to 6**, I was able to provide first insights into how *the nature* of these dynamic processes between parenting and adolescent functioning might be unique to each family. Across studies, I found that some adolescents were more strongly affected than others (and some others not at all) by the same parenting dimensions or practices in terms of their bi-weekly psychological functioning (**Chapter 4**) or daily affective functioning (**Chapters 5 & 6**). Relatedly, in **Chapter 5** I demonstrate that the direction (i.e., parent-driven, adolescent-driven, or reciprocal) of day-to-day effects varied across families - yet also within the same family across parenting dimensions. Additionally, whether a parenting dimension elicited better or worse functioning in adolescents also differed to some extent across families (see Table 3). To illustrate, when adolescents perceived more parental warmth than usual, 55% experienced fewer anxiety symptoms two weeks later, whereas 22% experienced *more* anxiety symptoms and 23% experienced no changes in their anxiety symptoms (**Chapter 4**). Thus, every family could have their own unique one-a-kind recipe: which parenting practices or dimensions are promoting or hindering certain of aspects of the adolescent's functioning and/or vice versa could be unique to each family.

**Table 3**

*Sample distribution of the sign (negative, null, or positive) of the standardized family-specific cross-lagged effects*

| | | | Adolescent functioning | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parenting dimension** | **Time scale** | | **Depressive symptoms** | | | **Anxiety symptoms** | | | **Negative affect** | | | **Self-esteem** | | | **Positive affect** | | |
| | | | - | 0 | + | - | 0 | + | - | 0 | + | - | 0 | + | - | 0 | + |
| **Warmth** | Day | P → A | | | | | | | 21% | **74%** | 5% | | | | 8% | 26% | **66%** |
| | | A → P | | | | | | | 25% | **55%** | 20% | | | | 9% | 35% | **55%** |
| | 2W | P → A | 21% | **51%** | 27% | **55%** | 23% | 22% | | | | 23% | 33% | 44% | | | |
| **Aut. support** | Day | P → A | | | | | | | 18% | **73%** | 9% | | | | 11% | 45% | 44% |
| | | A → P | | | | | | | 13% | **75%** | 11% | | | | 8% | 40% | **53%** |
| **Psy. control** | Day | P → A | | | | | | | 3% | **72%** | 25% | | | | 37% | 43% | 20% |
| | | A → P | | | | | | | 17% | **62%** | 21% | | | | 26% | **61%** | 13% |
| | 2W | P → A | 1% | **51%** | 47% | | | | | | | **71%** | 19% | 10% | | | |
| **Beh. control** | Day | P → A | | | | | | | 10% | 39% | **51%** | | | | 28% | 49% | 23% |
| | | A → P | | | | | | | 20% | **71%** | 9% | | | | 13% | **61%** | 26% |

*Note*. P → A: time-lagged effect from parenting to adolescent functioning. A → P: time-lagged effect from adolescent functioning to parenting. 2W: bi-weekly time interval. Daily data is from "100 days of my life" study ($t_{average}$ = 91, $N$ = 159). Bi-weekly data is from "One size does not fit all" ($t_{average}$ = 18, $N$ = 256).

A negative (-) effect is $\beta \leq -.05$. A null (0) effect is $-.05 < \beta < .05$. A positive (+) effect is $\beta \geq .05$. Group size in bold is a majority in the given association. The here presented bivariate family-specific effects were estimated with Dynamic Structural Equation Modelling (see Chapters 4 & 5).

### 3.2 Explaining heterogeneity: The role of adolescents' environmental sensitivity and neuroticism

To understand *why* families differ in their dynamic processes between parenting and adolescent functioning, I tried to explain the heterogeneity with several theoretically meaningful moderators. Based on my findings across studies, two adolescent characteristics seem especially promising: environmental sensitivity and neuroticism. *Environmental sensitivity*, or more specifically sensory processing sensitivity, is a relatively stable trait capturing the tendency of perceiving and responding to environmental stimuli, such as the behavior of others (Greven et al., 2019; Pluess, 2015). *Neuroticism* (or also called emotional instability) is the tendency to experience and inability to adaptively cope with negative emotions (Caspi et al., 2005), which is related to but distinct from environmental sensitivity (Greven et al., 2019). Overall, adolescents' trait level of environmental sensitivity (**Chapters 4-6**) and neuroticism (**Chapters 5 & 6**) explained subtle differences in the strength (but not simply in the presence) of how parenting impacted the adolescent's subsequent functioning. Specifically, higher trait levels of environmental sensitivity were associated with stronger day-to-day effects of parenting upon adolescents' positive affect, whereas higher trait levels of neuroticism were associated with stronger parenting effects upon adolescents' *negative* affect.



In contrast to earlier empirical work on between-family associations (e.g., Branje et al., 2010), other adolescent characteristics (i.e., sex, age, educational level; mean levels of daily parenting and affective functioning, internalizing problems, and legitimacy beliefs of parental authority; **Chapters 5 & 6**) were not related to the presence or strength of daily within-family associations between parenting and adolescents' affective functioning. Apparently, how between-family differences are explained by moderators does not necessarily translate to how within-family processes are moderated (for example, see Rekker et al., 2017). As the findings of Chapter 6 suggest that the dynamic parenting processes in everyday life may be family specific and not group differential, perhaps, the way in which moderators alter the within-family processes is also idiosyncratic. Potentially, adolescent environmental sensitivity and neuroticism might interact with many other adolescent, parent, and contextual characteristics and combine into an one-of-kind recipe that defines a family's unique dynamics (Bronfenbrenner, 2005).

### 3.3 Concluding remarks of aim 3

To conclude, the family-specific findings of this dissertation, which are based on different samples and timescales (i.e., daily and bi-weekly), align with long-held theoretical beliefs

that parents and adolescents influence each other in heterogeneous ways (e.g., Belsky & Pluess, 2009; Bronfenbrenner, 2005; Darling & Steinberg, 1993). Moreover, the findings provide evidence for relativistic views on parenting (Granic et al., 2008; Grusec, 2008; Richters, 2021). That is, every family might have its own unique "recipe" for how parenting and an adolescent's functioning impact each other over time.

The idiosyncratic nature of dynamic parenting processes has large implications for the empirical study of the phenomenon of parenting adolescents. If dynamic parenting processes are indeed idiosyncratic, no "average family" might truly exist. Therefore, average (sub)sample effects, in this dissertation and in other within-family studies (e.g., Kapetanovic et al., 2019; Vrolijk et al., 2020), might apply to only a few or no families. To avoid invalid inferences from "the average family" to a specific individual family, for which methodologists have been warning quite some time (Fisher et al., 2018; Moeller, 2022; Molenaar, 2004), parenting science is strongly encouraged to move away from the between-family paradigm and to instead adopt a family-specific paradigm to understand the dynamic processes between parenting and adolescent functioning in unique individual families.

The notion of idiosyncratic dynamic parenting processes evidently also has practical implications, such that universal "one-size-fits-all" parenting preventions and interventions are likely not equally effective for every family. Indeed, empirical studies on parenting programs have highlighted that some families benefit more than other families (Van Aar et al., 2019; Weeland et al., 2023). Therefore, parenting scholars might want to be careful when translating empirical nomothetic findings, such as between-family patterns or average within-family effects (Beltz et al., 2016), to general parenting advice. Parents who try to follow general parenting advice that is not matching their family dynamics and needs, might unintentionally harm their adolescent at worst and might experience feelings of incompetence and parenting stress when the advice is not working for their specific adolescent child. Hence, parenting preventions and interventions may be improved by tailoring to the needs of individual families (August & Gewirtz, 2019; Weeland et al., 2021). To do so, parenting science may want to learn from contemporary approaches in clinical psychology and psychiatry (e.g., Myin-Germeys et al., 2018), for instance by implementing self-monitoring (Swendeman et al., 2020) prior to, during, and after an intervention to understand the dynamic parenting processes of an individual family and to assess whether processes have been changing in the desired direction (Bamberger, 2016; Keijsers et al., 2022). Overall, the current methodological advances in parenting

science and in the broader field of psychology offer promising opportunities to finally unravel the complexities of parenting adolescents within individual families.

## STRENGTHS, LIMITATIONS, AND FUTURE DIRECTIONS

The work presented in this dissertation holds various strengths. By starting with a systematic literature review, major gaps were identified in the empirical study on the within-family processes between parenting and adolescent functioning. These gaps were a lack of studies on (I) reciprocal time-lagged effects, (II) micro- and meso-timescale effects, and (III) heterogeneity across families. These gaps were each addressed in the subsequent four empirical studies, which together analyzes six adolescent-reported datasets with daily to biennial time intervals. These data were examined with state-of-the-art analyses, including RI-CLPMs (Hamaker et al., 2015), Dynamic Structural Equation Modelling (DSEM; Asparouhov et al., 2018), and Subgrouping Group Iterative Multiple Modelling (S-GIMME; Lane et al., 2019), each being able to address different questions: From the average (sub)sample processes to the family-specific processes. By doing so, I was able to empirically demonstrate that the dynamic parenting processes of "the average family" are unlikely to represent the processes of each and every family and that parenting adolescents could be an idiosyncratic phenomenon. Hence, this dissertation contributed to the first studies introducing a family-specific paradigm in parenting science (for reviews, see **Chapter 2** and Keijsers et al., 2022; but see also Mastrotheodoros et al., 2022; Molenaar & Campbell, 2009).



Nonetheless, several limitations need be mentioned of the work of this dissertation. First, the here studied samples included adolescents from relatively well-functioning families drawn from community samples. Therefore, it remains an open question how the dynamic processes between parenting and adolescent functioning operate in families in need, such as families who suffer from psychopathology. Moreover, the samples lack diversity in terms of socioeconomic backgrounds, ethnicity, culture, religion, etc. Because of the relatively homogeneous adolescent samples, the studies of this dissertation could have underestimated the existing heterogeneity in the dynamic processes between parenting and adolescent functioning. To further understand the idiosyncratic nature of the dynamic parenting processes, future studies with more diverse samples, such as with families from non-WEIRD backgrounds (Western, education, industrial, rich, and democratic; Henrich et al., 2010), are urgently needed.

Second, some drawbacks of the study designs may have impacted the precision of the estimated within-family effects. To reduce participant burden in the intensive longitudinal

studies (**Chapters 3-6**), most parenting scales consisted of relatively few items (e.g., 1 to 5), which had often a lower reliability (<.70) than established scales in earlier between-family studies (e.g., Olivari et al., 2013). Because intensive longitudinal designs are relatively new in parenting science (for reviews, see **Chapter 2** and Keijsers et al., 2022), more psychometric work is needed to create both reliable and valid short parenting measures. Relatedly, applied analytical strategies did not account for measurement error, though measurement error is likely also part of observed within-family fluctuations (Schuurman & Hamaker, 2019). Accounting for measurement error in future work is a next step take to improve the precision of effects at the within-family or the individual-family level. Moreover, family-specific effects were estimated with 26 bi-weekly (**Chapter 4**) or 100 daily datapoints (**Chapters 5 & 6**) per family, and recent methodological work suggests that future studies with even larger timeseries may be necessary to more reliably demonstrate "true" heterogeneity across families (Hoekstra et al., 2022).

Third, other relevant timescales might not have been included. One important timescale is a real-time momentary timescale. Several theories assume that the dynamic processes between parenting and adolescent functioning also unfold on a momentary timescale (Bronfenbrenner, 2005; Granic et al., 2008; Lougheed & Keskin, 2021). To assess such momentary parenting processes within families, future studies can implement an Experience Sampling Method (ESM; Myin-Germeys et al., 2009; Repetti et al., 2015), in which families receive several micro-questionnaires per day. ESM has the potential to measure parent-adolescent interactions with higher ecological validity and lower recall bias than daily diaries (Keijsers et al., 2022). While ESM is increasingly applied in the broader field of adolescent psychology (for a review, see Van Roekel et al., 2019), few ESM studies are conducted on parenting adolescents (for reviews see **Chapter 2**; Boele et al., 2020; Keijsers et al.,, 2022, but see Bülow, Van Roekel et al., 2022). Hence, an important future direction is the use of ESM to study how parenting and adolescent functioning are intertwined from moment to moment.

Fourth, stable time-invariant adolescent characteristics (e.g., gender, personality) were used to explain heterogeneity across families. However, ecological models (Bronfenbrenner, 2005; Sameroff, 2010) and dynamic systems perspective (Granic et al., 2008; Smith & Thelen, 2003) highlight that the proximal processes between parenting and adolescent functioning also change and develop over time. Therefore, future studies may want to start examining how the dynamic processes between parenting and adolescent functioning also change within the same families and how they depend on time-varying

moderators (e.g., parenting stress, experienced support from outside the family (Belsky, 1984).

## CONCLUDING REMARKS

This dissertation examined how key dimensions of perceived parenting affect adolescents' functioning and vice versa, and how such dynamic parenting processes within families unfold on various timescales and differently across families. Across studies, the findings suggest that*, on average,* dimensions of parenting wax and wane with adolescent functioning within a family on various timescales, from a daily timescale to a biennial timescale. In addition, the findings suggest that longitudinal influences between parenting and adolescent functioning might not be inherently reciprocal. That is, whether over-time fluctuations in parenting affected the adolescent's subsequent functioning and/or vice versa varied, on average, across parenting dimensions. Furthermore, when moving beyond 'the average family' and instead focusing on *individual* families, substantial heterogeneity was observed across families in their dynamic parenting processes: *which* parenting dimensions (or practices) affected an adolescent's functioning and/or the other way around, and *how* they affected each other, varied from family to family. Adolescents with higher trait levels of environmental sensitivity and neuroticism seemed especially more strongly affected by parenting than adolescents with lower trait levels in everyday life. Overall, the findings of this dissertation align with long-held theoretical and perhaps even common-held beliefs that parents and adolescents influence each other in idiosyncratic ways. Nonetheless, many theoretical and empirical advances need to be made to truly comprehend the intriguing complexities of parenting adolescents. Therefore, it is about time for parenting research to put the individual family first, recognizing that every family deserves to be understood and to receive effective support which matches their unique dynamics and needs.

# APPENDICES

References

Samenvatting (Summary in Dutch)

Curriculum vitae

Dankwoord (Acknowledgements)

## REFERENCES


Achenbach, T. M. (2007). *Youth Self-Report for Ages 11-18*.

Achenbach, T. M., & Edelbrock, C. S. (1987). *Manual for the youth self-report and profile*. Sage.

Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology*, *12*(1), 116–128. https://doi.org/10.1080/17405629.2014.963549

Allen, L., & Astuto, J. (2009). Depression among racially, ethnically, and culturally diverse adolescents. In S. Nolen-Hoeksema & L. M. Hilt (Eds.), *Handbook of depression in adolescents* (pp. 76–110). Routledge.

Allen, N. B., Kuppens, P., & Sheeber, L. B. (2012). Heart rate responses to parental behavior in depressed adolescents. *Biological Psychology*, *90*, 80–87. https://doi.org/10.1016/j.biopsycho.2012.02.013

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders*. Washington, DC: Author.

Aron, E. N., & Aron, A. (1997). Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of Personality and Social Psychology*, *73*(2), 345–368. https://doi.org/10.1037/0022-3514.73.2.345

Aron, E. N., Aron, A., & Jagiellowicz, J. (2012). Sensory processing sensitivity: A review in the light of the evolution of biological responsivity. *Personality and Social Psychology Review*, *16*, 262–282. https://doi.org/10.1177/1088868311434213

Asparouhov, T., Hamaker, E. L., & Muthén, B. (2017). Dynamic Latent Class Analysis. *Structural Equation Modeling*, *24*(2), 257–269. https://doi.org/10.1080/10705511.2016.1253479

Asparouhov, T., Hamaker, E. L., & Muthén, B. (2018). Dynamic Structural Equation Models. *Structural Equation Modeling*, *25*(3), 359–388. https://doi.org/10.1080/10705511.2017.1406803

August, G. J., & Gewirtz, A. (2019). Moving toward a precision-based, personalized framework for prevention science: Introduction to the special issue. *Prevention Science*, *20*(1), 1–9. https://doi.org/10.1007/s11121-018-0955-9

Aunola, K., Tolvanen, A., Viljaranta, J., & Nurmi, J. E. (2013). Psychological control in daily parent-child interactions increases children's negative emotions. *Journal of Family Psychology*, *27*(3), 453–462. https://doi.org/10.1037/a0032891

Back, M. D., Baumert, A., Denissen, J. J. A., Hartung, F.-M., Penke, L., Schmukle, S. C., Schönbrodt, F. D., Schröder-Abé, M., Vollmann, M., Wagner, J., & Wrzus, C. (2011). PERSOC: A unified framework for understanding the dynamic interplay of personality and social relationships. *European Journal of Personality*, *25*, 90–107. https://doi.org/10.1002/per.811

Bai, S., Reynolds, B. M., Robles, T. F., & Repetti, R. L. (2017). Daily links between school problems and youth perceptions of interactions with parents: A diary study of school-to-home spillover. *Social Development*, *26*(4), 813–830. https://doi.org/10.1111/sode.12229

Bamberger, K. T. (2016). The application of intensive longitudinal methods to investigate change: Stimulating the field of applied family research. *Clinical Child and Family Psychology Review*, *19*(1), 21–38. https://doi.org/10.1007/s10567-015-0194-6

Bandura, A. (1977). *Social learning theory*. Prentice-Hall.

Barber, B. K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, *67*(6), 3296–3319. https://doi.org/10.1111/j.1467-8624.1996.tb01915.x

Barber, B. K., Xia, M., Olsen, J. A., Mcneely, C. A., & Bose, K. (2012). Feeling disrespected by parents: Refining the measurement and understanding of psychological control. *Journal of Adolescence*, *35*(2), 273–287. https://doi.org/10.1016/j.adolescence.2011.10.010

Barbot, B., Hein, S., Trentacosta, C., Beckmann, J. F., Bick, J., Crocetti, E., Liu, Y., Rao, S. F., Liew, J., Overbeek, G., Ponguta, L. A., Scheithauer, H., Super, C., Arnett, J., Bukowski, W., Cook, T. D., Côté, J., Eccles, J. S., Eid, M., … IJzendoorn, M. H. (2020). Manifesto for new directions in developmental science. *New Directions for Child and Adolescent Development*, *2020*(172), 135–149. https://doi.org/10.1002/cad.20359

Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology*, *4*, 1–103. https://doi.org/10.1037/h0030372

Baumrind, D. (1991). Parenting styles and adolescent development. In *The encyclopedia on adolescence* (pp. 746–758). Garland Publishing.

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, *75*, 81–95. https://doi.org/10.1037/h0025583

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, *55*(1), 83–96. https://doi.org/10.2307/1129836

Belsky, J. (1997). Variation in susceptibility to environmental influence: An evolutionary argument. *Psychological Inquiry*, *8*(3), 182–186. https://doi.org/10.1207/s15327965pli0803_3

Belsky, J., Bakermans-Kranenburg, M. J., & Van Ijzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science*, *16*(6), 300–304. https://doi.org/10.1111/j.1467-8721.2007.00525.x

Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, *135*(6), 885–908. https://doi.org/10.1037/a0017376

Belsky, J., Pluess, M., & Widaman, K. F. (2013). Confirmatory and competitive evaluation of alternative gene-environment interaction hypotheses. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *54*(10), 1135–1143. https://doi.org/10.1111/jcpp.12075

Belsky, J., Zhang, X., & Sayler, K. (2022). Differential susceptibility 2.0: Are the same children affected by different experiences and exposures. *Development and Psychopathology*, *34*(3), 1025–1033. https://doi.org/10.1017/S0954579420002205

Beltz, A. M., & Gates, K. M. (2017). Network Mapping with GIMME. *Multivariate Behavioral Research*, *52*(6), 789–804. https://doi.org/10.1080/00273171.2017.1373014

Beltz, A. M., & Molenaar, P. C. M. (2016). Dealing with multiple solutions in structural vector autoregressive models. *Multivariate Behavioral Research*, *51*(2–3), 357–373. https://doi.org/10.1080/00273171.2016.1151333

Beltz, A. M., Wright, A. G. C., Sprague, B. N., & Molenaar, P. C. M. (2016). Bridging the nomothetic and idiographic approaches to the analysis of clinical data. *Assessment*, *23*(4), 447–458. https://doi.org/10.1177/1073191116648209

Berry, D., & Willoughby, M. T. (2017). On the practical interpretability of cross-lagged panel models: Rethinking a developmental workhorse. *Child Development*, *88*(4), 1186–1206. https://doi.org/10.1111/cdev.12660

Besemer, S., Loeber, R., Hinshaw, S. P., & Pardini, D. A. (2016). Bidirectional associations between externalizing behavior problems and maladaptive parenting within parent-son dyads across childhood. *Journal of Abnormal Child Psychology*, *44*(7), 1387–1398. https://doi.org/10.1007/s10802-015-0124-6

Beyens, I., Pouwels, J. Loes., van Driel, I. I., Keijsers, L., & Valkenburg, P. M. (2021). Social media use and adolescents' well-being: Developing a typology of person-specific effect patterns. *Communication Research*, Advance online publication. https://doi.org/10.1177/00936502211038196

Birmaher, B., Khetarpal, S., Brent, D., Cully, M., Balach, L., Kaufman, J., & Neer, S. M. K. (1997). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*(4), 545–553. https://doi.org/10.1097/00004583-199704000-00018

Bodner, N., Kuppens, P., Allen, N. B., Sheeber, L. B., & Ceulemans, E. (2018). Affective family interactions and their associations with adolescent depression: A dynamic network approach. *Development and Psychopathology*, *30*(4), 1459–1473. https://doi.org/10.1017/S0954579417001699

Boele., S., Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). The direction of effects between parenting and adolescent affective well-being is family specific. *Scientific Reports*, *13*, 16106. https://doi.org/10.1038/s41598-023-43294-5

Boele, S., Bülow, A., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). Better, for worse, or both? Testing environmental sensitivity models with parenting at the level of individual families. *Development and Psychopathology*. Advance online publication. https://doi.org/10.1017/S0954579422001493

Boele, S., Denissen, J., Moopen, N., & Keijsers, L. (2020). Over-time fluctuations in parenting and adolescent adaptation within families: A systematic review. *Adolescent Research Review*, *5*, 317–339. https://doi.org/10.1007/s40894-019-00127-9

Boele, S., Nelemans, S. A., Denissen, J. J. A., Prinzie, P., Bülow, A., & Keijsers, L. (2023). Testing transactional processes between parental support and adolescent depressive symptoms: From a daily to a biennial timescale. *Development and Psychopathology*, *35*, 1656-1670. https://doi.org/10.1017/S0954579422000360

Bolger, N., & Schilling, E. A. (1991). Personality and the problems of everyday life: The role of neuroticism in exposure and reactivity to daily stressors. *Journal of Personality*, *59*(3), 355–386. https://doi.org/10.1111/j.1467-6494.1991.tb00253.x

Bolger, N., Zee, K. S., Rossignac-Milon, M., & Hassin, R. R. (2019). Causal processes in psychology are heterogeneous. *Journal of Experimental Psychology: General*, *148*(4), 601–618. https://doi.org/10.1037/xge0000558

Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*, *69*(5), 890–902. https://doi.org/10.1037/0022-3514.69.5.890

Bouwmans, M. E. J., Beltz, A. M., Bos, E. H., Oldehinkel, A. J., de Jonge, P., & Molenaar, P. C. M. (2018). The person-specific interplay of melatonin, affect, and fatigue in the context of sleep and depression. *Personality and Individual Differences*, *123*, 163–170. https://doi.org/10.1016/j.paid.2017.11.022

Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary–developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, *17*(2), 271–301. https://doi.org/10.1017/S0954579405050145

Boykin McElhaney, K., & Allen, J. P. (2001). Autonomy and adolescent social functioning: The moderating effect of risk. *Child Development*, *72*(1), 220–235. https://doi.org/10.1111/1467-8624.00275

Branje, S. J. T. (2018). Development of parent–adolescent relationships: Conflict interactions as a mechanism of change. *Child Development Perspectives*, *12*(3), 171–176. https://doi.org/10.1111/cdep.12278

Branje, S. J. T., Hale, W. W., Frijns, T., & Meeus, W. H. J. (2010). Longitudinal associations between perceived parent-child relationship quality and depressive symptoms in adolescence. *Journal of Abnormal Child Psychology*, *38*(6), 751–763. https://doi.org/10.1007/s10802-010-9401-6

Brauer, J. R. (2009). Testing social learning theory using reinforcement's residue: A multilevel analysis of self-reported theft and marijuana use in the national youth survey. *Criminology*, *47*(3), 929–970. https://doi.org/10.1111/j.1745-9125.2009.00164.x

Brehm, J. W. (1966). *A theory of psychological reactance*. Academic Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, *22*(6), 723–742.

Bronfenbrenner, U. (2005). *Making human beings human: Bioecological perspectives on human development*. Sage Publications.

Bryan, C. J., Tipton, E., & Yeager, D. S. (2021). Behavioural science is unlikely to change the world without a heterogeneity revolution. *Nature Human Behaviour*, *5*(8), 980–989. https://doi.org/10.1038/s41562-021-01143-3

Bülow, A., Keijsers, L., Boele, S., van Roekel, E., & Denissen, J. J. A. (2021). Parenting adolescents in times of a pandemic: Changes in relationship quality, autonomy support, and parental control? *Developmental Psychology*, *57*(10), 1582–1596. https://doi.org/10.1037/dev0001208

Bülow, A., Neubauer, A. B., Soenens, B., Boele, S., Denissen, J. J. A., & Keijsers, L. (2022). Universal ingredients to parenting teens: Parental warmth and autonomy support promote adolescent well-being in most families. *Scientific Reports, 12,* 16836. https://doi.org/10.1038/s41598-022-21071-0

Bülow, A., Van Roekel, E., Boele, S., Denissen, J. J. A., & Keijsers, L. (2022). Parent–adolescent interaction quality and adolescent affect—An experience sampling study on effect heterogeneity. *Child Development*, *93*(3), 1–17. https://doi.org/10.1111/cdev.13733

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, *56*, 453–484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Chaku, N., & Beltz, A. M. (2022). Using temporal network methods to reveal the idiographic nature of development. In *Advances in Child Development and Behavior* (Vol. 62). Elsevier Inc. https://doi.org/10.1016/bs.acdb.2021.11.003

Chavez Arana, C., de Pauw, S. S. W., van IJzendoorn, M. H., de Maat, D. A., Kok, R., & Prinzie, P. (2021). No differential susceptibility or diathesis stress to parenting in early adolescence: Personality facets predicting behaviour problems. *Personality and Individual Differences*, *170*, 110406. https://doi.org/10.1016/j.paid.2020.110406

Chung, G. H., Flook, L., & Fuligni, A. J. (2009). Daily family conflict and emotional distress among adolescents from Latin American, Asian, and European Backgrounds. *Developmental Psychology*, *45*(5), 1406–1415. https://doi.org/10.1037/a0014163

Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology*, *8*(4), 597–600. https://doi.org/10.1017/S0954579400007318

Clayborne, Z. M., Varin, M., & Colman, I. (2019). Systematic review and meta-analysis: Adolescent depression and long-term psychosocial outcomes. *Journal of the American Academy of Child & Adolescent Psychiatry*, *58*(1), 72–79. https://doi.org/10.1016/j.jaac.2018.07.896

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Coley, R. L., & Medeiros, B. L. (2007). Reciprocal longitudinal relations between nonresident father involvement and adolescent delinquency. *Child Development*, *78*(1), 132–147. https://doi.org/10.1111/j.1467-8624.2007.00989.x

Coley, R. L., Votruba-Drzal, E., & Schindler, H. S. (2008). Trajectories of parenting processes and adolescent substance use: Reciprocal effects. *Journal of Abnormal Child Psychology*, *36*(4), 613–625. https://doi.org/10.1007/s10802-007-9205-5

Coley, R. L., Votruba-Drzal, E., & Schindler, H. S. (2009). Fathers' and mothers' parenting predicting and responding to adolescent sexual risk behaviors. *Child Development*, *80*(3), 808–827. https://doi.org/10.1111/j.1467-8624.2009.01299.x

Copeland, W. E., Shanahan, L., Costello, E. J., & Angold, A. (2009). Childhood and adolescent psychiatric disorders as predictors of young adult disorders. *Archives of General Psychiatry*, *66*(7), 764. https://doi.org/10.1001/archgenpsychiatry.2009.85

Cox, M. J., Ennett, S. T., Foshee, V., Hussong, A., Lippold, M., & McNaughton-Reyes, H. L. (2018). Bidirectional relationships between alcohol-specific parental socialization behaviors and adolescent alcohol misuse. *Substance Use and Misuse*, *53*(10), 1645–1656. https://doi.org/10.1080/10826084.2017.1421663

Coyne, J. C. (1976). Toward an interactional description of depression. *Psychiatry: Interpersonal and Biological Processes*, *39*(1), 28–40. https://doi.org/10.1080/00332747.1976.11023874

Crowell, S. E., Baucom, B. R., Yaptangco, M., Bride, D., Hsiao, R., McCauley, E., & Beauchaine, T. P. (2014). Emotion dysregulation and dyadic conflict in depressed and typical adolescents: Evaluating concordance across psychophysiological and observational measures. *Biological Psychology*, *98*, 50–58. https://doi.org/10.1016/j.biopsycho.2014.02.009

Csikszentmihalyi, M., Larson, R., & Prescott, S. (1977). The ecology of adolescent activity and experience. *Journal of Youth and Adolescence*, *6*, 281–294. https://doi.org/10.1007/BF02138940

Cummings, E. M., & Davies, P. T. (1995). The impact of parents on their children: An emotional security perspective. In *Annals of Child Development* (Vol. 10, pp. 167–208). Jessica Kinysley Publishers.

Cyranowski, J. M., Frank, E., Young, E., & Shear, M. K. (2000). Adolescent onset of the gender difference in lifetime rates of major depression. A theoretical model. *Archives of General Psychiatry*, *57*(1), 21–27. https://doi.org/10.1001/archpsyc.57.1.21

Darling, N., Cumsille, P., Loreto Martínez, M., Martínez, M. L., Loreto Martínez, M., & Martínez, M. L. (2007). Adolescents' as active agents in the socialization process: Legitimacy of parental authority and obligation to obey as predictors of obedience. *Journal Of Adolescence*, *30*(2), 297–311. https://doi.org/10.1016/j.adolescence.2006.03.003

Darling, N., Cumsille, P., & Martínez, M. L. (2008). Individual differences in adolescents' beliefs about the legitimacy of parental authority and their own obligation to obey: A longitudinal investigation. *Child Development*, *79*(4), 1103–1118. https://doi.org/10.1111/j.1467-8624.2008.01178.x

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, *113*(3), 487–496. https://doi.org/10.1037/0033-2909.113.3.487

De Haan-Rietdijk, S., Kuppens, P., Bergeman, C. S., Sheeber, L. B., Allen, N. B., & Hamaker, E. L. (2017). On the use of mixed Markov models for intensive longitudinal data. *Multivariate Behavioral Research*, *52*(6), 747–767. https://doi.org/10.1080/00273171.2017.1370364

De Vries, L. P., Bülow, A., Pelt, D. H. M., Boele, S., Bartels, M., & Keijsers, L. (2023). Daily affect intensity and variability of adolescents and their parents before and during a COVID‐19 lockdown. *Journal of Adolescence*, *95*(2), 336–353. https://doi.org/10.1002/jad.12117

Denissen, J. J. A., Geenen, R., Soto, C. J., John, O. P., & Van Aken, M. A. G. (2020). The Big Five Inventory–2: Replication of psychometric properties in a Dutch adaptation and first evidence for the discriminant predictive validity of the facet scales. *Journal of Personality Assessment*, *102*(3), 309–324.

Denissen, J. J. A., & Penke, L. (2008). Neuroticism predicts reactions to cues of social inclusion. *European Journal of Personality*, *22*(6), 497–517. https://doi.org/10.1002/per.682

Diener, E., Lucas, R. E., & Oishi, S. (2018). Advances and open questions in the science of subjective well-being. *Collabra: Psychology*, *4*(1), 1–49. https://doi.org/10.1525/collabra.115

Dietvorst, E., Hiemstra, M., Hillegers, M. H. J., & Keijsers, L. (2018). Adolescent perceptions of parental privacy invasion and adolescent secrecy: An illustration of simpson's paradox. *Child Development*, *89*, 2081–2090. https://doi.org/10.1111/cdev.13002

Driver, C. C., Oud, J. H. L., & Voelkle, M. C. (2017). Continuous time structural equation modeling with R package ctsem. *Journal of Statistical Software*, *77*, 1–35. https://doi.org/10.18637/jss.v077.i05

Ebesutani, C., Regan, J., Smith, A., Reise, S., Higa-McMillan, C., & Chorpita, B. F. (2012). The 10-item Positive and Negative Affect Schedule for Children, child and parent shortened versions: Application of item response theory for more efficient assessment. *Journal of Psychopathology and Behavioral Assessment*, *34*(2), 191–203. https://doi.org/10.1007/s10862-011-9273-2

Eccles, J. S., Buchanan, C. M., Flanagan, C., Fuligni, A., Midgley, C., & Yee, D. (1991). Control versus autonomy during early adolescence. *Journal of Social Issues*, *47*, 53–68. https://psycnet.apa.org/doi/10.1111/j.1540-4560.1991.tb01834.x

Ellis, B. J., & Boyce, W. T. (2008). Biological sensitivity to context. *Current Directions in Psychological Science*, *17*(3), 183–187. https://doi.org/10.1111/j.1467-8721.2008.00571.x

Epskamp, S., van Borkulo, C. D., van der Veen, D. C., Servaas, M. N., Isvoranu, A.-M., Riese, H., & Cramer, A. O. J. (2018). Personalized network modeling in psychopathology: The importance of contemporaneous and temporal connections. *Clinical Psychological Science*, *6*(3), 416–427. https://doi.org/10.1177/2167702617744325

Farrington, D. P., Loeber, R., Yin, Y., & Anderson, S. J. (2002). Are within-individual causes of delinquency the same as between-individual causes? *Criminal Behaviour and Mental Health*, *12*(1), 53–68. https://doi.org/10.1002/cbm.486

Farrington, D. P., Ttofi, M. M., & Piquero, A. R. (2016). Risk, promotive, and protective factors in youth offending: Results from the Cambridge study in delinquent development. *Journal of Criminal Justice*, *45*, 63–70. https://doi.org/10.1016/j.jcrimjus.2016.02.014

Fisher, A. J., Medaglia, J. D., & Jeronimus, B. F. (2018). Lack of group-to-individual generalizability is a threat to human subjects research. *Proceedings of the National Academy of Sciences*, *115*(27), E6106–E6115. https://doi.org/10.1073/pnas.1711978115

Franck, E., De Raedt, R., Barbez, C., & Rosseel, Y. (2008). Psychometric properties of the Dutch Rosenberg Self-Esteem Scale. *Psychologica Belgica*, *48*, 25–35. https://doi.org/10.5334/PB-48-1-25

Furman, W., & Buhrmester, D. (1985). Children's perceptions of the personal relationships in their social networks. *Developmental Psychology*, *21*(6), 1016–1024. https://doi.org/10.1037/0012-1649.21.6.1016

Gates, K. M., Fisher, Z. F., & Bollen, K. A. (2020). Latent variable GIMME using model implied instrumental variables (MIIVs). *Psychological Methods*, *25*(2), 227–242. https://doi.org/10.1037/met0000229

Gates, K. M., Lane, S. T., Varangis, E., Giovanello, K., & Guiskewicz, K. (2017). Unsupervised classification during time-series model building. *Multivariate Behavioral Research*, *52*(2), 129–148. https://doi.org/10.1080/00273171.2016.1256187

Gates, K. M., & Molenaar, P. C. M. (2012). Group search algorithm recovers effective connectivity maps for individuals in homogeneous and heterogeneous samples. *NeuroImage*, *63*(1), 310–319. https://doi.org/10.1016/j.neuroimage.2012.06.026

Gates, K. M., Molenaar, P. C. M., Hillary, F. G., Ram, N., & Rovine, M. J. (2010). Automatic search for fMRI connectivity mapping: An alternative to Granger causality testing using formal equivalences among SEM path modeling, VAR, and unified SEM. *NeuroImage*, *50*(3), 1118–1125. https://doi.org/10.1016/j.neuroimage.2009.12.117

Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, *19*(1), 72–91. https://doi.org/10.1037/a0032138

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*(5), 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1

Gottfredson, N. C., & Hussong, A. M. (2011). Parental involvement protects against self-medication behaviors during the high school transition. *Addictive Behaviors*, *36*(12), 1246–1252. https://doi.org/10.1016/j.addbeh.2011.07.035

Gottfredson, N. C., Hussong, A. M., Ennett, S. T., & Rothenberg, W. A. (2017). The role of parental engagement in the intergenerational transmission of smoking behavior and identity. *The Journal of Adolescent Health*, *60*(5), 599–605. https://doi.org/10.1016/j.jadohealth.2016.11.004

Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, *10*(3), 243–268. https://doi.org/10.1037/0893-3200.10.3.243

Granic, I. (2005). Timing is everything: Developmental psychopathology from a dynamic systems perspective. *Developmental Review*, *25*(3–4), 386–407. https://doi.org/10.1016/j.dr.2005.10.005

Granic, I., Dishion, T. J., & Hollenstein, T. (2008). The family ecology of adolescence: A dynamic systems perspective on normative development. *Blackwell Handbook of Adolescence*, *541*, 60–91. https://doi.org/10.1002/9780470756607.ch4

Granic, I., & Patterson, G. R. (2006). Toward a comprehensive model of antisocial development: A dynamic systems approach. *Psychological Review*, *113*(1), 101–131. https://doi.org/10.1037/0033-295X.113.1.101

Greven, C. U., Lionetti, F., Booth, C., Aron, E. N., Fox, E., Schendan, H. E., Pluess, M., Bruining, H., Acevedo, B., Bijttebier, P., & Homberg, J. (2019). Sensory Processing Sensitivity in the context of Environmental Sensitivity: A critical review and development of research agenda. *Neuroscience and Biobehavioral Reviews*, *98*, 287–305. https://doi.org/10.1016/j.neubiorev.2019.01.009

Grice, J. W., Medellin, E., Jones, I., Horvath, S., McDaniel, H., O'lansen, C., & Baker, M. (2020). Persons as effect sizes. *Advances in Methods and Practices in Psychological Science*, *3*(4), 443–455. https://doi.org/10.1177/2515245920922982

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, *83*(4), 508–517. https://doi.org/10.1037/0022-0663.83.4.508

Grundy, A. M., Gondoli, D. M., & Blodgett Salafia, E. H. (2010). Hierarchical linear modeling analysis of change in maternal knowledge over the transition to adolescence. *Journal of Early Adolescence*, *30*(5), 707–732. https://doi.org/10.1177/0272431609341047

Grusec, J. E. (2008). What is the nature of effective parenting? It depends. In M. Kerr & R. C. M. E. Engels (Eds.), *New Insights into the Role of Parents in Adolescent Problem Behavior* (pp. 239–257). John Wiley & Sons.

Hale, W. W., Crocetti, E., Raaijmakers, Q. A. W., & Meeus, W. H. J. (2011). A meta-analysis of the cross-cultural psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED). *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *52*(1), 80–90. https://doi.org/10.1111/j.1469-7610.2010.02285.x

Hallquist, M. N., & Wiley, J. F. (2018). MplusAutomation: An R package for facilitating large-scale latent variable analyses in Mplus. *Structural Equation Modeling*, *25*(4), 621–638. https://doi.org/10.1080/10705511.2017.1402334

Hamaker, E. L. (2012). Why researchers should think " within-person": A paradigmatic rationale. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of Research Methods for Studying Daily Life* (pp. 43–61). Guilford.

Hamaker, E. L., Asparouhov, T., Brose, A., Schmiedek, F., & Muthén, B. (2018). At the frontiers of modeling intensive longitudinal data: Dynamic structural equation models for the affective measurements from the COGITO study. *Multivariate Behavioral Research*, *53*(6), 820–841. https://doi.org/10.1080/00273171.2018.1446819

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, *20*(1), 102–116. https://doi.org/10.1037/a0038889

Hammen, C. (2006). Stress generation in depression: Reflections on origins, research, and future directions. *Journal of Clinical Psychology*, *62*(9), 1065–1082. https://doi.org/10.1002/jclp.20293

Han, Y., & Grogan-Kaylor, A. (2013). Parenting and youth psychosocial well-being in South Korea using fixed-effects models. *Journal of Family Issues*, *34*(5), 689–715. https://doi.org/10.1177/0192513X12440091

Hankin, B. L., Abramson, L. Y., Moffitt, T. E., Silva, P. A., McGee, R., & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology*, *107*, 128–140. https://doi.org/10.1037/0021-843x.107.1.128

Hankin, B. L., Mermelstein, R., & Roesch, L. (2007). Sex differences in adolescent depression: Stress exposure and reactivity models. *Child Development*, *78*(1), 279–295. https://doi.org/10.1111/j.1467-8624.2007.00997.x

Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review*, *102*(3), 254–286. https://psycnet.apa.org/doi/10.1037/0033-295X.102.3.458

Harris, J. R. (2006). *No two alike*. Norton & Company.

Henrich, J., Heine, S. j., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*(2–3), 61–83. https://doi.org/doi:10.1017/S0140525X0999152X

Hinde, R. A. (1997). *Relationships: A dialectical perspective*. Psychology Press Publishers, UK.

Hoekstra, R. H. A., Epskamp, S., & Borsboom, D. (2022). Heterogeneity in individual network analysis: Reality or illusion? *Multivariate Behavioral Research*, *58*(4), 762–786. https://doi.org/10.1080/00273171.2022.2128020

Hoeve, M., Dubas, J. S., Eichelsheim, V. I., Van Der Laan, P. H., Smeenk, W., & Gerris, J. R. M. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, *37*, 749–775. https://doi.org/10.1007/s10802-009-9310-8

Hou, Y., Benner, A. D., Kim, S. Y., Chen, S., Spitz, S., Shi, Y., & Beretvas, T. (2019). Discordance in parents' and adolescents' reports of parenting: A meta-analysis and qualitative review. *American Psychologist*, *75*(3), 329–348. https://doi.org/10.1037/amp0000463

Huinink, J., Brüderl, J., Nauck, B., Walper, S., Castiglioni, L., & Feldhaus, M. (2011). Panel analysis of intimate relationships and family dynamics (pairfam): Conceptual framework and design. *Zeitschrift Fur Familienforschung*, *23*(1), 77–101.

Janssen, H. J., Bruinsma, G. J. N. N., Deković, M., & Eichelsheim, V. I. (2018). A between- and within-person analysis of parenting and time spent in criminogenic settings during adolescence: The role of self-control and delinquent attitudes. *Youth and Society*, *50*(2), 229–254. https://doi.org/10.1177/0044118X16636138

Janssen, H. J., Deković, M., & Bruinsma, G. J. N. N. (2014). Parenting and time adolescents spend in criminogenic settings: A between- and within-person analysis. *British Journal of Criminology*, *54*(4), 551–567. https://doi.org/10.1093/bjc/azu032

Janssen, H. J., Eichelsheim, V. I., Deković, M., & Bruinsma, G. J. N. N. (2016). How is parenting related to adolescent delinquency? A between- and within-person analysis of the mediating role of self-control, delinquent attitudes, peer delinquency, and time spent in criminogenic settings. *European Journal of Criminology*, *13*(2), 169–194. https://doi.org/10.1177/1477370815608881

Janssen, H. J., Weerman, F. M., & Eichelsheim, V. I. (2017). Parenting as a protective factor against criminogenic settings? Interaction effects between three aspects of parenting and unstructured socializing in disordered areas. *Journal of Research in Crime and Delinquency*, *54*(2), 181–207. https://doi.org/10.1177/0022427816664561

Janssen, L. H. C., Elzinga, B. M., Verkuil, B., Hillegers, M. H. J. J., & Keijsers, L. (2021). The link between parental support and adolescent negative mood in daily life: Between-person heterogeneity in within-person processes. *Journal of Youth and Adolescence*, *50*(2), 271–285. https://doi.org/10.1007/s10964-020-01323-w

Janssen, L. H. C., Verkuil, B., van Houtum, L. A. E. M., Wever, M. C. M., & Elzinga, B. M. (2021). Perceptions of parenting in daily life: Adolescent-parent differences and associations with adolescent affect. *Journal of Youth and Adolescence*, *50*(12), 2427–2443. https://doi.org/10.1007/s10964-021-01489-x

Jaursch, S. (2003). *Erinnertes und aktuelles Erziehungsverhalten von Müttern und Vätern: Intergenerationale Zusammenhänge und kontextuelle Faktoren*. Friedrich-Alexander-Universität.

Johnson, T. P. (1991). Mental health, social relations, and social selection: A longitudinal analysis. *Journal Of Health and Social Behavior*, *32*, 408–423. https://doi.org/10.2307/2137107

Jolicoeur-Martineau, A., Belsky, J., Szekely, E., Widaman, K. F., Pluess, M., Greenwood, C., & Wazana, A. (2019). Distinguishing differential susceptibility, diathesis-stress, and vantage sensitivity: Beyond the single gene and environment model. *Development and Psychopathology*, *32*(1), 73–83. https://doi.org/10.1017/S0954579418001438

Kakihara, F., & Tilton-weaver, L. (2009). Adolescents' interpretations of parental control: Differentiated by domain and types of control. *Child Development*, *80*(6), 1722–1738. https://doi.org/10.1111/j.1467-8624.2009.01364.x

Kapetanovic, S., Boele, S., & Skoog, T. (2019). Parent-adolescent communication and adolescent delinquency: Unraveling within-family processes from between-family differences. *Journal of Youth and Adolescence*, *48*, 1707–1723. https://doi.org/10.1007/s10964-019-01043-w

Keijsers, L. (2016). Parental monitoring and adolescent problem behaviors: How much do we really know? *International Journal of Behavioral Development*, *40*(3), 271–281. https://doi.org/10.1177/0165025415592515

Keijsers, L., Boele, S., & Bülow, A. (2022). Measuring parent–adolescent interactions in natural habitats. The potential, status, and challenges of ecological momentary assessment. *Current Opinion in Psychology*, *44*, 264–269. https://doi.org/10.1016/j.copsyc.2021.10.002

Keijsers, L., Branje, S., Hawk, S. T., Schwartz, S. J., Frijns, T., Koot, H. M., van Lier, P., & Meeus, W. (2012). Forbidden friends as forbidden fruit: Parental supervision of friendships, contact with deviant peers, and adolescent delinquency. *Child Development*, *83*(2), 651–666. https://doi.org/10.1111/j.1467-8624.2011.01701.x

Keijsers, L., Hillegers, M. H. J., & Hiemstra, M. (2015). *Grumpy or depressed research project (Utrecht University Seed Project)*.

Keijsers, L., & Van Roekel, E. (2018). Longitudinal methods in adolescent psychology. Where could we go from here? And should we? In L. B. Hendry & M. Kloep (Eds.), *Reframing Adolescent Research* (pp. 70–91). Routledge.

Keijsers, L., Voelkle, M. C., Maciejewski, D., Branje, S., Koot, H., Hiemstra, M., & Meeus, W. (2016). What drives developmental change in adolescent disclosure and maternal knowledge? Heterogeneity in within-family processes. *Developmental Pyschology*, *52*(12), 2057–2070. https://doi.org/10.1037/dev0000220

Kelly, D. P., Weigard, A., & Beltz, A. M. (2020). How are you doing? The person-specificity of daily links between neuroticism and physical health. *Journal of Psychosomatic Research*, *137*, 110194. https://doi.org/10.1016/j.jpsychores.2020.110194

Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*, *36*, 366–380. https://psycnet.apa.org/doi/10.1037/0012-1649.36.3.366

Kerr, M., Stattin, H., & Özdemir, M. (2012). Perceived parenting style and adolescent adjustment: Revisiting directions of effects and the role of parental knowledge. *Developmental Psychology*, *48*(6), 1540–1552. https://doi.org/10.1037/a0027720

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 593. https://doi.org/10.1001/archpsyc.62.6.593

Keyes, C. L. M. (2014). Mental health as a complete state: How the salutogenic perspective completes the picture. In *Bridging Occupational, Organizational and Public Health: A Transdisciplinary Approach* (pp. 179–192). https://doi.org/10.1007/978-94-007-5640-3

Kim-Cohen, J., Caspi, A., Moffitt, T. E., Harrington, H., Milne, B. J., & Poulton, R. (2003). Prior juvenile diagnoses in adults with mental disorder: Developmental follow-back of a prospective-longitudinal cohort. *Archives of General Psychiatry*, *60*(7), 709. https://doi.org/10.1001/archpsyc.60.7.709

Kline, R. B. (2016). *Principles and practice of structural equation modeling*. The Guilford Press. http://amosdevelopment.com/webhelp/kline_2005.htm

Koning, I., de Looze, M., & Harakeh, Z. (2020). Parental alcohol-specific rules effectively reduce adolescents' tobacco and cannabis use: A longitudinal study. *Drug and Alcohol Dependence*, *216*. https://doi.org/10.1016/j.drugalcdep.2020.108226

Kuczynski, L., & Parkin, C. M. (2007). Agency and bidirectionality in socialization: Interactions, transactions, and relational dialectics. In *Handbook of socialization: Theory and research* (pp. 259–283). The Guilford Press.

Kuhlman, K. R., Repetti, R. L., Reynolds, B. M., & Robles, T. F. (2016). Change in parent-child conflict and the HPA-axis: Where should we be looking and for how long? *Psychoneuroendocrinology*, *68*, 74–81. https://doi.org/10.1016/j.psyneuen.2016.02.029

Kuiper, R. M., & Ryan, O. (2018). Drawing conclusions from cross-lagged relationships: Re-considering the role of the time-interval. *Structural Equation Modeling*, *25*(5), 809–823. https://doi.org/10.1080/10705511.2018.1431046

Kunnen, E. S., de Ruiter, N. M. P., Jeronimus, B. F., & Van der Gaag, M. A. E. (2019). Introduction to a dynamic systems approach to psychosocial development in adolescence. In *Psychosocial Development in Adolescence: Insights from the Dynamic Systems Approach* (pp. 1–16). https://doi.org/10.4324/9781315165844-1

Kuppens, S., & Ceulemans, E. (2019). Parenting styles: A closer look at a well-known concept. *Journal of Child and Family Studies*, 168–181. https://doi.org/10.1007/s10826-018-1242-x

LaFleur, L. K., Zhao, Y., Zeringue, M. M., & Laird, R. D. (2016). Warmth and legitimacy beliefs contextualize adolescents' negative reactions to parental monitoring. *Journal of Adolescence*, *51*(1), 58–67. https://doi.org/10.1016/j.adolescence.2016.05.013

Laird, R. D., Pettit, G. S., Bates, J. E., & Dodge, K. A. (2003). Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: Evidence of correlated developmental changes and reciprocal influences. *Child Development*, *74*(3), 752–768. https://doi.org/10.1111/1467-8624.00566

Lakens, D., Scheel, A. M., & Isager, P. M. (2018). Equivalence testing for psychological research: A tutorial. *Advances in Methods and Practices in Psychological Science*, *1*(2), 259–269. https://doi.org/10.1177/2515245918770963

Lam, C. B., Greene, K. M., & McHale, S. M. (2016). Housework time from middle childhood through adolescence: Links to parental work hours and youth adjustment. *Developmental Psychology*, *52*(12), 2071–2084. https://doi.org/10.1037/dev0000223

Lam, C. B., & McHale, S. M. (2015). Developmental patterns and parental correlates of youth leisure-time physical activity. *Journal of Family Psychology*, *29*(1), 100–107. https://doi.org/10.1037/fam0000049

Lane, S. T., Gates, K. M., Pike, H. K., Beltz, A. M., & Wright, A. G. C. (2019). Uncovering general, shared, and unique temporal patterns in ambulatory assessment data. *Psychological Methods*, *24*(1), 54–69. https://doi.org/10.1037/met0000192

Lansford, J. E. (2022). Annual Research Review: Cross-cultural similarities and differences in parenting. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(4), 466–479. https://doi.org/10.1111/jcpp.13539

Larson, R., & Richards, M. H. (1991). Daily companionship in late childhood and early adolescence: Changing developmental contexts. *Child Development*, *62*(2), 284–300. https://doi.org/10.2307/1131003

Larson, R. W., Richards, M. H., Moneta, G., Holmbeck, G., & Duckett, E. (1996). Changes in adolescents' daily interactions with their families from ages 10 to 18: Disengagement and transformation. *Development Psychology*, *32*(4), 744–754. https://doi.org/10.1037/0012-1649.32.4.744

Lau, E. Y., Faulkner, G., Qian, W., & Leatherdale, S. T. (2016). Longitudinal associations of parental and peer influences with physical activity during adolescence: Findings from the COMPASS study. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice*, *36*(11), 235–242. https://doi.org/10.24095/hpcdp.36.11.01

Laursen, B., & Bukowski, W. M. (1997). A developmental guide to the organisation of close relationships. *Journal of Behavioral Development*, *21*(4), 747–770. https://doi.org/10.1080/016502597384659

Lehman, B. J., & Repetti, R. L. (2007). Bad days don't end when the school bell rings: The lingering effects of negative school events on children's mood, self-esteem, and perceptions of parent–child interaction. *Social Development*, *16*, 596–618. https://doi.org/10.1111/j .1467-9507.2007.00398.x

Lerner, R. M., & Schwartz, S. J. (2009). Problematics of time and timing in the longitudinal study of human development: Theoretical and methodological Issues. *Human Development*, *52*(1), 1–24. https://doi.org/10.1159%2F000189215

Lionetti, F., Klein, D. N., Pastore, M., Aron, E. N., Aron, A., & Pluess, M. (2021). The role of environmental sensitivity in the development of rumination and depressive symptoms in childhood: A longitudinal study. *European Child and Adolescent Psychiatry*, *31*, 1815–1825. https://doi.org/10.1007/s00787-021-01830-6

Lionetti, F., Palladino, B. E., Moses Passini, C., Casonato, M., Hamzallari, O., Ranta, M., Dellagiulia, A., & Keijsers, L. (2018). The development of parental monitoring during adolescence: A meta-analysis. *European Journal of Developmental Psychology*, *16*(5), 552–580. https://doi.org/10.1080/17405629.2018.1476233

Lionetti, F., Pastore, M., Moscardino, U., Nocentini, A., Pluess, K., & Pluess, M. (2019). Sensory Processing Sensitivity and its association with personality traits and affect: A meta-analysis. *Journal of Research in Personality*, *81*, 138–152. https://doi.org/10.1016/j.jrp.2019.05.013

Lionetti, F., Spinelli, M., Moscardino, U., Ponzetti, S., Garito, M. C., Dellagiulia, A., Aureli, T., Fasolo, M., & Pluess, M. (2022). The interplay between parenting and environmental sensitivity in the prediction of children's externalizing and internalizing behaviors during COVID-19. *Development and Psychopathology*, 1–14. https://doi.org/10.1017/S0954579421001309

Lippold, M. A., Davis, K. D., McHale, S. M., & Almeida, D. M. (2016). Daily parental knowledge of youth activities is linked to youth physical symptoms and HPA functioning. *Journal of Family Psychology*, *30*(2), 245–253. https://doi.org/10.1037/fam0000167

Lippold, M. A., Davis, K. D., McHale, S. M., Buxton, O. M., & Almeida, D. M. (2016). Daily stressor reactivity during adolescence: The buffering role of parental warmth. *Health Psychology*, *35*(9), 1027–1035. https://doi.org/10.1037/hea0000352

Lippold, M. A., McHale, S. M., Davis, K. D., Almeida, D. M., & King, R. B. (2016). Experiences with parents and youth physical health symptoms and cortisol: A daily diary investigation. *Journal of Research on Adolescence*, *26*(2), 226–240. https://doi.org/10.1111/jora.12186

Lollis, S., & Kuczynski, L. (1998). Beyond one hand clapping: Seeing bidirectionality in parent-child relations. *Journal of Social and Personal Relationships*, *14*(4), 441–461. https://doi.org/10.1177/0265407597144002

Lougheed, J. P. (2020). Parent–adolescent dyads as temporal interpersonal emotion systems. *Journal of Research on Adolescence*, *30*(1), 26–40. https://doi.org/10.1111/jora.12526

Lougheed, J. P., & Keskin, G. (2021). Parent-adolescent emotion dynamics at multiple time scales. *Child Development Perspectives*, *15*(2), 125–131. https://doi.org/10.1111/cdep.12409

Lucas, R. E. (2023). Why the cross-lagged panel model Is almost never the right cChoice. *Advances in Methods and Practices in Psychological Science*, *6*(1). https://doi.org/10.1177/25152459231158378

Luo, L., Fisher, Z. F., Arizmendi, C., Molenaar, P. C. M., Beltz, A., & Gates, K. M. (2023). Estimating both directed and undirected contemporaneous relations in time series data using hybrid-group iterative multiple model estimation. *Psychological Methods*, *28*(1), 189–206. https://doi.org/10.1037/met0000485

Mabbe, E., Vansteenkiste, M., Brenning, K., De Pauw, S., Beyers, W., & Soenens, B. (2019). The moderating role of adolescent personality in associations between psychologically controlling parenting and problem behaviors: A longitudinal examination at the level of within-person change. *Developmental Psychology*, *55*(12), 2665–2677. https://doi.org/10.1037/dev0000802

Maccoby & Martin. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Ed.), *Handbook of child psychology*. Wiley.

Maciejewski, D. F., Keijsers, L., Branje, S., & Meeus, W. H. J. (2019). Most fare well—But some do not: Distinct profiles of mood variability development and their association with adjustment during adolescence. *Development Psychology*, *55*(2), 434–448. https://doi.org/10.1037/dev0000650

Mastrotheodoros, S., Papp, L. M., Van der Graaff, J., Deković, M., Meeus, W. H. J., & Branje, S. (2022). Explaining heterogeneity of daily conflict spillover in the family: The role of dyadic marital conflict patterns. *Family Process*, *61*(1), 342–360. https://doi.org/10.1111/famp.12648

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: A meta-analysis. *Clinical Psychology Review*, *27*, 986–1003. https://doi.org/10.1016/j.cpr.2007.03.001

McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the association between parenting and childhood anxiety: A meta-analysis. *Clinical Psychology Review*, *27*, 155–172. https://doi.org/10.1016/j.cpr.2006.09.002

McNeish, D., & Hamaker, E. L. (2019). A primer on two-level dynamic structural equation models for intensive longitudinal data in Mplus. *Psychological Methods*, *25*(5), 610–635. https://doi.org/10.1037/met0000250

Meeus, W. (2016). Adolescent psychosocial development: A review of longitudinal models and research. *Developmental Psychology*, *52*(12), 1969–1993. https://doi.org/10.1037%2Fdev0000243

Meldrum, R. C., Young, J. T. N., & Weerman, F. M. (2012). Changes in self-control during adolescence: Investigating the influence of the adolescent peer network. *Journal of Criminal Justice*, *40*(6), 452–462. https://doi.org/10.1016/j.jcrimjus.2012.07.002

Mervielde, I., & De Fruyt, F. (1999). Construction of the hierarchical personality inventory for children (HiPIC). In *Personality psychology in Europe*. Tilburg University.

Milfont, T. L., Merry, S., & Robinson, E. (2008). Evaluating the short form of the Reynolds Adolescent Depression Scale in New Zealand adolescents. *Australian & New Zealand Journal of Psychiatry*, *42*(11). https://doi.org/10.1080/00048670802415343

Moeller, J. (2022). Averting the next credibility crisis in psychological science: Within-person methods for personalized diagnostics and intervention. *Journal for Person-Oriented Research*, *7*(2), 53–77. https://doi.org/10.17505/jpor.2021.23795

Moeller, J., Dietrich, J., Neubauer, A., Brose, A., Kühnel, J., Dehne, M., Jähne, M. F., Schmiedek, F., Bellhäuser, H., Malmberg, L., Stockinger, K., Riediger, M., & Pekrun, R. (2022). *Generalizability Crisis Meets Heterogeneity Revolution: Determining Under Which Boundary Conditions Findings Replicate and Generalize*. 1–48.

Molenaar, P. C. M. (2004). A manifesto on psychology as idiographic science: Bringing the person back into scientific psychology, this time forever. *Measurement Interdisciplinary Research and Perspectives*, *2*(4), 201–218. https://doi.org/10.1207/s15366359mea0204

Molenaar, P. C. M., & Campbell, C. G. (2009). The new person-specific paradigm in psychology. *Current Directions in Psychological Science*, *18*(2), 112–117. https://doi.org/10.1111/j.1467-8721.2009.01619.x

Monroe, S. M., & Simons, A. D. (1991). Diathesis-stress theories in the context of life stress research: Implications for the depressive disorders. *Psychological Bulletin*, *110*(3), 406–425. https://doi.org/10.1037/0033-2909.110.3.406

Muthén, L. K., & Muthén, B. (2020). *Mplus User's Guide* (Muthén & Muthén, Eds.).

Myin-Germeys, I., Kasanova, Z., Vaessen, T., Vachon, H., Kirtley, O., Viechtbauer, W., & Reininghaus, U. (2018). Experience sampling methodology in mental health research: New insights and technical developments. *World Psychiatry*, *17*(2), 123–132. https://doi.org/10.1002/wps.20513

Myin-Germeys, I., & Kuppens, P. (2022). *The open handbook of experience sampling methodology: A step-by-step guide to designing, conducting, and analyzing ESM studies*. Center for Research on Experience Sampling and Ambulatory Methods Leuven.

Myin-Germeys, I., Oorschot, M., Collip, D., Lataster, J., Delespaul, P., & van Os, J. (2009). Experience sampling research in psychopathology: Opening the black box of daily life. *Psychological Medicine*, *39*(09), 1533–1547. https://doi.org/10.1017/S0033291708004947

Nelemans, S. A., Hale, W. W., Branje, S. J. T., Goossens, L., Koot, H. K., Oldehinkel, A. J., & Meeus, W. H. J. (2016). Discrepancies between perceptions of the parent – adolescent relationship and early adolescent depressive symptoms: An illustration of polynomial regression analysis. *Journal of Youth and Adolescence*, *45*(10), 2049–2063. https://doi.org/10.1007/s10964-016-0503-5

Nelemans, S. A., Keijsers, L., Colpin, H., van Leeuwen, K., Bijttebier, P., Verschueren, K., & Goossens, L. (2020). Transactional links between social anxiety symptoms and parenting across adolescence: Between- and within-person associations. *Child Development*, *91*(3), 814–828. https://doi.org/10.1111/cdev.13236

Neubauer, A. B., Schmidt, A., Kramer, A. C., & Schmiedek, F. (2021). A little autonomy support goes a long way: Daily autonomy-supportive parenting, child well-being, parental need fulfillment, and change in child, family, and parent adjustment across the adaptation to the COVID-19 pandemic. *Child Development*, *92*(5), 1679–1697. https://doi.org/10.1111/cdev.13515

Neubauer, A. B., Voelkle, M. C., Voss, A., & Mertens, U. K. (2020). Estimating reliability of within-person couplings in a multilevel framework. *Journal of Personality Assessment*, *102*, 10–21. https://doi.org/10.1080/00223891.2018.1521418

Nivard, M. G., Lubke, G. H., Dolan, C. V., Evans, D. M., St. Pourcain, B., Munafò, M. R., & Middeldorp, C. M. (2017). Joint developmental trajectories of internalizing and externalizing disorders between childhood and adolescence. *Development and Psychopathology*, *29*(3), 919–928. https://doi.org/10.1017/S0954579416000572

Olivari, M. G., Tagliabue, S., & Confalonieri, E. (2013). Parenting Style and Dimensions Questionnaire: A Review of reliability and validity. *Marriage & Family Review*, *49*(6), 465–490. https://doi.org/10.1080/01494929.2013.770812

Olofsdotter, S., Åslund, C., Furmark, T., Comasco, E., & Nilsson, K. W. (2018). Differential susceptibility effects of oxytocin gene (OXT) polymorphisms and perceived parenting on social anxiety among adolescents. *Development and Psychopathology*, *30*(2), 449–459. https://doi.org/10.1017/S0954579417000967

Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*, *120*(4), 1013–1034. https://doi.org/10.1037/pspp0000358.supp

Orth, U., Meier, L. L., Bühler, J. L., Dapp, L. C., Krauss, S., Messerli, D., & Robins, R. W. (2022). Effect size guidelines for cross-lagged effects. *Psychological Methods*. Advance online publication. https://doi.org/10.1037/met0000499

Ortuño-Sierra, J., Aritio-Solana, R., Inchausti, F., De Luis, E. C., Molina, B. L., De Albéniz, A. P., & Fonseca-Pedrero, E. (2017). Screening for depressive symptoms in adolescents at school: New validity evidences on the short form of the reynolds depression scale. *PLoS ONE*, *12*(2), 1–11. https://doi.org/10.1371/journal.pone.0170950

Padilla, J., McHale, S. M., Updegraff, K. A., & Umaña-Taylor, A. J. (2016). Mexican-origin parents' differential treatment and siblings' adjustment from adolescence to young adulthood. *Journal of Family Psychology*, *30*(8), 955–965. https://doi.org/10.1037/fam0000229

Padilla-Walker, L. M., & Nelson, L. J. (2012). Black hawk down? Establishing helicopter parenting as a distinct construct from other forms of parental control during emerging adulthood. *Journal of Adolescence*, *35*(5), 1177–1190. https://doi.org/10.1016/j.adolescence.2012.03.007

Papp, L. M., Pendry, P., & Adam, E. K. (2009). Mother-adolescent physiological synchrony in naturalistic settings: Within-family cortisol associations and moderators. *Journal of Family Psychology*, *23*(6), 882–894. https://doi.org/10.1037/a0017147

Pardini, D. A. (2008). Novel insights into longstanding theories of bidirectional parent–child influences: Introduction to the special section. *Journal of Abnormal Child Psychology*, *36*, 627–631. https://doi.org/10.1007/s10802-008-9231-y

Patterson, G. R. (1982). *Coercive family process*. Castalia Publishing Company.

Patterson, G. R., & Fisher, P. A. (2002). Recent developments in our understanding of parenting: Bidirectional effects, causal models, and the search for parsimony. In *Handbook of Parenting Volume 5 Practical Issues in Parenting* (Vol. 5, pp. 59–88). Lawrence Erlbaum Associates Publishers.

Patterson, G. R., & Stouthamer-Loeber, M. (1984). The correlation of family management practices and delinquency. *Child Development*, *55*(4), 1299–1307. https://psycnet.apa.org/doi/10.2307/1129999

Pelham, W. E., Tapert, S. F., Gonzalez, M. R., Guillaume, M., Dick, A. S., Sheth, C. S., Baker, F. C., Baskin-Sommers, A., Marshall, A. T., Lisdahl, K. M., Breslin, F. J., Van Rinsveld, A., & Brown, S. A. (2022). Parental knowledge/monitoring and depressive symptoms during adolescence: Protective factor or spurious association? *Research on Child and Adolescent Psychopathology*. https://doi.org/10.1007/s10802-021-00896-9

Pine, D. S., Cohen, E., Cohen, P., & Brook, J. (1999). Adolescent depressive symptoms as predictors of adult depression: Moodiness or mood disorder? *American Journal of Psychiatry*, *156*(1), 133–135. https://doi.org/10.1176/ajp.156.1.133

Pinquart, M. (2017a). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology*, *53*(5), 873–932. https://doi.org/10.1037/dev0000295

Pinquart, M. (2017b). Associations of parenting dimensions and styles with internalizing symptoms in children and adolescents: A meta-analysis. *Marriage and Family Review*, *53*(7), 613–640. https://doi.org/10.1080/01494929.2016.1247761

Pinquart, M., & Gerke, D. C. (2019). Associations of parenting styles with self-esteem in children and adolescents: A meta-analysis. *Journal of Child and Family Studies*, *28*(8), 2017–2035. https://doi.org/10.1007/s10826-019-01417-5

Pluess, M. (2015). Individual differences in environmental sensitivity. *Child Development Perspectives*, *9*(3), 138–143. https://doi.org/10.1111/cdep.12120

Pluess, M. (2017). Vantage sensitivity: Environmental sensitivity to positive experiences as a function of genetic differences. *Journal of Personality*, *85*(1), 38–50. https://doi.org/10.1111/jopy.12218

Pluess, M., Assary, E., Lionetti, F., Lester, K. J., Krapohl, E., Aron, E. N., & Aron, A. (2018). Environmental sensitivity in children: Development of the highly sensitive child scale and identification of sensitivity groups. *Developmental Psychology*, *54*, 51–70. https://doi.org/10.1037/dev0000406

Pluess, M., & Belsky, J. (2012). Parenting effects in the context of child genetic differences. *ISSBD Bulletin*, *62*(2), 2–5.

Pluess, M., & Belsky, J. (2013). Vantage sensitivity: Individual differences in response to positive experiences. *Psychological Bulletin*, *139*(4), 901–916. https://doi.org/10.1037/a0030196

Power, T. G. (2013). Parenting dimensions and styles: A brief history and recommendations for future research. *Childhood Obesity*, *9*(1), 14–21. https://doi.org/10.1089/chi.2013.0034

Prinzie, P., Onghena, P., Hellinckx, W., Grietens, H., Ghesquière, P., & Colpin, H. (2003). The additive and interactive effects of parenting and children's personality on externalizing behaviour. *European Journal of Personality*, *17*(2), 95–117. https://doi.org/10.1002/per.467

Putnick, D. L., Bornstein, M. H., Hendricks, C., Painter, K. M., Suwalsky, J. T. D., & Collins, W. A. (2010). Stability, continuity, and similarity of parenting stress in European American mothers and fathers across their child's transition to adolescence. *Parenting*, *10*(1), 60–77. https://doi.org/10.1080/15295190903014638

Rabinowitz, J. A., & Drabick, D. A. G. (2017). Do children fare for better and for worse? Associations among child features and parenting with child competence and symptoms. *Developmental Review*, *45*, 1–30. https://doi.org/10.1016/j.dr.2017.03.001

Rammstedt, B., & John, O. P. (2005). Kurzversion des Big Five Inventory (BFI-K): Entwicklung und Validierung eines ökonomischen Inventars zur Erfassung der fünf Faktoren der Persönlichkeit. *Diagnostica*, *51*(4), 195–206.

Rekker, R., Keijsers, L., Branje, S., Koot, H., & Meeus, W. (2017). The interplay of parental monitoring and socioeconomic status in predicting minor delinquency between and within adolescents. *Journal of Adolescence*, *59*(1), 155–165. https://doi.org/10.1016/j.adolescence.2017.06.001

Rekker, R., Pardini, D., Keijsers, L., Branje, S., Loeber, R., & Meeus, W. (2015). Moving in and out of Poverty: The Within-Individual Association between Socioeconomic Status and Juvenile Delinquency. *PLOS ONE*, *10*(11), e0136461–e0136461. https://doi.org/10.1371/journal.pone.0136461

Repetti, R. L., Reynolds, B. M., & Sears, M. S. (2015). Families under the microscope: Repeated sampling of perceptions, experiences, biology, and behavior. *Journal of Marriage and Family*, *77*(1), 126–146. https://doi.org/10.1111/jomf.12143

Reyes, A. D. L., & Kazdin, A. E. (2005). Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. *Psychological Bulletin*, *131*(4), 483–509. https://doi.org/10.1037/0033-2909.131.4.483

Reyes, H. L. M. N., Foshee, V. A., Tharp, A. T., Ennett, S. T., & Bauer, D. J. (2015). Substance use and physical dating violence: The role of contextual moderators. *American Journal of Preventive Medicine*, *49*(3), 467–475. https://doi.org/10.1016/j.amepre.2015.05.018

Reynolds, B. M., Robles, T. F., & Repetti, R. L. (2016). Measurement reactivity and fatigue effects in daily diary research with families. *Developmental Psychology*, *52*(3), 442–456. https://doi.org/10.1037/dev0000081

Reynolds, W. M. (2005). Reynolds adolescent depression scale—2nd edition. In M. Hersen, D. L. Segal, & M. Hilsenroth (Eds.), *Comprehensive handbook of psychological assessment, Volume 2: Personality assessment and psychopathology* (pp. 224–236). John Wiley & Sons.

Reynolds, W. M. (2008). *Reynolds Adolescent Depression Scale (2nd ed., Short Form–RADS–2:SF)*. Psychological Assessment Resources.

Richmond, M. K., Stocker, C. M., & Rienks, S. L. (2005). Longitudinal associations between sibling relationship quality, parental differential treatment, and children's adjustment. *Journal of Family Psychology*, *19*, 550–559. https://doi.org/10.1037/0893-3200.19.4.550

Richters, J. E. (1997). The Hubble hypothesis and the developmentalist's dilemma. *Development and Psychopathology*, *9*(2), 193–229. https://doi.org/10.1017/s0954579497002022

Richters, J. E. (2021). Incredible utility: The lost causes and causal debris of psychological science. *Basic and Applied Social Psychology*, *43*(6), 366–405. https://doi.org/10.1080/01973533.2021.1979003

Rioux, C., Castellanos-Ryan, N., Parent, S., & Séguin, J. R. (2016). The interaction between temperament and the family environment in adolescent substance use and externalizing behaviors: Support for diathesis-stress or differential susceptibility? *Developmental Review*, *40*, 117–150. https://doi.org/10.1016/j.dr.2016.03.003

Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports*, *77*(3), 819–830. https://doi.org/10.2466/pr0.1995.77.3.819

Robinson, O. C. (2011). The idiographic / nomothetic dichotomy: Tracing historical origins of contemporary confusions. *History & Philosophy of Psychology*, *13*(2), 32–39.

Robles, T. F., Carroll, J. E., Bai, S., Reynolds, B. M., Esquivel, S., & Repetti, R. L. (2016). Emotions and family interactions in childhood: Associations with leukocyte telomere length. *Psychoneuroendocrinology*, *63*, 343–350. http://dx.doi.org/10.1016/j.psyneuen.2015.10.018

Rohner, R. P. (2016). Introduction to Interpersonal Acceptance-Rejection Theory (IPARTheory) and evidence. In *Online Readings in Psychology and Culture* (Vol. 6, Issue 1). https://doi.org/10.9707/2307-0919.1055

Rohner, R. P., Khaleque, A., & Cournoyer, D. E. (2005). Parental acceptance-rejection: Theory, methods, cross-cultural evidence, and implications. *Ethos*, *33*(3), 299–334. https://doi.org/doi.org/10.1525/eth.2005.33.3.299

Roisman, G. I., Newman, D. A., Fraley, R. C., Haltigan, J. D., Groh, A. M., & Haydon, K. C. (2012). Distinguishing differential susceptibility from diathesis-stress: Recommendations for evaluating interaction effects. *Development and Psychopathology*, *24*(2), 389–409. https://doi.org/10.1017/S0954579412000065

Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton University Press.

Rote, W. M., Olmo, M., Feliscar, L., Jambon, M. M., Ball, C. L., & Smetana, J. G. (2020). Helicopter parenting and perceived overcontrol by emerging adults: A family-level profile analysis. *Journal of Child and Family Studies*, *29*(11), 3153–3168. https://doi.org/10.1007/s10826-020-01824-z

Rote, W. M., & Smetana, J. G. (2018). Within-family dyadic patterns of parental monitoring and adolescent information management. *Development Psychology*, *54*(12), 2302–2315. https://doi.org/10.1037/dev0000615

Rudolph, K. D. (2002). Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health*, *30*(4), 3–13. https://doi.org/10.1016/S1054-139X(01)00383-4

Rudolph, K. D. (2009). The interpersonal context of adolescent depression. In S. Nolen-Hoeksema & L. M. Hilt (Eds.), *Handbook of depression in adolescents* (pp. 377–418). Routledge.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://psycnet.apa.org/doi/10.1037/0003-066X.55.1.68

Ryff, C. D., Dienberg Love, G., Urry, H. L., Muller, D., Rosenkranz, M. A., Friedman, M., Davidson, R. J., & Singer, B. (2006). Psychological well-Being and ill-being: Do they have distinct or mirrored biological correlates? *Psychotherapy and Psychosomatics*, *75*(2), 85–95. https://doi.org/10.1159/000090892

Sameroff, A. (2009). The transactional model of development. In *The transactional model of development: How children and contexts shape each other* (pp. 3–21). American Psychological Association.

Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, *81*(1), 6–22. https://doi.org/10.1111/j.1467-8624.2009.01378.x

Sanford, B. T., Ciarrochi, J., Hofmann, S. G., Chin, F., Gates, K. M., & Hayes, S. C. (2022). Toward empirical process-based case conceptualization: An idionomic network examination of the process-based assessment tool. *Journal of Contextual Behavioral Science*, *25*, 10–25. https://doi.org/10.1016/j.jcbs.2022.05.006

Sayler, K., Zhang, X., Steinberg, L., & Belsky, J. (2022). Parenting, peers and psychosocial adjustment: Are the same—Or different—Children affected by each? *Journal of Youth and Adolescence*, *51*(3), 443–457. https://doi.org/10.1007/s10964-022-01574-9

Schacter, H. L., & Margolin, G. (2019). The interplay of friends and parents in adolescents' daily lives: Towards a dynamic view of social support. *Social Development*, *28*(3), 708–724. https://doi.org/10.1111/sode.12363

Schiffrin, H. H., Liss, M., Miles-McLean, H., Geary, K. A., Erchull, M. J., & Tashner, T. (2014). Helping or hovering? The effects of helicopter parenting on college students' well-being. *Journal of Child and Family Studies*, *23*(3), 548–557. https://doi.org/10.1007/s10826-013-9716-3

Schumacker, R. E., & Lomax, R. G. (2016). *A beginner's guide to structural equation modeling*. Routledge.

Schuurman, N. K., & Hamaker, E. L. (2019). Measurement error and person-specific reliability in multilevel autoregressive modeling. *Psychological Methods*, *24*(1), 70–91. https://doi.org/10.1037/met0000188

Shanahan, L., McHale, S. M., Crouter, A. C., & Osgood, D. W. (2008). Linkages between parents' differential treatment, youth depressive symptoms, and sibling relationships. *Journal of Marriage and Family*, *70*(2), 480–494. https://doi.org/10.1111/j.1741-3737.2008.00495.x

Sheeber, L. B., Davis, B., Leve, C., Hops, H., & Tildesley, E. (2007). Adolescents' relationships with their mothers and fathers: Associations with depressive disorder and subdiagnostic symptomatology. *Journal of Abnormal Psychology*, *116*(1), 144–154. https://psycnet.apa.org/doi/10.1037/0021-843X.116.1.144

Shorey, S., Ng, E. D., & Wong, C. H. J. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology*, *61*(2), 287–305. https://doi.org/10.1111/bjc.12333

Slagt, M., Dubas, J. S., Aken, M. A. G. V., & Ellis, B. J. (2018). Sensory Processing Sensitivity as a marker of differential susceptibility to parenting. *Development Psychology*, *54*(3), 543–558. https://psycnet.apa.org/doi/10.1037/dev0000431

Slagt, M., Dubas, J. S., Deković, M., & van Aken, M. A. G. (2016). Differences in sensitivity to parenting depending on child temperament: A meta-analysis. *Psychological Bulletin*, *142*, 1068–1110. https://doi.org/10.1037/bul0000061

Slagt, M., Dubas, J. S., Denissen, J. J. A., Deković, M., & van Aken, M. A. G. (2015). Personality traits as potential susceptibility markers: Differential susceptibility to support among parents. *Journal of Personality*, *83*(2), 155–166. https://doi.org/10.1111/jopy.12091

Smetana, J. G. (2008). "It's 10 o'clock: Do you know where your children are?" Recent advances in understanding parental monitoring and adolescents' information management. *Child Development Perspectives*, *2*(1), 19–25. https://doi.org/10.1111/j.1750-8606.2008.00036.x

Smetana, J. G. (2017). Current research on parenting styles, dimensions, and beliefs. *Current Opinion in Psychology*, *15*, 19–25. https://doi.org/10.1016/j.copsyc.2017.02.012

Smetana, J. G., & Asquith, P. (1994). Adolescents' and parents' conceptions of parental authority and personal autonomy. *Child Development*, *65*(4), 1147–1162. https://doi.org/10.1111/j.1467-8624.1994.tb00809.x

Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology*, *57*, 255–284. https://doi.org/10.1146/annurev.psych.57.102904.190124

Smetana, J. G., & Daddis, C. (2002). Domain-specific antecedents of parental psychological control and monitoring: The role of parenting beliefs and practices. *Child Development*, *73*(2), 563–580. https://doi.org/10.1111/1467-8624.00424

Smetana, J. G., & Rote, W. M. (2019). Adolescent–parent relationships: Progress, processes, and prospects. *Annual Review of Developmental Psychology*, *1*, 41–68. https://doi.org/10.1146/annurev-devpsych-121318-084903

Smith, L. B., & Thelen, E. (2003). Development as a dynamic system. *Trends in Cognitive Sciences*, *7*(8), 343–348. https://doi.org/10.1016/S1364-6613(03)00156-6

Soenens, B., Deci, E. L., & Vansteenkiste, M. (2017). How parents contribute to children's psychological health: The critical role of psychological need support. In *Development of self-determination through the life-course* (pp. 171–187). Springer. https://doi.org/10.1007/978-94-024-1042-6_13

Soenens, B., & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review*, *30*(1), 74–99. https://doi.org/10.1016/j.dr.2009.11.001

Soenens, B., & Vansteenkiste, M. (2020). Taking adolescents' agency in socialization seriously: The role of appraisals and cognitive-behavioral responses in autonomy-relevant parenting. *New Directions for Child and Adolescent Development*, *2020*(173), 7–26. https://doi.org/10.1002/cad.20370

Soenens, B., Vansteenkiste, M., & Beyers, W. (2019). Parenting Adolescents. In M. H. Bornstein (Ed.), *Handbook of parenting* (pp. 111–167). Routledge.

Soenens, B., Vansteenkiste, M., Lens, W., Ryan, R. M., Luyckx, K., Goossens, L., Beyers, W., & Ryan, R. M. (2007). Conceptualizing parental autonomy support: Adolescent perceptions of promotion of independence versus promotion of volitional functioning. *Developmental Psychology*, *43*(3), 633–646. https://doi.org/10.1037/0012-1649.43.3.633

Soenens, B., Vansteenkiste, M., & Van Petegem, S. (2015). Let us not throw out the baby with the bathwater: Applying the principle of universalism without uniformity to autonomy-supportive and controlling parenting. *Child Development Perspectives*, *9*(2), 44–49. https://doi.org/10.1111/cdep.12103

Sörbom, D. (1989). Model modification. *Psychometrika*, *54*(3), 371–384. https://doi.org/10.1007/BF02294623

Stattin, H., & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, *71*(4), 1072–1085. https://doi.org/10.1111/1467-8624.00210

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences*, *9*(2), 69–74. https://doi.org/10.1016/j.tics.2004.12.005

Steinberg, L. (2014). *Age of opportunity: Lessons from the new science of adolescence*. Houghton Mifflin Harcourt.

Stice, E., Ragan, J., & Randall, P. (2004). Prospective relations between social support and depression: Differential direction of effects for parent and peer support? *Journal of Abnormal Psychology*, *113*(1), 155–159. https://doi.org/10.1037/0021-843X.113.1.155

Stouthamer-Loeber, M., Loeber, R., Wei, E., Farrington, D. P., & Wikström, P. O. H. (2002). Risk and promotive effects in the explanation of persistent serious delinquency in boys. *Journal of Consulting and Clinical Psychology*, *70*(1), 111–123. https://doi.org/10.1037/0022-006X.70.1.111

Suls, J., & Martin, R. (2005). The daily life of the garden-variety neurotic: Reactivity, stressor exposure, mood spillover, and maladaptive coping. *Journal of Personality*, *73*(6), 1485–1510. https://doi.org/10.1111/j.1467-6494.2005.00356.x

Svensson, R., Pauwels, L. J. R., Weerman, F. M., & Bruinsma, G. J. N. (2017). Explaining individual changes in moral values and moral emotions among adolescent boys and girls: A fixed-effects analysis. *European Journal of Criminology*, *14*(3), 290–308. https://doi.org/10.1177/1477370816649626

Swendeman, D., Sumstine, S., Brink, A., Mindry, D., Medich, M., & Russell, M. (2020). Smartphone self-monitoring by young adolescents and parents to assess and improve family functioning: Qualitative feasibility study. *JMIR Formative Research*, *4*(6), e15777. https://dx.doi.org/10.2196/15777

Thelen, E., & Smith, L. B. (1994). *A dynamic systems approach to the development of cognition and action*. Bradford/MITT Press.

Tillmann, T., Bertrams, A., El Matany, K., & Lionetti, F. (2021). Replication of the existence of three sensitivity groups in a sample of German adolescents. *European Journal of Developmental Psychology*, *18*(1), 131–143. https://doi.org/10.1080/17405629.2020.1763791

Timbremont, B., Braet, C., & Roelofs, J. (2008). *Children's Depression Inventory. Handleiding (herziene uitgave)*. Pearson.

Timmons, A. C., & Margolin, G. (2015). Family conflict, mood, and adolescents' daily school problems: Moderating roles of internalizing and externalizing symptoms. *Child Development*, *86*(1), 241–258. https://doi.org/10.1111/cdev.12300

Tung, I., Noroña, A. N., Morgan, J. E., Caplan, B., Lee, S. S., & Baker, B. L. (2019). Patterns of sensitivity to parenting and peer environments: Early temperament and adolescent externalizing behavior. *Journal of Research on Adolescence*, *29*(1), 225–239. https://doi.org/10.1111/jora.12382

Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology*, *128*(3), 185–199. https://doi.org/10.1037/abn0000410

Valkenburg, P., Beyens, I., Pouwels, J. L., van Driel, I. I., & Keijsers, L. (2021). Social media use and adolescents' self-esteem: Heading for a person-specific media effects paradigm. *Journal of Communication*, *71*(1), 56–78. https://doi.org/10.1093/joc/jqaa039

Van Aar, J., Leijten, P., Orobio De Castro, B., Weeland, J., Matthys, W., Chhangur, R., & Overbeek, G. (2019). Families who benefit and families who do not: Integrating person- and variable-centered analyses of parenting intervention responses. *Journal of the American Academy of Child & Adolescent Psychiatry*, *58*(10), 993-1003.e1. https://doi.org/10.1016/j.jaac.2019.02.004

Van Bommel, D. M. H., Van der Giessen, D., Van der Graaff, J., Meeus, W. H. J., & Branje, S. J. T. (2019). Mother–adolescent conflict interaction sequences: The role of maternal internalizing problems. *Journal of Research on Adolescence*, *29*(4), 1001–1018. https://doi.org/10.1111/jora.12441

Van Der Kaap-Deeder, J., Vansteenkiste, M., Soenens, B., & Mabbe, E. (2017). Children's daily well-being: The role of mothers', teachers', and siblings' autonomy support and psychological control. *Developmental Psychology*, *53*(2), 237–251. https://doi.org/10.1037/dev0000218

Van Geert, P. L. C., & Lichtwarck-Aschoff, A. (2005). A dynamic systems approach to family assessment. *European Journal of Psychological Assessment*, *21*(4), 240–248. https://doi.org/10.1027/1015-5759.21.4.240

Van Lissa, C. J., Keizer, R., Van Lier, P. A. C., Meeus, W. H. J., Branje, S. (2019). The role of fathers' versus mothers' parenting in emotion-regulation development from mid-late adolescence: Disentangling between-family differences from within-family effects. *Development Psychology*, *55*(2), 377–389. https://doi.org/10.1037/dev0000612

Van Petegem, S., Albert Sznitman, G., Darwiche, J., & Zimmermann, G. (2022). Putting parental overprotection into a family systems context: Relations of overprotective parenting with perceived coparenting and adolescent anxiety. *Family Process*, *61*(2), 792–807. https://doi.org/10.1111/famp.12709

Van Petegem, S., Soenens, B., Vansteenkiste, M., & Beyers, W. (2015). Rebels with a cause? Adolescent defiance from the perspective of reactance theory and Self-Determination Theory. *Child Development*, *86*(3), 903–918. https://doi.org/10.1111/cdev.12355

Van Roekel, E., Keijsers, L., & Chung, J. M. (2019). A review of current ambulatory assessment studies in adolescent samples and practical recommendations. *Journal of Research on Adolescence*, *29*(3), 560–577. https://doi.org/10.1111/jora.12471

Vandewalle, J., Mabbe, E., Debeuf, T., Braet, C., & Moens, E. (2017). The daily relation between parental rejection and emotional eating in youngsters: A diary study. *Frontiers in Psychology*, *8*, 691. https://doi.org/10.3389/fpsyg.2017.00691

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*(3), 263–280. https://doi.org/10.1037/a0032359

Vaughan, C. A., Foshee, V. A., & Ennett, S. T. (2010). Protective effects of maternal and peer support on depressive symptoms during adolescence. *Journal of Abnormal Child Psychology*, *38*(2), 261–272. https://doi.org/10.1007/s10802-009-9362-9

Verhulst, F. C., van der Ende, J., & Koot, H. M. (1996). *Handleiding voor de CBCL/4-18 [Manual for the CBCL/4–18]*. Erasmus University and Department of Child and Adolescent Psychiatry.

Villalobos Solís, M., Smetana, J. G., & Comer, J. (2015). Associations among solicitation, relationship quality, and adolescents' disclosure and secrecy with mothers and best friends. *Journal of Adolescence*, *43*(1), 193–205. https://doi.org/10.1016/j.adolescence.2015.05.016

Visscher, A. H., Boele, S., & Denissen, J. J. A. (2023). Unraveling the bidirectional associations between parental knowledge and children's externalizing behavior. *Journal of Youth and Adolescence*, *52*(4), 794–809. https://doi.org/10.1007/s10964-023-01743-4

Voelkle, M. C., Gische, C., Driver, C. C., & Lindenberger, U. (2018). The role of time in the quest for understanding psychological mechanisms. *Multivariate Behavioral Research*, *53*(6), 782–805. https://doi.org/10.1080/00273171.2018.1496813

Voelkle, M. C., Oud, J. H. L., Oertzen, T. V., & Voelkle, M. C. (2012). Maximum likelihood dynamic factor modeling for arbitrary N and T using SEM. *Structural Equation Modeling*, *19*(3), 329–350. https://doi.org/10.1080/10705511.2012.687656

Vrolijk, P., Van Lissa, C. J., Branje, S. J. T., Meeus, W. H. J., & Keizer, R. (2020). Longitudinal linkages between father and mother autonomy support and adolescent problem behaviors: Between-family differences and within-family effects. *Journal of Youth and Adolescence*, *49*, 2372–2387. https://doi.org/10.1007/s10964-020-01309-8

Wang, L., Zhang, Q., Maxwell, S. E., Bergeman, C. S., Wang, L., Zhang, Q., Maxwell, S. E., & On, C. S. B. (2019). On standardizing within-person effects: Potential problems of global standardization. *Multivariate Behavioral Research*, *54*(3), 382–403. https://doi.org/10.1080/00273171.2018.1532280

Weeland, J., Helmerhorst, K. O. W., & Lucassen, N. (2021). Understanding differential effectiveness of behavioral parent training from a family systems perspective: Families are greater than "some of their parts." *Journal of Family Theory and Review*, *13*(1), 34–57. https://doi.org/10.1111/jftr.12408

Weeland, J., Leijten, P., Orobio De Castro, B., Menting, A., Overbeek, G., Raaijmakers, M., Jongerling, J., & Matthys, W. (2023). Exploring parenting profiles to understand who benefits from the Incredible Years Parenting Program. *Prevention Science*, *24*(2), 259–270. https://doi.org/10.1007/s11121-022-01364-6

Weyn, S., Van Leeuwen, K., Pluess, M., Lionetti, F., Goossens, L., Bosmans, G., Van Den Noortgate, W., Debeer, D., Bröhl, A. S., & Bijttebier, P. (2022). Improving the measurement of environmental sensitivity in children and adolescents: The Highly Sensitive Child Scale–21 item version. *Assessment*, *29*(4), 607–629. https://doi.org/10.1177/1073191120983894

Weyn, S., Van Leeuwen, K., Pluess, M., Lionetti, F., Greven, C. U., Goossens, L., Colpin, H., Van Den Noortgate, W., Verschueren, K., Bastin, M., Van Hoof, E., De Fruyt, F., & Bijttebier, P. (2021). Psychometric properties of the Highly Sensitive Child scale across developmental stage, gender, and country. *Current Psychology*, *40*(7), 3309–3325. https://doi.org/10.1007/s12144-019-00254-5

Wijsbroek, S. A. M., & Hale, W. W. (2005). Psychometrische eigenschappen van de Screen for Child Anxiety Related Emotional Disorders (SCARED) in een Nederlandse adolescentenpopulatie. *Nederlands Tijdschrift Psychologie*, *60*, 119–128. https://doi.org/10.1007/BF03062350

Willoughby, T., & Hamza, C. A. (2011). A longitudinal examination of the bidirectional associations among perceived parenting behaviors, adolescent disclosure and problem behavior across the high school years. *Journal of Youth and Adolescence*, *40*(4), 463–478. https://doi.org/10.1007/s10964-010-9567-9

Wrzus, C., & Neubauer, A. B. (2023). Ecological Momentary Assessment: A meta-analysis on designs, samples, and compliance across research fields. *Assessment*, *30*(3), 825–846. https://doi.org/10.1177/10731911211067538

Xu, J., & Zheng, Y. (2023). Parent- and child-driven daily family stress processes between daily stress, parental warmth, and adolescent adjustment. *Journal of Youth and Adolescence*, *52*, 490–505. https://doi.org/10.1007/s10964-022-01691-5

Yap, M. B. H., Cardamone-Breen, M. C., Rapee, R. M., Lawrence, K. A., MacKinnon, A. J., Mahtani, S., & Jorm, A. F. (2019). Medium-term effects of a tailored web-based parenting intervention to reduce adolescent risk of depression and anxiety: 12-month findings from a randomized controlled trial. *Journal of Medical Internet Research*, *21*(8). https://doi.org/10.2196/13628

Yap, M. B. H., Cheong, T. W. K., Zaravinos-tsakos, F., Lubman, D. I., & Jorm, A. F. (2017). Modifiable parenting factors associated with adolescent alcohol misuse: A systematic review and meta-analysis of longitudinal studies. *Addiction*, *112*(7), 1142–1162. https://doi.org/10.1111/add.13785

Yap, M. B. H., Pilkington, P. D., Ryan, S. M., & Jorm, A. F. (2014). Parental factors associated with depression and anxiety in young people: A systematic review and meta-analysis. *Journal of Affective Disorders*, *156*, 8–23. https://doi.org/10.1016/j.jad.2013.11.007

Young, J. F., Berenson, K., Cohen, P., & Garcia, J. (2005). The role of parent and peer support in predicting adolescent depression: A longitudinal community study. *Journal of Research on Adolescence*, *15*(4), 407–423. https://doi.org/10.1111/j.1532-7795.2005.00105.x

Zhang, S., Baams, L., van de Bongardt, D., & Dubas, J. S. (2018). Intra- and inter-individual differences in adolescent depressive mood: The role of relationships with parents and friends. *Journal of Abnormal Child Psychology*, *46*(4), 811–824. https://doi.org/10.1007/s10802-017-0321-6

Zuckerman, M. (1999). *Vulnerability to psychopathology: A biosocial model*. American Psychological Association.

## SAMENVATTING / SUMMARY IN DUTCH

Elke persoon is uniek, *one of a kind,* en wordt gevormd door talloze ervaringen. Een van de belangrijkste ervaringen die ons vormen, vinden plaats in de relatie met onze ouders (of andere opvoeders; Bronfenbrenner, 2005; Sameroff, 2010). Deze invloeden in de ouder-kind relatie zijn complex. Hoe ouders zich gedragen heeft invloed op het dagelijkse functioneren als zowel de lang termijn ontwikkeling van hun kinderen. Daarnaast hebben kinderen ook invloed op hun ouders (Bronfenbrenner, 2005; Granic et al., 2008) en de manier waarop ze elkaar beïnvloeden varieert waarschijnlijk van gezin tot gezin (Belsky & Pluess, 2009; Darling & Steinberg, 1993). Mogelijk functioneert zelfs elk gezin op een unieke manier (Bronfenbrenner, 2005; Granic et al., 2008).

Wetenschappelijk onderzoek naar opvoeding tijdens de adolescentie, de periode tussen 10 en 25 jaar (Smetana & Rote, 2019; Steinberg, 2014), richt zich vaak op hoe ouders bijdragen aan de mentale problemen van hun kind (Pinquart, 2017a). De adolescentie blijkt namelijk een kwetsbare periode te zijn voor het ontwikkelen van bijvoorbeeld depressie en angst (Shorey et al., 2022). Maar *hoe* ouders het welzijn van *hun eigen kinderen* het beste kunnen ondersteunen tijdens de adolescentie, blijft tot op heden een moeilijke vraag, omdat de huidige wetenschappelijke kennis nog weinig valide inzichten biedt.



De grote meerderheid van empirische studies naar het opvoeden van adolescenten is namelijk gericht op het identificeren van algemene opvoedprincipes of -patronen (zie **Hoofdstuk 2**; Boele et al., 2020). Als vakgebied is er hierdoor veel begrip ontwikkeld over patronen op basis van groepsgemiddeldes. Zo laten veel studies bijvoorbeeld zien dat adolescenten die relatief hoge niveaus van ouderlijke steun ervaren, minder mentale problemen vertonen dan adolescenten die minder ouderlijke steun ervaren (Pinquart, 2017a, 2017b). Maar vertellen deze patronen op groepsniveau wel iets over hoe het eraan toe gaat binnen echte gezinnen, die mogelijk afwijken van het ‘gemiddelde gezin’?

Methodologisch werk heeft hierover veelvuldig twijfels opgeroepen (Fisher et al., 2018; Hamaker, 2012; Molenaar, 2004). Patronen op basis van groepsgemiddeldes (zoals correlaties of longitudinale associaties op groepsniveau) geven weinig tot geen informatie over hoe ouders en adolescenten *binnen hetzelfde gezin* elkaar beïnvloeden. Bijvoorbeeld: voelt een adolescent zich slechter als hun eigen ouder minder steunend is dan normaal? En als een adolescent zich slechter voelt, gaan ouders als reactie dan juist meer steun geven? Daarnaast is door het veelvuldig gebruik van groepsgemiddeldes weinig kennis tot stand gekomen over hoe (en waarom) invloeden tussen ouders en

adolescenten verschillen van gezin tot gezin. Hierdoor weten we bijvoorbeeld nog nauwelijks in hoeverre adolescenten hetzelfde reageren op schommelingen in ouderlijke steun. Juist deze inzichten – hoe ouders en adolescenten binnen hetzelfde gezin elkaar beïnvloeden en hoe deze invloeden verschillen tussen gezinnen – zijn essentieel om wetenschappelijke kennis om te zetten naar de praktijk.

Om meer valide inzichten te genereren over de complexiteiten van opvoeden was het overkoepelende doel van deze dissertatie om opvoedingsprocessen tijdens de adolescentie *binnen (individuele) gezinnen* te onderzoeken. Hiervoor waren drie doelstellingen geformuleerd: (1) om te onderzoeken hoe belangrijke opvoedingsdimensies (gemiddeld gezien) verband houden met het functioneren van adolescenten *binnen gezinnen*, (2) om dergelijke verbanden te onderzoeken op verschillende tijdschalen, en om (3a) de verschillen tussen gezinnen in deze verbanden te kwantificeren en (3b) te verklaren. Deze doelstellingen werden bereikt door het uitvoeren van een systematische literatuurstudie (**Hoofdstuk 2**) en vier empirische studies (**Hoofdstukken 3-6**).

## Doelstelling 1: Onderzoeken hoe belangrijke opvoedingsdimensies (gemiddeld gezien) verband houden met het functioneren van adolescenten binnen gezinnen

Ondanks dat opvoedingsprocessen *binnen gezinnen* plaatsvinden – tussen een ouder en hun eigen kind - (zie o.a. dynamische systeemtheorie; Granic et al., 2008; Smith & Thelen, 2003, en het integratieve opvoedingsmodel; Darling & Steinberg, 1993), toonde mijn systematische review (**Hoofdstuk 2**) dat er relatief weinig onderzoek is op dat niveau (zogenaamde binnen-gezinsniveau). Tot 2018 waren slechts 46 studies gepubliceerd die onderzochten hoe opvoeding en het functioneren van adolescenten samenhing binnen gezinnen. Dit staat in sterk contrast met de duizenden gepubliceerde studies op groepsniveau (Pinquart, 2017a, 2017b). Daarnaast onderzochten de 46 studies voornamelijk de opvoedingsdimensies steun en gedragscontrole. Autonomie-ondersteuning en psychologische controle was nog nauwelijks onderzocht. Bovendien waren de meeste studies gericht op gelijktijdige verbanden en niet op longitudinale verbanden. Dus aan het begin van dit promotieonderzoek was er beperkte kennis over hoe opvoeding en het functioneren van adolescenten elkaar over en weer beïnvloeden binnen gezinnen.

Om dit hiaat in kennis aan te pakken, richtte deze dissertatie zich op de longitudinale verbanden tussen opvoedingsdimensies en het functioneren van adolescenten. Mijn

resultaten (**Hoofdstukken 3-5)** laten echter geen overtuigend bewijs zien dat invloeden tussen opvoeding en het functioneren van adolescenten binnen gezinnen inherent wederzijds zijn (Soenens & Vansteenkiste, 2020). Of opvoeding en het functioneren van de adolescent elkaar wederkerig beïnvloedde over de tijd heen, verschilde per opvoedingsdimensie en per uitkomstmaat. Ter illustratie, psychologisch controlerend gedrag van ouders verlaagde (gemiddeld gezien) het zelfvertrouwen van adolescenten, en omgekeerd, terwijl het ook een toename van depressieve symptomen bij adolescenten voorspelde, maar niet vice versa. Deze bevindingen benadrukken de complexiteit in de wisselwerking tussen opvoeding en het functioneren van adolescenten.

### Doelstelling 2: De verbanden tussen opvoedingsdimensies en het functioneren van adolescenten binnen families onderzoeken op verschillende tijdschalen

Verschillende theorieën stellen dat invloeden tussen ouders en kinderen plaatsvinden op verschillende tijdschalen (Bronfenbrenner, 2005; Granic et al., 2008; Lougheed & Keskin, 2021). Desondanks liet mijn systematische review (**Hoofdstuk 2**) zien dat de meeste studies naar opvoedingsprocessen binnen gezinnen tijdens de adolescentie waren gedaan op een macrotijdsschaal (halfjaarlijks of langer). Onderzoek leek dus micro- (bijv. van uur tot uur en dagelijks) en mesotijdschalen (bijv. wekelijks en maandelijks) grotendeels over het hoofd te hebben gezien. Om de empirische kennis te vergroten, heb ik een nieuwe methodologische aanpak geïntroduceerd: een meso-longitudinaal design met tweewekelijkse metingen. Daarnaast heb ik nog andere tijdschalen onderzocht, in totaal vijf verschillende: dagelijks (**Hoofdstukken 3, 5 en 6**), tweewekelijks (**Hoofdstukken 3 en 4**), driemaandelijks (**Hoofdstuk 3**), jaarlijks (**Hoofdstuk 3**) en tweejaarlijks (**Hoofdstuk 3**).

De resultaten van deze dissertatie laten nieuwe empirische bewijzen zien dat opvoedingsprocessen binnen gezinnen tijdens de adolescentie plaatsvinden op verschillende tijdschalen, met name op micro- en mesotijdschalen. Interessant was dat ouderlijke warmte en autonomie-ondersteuning met name sterk samenhing met een beter dagelijkse functioneren (**Hoofdstukken 5 en 6**). De aard van de dagelijkse invloeden tussen opvoeding en het functioneren van adolescenten verschilde in sommige opzichten van de tweewekelijkse invloeden. Psychologisch controlerend gedrag van ouders had bijvoorbeeld na twee weken (**Hoofdstuk 4**) een groter negatief effect op het functioneren van adolescenten dan na één dag (**Hoofdstuk 5**). Van jaar tot jaar werden er weinig effecten gevonden (**Hoofdstuk 3**), wat aangeeft dat een macrotijdschaal mogelijk te lang is om opvoedingsprocessen binnen gezinnen vast te leggen.

Deze dissertatie laat dus de noodzaak zien naar studies op micro- en mesotijdschalen. Bovendien geven mijn bevindingen aan dat toekomstig onderzoek voorzichtig moet zijn met het generaliseren van effecten over verschillende tijdschalen, omdat resultaten kunnen variëren op verschillende tijdschalen. De nieuwe bevindingen geven ook aanleiding om theorieën te verfijnen. Specifiek zijn er verfijnde theoretische ideeën nodig die expliciete hypothesen formuleren over de tijdschalen waarop opvoedingsprocessen plaatsvinden. Dit is een belangrijke richting voor vervolgonderzoek.

### Doelstelling 3: De heterogeniteit tussen gezinnen in hun verbanden tussen opvoedingsdimensies en het functioneren van adolescenten kwantificeren en verklaren

Veel theorieën stellen dat invloeden tussen ouders en kinderen variëren van gezin tot gezin. Sommige stellen dat invloeden verschillen tussen subgroepen (Belsky & Pluess, 2009; Darling & Steinberg, 1993; Soenens et al., 2015) en anderen stellen dat ze uniek zijn voor elk gezin (Bronfenbrenner, 2005; Sameroff, 2010; Van Geert & Lichtwarck-Aschoff, 2005). Ondanks deze theoretische consensus ontbreekt er empirische kennis over hoe en waarom gezinnen verschillen in hun opvoedingsprocessen tijdens de adolescentie. Mijn systematische review (**Hoofdstuk 2**) toonde namelijk aan dat minder dan de helft van de bestaande studies zulke heterogeniteit had onderzocht. Daarom heb ik in deze dissertatie onderzocht (doel 3a) in welke mate invloeden tussen opvoeding en het functioneren van adolescenten binnen gezinnen varieert tussen gezinnen en (doel 3b) welke kenmerken van adolescenten dit kunnen verklaren.

De eerste empirische studie (**Hoofstuk 3**) leverde weinig bewijs dat subgroepen van adolescenten gemiddeld verschilden in de manier waarop ouderlijke steun hun depressieve symptomen beïnvloedde, en omgekeerd. Deze bevinding suggereert dat zulke opvoedingsprocessen mogelijk hetzelfde zijn voor gezinnen. Een andere mogelijkheid is echter dat er zelfs binnen subgroepen grote variatie bestaat. Om dit bloot te leggen is een meer gedetailleerde benadering nodig, namelijk een idiografische benadering.

Een idiografische benadering is de (intensieve) studie van het individu (Molenaar, 2004, 2009). Met een idiografische benadering wordt elk individueel gezin als een aparte eenheid in de analyse beschouwd. Idiografische analyses vereisen een grote hoeveelheid data per individueel gezin. Om dit toe te kunnen passen hebben ik en mijn collega's een nieuwe aanpak geïntroduceerd. Deelnemende gezinnen ($N$ = 259) vulden elke twee weken gedurende één jaar herhaaldelijk vragenlijsten in, wat resulteerde in

26 tweewekelijkse metingen per gezin. Daarnaast vulden andere gezinnen (*N* = 159) gedurende 100 dagen dagelijks vragenlijsten in.

Uit mijn bevindingen, gebaseerd op deze intensieve longitudinale data op individueel gezinsniveau (**Hoofdstukken 4-6**), bleek dat de invloeden tussen ouders en adolescenten mogelijk uniek zijn voor elk gezin. Het verschilde per adolescent op wat voor soort opvoedgedrag (zoals steun, autonomie ondersteuning, psychologische controle en gedragscontrole) zij reageerden. Bij sommige adolescenten bleek het humeur bijvoorbeeld sterker beïnvloed te worden door ouderlijke steun dan bij anderen. Daarnaast waren er verschillen tussen adolescenten *hoe* zij reageerden op hun ouders. Terwijl sommige zich beter voelden wanneer ouders meer steunend waren, leken sommige zich juist slechter te voelen. Ook tussen ouders waren er verschillen in hoe zij reageerden op schommelingen in het functioneren van hun kind. Sommige adolescenten ervoeren bijvoorbeeld dat hun ouders meer steun boden wanneer zij zich slechter voelden, terwijl anderen juist vonden dat de steun van hun ouders onveranderd bleef. Al met al lijkt dus elk gezin zijn unieke recept te hebben.

Om beter te begrijpen waarom gezinnen van elkaar verschillen in hun opvoedingsprocessen heb ik gekeken naar verschillende kenmerken van de adolescenten (**Hoofdstukken 4-6**). Over het algemeen leken demografische kenmerken de verschillen niet te verklaren. Ik vond geen structurele verschillen tussen jongens en meisjes, tussen adolescenten van verschillende leeftijden en tussen adolescenten die verschillende onderwijsniveaus volgde. Wel vond ik dat adolescenten die hoger scoorden op de persoonlijkheidstrekken omgevingsgevoeligheid en neuroticisme sterker werden beïnvloed door opvoeding in het dagelijks leven (**Hoofdstuk 5**). Dus persoonlijkheid lijkt een veelbelovend stabiel kenmerk om te verklaren waarom adolescenten verschillend reageren op opvoeding.

Deze bevindingen hebben grote implicaties voor toekomstig empirisch onderzoek. Als opvoedingsprocessen verschillend zijn tussen gezinnen, en zelfs mogelijk uniek voor elk gezin, bestaat er geen ‘gemiddeld gezin’. Daarom zouden gemiddelde steekproefeffecten (zie bijvoorbeeld Kapetanovic et al., 2019; Vrolijk et al., 2020), mogelijk slechts van toepassing zijn op enkele gezinnen of zelfs op geen één gezin. Om zulke invalide conclusies te vermijden (Fisher et al., 2018; Moeller, 2022; Molenaar, 2004), moedig ik wetenschappers sterk aan om weg te bewegen van het veelvuldige gebruik van groepsgemiddelden (nomothetische benadering) en in plaats daarvan een idiografische benadering te omarmen, waarin het individuele gezin centraal staat. Het empirisch onderzoeken van individuele gezinnen is immers ook de sleutel tot het begrijpen van de variatie en overeenkomsten tussen gezinnen.

## Implicaties

De bevindingen van deze dissertatie benadrukken de unieke aard van het opvoeden van adolescenten en de impact daarvan op het onderzoek. Het suggereert dat er niet zoiets bestaat als het 'gemiddeld gezin' en dat daardoor 'one-size-fits-all' opvoedadviezen en interventies hoogstwaarschijnlijk niet effectief zijn voor elk gezin. In plaats daarvan pleit deze dissertatie voor onderzoek naar het begrijpen van opvoedingsprocessen op individueel gezinsniveau (idiografische benadering), zodat advies, preventies en interventies in de toekomst mogelijk beter op maat gemaakt kunnen worden.

## Conclusie

Deze dissertatie onderzocht hoe belangrijke dimensies van opvoeding (warmte, autonomie ondersteuning, psychologische controle en gedragscontrole) van invloed zijn op het functioneren van adolescenten (negatief humeur, depressieve en angstige symptomen, positief humeur en zelfvertrouwen) en vice versa. Specifiek is onderzocht hoe dergelijke opvoedingsprocessen zich ontvouwen *binnen gezinnen* – tussen een ouder en hun eigen kind – over verschillende tijdschalen heen en hoe ze verschillen tussen gezinnen. De studies leveren bewijs dat deze invloeden zich voordoen op verschillende tijdschalen, waaronder dagelijks en tweewekelijks. Wanneer individuele gezinnen onder de loep werden genomen (in plaats van 'het gemiddelde gezin'), door ze meer dan 25 tot 100 keer herhaaldelijk te gemeten, werd ook bewijs gevonden voor heterogeniteit tussen deze gezinnen. De aard van de invloeden tussen opvoeding en het functioneren van adolescenten bleek namelijk aanzienlijk te variëren tussen gezinnen. Adolescenten met hogere omgevingssensitiviteit en neuroticisme leken met name sterker te reageren op opvoeding. Kortom, de bevindingen van deze dissertatie leveren bewijs voor de breed geaccepteerde theorieën en overtuigingen dat invloeden tussen ouders en hun kinderen uniek zijn in elk gezin. Er is echter nog meer onderzoek nodig om deze complexe invloeden volledig te begrijpen en te kunnen verlaten naar de praktijk. Met onderzoeksopzetten en bevindingen die openlijk gedeeld zijn met de internationale wetenschappelijke gemeenschap, biedt deze dissertatie een stevig fundament waarop toekomstig onderzoek kan voortbouwen. Al met al is het de hoogste tijd dat wetenschappelijk onderzoek het individuele gezin centraal stelt, want ieder gezin doet ertoe en verdient om ondersteuning te krijgen die aansluit bij hun unieke behoeften.

## CURRICULUM VITEA

Savannah Boele, born on September 3, 1993, in Bergeijk, the Netherlands (NL), earned her propaedeutic in Applied Psychology from Fontys University of Applied Sciences in 2011. She received her Bachelor's in Psychology from Tilburg University in 2014, followed by a two-year research master in Development and Socialisation in Childhood and Adolescence at Utrecht University (2015-2017). In September 2017, she started as a PhD student at the department of Developmental Psychology at Tilburg University (TiU), supervised by prof. dr. Loes Keijsers and prof. dr. Jaap Denissen. In 2020, the research project moved to the team Youth and Family at Erasmus University Rotterdam (EUR), where also dr. Amaranta de Haan joined as a co-supervisor. Savannah is currently working as a postdoctoral researcher in the PARADOx project at EUR, to unravel why parental (over)involvement might backfire and cause internalizing problems in adolescence.



### Publications of this dissertation

**Boele., S**., Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., De Moor, M. H. M., & Keijsers, L. (in press). Like no other? A family-specific network approach to parenting adolescents. *Journal of Youth and Adolescence*. https://osf.io/preprints/psyarxiv/a6gn3/

**Boele., S**., Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). The direction of effects between parenting and adolescent affective well-being is family specific. *Scientific Reports, 13,* 16106. https://doi.org/10.1038/s41598-023-43294-5

**Boele, S.**, Bülow, A., De Haan, A., Denissen, J. J. A., & Keijsers, L. (2023). Better, for worse, or both? Testing environmental sensitivity models with parenting at the level of individual families. *Development and Psychopathology.* Advance online publication. https://doi.org/10.1017/S0954579422001493

**Boele, S.,** Nelemans, S. A., Denissen, J. J. A., Prinzie, P., Bülow, A., & Keijsers, L. (2023). Testing transactional processes between parental support and adolescent depressive symptoms: From a daily to a biennial timescale. *Development and Psychopathology*, *35*, 1656-1670. https://doi.org/10.1017/S0954579422000360

**Boele, S.,** Denissen, J. J. A., Moopen, N., & Keijsers, L. (2020). Over-time fluctuations in parenting and adolescent adaptation within families: A systematic review. *Adolescent Research Review*, *5*, 317–339. https://doi.org/10.1007/s40894-019-00127-9

## Other publications and papers

### Published

Luik, M. P. C. M., Bülow, A., **Boele, S**., De Haan, A., Van der Kaap-Deeder, J., & Keijsers, L. (2023). Overparenting in adolescents' everyday life: Development and validation of the momentary overparenting scale. *Journal of Social and Personal Relationships.* Advance online publication. https://doi.org/10.1177/02654075231192382

Buist, K. L., **Boele, S.,** Bülow, A., Reitz, E., Verhoeven, M., Keijsers, L. (2023). Quaranteens: Pre-pandemic relationship quality and changes in adolescent internalizing problems during the COVID-19 pandemic. *Journal of Research on Adolescence*. Advance online publication. https://doi.org/10.1111/jora.12867

*Visscher, A. H., **Boele, S**., & Denissen, J. J. A. (2023). Unraveling the bidirectional associations between parental knowledge and children's externalizing behavior. *Journal of Youth and Adolescence*, *52*, 794-809. https://doi.org/10.1007/s10964-023-01743-4

De Vries, L. P., Bülow, A., Pelt, D. H. M., **Boele, S.,** Bartels, M., Keijsers, L. (2023). Daily affect intensity and variability of adolescents and their parents before and during the second COVID-19 lockdown in the Netherlands. *Journal of Adolescence*, *95*, 336-353. https://doi.org/10.1002/jad.12117

Bülow, A., Neubauer, A. B., Soenens, B., **Boele, S.,** Denissen, J. J. A., & Keijsers, L. (2022). Universal ingredients to parenting teens: Parental warmth and autonomysupport promote adolescent well-being in most families. *Scientific Reports*, *12*, 16836. https://doi.org/10.1038/s41598-022-21071-0

Bülow, A., Van Roekel, E., **Boele, S.,** Denissen, J. J. A, & Keijsers, L. (2022). Parent-adolescent interaction quality and adolescent affect — An experience sampling study on effect heterogeneity. *Child Development*, *93*, e315– e331. https://doi.org/10.1111/cdev.13733

Keijsers, L., **Boele, S.**, & Bülow, A. (2022). Measuring parent–adolescent interactions in natural habitats. The potential, status, and challenges of ecological momentary assessment. *Current Opinion in Psychology, 44*, 264-269.https://doi.org/10.1016/j.copsyc.2021.10.002

Bülow, A., Keijsers, L., **Boele, S.,** Van Roekel, E., & Denissen, J. J. A. (2021). Parenting adolescents in times of a pandemic: Changes in relationship quality, autonomy support, and parental control? *Developmental Psychology*, *57*, 1582-1596. https://doi.org/10.1037/dev0001208

*Kapetanovic**,** S., **Boele, S.,** & Skoog, T. (2019). Parent-adolescent communication and adolescent delinquency: Unraveling within-family processes from between-family differences. *Journal of Youth and Adolescence*, *48*, 1707-1723. https://doi.org/10.1007/s10964-019-01043-w

***Boele, S.,** Van der Graaff, J., De Wied, M., Van der Valk, I. E., Crocetti, E., & Branje, S. (2019). Linking parent–child and peer relationship quality to empathy in adolescence: A multilevel meta-analysis. *Journal of Youth and Adolescence, 48*, 1033-1055. https://doi.org/10.1007/s10964-019-00993-5

***Boele, S.,** Sijtsema, J. J., Klimstra, T. A., Denissen, J. J. A., & Meeus, W. H. J. (2017). Person- group dissimilarity in personality and peer victimization. *European Journal of Personality, 31,* 220-233*.* https://doi.org/10.1002/per.2105

** = independent from first promotor Prof. dr. L. Keijsers*

**In preparation and under review**

Arslan, I. B., **Boele, S.**, Dietvorst, E., Lucassen, N., & Keijsers, L. (in revision). Within-family associations of parent-adolescent relationship quality and adolescent affective well-being.

Bülow, A., **Boele, S.**, Lougheed, J. P., Denissen, J. J. A., Van Roekel, E., & Keijsers, L. (submitted). A matter of timing? Effects of parent-adolescent conflict on adolescent ill-being on six timescales. https://osf.io/preprints/psyarxiv/k2d5s

De Haan, A., Bülow, A., **Boele, S**., Lucassen, N., Belsky, J., & Keijsers, L. (in prep.). Why parents parent the way they do in daily life: A dynamic process model.

Keijsers, L., **Boele, S**., Bülow, A., & Vreeker, A. (in prep.). Parent-adolescent communication as a dynamic process.

Šutić, L., Yıldı, E., Yavuz Şala, F. C., Duzen, A., Keijsers, L., & **Boele, S.** (submitted). Parenting and adolescent anxiety within families: A biweekly longitudinal study. https://osf.io/preprints/psyarxiv/anfp2

Wang, Y., **Boele., S.**, Bülow, A., Keijsers, L., Hawk, S. T. (in prep.). Helicopter parenting and adolescents' affective well-being: Testing the mediating role of need satisfaction and frustration at the within-family level.

Wang, Y., **Boele, S**., Keijsers, L., & Hawk, S. T. (in prep.). Control or concern? Associations between perceived helicopter parenting and mother-adolescent relationship quality..

## Conference presentations

### Oral presentations

**Boele., S.***,* Bülow, A.*, Beltz, A. M., De Haan, A., Denissen, J. J. A., De Moor, M. H. M., &* Keijsers, L. (2023). *Family-specific temporal networks of daily adolescent affect and perceived parenting*. Emotions, Tilburg, NL.

**Boele, S.,** Bülow, A., De Haan, A., Denissen, J. J. A., Keijsers, L. (2023). *For better, for worse, or both? Testing environmental sensitivity models with parenting at the level of individual families*. European Conference on Developmental Psychology (ECDP), Turku, Finland.

**Boele, S.,** Bülow, A., Beltz, A. M., De Haan, A., Denissen, J. J. A., Keijsers, L. (2023). *Direction and nature of day-to-day parenting processes in adolescence is heterogeneous*. Society for Ambulatory Assessment (SAA), Amsterdam, NL.

**Boele, S.,** Bülow, A., De Haan, A., Denissen, J. J. A., Keijsers, L. (2022). *For better, for worse, for both, or neither? Testing patterns of person-specific parenting effects in adolescents.* Biennial Meeting of the International Society for the Study of Behavioural Development (ISSBD), Rhodos, Greece.

**Boele, S.,** Bülow, A., De Haan, A., Denissen, J. J. A., Keijsers, L. (2022). *Effects of (un) supportive parenting on adolescent emotional well-being: For better, for worse, for both or neither?* Vereniging van Ontwikkelingspsychologie (VNOP), Utrecht, NL.

**Boele, S.**, Moopen, N., & Keijsers, L. (2018). *Examining parenting or the parent-child interaction with the Experience Sampling Method in Adolescence*. VNOP-CAS Research Days, Utrecht, NL.

**Boele, S.**, Van der Graaff, J., De Wied, M., Van der Valk, I. E., Crocetti, E., & Branje, S.. (2017). *A meta-analytic review of the association between relationship quality and empathy: parents versus peers*. ECDP, Utrecht, NL.

### Chaired symposia

**Boele, S.**, Nelemans, S. A., Denissen, J. J. A., Prinzie, P., Bülow, A., & Keijsers, L. (2021). *Transactional processes between parental support and adolescent depressive symptoms: From daily to annual processes.* In **S. Boele** & A. Bülow (Chairs), Studying the dynamics of parenting adolescents on a momentary timescale. Society for Research in Child Development (SRCD), virtual.

**Boele, S.**, Moopen, N., & Keijsers, L. (2019). *Examining the quality of parent-child interactions and parenting with the Experience Sampling Method*. In **S. Boele** and S. van Halem (Chairs), Exploring new grounds with the Experience Sampling Method. ECPD, Athens, Greece.

**Boele, S.,** Moopen, N., Denissen, J. J. A., & Keijsers, L. (2018). *Dynamics between parenting and adolescent adaptation: A systematic review of processes within individual families*. In **S. Boele** (Chair), Dynamics between parents and adolescents within individual families. European Association for Research on Adolescence (EARA), Ghent, Belgium.

**Boele, S.**, Moopen, N., Denissen, J. J. A., & Keijsers, L. (2018). *Dynamics between parenting and adolescent adaptation: A systematic review of processes within parent-adolescent dyads.* In **S. Boele** (Chair), Parenting dynamics within individual parent-child dyads. VNOP, Wageningen, NL.

**Invited talks**

**Boele, S.,** & Bülow, A. (2020). *Using Experience Sampling Method (ESM) for studying parenting: A practical workshop*. International Society for Developmental Psychobiology (ISDP), virtual.

**Poster presentations**

Bülow, A., **Boele, S.,** & Keijsers, L. (2019). *Measuring parenting with ESM*. The Belgium-Dutch ESM network meeting, Tilburg, NL.

**Boele, S**., Sijtsema, J. J., Klimstra, T. A., Denissen, J. J. A., & Meeus, W. H. J. (2017). *Person-group dissimilarity in personality and peer victimization*. ECDP, Utrecht, NL.

**Boele, S**., Henrichs, J., De Cock, E., Maas, A., Vreeswijk, C., & Van Bakel, H. (2015). *Partner support and children's self-regulatory functioning in toddlerhood: A mediating effect of parenting stress*. Emotions, Tilburg, NL.

## Provided workshops for academics

- Graduate school course of EUR: *Experience Sampling: Opening the black box of daily life* (May 2022). Together with Anne Bülow.
- Mini-workshop at HR-research day (November 2019, Tilburg, NL): *Setting up your first ESM study.* Together with Daphne van der Kruijssen.
- Mini-workshop at the international conference Emotions (October 2019, Tilburg, NL): *Setting up your first ESM study*. Together with Daphne van der Kruijssen.
- Pre-conference workshop at ECDP (August 2019, Athens, Greece): *Experience Sampling Methods in Developmental Psychology: Promises and Pitfalls*. Together with Dr. Loes Keijsers.

## Awards and Grants

- 2022 EUR Open and Responsible Science Award (€2500 ≈ $2.774). Awarded to the research project ADAPT.
- NPO research funding (April 2023): Travel grant of €1460 (≈ $1.620)
- Youth Innovation Network funding of €2000 (≈ $2240). Awarded to the research project ADAPT in May 2019.

## Reviewing activities

- Abstract reviewer for the annual meeting of the Society for Research on Adolescence (SRA) 2024.
- Jury member of the EUR Open Science Awards 2023.
- Manuscripts: *Child Development (1x), Current Psychology (3x), Developmental Psychology (1x), Journal of Child Psychology and Psychiatry (1x), Journal of Early Adolescence (1x), Journal of Happiness Studies (1x), Journal of Research in Crime and Delinquency (1x), International Journal of Adolescence and Youth (1x), Learning Environments Research (1x), and Scandinavian Journal of Psychology (1x).*

## Open science practices

- 3x preregistered data collections and 16x preregistered papers (4 first-author papers).
- 7x open code and output, and 3x open datasets.

## Leadership in international workgroups

- Chair of overparenting expert network (20 members, 7 countries)
- Co-chair (with Anne Bülow) of ESM parenting network (64 members, 8 countries)

## Outreach / Invited talks for professionals

**Boele, S.** (2022). *Sommige kinderen zijn gevoeliger voor het gedrag van ouders dan anderen* [Some children are more sensitive for the behavior of their parents]. At the conference Hoogsensitiviteit: Wetenschap en praktijk, Veenendaal, NL.

Keijsers, L. & **Boele, S.** (2018). *Help een puber in huis*. Quest Historie - Trimbos Special, p. 4-7.

## Courses & Training

### Graduate school

- Professionalism and Integrity in Research (1.5 ETCS; 2022, EUR)
- Searching and managing your literature (1 ECTS; 2022, EUR)
- Maximise your visibility as a researcher (1 ECTS; 2022, EUR)
- Communicating your research: Lessons from Bitescience (1.5 ECTS; 2022, EUR)
- Research Project Management 101 (1 ECTS; 2018, TiU)
- Academic Writing for PhD students (2 ECTS; 2018, TiU)

### External

- Two-day course Group Iterative Multiple Model Estimation (GIMME). Given by Dr. Kathleen Gates from University of North Carolina (1.5 ECTS; 2022; online).
- Winter school modeling the dynamics of intensive longitudinal data. Organized by Tilburg Experience Sampling Centre (2 ECTS; 2020; Tilburg, NL)
- Summer school about adolescent psychology. Organized by EARA-ECDP-SRA (2 ECTS; 2018; Gent, Belgium).
- Five-day course about advanced methods for reproducible science. Organized by University of Bristol (2 ECTS; 2018; Windsor, UK).



### Supervision of internship and thesis

- Supervision graduate students: Y. Wang from University of Hong Kong and L. Šutić from University of Zagreb.
- Supervisor BA/MA internships and BA theses (2021&2022; EUR). Evaluation: 8.0/10.0.
- Supervisor of BA Psychology course “Research Skills in Psychology” (2017-2019; TiU).

## Teaching

- Tutor of workgroups in the BA minor Pedagogics (2022; EUR)
- Guest-lecture “The empirical cycle” for a BA Pedagogics course (2022; EUR)
- Guest-lecture “The development of personal relationships” for a BA Psychology course (2018 & 2020; TiU)

## DANKWOORD / ACKNOWLEDGEMENTS

Mijn proefschrift is af! Wat een mijlpijl. En wat heb ik genoten van de afgelopen jaren, mede dankzij de hulp en steun van vele personen die ik graag wil bedanken.

Allereerst **Loes,** mijn promotor maar ook voor een groot deel mijn dagelijks begeleider. Ondanks je drukke schema, was je altijd beschikbaar en kon ik alles met je bespreken - en nog steeds. Dank je wel voor al je tijd, je bereikbaarheid en je oprechtheid. Ook wil ik je bedanken voor je gezelligheid, positiviteit en inspiratie. Na elk overleg ging ik vol enthousiasme en bruisend van ideeën weer verder. Ik ben je ook enorm dankbaar voor het vertrouwen dat je in mij hebt getoond en voor alle kansen die je me hebt gegeven om mijzelf te ontwikkelen, zelfs als dat betekende dat het zonder jou was. Ik heb ontzettend veel van je geleerd en dankzij jou ben ik gegroeid, zowel als academicus maar ook zeker op persoonlijk vlak. Mede door jou heb ik ook ontzettend van mijn promotietraject genoten. Ik had me geen betere promotor kunnen wensen. Dank je wel voor alles.

**Jaap**, wij kennen elkaar al een tijdje. Ik kwam als masterstudent in jouw departement vragen om onderzoekservaring, om te ontdekken of wetenschappelijk onderzoek beter bij mij zou passen dan klinisch werk. Jij hebt mij toen met open armen ontvangen en mij verschillende kansen aangeboden. Ook tijdens mijn PhD project was je als mijn promotor een constante factor. Je betrokkenheid beperkte zich niet alleen tot mijn professionele ontwikkeling, maar je toonde ook oprechte interesse in mij als persoon, inclusief je begrip betreft het combineren van een promotietraject met beginnend ouderschap. Ik wil je heel erg bedanken voor al je wijze lessen, vertrouwen, steun en tijd door de jaren heen.

**Amaranta**, hoewel je pas halverwege mijn promotietraject mijn co-promotor bent geworden, voelt het alsof je er altijd al onderdeel van hebt uitgemaakt. Ik wil je bedanken voor je warme welkom en mij de wegwijs maken toen ik overstapte naar de EUR. Ik wil je ook bedanken voor je gezelligheid, openheid, steun en betrokkenheid tijdens onze meetings en natuurlijk voor al je waardevolle feedback en suggesties. Ik ben blij dat we de komende jaren gewoon nog samen blijven werken.

Ook wil de leden van de leescommissie graag bedanken voor het lezen en beoordelen van mijn proefschrift. **Inez**, **Geertjan** en **Pauline**, bedankt!

**Anne**, mijn partner-in-crime. Wat ben ik blij dat ik jou als mede-promovendus had in ons onderzoeksproject. Samen hebben we zoveel geleerd, ook van elkaar. Ondanks dat we een groot deel van onze promotietrajecten thuis hebben gewerkt door de COVID-19

pandemie zijn we wel naar elkaar toegegroeid. Samen online “even” de werkdag starten en uiteindelijk veel te lang blijven kletsen (en klagen) over van alles en nog wat. Bedankt voor al je gezelligheid, openheid, steun en begrip. Ook wil ik je bedanken dat je aan mijn zijde wil staan als paranimf. Wel hebben we door de pandemie eigenlijk te weinig internationale congressen samen bezocht. Hopelijk kunnen we dat in de toekomst nog goed maken.

**Paula**, nu is het mijn beurt om jou te bedanken. Samen zijn we gelijktijdig gepromoveerd op een soortgelijk onderwerp. Het was heel erg leuk om ook deze ervaring samen met jou te delen. Bedankt dat je dit hoofdstuk samen met mij wil afsluiten als mijn paranimf en mij wilt ondersteunen met de laatste loodjes. Ook bedankt voor je luisterende oor tijdens onze gesprekken op het terras van the place to be: Dordrecht. Met jou kan ik over alles praten en dat waardeer ik heel erg. Ik ben trots op wat we geflikt hebben, van DaSCA tot onze PhDs.

**Claire**, we hebben maar 2 jaar mogen samenwerken maar wat was dat ontzettend leuk. Bedankt voor al je ondersteuning als projectmanager en alle gezelligheid. Samen waren we een goed team. Het was ook bijzonder dat onze zwangerschappen zo synchroon liepen en om samen de allereerste ervaringen te delen. Ik wens jullie gezin veel liefde en geluk toe.



**Adriene**, I want to thank you for being such a wonderful, supportive co-author. Thank you for sharing your tips and tricks regarding idiographic research and for taking the time to provide extensive feedback on my manuscripts. I learned a lot from you, and it was a pleasure to work together. I hope that our paths will cross again in the future.

Ik wil ook graag **Stefanie** en **Peter** bedanken voor jullie bijdrage aan mijn tweede studie. Bedankt voor jullie tijd en feedback en de prettige en vlotte samenwerking. En **Peter**, ook bedankt dat ik de data van de Vlaamse studie mocht gebruiken.

Verder wil ik mijn **EUR-collega’s** van *Youth and Family* bedanken. Bedankt voor het warme welkom toen ik hier mijn PhD project kwam voortzetten en bedankt voor alle gezelligheid, interesse, steun en hulp. Ik ben blij dat ik de komende jaren nog met jullie mag blijven werken. Ook wil ik mijn kersverse collega’s **Céline** en **Rick** extra bedanken voor jullie steun en hulp toen ik aan het zwoegen was met de laatste loodjes van dit proefschrift. En **Ildeniz**, bedankt voor alle fijne steunende gesprekken.

Daarnaast wil ik uiteraard ook mijn **voormalige collega’s** bedanken van het departement *Development Psychology* van Tilburg University. Met jullie heb ik de eerste helft van

mijn PhD doorgebracht, grotendeels nog voor de COVID-19 pandemie, toen het nog de norm was om volledig op kantoor te werken. Ik heb genoten van deze tijd en ik voelde mij helemaal thuis. Bedankt voor de gezellige lunches en de gesprekken bij de koffieautomaat, en alle babytalk tijdens onze eigen babyboom. En in het bijzonder wil ik nog **Theo** en **Jelle** bedanken. Bedankt dat jullie mij de kans hebben gegeven om als student-assistent samen een paper te schrijven en te publiceren. Het was een fijne introductie in het academische werk en heeft mij mede het vertrouwen gegeven om een promotietraject aan te gaan.

Daarnaast wil ik **alle jongeren en ouders bedanken die hebben deelgenomen** aan onze studies. Zonder jullie openheid en eerlijkheid konden we dit mooie onderzoek niet doen. Jullie hebben de wetenschap een stuk verder gebracht! Ook wil ik graag nog ieder ander bedanken die de moeite heeft genomen om dit proefschrift te lezen en die mij heeft bijgestaan tijdens mijn verdediging.

**Mooi volk**, lieve vrienden, ook jullie wil ik hierbij bedanken voor jullie interesse, steun en de brainstormsessies over de titel en het design van dit proefschrift. Mogen we samen nog vele feestjes vieren, maar laten we elkaar ook weten te vinden in moeilijkere tijden.

**Piet** en **Monique**, bedankt voor alle ondersteuning die jullie mij hebben geboden ten behoeve van mijn academische ontwikkeling. Dankzij jullie ben ik meer in mijzelf gaan geloven en heb ik gedurfd om grotere stappen te nemen. Dank voor jullie vertrouwen en voor het zijn van een voorbeeld.

**Samir**, bedankt voor je steun en toeverlaat in deze intensieve periode en voor het meedenken wanneer ik even vastzat. Bedankt dat je mij tijd en ruimte hebt gegund zodat ik een laatste “proefschriftsprint” kon trekken, te midden van de verhuisdrukte. Ik waardeer het dat je bijvoorbeeld in het weekend de kinderen meenam naar een “krijspaleis” zodat ik even ongestoord kon werken. Dankjewel voor alles.

Ten slotte, **Elina** en **Ilias**. Op het moment van schrijven zijn jullie nog maar peuters, mijn eigen “peuterpubers”. Ik hoop dat jullie over 15 jaar toch stiekem een beetje trots dit proefschrift van je moeder doorbladeren. Dit proefschrift afronden met twee kleine peutertjes was niet altijd makkelijk, maar wat hebben jullie deze ervaring ook verrijkt. Ik ervaar zelf iedere dag hoe dynamisch opvoeden is. Wat de ene dag werkt, werkt de andere dag niet meer. En wat voor de een werkt, werkt voor de ander weer niet. Opvoeden is een hele uitdaging, maar het is een uitdaging die ik met alle liefde met jullie aanga <3

In this dissertation, Savannah Boele aimed to unravel how adolescents' functioning is influenced by parenting and vice versa. Specifically, she examined how such parenting processes in adolescence unfold within families on various timescales and differ across families. Her findings indicate that, *on average*, key dimensions of parenting (i.e., warmth, autonomy support, and behavioral and psychological control) are linked to adolescents' functioning within a family on various timescales. Intriguingly, when moving beyond 'the average family' and zooming into *individual families*, substantial heterogeneity in families' parenting processes was revealed. The ways in which parenting dimensions (or practices) seemed to influence adolescents' functioning, and vice versa, varied from family to family. Overall, the findings align with long-held theoretical beliefs that parenting processes are idiosyncratic. Therefore, the findings of this dissertation call for a paradigm shift in parenting research – one that prioritizes the individual family instead of 'the average family' – to truly understand how parenting processes operate within real existing families.