

A moment of autonomy support brightens adolescents' mood: Autonomy support, psychological control and adolescent affect in everyday life

Jolene van der Kaap-Deeder¹  | Anne Bülow²  | Joachim Waterschoot³  |
Isabel Truyen⁴ | Loes Keijsers² 

¹Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway

²Department of Psychology, Education & Child Studies, Erasmus University Rotterdam, Rotterdam, The Netherlands

³Department of Developmental, Personality, and Social Psychology, Ghent University, Ghent, Belgium

⁴Konvert Interim Vlaanderen, Kortrijk, Belgium

Correspondence

Jolene van der Kaap-Deeder, Department of Psychology, Norwegian University of Science and Technology, Dragvoll, 7491 Trondheim, Norway.
Email: jolene.van.der.kaap-deeder@ntnu.no

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Abstract

This experience sampling study examined whether autonomy-supportive and psychologically controlling interactions with parents are intertwined with adolescents' momentary affect. For 7 days (in 2020), 143 adolescents ($M_{\text{age}} = 15.82$; $SD_{\text{age}} = 1.75$; 64% girls; 95% European, 1% African, 3% unknown) reported 5 or 6 times a day how they felt and how interactions with parents were experienced. Preregistered dynamic structural equation models on 1439 (including 532 adjacent) parent–adolescent interactions revealed significant within-family associations: Adolescents experienced more positive affect during and following autonomy-supportive interactions, and vice versa. Adolescents felt more negative affect during and 3h before psychologically controlling interactions. Between-family associations showed significant linkages between parenting and affect. These findings show that a moment of autonomy support can alter adolescents' everyday well-being.

Parental autonomy support is an important ingredient for optimal development in children (see Vasquez et al., 2016 for a meta-analysis), whereas the employment of psychological control by parents is detrimental for children's functioning (see Scharf & Goldner, 2018 for a review). Much of what we know, however, comes from population wide studies that compare how families differ from each other in terms of their overall parenting practices. Prior studies that have only examined between-family differences cannot provide insights into the underlying everyday processes within families function (Keijsers, 2016; Keijsers et al., 2022).

Within families, parenting is a dynamic process. For instance, the extent to which parents are

autonomy-supportive or psychologically controlling may be situationally determined (Smetana, 2017). Rather than being “carved in stone” or a stable trait of a parent, research increasingly demonstrates that parenting is characterized by meaningful fluctuations across days (Boele et al., 2020; Van der Kaap-Deeder et al., 2017). These within-person fluctuations in parenting across days might reciprocally relate to adolescents' functioning (Boele et al., 2020). Additionally, these transactional micro-processes of parenting as they occur within families in their everyday lives may be important building blocks for understanding the emergence of developmental changes in relationships, and in adolescent outcomes (Keijsers et al., 2022).

Abbreviations: DSEM, Dynamic Structural Equation Model; ESM, experience sampling method; MPASS, Momentary Parental Autonomy Support Scale; MPPCS, Momentary Parental Psychological Control Scale; MLVAR, multilevel vector autoregressive model; SDT, Self-Determination Theory; VAS, Visual Analogue Scale.

Jolene van der Kaap-Deeder and Anne Bülow made equal contributions and thus share first authorship.

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Even though research on how parenting may fluctuate from one interaction to the next is increasing (Keijsers et al., 2022), there are currently no studies that have examined momentary changes in parental autonomy support or psychological control. Grounded in Self-Determination Theory (SDT; Deci & Ryan, 2000), this study therefore aimed to enhance our understanding on micro-processes in parents' employment of autonomy support or psychological control in parent-adolescent everyday interactions and its association with adolescents' positive and negative affect throughout the day. This will illuminate the extent to which parents' use of such behaviors varies from one interaction to the next, and whether adolescents' well-being directly benefits or suffers from, respectively, autonomy-supportive or psychologically controlling parenting practices.

The role of parental autonomy support and psychological control in child outcomes

Within SDT (Deci & Ryan, 2000), a broad theory on human motivation and socialization, parental autonomy support nurtures the child's volitional functioning and is, therefore, assumed to be essential for children's development (e.g., Ryan et al., 2016). When providing autonomy support, parents acknowledge the child's perspective and needs, show an authentic interest in the child's inner world, provide choice whenever possible, and offer a rationale when choice is restricted. Such autonomy-supportive parenting practices not only enhance children's feelings of choice and volition, but also their sense of relatedness and competence (e.g., Grolnick et al., 2000). By doing so, children who experience more autonomy support than their peers score higher on a broad set of beneficial outcomes such as executive functioning (Bindman et al., 2015), socio-emotional development (Matte-Gagné et al., 2015), rule internalization (Laurin & Joussemet, 2017), and academic autonomous motivation and effort (Feng et al., 2019).

Autonomy support is often contrasted with psychological control, referring to a set of intrusive parenting strategies in which children are pressured to behave, feel, or think in certain ways (Barber, 1996; Soenens & Vansteenkiste, 2010). Parental psychological control is, for instance, apparent when parents employ guilt- or shame-induction, or conditional regard (i.e., attention or love being dependent on the child's actions) toward their child. A vast amount of research has shown the detrimental outcomes of parental psychological control, such as externalizing and internalizing problems, problematic social functioning, and poor academic performance and motivation, often through children's feelings of pressure, rejection or social isolation, or incompetence (see Scharf & Goldner, 2018 for a review).

Recent theorizing and empirical evidence (Vansteenkiste & Ryan, 2013) has pointed out the importance of

differentiating between autonomy support and psychological control, as they do not represent completely opposite ends of a single continuum (e.g., Silk et al., 2003). That is, although psychological control always implicates a low level of autonomy support, decreased autonomy support (e.g., limited provided choice) does not always go hand in hand with a high level of psychological control (e.g., forcing the child to behave in a certain way). This distinction is also in line with the dual pathway perspective (Vansteenkiste & Ryan, 2013), indicating that autonomy support relates especially to beneficial child outcomes such as well-being, positive affect, and persistence (i.e., bright socialization pathway), whereas psychological control predominantly predicts detrimental outcomes such as ill-being, negative affect, and psychopathology (i.e., dark socialization pathway; Costa et al., 2015; Mageau et al., 2015; Van der Kaap-Deeder et al., 2017). Hence, in this study, we examined how within-family fluctuations in both autonomy support and psychological control relate to adolescents' everyday affective well-being.

A dynamic perspective on parental autonomy support and psychological control

Previous research provided substantial evidence for the key role of both parental autonomy support and psychological control in children's functioning (e.g., Liga et al., 2020). Mainly, this research was done on a group level, such that findings provided valuable information regarding differences between parents in their general parenting practices (e.g., Baumrind, 1991; Darling & Steinberg, 1993; Feng et al., 2019). In everyday reality, however, parenting is a dynamic process: Parents engage in different practices within a particular time window, depending on situational features like demands, stress levels, or child behaviors (Belsky, 1984; Boele et al., 2020; Keijsers & Van Roekel, 2018; Smetana, 2017). Indeed, observational studies have shown parenting, in general (e.g., Waite & Creswell, 2015) and autonomy support versus psychological control, specifically (e.g., Van der Kaap-Deeder et al., 2020) to vary depending on for instance child characteristics and situational demands. Similarly, questionnaire-based studies have demonstrated parenting to fluctuate significantly at multiple time scales (e.g., Boele et al., 2022). Focusing on fluctuations across days, previous diary studies show that both parent-reported (Aunola et al., 2013; Bülow, Neubauer, et al., 2022; Mabbe et al., 2018; Neubauer et al., 2021; Xu & Zheng, 2022) and child-reported (Bülow, Neubauer, et al., 2022; Van der Kaap-Deeder et al., 2017; Xu & Zheng, 2022) autonomy support and psychological control fluctuate from day to day. Moreover, at the daily level, such fluctuations in parenting wax and wane together with child functioning like affect (Bülow, Neubauer, et al., 2022; Van der Kaap-Deeder et al., 2017).

Even though diary studies provide initial insights into the dynamics of autonomy-supportive and psychologically controlling parenting, the current study focusses on even shorter dynamics, to unravel the effects from one interaction to the next. Using retrospective assessments (i.e., how autonomy supportive or controlling the parent–child relationship has been that day), most daily diary studies conflate the frequency or patterning of interactions with the perceived quality of them. For instance, a child could perceive the relationship as minimally psychologically controlling at the end of the day because each interaction was minimally controlling, because no interaction has taken place, or because the overall experienced parenting was colored by the last interaction of that day, which was minimally controlling (recency effects; Baddeley & Hitch, 1993). To understand not only the overall perceived quality of the relationship that day, but also the smaller building blocks, the actual quality of interactions, more frequent assessments are needed. Hence, frequent assessments enable researchers to unravel how the dynamic process unfolds at a micro-timescale of hours, and thereby shed more light on how parenting relates to the children's more immediate or very short-term (e.g., a few hours) functioning (Bülow, Van Roekel, et al., 2022; Keijsers et al., 2022). Additionally, examining parenting processes at a micro-time scale informs theorizing on dynamic changes in parenting, which might elucidate some of the inconsistent across-day findings in diary studies (Boele et al., 2022; Timmons & Margolin, 2015). That is, assessing parenting within specific interactions several times a day might result in finding effects of parenting practices that only last several hours, something that is impossible to detect using diary designs.

Experience sampling methods (ESMs; Larson, 2019; Myin-Germeys & Kuppens, 2022), where participants answer several brief questionnaires during the day, can be employed to tap into everyday parent–child interactions in natural habitats (Keijsers et al., 2022; Repetti et al., 2015). Indeed, by asking whether parents and adolescents had an interaction in the last hour (or period), and assessing how this was perceived, ESM provides ecologically valid information on short-term family dynamics. Such information offers valuable insights on how parents interact with their children in their everyday lives (Bolger et al., 2003; Keijsers et al., 2022). Moreover, assessing individuals' perspectives at the current moment increases the likelihood that these perspectives are indeed based on their experiential knowledge (i.e., “How am I currently feeling?”), instead of on their beliefs or memories of previous events (retrospective bias; Robinson & Clore, 2002).

Experience sampling method research on parent–adolescent interactions (with no previous research focusing on autonomy support and psychological control) is still in its infancy (Keijsers et al., 2022). Only a couple of recent studies have shown parenting to fluctuate significantly from interaction to interaction, with these

fluctuations being related to adolescents' psychological functioning. For instance, a recent study examined parent–adolescent interaction quality (i.e., warmth and conflict) and positive and negative affect five to six times a day and found that adolescents reported more positive affect and less negative affect when experiencing more warmth and less conflict in interactions with their parent (Bülow, Van Roekel, et al., 2022).

The present study

In absence of earlier work on the moment-to-moment fluctuations in autonomy support and psychological control, this study aimed to examine how such within-person fluctuations across time in parental autonomy support and psychological control regarding child–parent interactions are reciprocally related to adolescents' momentary positive and negative affect. Examining such reciprocal effects is crucial as parent–child relationships are highly bidirectional in nature (Soenens & Vansteenkiste, 2020), and child characteristics such as their affect are important predictors of parenting practices (Belsky, 1984). We focused on adolescents' perceptions of parenting, as those perceptions are deemed to be the most important predictor of adolescents' well-being (Soenens et al., 2015). We preregistered the following hypotheses for this ESM study (see OSF: <https://osf.io/9xjt5/>):

Within-family hypotheses regarding concurrent and lagged effects:

- H1a: Parental autonomy support is positively and bi-directionally linked with positive affect (i.e., being joyful and happy);
- H1b: and negatively and bi-directionally linked with negative affect (i.e., angry, scared, and sad).
- H2a: Parental psychological control is negatively and bi-directionally linked with positive affect (i.e., being joyful and happy);
- H2b: and positively and bi-directionally linked with negative affect (i.e., angry, scared, and sad).

Between-family hypotheses regarding stable differences between families:

- H3a: Parental autonomy support is positively linked with positive affect;
- H3b: and negatively linked with negative affect.
- H4a: Parental psychological control is negatively linked with positive affect;
- H4b: and positively linked with negative affect.

Regarding the within-family hypotheses, both concurrent and lagged effects were examined with the latter referring to relations across a 3 h timespan. We also preregistered models assessing the relations between parenting (autonomy support and psychological control)



with emotion regulation. However, these models did not show an adequate convergence and were removed from the manuscript. For more details, see the [Supporting Information](#). In an explorative fashion, we also examined (1) between-family differences in the within-family associations described under H1 and H2 and (2) the within- and across-time associations between autonomy support and psychological control (reported in [Supporting Information](#)). Regarding the first exploratory research question, we deemed it necessary to examine whether the relations between parenting and adolescents' affective well-being can be generalized across families or whether these relations are typified by important between-family differences. Although many theoretical accounts describe such differences between families (e.g., person-to-person differences in how children react to parents; Pluess & Belsky, 2010), differences between families in parenting processes are seldom explicitly modeled (see Boele et al., 2020 for a review).

METHOD

Participants

From the 172 adolescents of the Dutch Experience Sampling Study on Parent-Adolescent Interactions, 143 adolescents are included in this current analytical sample (Dutch $n=72$, Belgian $n=71$, $n=29$ excluded as they have not reported any interactions with their parents). In the analyses, only interactions with the primary caregiver (i.e., the parent adolescents reported most interactions with) were included. Most primary caregivers were mothers (82%) while others were fathers (16%). Also, one stepmother and one stepfather were identified as primary caregivers.

Adolescents were on average 15.82 years old ($SD=1.75$, range 11–18). Most adolescents were girls (64%), others were boys (33%) and a few did not indicate a gender or indicated to neither identify as male nor female (3%). About half of the adolescents followed a higher educational track (51%), while others followed a medium (31%) or a lower educational track (12%). A few could not be classified (6%, no information/ elementary education). The majority of the adolescents (92%) had the nationality of the country they were living in (the Netherlands and Belgium). Others had a nationality of another European country (3%) or African country (1%). Some adolescents did not indicate their nationality (3%). With respect to parents' country of birth, 82.3% indicated that both their parents were born in the country where the data were collected. Regarding parents' level of education as reported by the adolescents, most parents completed non-university post-secondary education (39%), secondary education (25%), or university (20%), whereas 3% did not complete secondary education (14% of the adolescents indicated to not know their parents' educational level).

Procedure

In the recruitment of adolescents, undergraduate students from Tilburg University (the Netherlands) and Ghent University (Belgium) performed home or school visits, thereby relying on their own social network. To those adolescents having completed the active informed consent, instructions were provided about the study and about installing and using the Ethica Data app. After filling out a baseline survey including demographic information, a series of ESM questionnaires were initiated for 7 days in February of 2020. Subsequently, participants were requested to fill out another survey assessing their experienced parenting in the past ESM week. Participants received €5 (ca. \$5.26) if answering 75% or more of the ESM questionnaires and €3 (about \$3.16) if they answered at least 65%. They could earn another €5 if they answered the baseline questionnaire. The data collection was approved by the Ethical Committee of Tilburg University (EC-2017.105a) and Ghent University (2019/113). More information about the procedure can be found on OSF (<https://osf.io/vstrn>; see also <https://osf.io/9xjt5/>). We follow the guidelines for reporting ESM studies of Van Roekel et al. (2019).

During the ESM period, adolescents received five questionnaires per day on Monday until Friday and six questionnaires per day on Saturday and Sunday (i.e., signal-contingent sampling scheme; $t_{\max}=37$). These questionnaires were delivered at semi-random intervals throughout the day, specifically at times where adolescents could potentially have contact with their parents, thus avoiding school time and early mornings during weekends (Monday–Friday: 7:00–7:30, 15:30–16:10, 17:30–18:10, 19:30–20:10, 21:30–22:00; Saturday–Sunday: 11:30–12:10, 13:30–14:10, 15:30–16:10, 17:30–18:10, 19:30–20:10, 21:30–22:00). Based on recommendations by the Ethical Committee of Ghent University, Belgian adolescents below the age of 13 ($n=8$) did not receive the last questionnaire of the day (21:30–22:00), as not to interrupt their sleep. After the initial notification, adolescents had 30 min to complete the ESM questionnaire. After 20 min they received an automatic reminder. If adolescents indicated that they had seen and talked to one of their parents in the last hour, they received follow-up questions about the perceived autonomy support and psychological control. Adolescents who indicated to not have interacted with their parents received other follow-up questions to balance questionnaire length.

Compliance

For the current study, 5235 ESM questionnaires were planned. Due to some technical errors, 4734 (90% of planned questionnaires) were received and 3312 (70% of received questionnaires, i.e., compliance) were answered (which is typical for ESM studies among adolescents;

Van Roekel et al., 2019). Of these questionnaires, adolescents reported on 1829 times (55% of all answered questionnaires) that they had interacted with their parents and on 1439 times (79% of all reported interactions with 532 being adjacent interactions) this interaction was with the primary caregiver, which is the analytical sample of this paper. On average, adolescents reported on 10 interactions with their primary caregiver ($SD=6.27$, range=1–30).

Measures

Momentary parental autonomy support

Adolescents rated four items of the Momentary Parental Autonomy Support Scale (MPASS) to assess momentary parental autonomy support, rating each item on a Visual Analogue Scale (VAS) from 0 (*not at all*) to 100 (*very much*). Items were adapted from a prior daily diary study (Van der Kaap-Deeder et al., 2017), such that these would be more appropriate for ESM use (e.g., “My parent took into account how I thought about things.”, all items can be found in Appendix). The understandability of items was assessed prior to the study by three male adolescents (12–17 years), and items were slightly reworded based on their feedback. Items showed internal consistency on the within- ($\omega_w=.73$) and between-family level ($\omega_b=.94$). Aggregated momentary autonomy support across the ESM period correlated with retrospective reports of autonomy support ($r=.31$, $p<.001$) indicating convergent between-family validity.

Momentary parental psychological control

Adolescents rated four items of the Momentary Parental Psychological Control Scale (MPPCS) to assess momentary parental psychological control, rating each item on a VAS from 0 (*not at all*) to 100 (*very much*). Similar to the assessment of momentary parental autonomy support, we rephrased these items from a daily diary instrument (Van der Kaap-Deeder et al., 2017) to be appropriate for ESM use and tested their understandability (e.g., “My parent forced me to think, feel, or behave in a certain way.”, all items can be found in Appendix). Items showed internal consistency on the within- ($\omega_w=.76$) and between-family level ($\omega_b=.94$). Aggregated momentary psychological control across the ESM period correlated with retrospective reports of psychological control ($r=.54$, $p<.001$) indicating convergent between-family validity.

Momentary positive and negative affect

Adolescents rated on their past hour positive (two items: happy, joyful) and negative (three items: angry, scared, sad) affect on a VAS from 0 (*not at all*) to 100 (*very much*).

Items were adapted from the Positive and Negative Affect Schedule for Children (Ebesutani et al., 2012) and have been used in previous ESM research (Bülow, Van Roekel, et al., 2022). The items for positive affect were highly correlated on the within- ($r_w=.73$) and between-family level ($r_b=.90$). The items for negative affect showed internal consistency on the within- ($\omega_w=.71$) and between-family level ($\omega_b=.84$).

Preregistered analysis plan

Prior to the data collection, we preregistered our analysis plan (see OSF: <https://osf.io/9xjt5/>), which was adapted from Bülow, Van Roekel, et al. (2022). We preregistered Dynamic Structural Equation Models (DSEM; Asparouhov et al., 2018; McNeish & Hamaker, 2019), as it combines Structural Equation Modeling with Time Series Analysis. We specified our models as multilevel vector autoregressive models (MLVAR(1)) in *Mplus* (Version 8.4; syntax in Supporting Information). This allows to separate the variance on two levels, the within-family level (variation from interaction to interaction) and the between-family level (stable differences between families), to answer our hypotheses on both levels. On the within-family level, we specified concurrent and lagged effects between parenting and adolescents' affect, with the latter referring to lags of 3 h. To do so, we employed the “tinterval” option (set to 3 h) in *Mplus*. This setting accounts for unequal spacing between the ESM assessments by restructuring the continuous variable of hours in study in equal time bins (of 3 h). If there is no measurement within a time bin, a missing value is inserted (for more technical information see: Asparouhov et al., 2018; McNeish & Hamaker, 2019). The lagged effects were specified as random (i.e., differences between families in the lagged effects). On the between-family level, associations between the stable means (i.e., random intercepts) of parenting and affect as well as the random slopes of the lagged effects were estimated.

In line with the preregistration, we only included data of adolescents' interactions with one caregiver. Hereby, we focused on the caregiver that the adolescent reported the most interactions with during the ESM period (i.e., the primary caregiver). Data of interactions with other caregivers were excluded. Four models were estimated examining the relation between parenting (autonomy support or psychological control) and affect (positive or negative). In our exploratory analyses (see also Supporting Information), we also examined between-family differences in the within-family associations by examining the random variance around the lagged effects and estimated a model focusing on the concurrent and lagged associations between autonomy support and psychological control.

We determined convergence by examining density, trace plots, and the Gelman–Rubin statistics (i.e., potential scale reduction factors). One model (autonomy

support and positive affect) displayed a satisfactory model convergence. For the other models, we first increased the number of iterations and the thinning factor in accordance with the preregistration. As these models still did not converge, we simplified the models by (1) deleting the associations between random factors on which no hypotheses were specified at the between-family level (resulting in convergence of two additional models: psychological control and positive affect; autonomy support and negative affect), (2) running the model with fixed lagged effects (resulting in convergence for the models with psychological control and negative affect and with autonomy support and psychological control). Associations were deemed significant when the two-sided p -values of the unstandardized effects were $<.05$, whereas effect sizes were obtained from the standardized effect (STDYX standardization in *Mplus*; Schuurman et al., 2016). Finally, to check the robustness of our findings several sensitivity analyses were conducted (e.g., other time intervals), which revealed relatively robust findings (see [Supporting Information](#)). Nonconvergence of some sensitivity models as well as simplifications of the main models show that the complexity of the analyses is at the edge of what is computationally possible with these data.

Deviation from the preregistration

Although we preregistered that participants without variance in their responses would be removed by default, this is not the default setting in *Mplus*. In total, 33 participants did not show variance on at least one scale ($n=4$ autonomy support, $n=18$ psychological control, $n=2$ positive affect, $n=19$ negative affect). These participants were still included in the main models, as their data could be used to estimate between-family associations. Note that we also ran sensitivity tests without these participants (see also [Supporting Information](#)).

RESULTS

As shown in [Table 1](#), autonomy support related to more positive affect and to less negative affect, whereas

psychological control showed an opposite pattern of relations both at the between-family and the within-family level. Moreover, across the four variables, there was a substantial amount of variance situated at the within-family level (i.e., ranging between 38% and 65%, $1 - ICC$). This finding indicates significant fluctuations from moment to moment in autonomy-supportive and psychologically controlling parenting, as well as in adolescent affective well-being. [Figure 1](#) illustrates such over-time fluctuations for three participants.

Dynamic structural equation models

Within-family associations (H1 and H2)

We hypothesized that autonomy support (H1) and psychological control (H2) would significantly and bidirectionally relate to positive and negative affect, in opposite ways. Results are displayed in [Table 2](#). With regard to concurrent associations, these hypotheses received support: Within-family associations showed autonomy support to relate to higher levels of positive affect ($r=.18, p<.001$) but not negative affect ($r=-.07, p=.054$), whereas psychological control was unrelated to momentary positive affect ($r=-.02, p=.766$) but did relate to negative affect ($r=.15, p<.001$). Hence, at moments when parents were more autonomy supportive, children experienced higher positive affect, and at moments when parents were more psychologically controlling, adolescents felt worse than they typically would. With regard to lagged associations, the expected reciprocal effect was found between autonomy support and positive affect ($\beta_{AS(t) \rightarrow PA(t+1)} = .15, p=.002$; $\beta_{PA(t) \rightarrow AS(t+1)} = .12, p=.026$). Three hours after a more autonomy-supportive interaction, adolescents reported more positive affect, and vice versa, 3 h after adolescents' experience of positive affect, parents were perceived to be more autonomy supportive. Adolescents' negative affect also predicted subsequent increases in psychological control across time ($\beta=.11, p=.004$), but psychological control could not predict the negative affect of adolescents 3 h later ($\beta=-.07, p=.134$). Further, autonomy support and negative affect were unrelated across time, as were psychological control and positive affect.

TABLE 1 Descriptives of and correlations between the study variables.

	M	SD	Min–max	Skewness	Kurtosis	ICC	1	2	3	4
1. Autonomy support	77.74	21.52	0–100	−1.35	1.80	.62	—	−.33**	.19**	−.14**
2. Psychological control	7.57	13.29	0–100	2.83	9.84	.48	−.58**	—	−.09*	.19**
3. Positive affect	72.01	21.02	0–100	−1.03	1.18	.60	.65**	−.36**	—	−.36**
4. Negative affect	5.67	11.89	0–100	3.32	13.54	.35	−.29*	.59**	−.51**	—

Note: Between-family correlations are presented under the diagonal, within-family correlations are presented above the diagonal.

Abbreviation: ICC, intraclass correlation coefficient.

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

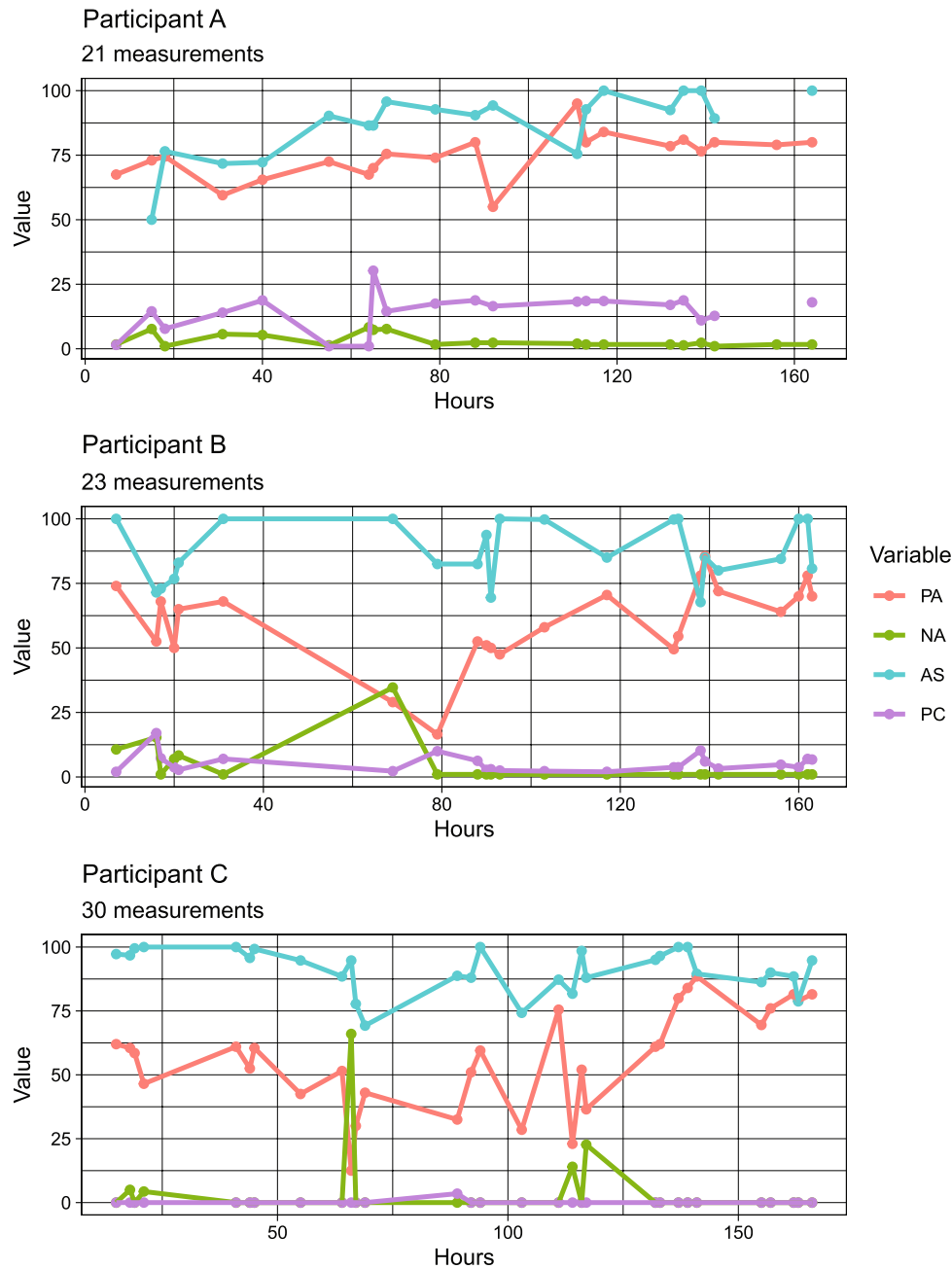


FIGURE 1 Fluctuations in experience sampling data for three participants. AS, autonomy support; NA, negative affect; PA, positive affect; PC, psychological control.

Between-family associations (H3 and H4)

Next, we looked at between-family relations between parenting and affect, thereby examining correlations between estimated stable levels (i.e., intercepts). In line with all our between-family hypotheses (H3 and H4), adolescents in families characterized by a higher level of autonomy support and a lower level of psychological control experienced more positive affect and less negative affect across the 7-day period ($r = -.58$ to $.56$).

Sensitivity analysis

To check the robustness of the findings, several sensitivity analyses were conducted. Up to six additional models were run: (1) the iterations were doubled to check for local minima, (2) participants with suspicious answer patterns were removed, (3) participants without within-person variance were removed, (4) random slope correlations were removed, (5) interval was set to 2 h (instead of 3 h), (6) interval was doubled (6 h instead of 3 h). All results can

TABLE 2 Model results of preregistered dynamic structure equation models (ML-VAR) examining associations between parenting and affect.

	Positive affect				Negative affect			
	Est.	Est. St.	<i>p</i>	95% CI	Est.	Est. St.	<i>p</i>	95% CI
Autonomy support (AS)								
Within-family								
AS (<i>t</i>) & Affect (<i>t</i>) (H1)	23.32	.18	<.001	[13.71; 33.20]	-5.23	-.07	.054	[-10.56; 0.07]
AS (<i>t</i>) → AS (<i>t</i> +1)	0.17	.15	.006	[0.05; 0.27]	0.23	.22	<.001	[0.13; 0.32]
AS (<i>t</i>) → Affect (<i>t</i> +1) (H1)	0.19	.15	.002	[0.06; 0.31]	-0.07	-.09	.148	[-0.17; 0.02]
Affect (<i>t</i>) → AS (<i>t</i> +1) (H1)	0.17	.12	.026	[0.02; 0.26]	0.04	.03	.574	[-0.11; 0.20]
Affect (<i>t</i>) → Affect (<i>t</i> +1)	0.25	.26	<.001	[0.17; 0.34]	0.15	.15	.004	[0.05; 0.25]
Between-family								
AS & Affect (H3)	134.37	.56	<.001	[78.53; 210.73]	-22.57	-.58	.004	[-41.55; -7.61]
Psychological control (PC)								
Within-family								
PC (<i>t</i>) & Affect (<i>t</i>) (H2)	-0.85	-.02	.766	[-6.51; 4.73]	13.62	.15	<.001	[8.04; 19.54]
PC (<i>t</i>) → PC (<i>t</i> +1)	0.09	.08	.070	[-0.01; 0.18]	0.23	.23	<.001	[0.12; 0.32]
PC (<i>t</i>) → Affect (<i>t</i> +1) (H2)	-0.07	-.04	.572	[-0.28; 0.18]	-0.06	-.07	.134	[-0.14; 0.02]
Affect (<i>t</i>) → PC (<i>t</i> +1) (H2)	-0.05	-.07	.366	[-0.16; 0.06]	0.12	.11	.004	[0.04; 0.20]
Affect (<i>t</i>) → Affect (<i>t</i> +1)	0.29	.29	<.001	[0.20; 0.37]	0.47	.47	<.001	[0.40; 0.53]
Between-family								
PC & Affect (H4)	-48.91	-.43	<.001	[-85.55; -21.67]	33.42	.54	<.001	[18.52; 53.48]

Note: Est. = unstandardized estimates; Est. St. = estimates for fixed within- and between-family effects are standardized using the STDYX Standardization (within-level standardized estimates averaged over clusters) in *Mplus*. *p* = Bayesian equivalent to two-sided *p*-values. They are interpreted "as the proportion of the posterior distribution on the opposite side of 0 than the posterior mean" (McNeish & Hamaker, 2019). This was the preregistered inference criterium for the hypotheses, 95% CI = 95% credibility interval of unstandardized values. Significant associations are indicated in bold.

Abbreviations: AS, autonomy support; ML-VAR, multilevel vector autoregressive model; PC, psychological control.

be found in the supplemental materials (Tables S1–S4). All results (partially) confirming our hypotheses (H1–H4) could be replicated in all additional models.

Exploratory findings

Finally, in an explorative fashion, we examined effect heterogeneity: Between-family differences in the within-family associations. This was done by examining the random variance around the lagged effects (see also Supporting Information), which indicated that the across-time relations between parenting and adolescent affect were not similar in terms of strength and direction across families.

Next, we also estimated a similar model including autonomy support and psychological control (see also Supporting Information). Autonomy support and psychological control were unrelated across time (i.e., no lagged effects were found). However, autonomy support did relate to lower levels of psychological control concurrently (at moments with more autonomy-supportive parenting, psychological control was lower, $r = -.32$) and also at the between-family level (parents who were on average more autonomy supportive were on average also less psychologically controlling, $r = -.48$).

DISCUSSION

Self-Determination Theory stresses the importance of interacting with one's children in an autonomy-supportive way as to support their well-being, whereas psychologically controlling parenting is stated to be detrimental to children's flourishing (Soenens et al., 2015). While there is ample evidence of autonomy support's (e.g., Bindman et al., 2015) and psychological control's (Scharf & Goldner, 2018) long-term effects, the processes in the short-term are mostly unknown (Boele et al., 2020). Although a few studies have examined the dynamic nature of these constructs at the daily level (e.g., Van der Kaap-Deeder et al., 2017), no study thus far investigated moment-to-moment changes in these parenting practices and adolescents' affect. This study, therefore, sought to investigate the momentary and short-term lagged relations between both adolescent-perceived parental autonomy support and psychological control and their experienced positive as well as negative affect. By doing so, we were also able to shed light on the reciprocity between parents and adolescents in their everyday lives, thereby acknowledging both parents' and adolescents' active role in adolescents' development (Bell, 1968).

By employing 1439 parent–adolescent interactions and preregistered DSEMs, this study supported the premise

that parenting is situationally determined (Belsky, 1984; Smetana, 2017). Adolescents' perception of how autonomy supportive and/or psychologically controlling their parents are may differ from one interaction to the next. Such within-person fluctuations across time in how parents are perceived were intertwined with adolescent everyday affective well-being. At moments when parents were perceived to be more autonomy supportive and less psychologically controlling, adolescents' feelings were more positive and less negative. Moreover, autonomy-supportive parenting predicted increased adolescents' positive affect 3 h later above and beyond the carry-over stability of positive affect, suggesting that these positive parenting effects may linger. Adolescent agency was also visible. Adolescent positive affect predicted more autonomy-supportive parenting in the next interaction, and adolescents' negative affect predicted subsequently more psychologically controlling parenting.

Autonomy support

Autonomy support is considered to be a universal ingredient of optimal parenting (Soenens et al., 2015), thereby supporting adolescents' volitional functioning as well as their needs for relatedness and competence. The between-family associations all supported our hypotheses and were in line with results found in previous research including diary studies (e.g., Neubauer et al., 2021; Van der Kaap-Deeder et al., 2017). That is, adolescents in families characterized by a higher level of autonomy support experienced overall more positive affect and less negative affect in their everyday lives. However, parents' autonomy support is not merely a stable factor (e.g., Matte-Gagné et al., 2013), as the current findings demonstrated important fluctuations within-families across time. This indicates that autonomy-supportive parenting also has a crucial dynamic element that is unique to specific situations (e.g., La Guardia & Ryan, 2007). Given these significant moment-to-moment fluctuations, this study subsequently aimed to enhance our understanding on micro-processes in parents' employment of autonomy support and the relation with adolescents' positive and negative affect.

Our results showed that adolescents experienced more positive affect at moments when their parents were perceived to be higher in autonomy support in line with previous diary studies employing both parent-reports and child-reports of parenting (e.g., Bülow, Neubauer, et al., 2022). Only one previous diary study looked at reciprocal relations between parental autonomy support and child positive affect, finding only autonomy support to predict next day positive affect (not vice versa; Neubauer et al., 2021). In contrast, and pointing out the relevance of examining parent-child interactions at a micro-time scale, we did find evidence for reciprocal relations between autonomy support and adolescent affective well-being. That is, parents' autonomy support

not only related to a higher level of positive affect 3 h later, but experiencing more positive affect also predicted more autonomy support the next moment. This is in line with bidirectional models of parenting wherein both parents and children are seen as active contributors to the parent-child relationship (e.g., Bell, 1968) with child characteristics as one of the important sources in predicting parenting behaviors (Belsky, 1984). These transactions were demonstrated here at a micro-time scale. Transactional models suggest that children's development takes place in a continuous, reciprocal process, with children both influencing and being influenced by their social context (Sameroff, 2009). This reciprocal interaction may lead to a reinforcing cycle between parenting practices and children's affect, in line with developmental cascade models (Masten & Cicchetti, 2010; Patterson, 2016). Future research focusing on possible mechanisms explaining why adolescents' positive affect positively relates to parents' autonomy support could employ the Broaden-and-Build Theory (Fredrickson, 1998, 2001) as a useful framework. That is, according to this theory, positive emotions have cascading effects on optimal functioning through broadening individuals' attention and thought-action repertoire (Fredrickson & Joiner, 2018). For instance, experiencing positive affect might enable adolescents to adopt better problem-focused skills, which not only builds their resilience but also improves their social functioning.

This insight indicating that autonomy-supportive parenting has a rather immediate effect can be employed to foster positive parenting practices and to create a virtuous circle of positive interactions within families. Specifically, enhancing autonomy-supportive practices in concrete situations can fuel children's positive affect that, in turn, fosters parents' employment of autonomy support. Further, as most studies on bidirectionality in the parent-child relationship have focused on the macro-level (e.g., assessing parenting and child functioning every 3 months; Pettit & Arsiwalla, 2008), the present study further enhances current knowledge on micro-processes in the bidirectional relation between parental autonomy support and adolescents' positive affect demonstrating the active roles of both parents and adolescents.

The effect of autonomy support may be limited to positive affective well-being. In contrast to our hypothesis, we found parental autonomy support and adolescents' negative affect to be unrelated at the within-family level. This is partly in line with previous diary studies showing parental autonomy support to be related to concurrent child negative affect (Neubauer et al., 2021) but not to across-day changes (Van der Kaap-Deeder et al., 2017). Our finding can be understood from the dual pathway perspective with autonomy support being especially predictive of beneficial outcomes (such as positive affect; bright pathway) and not or to a lesser degree of detrimental outcomes (such as negative affect; dark pathway; Costa et al., 2015; Vansteenkiste & Ryan, 2013). The current finding showing autonomy

support to enhance children's positive feelings at the very moment but also 3 h later is therefore in line with this theoretical perspective and previous empirical findings mostly examining between-family differences.

Psychological control

As hypothesized, and supporting an ever-expanding body of literature (Barber, 1996; Scharf & Goldner, 2018) including diary studies (e.g., Aunola et al., 2013), adolescents in families characterized by more psychological control experienced overall less positive affect and more negative affect. However, looking at the micro-dynamics within families, the conclusion that psychological control may lead to decreased adolescent well-being in families seems to be premature.

In their everyday lives, psychological control was unrelated to adolescents' positive affect, but did show a positive relation with concurrent negative affect. Even though adolescents experienced more negative affect at moments when their parents were more controlling, adolescents' perceptions of parental psychological control did not predict subsequent changes in their negative affect, with one exception. That is, the sensitivity analyses showed a negative relation between psychological control and negative affect 6 (but not 3) hours later. In contrast, a previous diary study found psychological control to be related to decreases in well-being and increases in ill-being across days (Van der Kaap-Deeder et al., 2017). This might be due to a different focus, with diary studies focusing on a retrospective account of parenting across 1 day and our ESM approach zooming in on parenting as experienced during a specific interaction.

Through examining this process as a transactional phenomenon by disentangling the direction of effects, we additionally found that adolescents' own negative affect related to increased psychological control 3 h later (not vice versa). Rather than being affected by their parents, adolescents, as such, can be seen as active agents. Adolescent negative affect may elicit more (perceived) psychological control later that day. This insight is in line with previous research showing, for instance, children's frustration and fearfulness to prompt more negative parenting behaviors (Kiff et al., 2011). Although diary studies tend to focus less on across-day associations and especially possible child-effects of affect, Aunola et al. (2013) found children's negative affect to relate to less psychological control the following day. Perhaps different mechanisms come into play depending on the time interval, with child negative affect eliciting more psychological control in the short-term (immediate reaction of the parent) but less in the longer term (when parents were able to reflect more on their parenting practices).

Nonetheless, the extent to which parents really change their behaviors, or whether children perceive them differently, is an open question. Indeed, another explanation for our finding is that adolescents, due to the experience of negative affect, appraise parents'

behavior as more controlling (Soenens et al., 2015). Such reasoning is in line with the mood-congruity bias stating that children might perceive their social world more negatively when they are in a negative mood (Stegge et al., 1995). Future research employing a multi-informant design or observer ratings of parenting is needed to determine whether children elicit and/or perceive more maladaptive parenting practices due to their negative affect. Finding evidence for the dual pathway perspective for both autonomy support and psychological control, highlights that these parenting practices are not mere opposites (Vansteenkiste & Ryan, 2013) but function within families via different pathways. This is also in line with the results of the exploratory analyses indicating that autonomy support and psychological control are only concurrently related (not across time), highlighting their distinct role in adolescents' development. In absence of an effect from parents' psychological control to later well-being, and in light of reciprocal effects of autonomy-supportive parenting with well-being, autonomy-supportive parenting seems a more promising modifiable factor within interventions.

Limitations and directions for future research

This study was a first examination of the relations between parental autonomy support or psychological control and adolescents' positive or negative affect at the momentary level, doing this across 1439 parent-child interactions. Hence, the findings should be considered in the light of several limitations. First, at the methodological level, this study was correlational and employed only self-reports. Even though we disentangled the direction of effects by employing multiple assessments, we cannot draw causal conclusions and could not, with the current design, estimate whether actual parenting behavior or just the adolescent perception of it changed across time. Future research could employ multi-informant reports and observer ratings to shed further light on this issue, especially because previous research has shown parents' and adolescents' unique and shared perspectives on psychological control to differentially relate to adolescents' emotional functioning at the within-family level (Xu & Zheng, 2022).

Second, even though an average ESM study among adolescents includes 99 individuals (compared to 143 in our study; Van Roekel et al., 2019), a larger sample would have allowed us to assess the complexity of everyday parent-child dynamics with more rigor. For example, our exploratory analyses indicated significant differences between families both in terms of strength and direction of effects between parenting and adolescent affect, for which we could not account in all models. Future research with more measurements and more families from diverse backgrounds is needed to replicate these findings, to determine the generalizability of the current findings and to assess the magnitude of heterogeneity. Such studies could also help to determine

why some families benefit or suffer (more) from, respectively, autonomy support and psychological control.

Third, on a conceptual level, it might be interesting for future research to examine the relations of autonomy-supportive and psychologically controlling parenting with adolescents' affect with varying time intervals. Recently, Boele et al. (2022) showed that lagged effects concerning parental support and adolescent depressive symptoms could not be generalized across different timescales (i.e., daily, bi-weekly, three-monthly, annual, and biennial). In this study, we were able to replicate all (using a 2h interval) or most (seven out of the eight lagged effects; using a 6h interval) results of the models employing a 3h interval. These results thus point out the robustness of our findings and that employing a 2, 3, or, 6h interval does not strongly influence our main findings and conclusions. Nonetheless, it should be determined whether for instance the enduring positive effects of autonomy support across an interval of several hours extrapolate to longer time periods (e.g., across days).

CONCLUSION

This first study on moment-to-moment relations between two key parental practices (i.e., autonomy support and psychological control) and adolescents' affect showed that (a) autonomy support and psychological control are situation-specific and vary within a family from one interaction to the next; (b) autonomy support and psychological control are linked to adolescents' affect at the within-family level indicating that effects on adolescent well-being are already observable within just a few hours; (c) children's affect also predicts subsequent changes in parental autonomy support and psychological control (or the perception thereof); and (d) autonomy support and psychological control function also within families via two separate pathways. Overall, this micro-level study demonstrates that just a moment of autonomy support can already brighten adolescents' mood.

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CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

DATA AVAILABILITY STATEMENT


The data necessary to reproduce the analyses presented here are not publicly accessible. Data are available from the first author upon reasonable request. The analytic

code necessary to reproduce the main analyses presented in this paper is publicly available in the supplemental materials. The materials necessary to attempt to replicate the findings presented here are publicly accessible (codebook of the study: <https://osf.io/vstrn>). The analyses presented here were preregistered. The preregistered analytical plan is shared on OSF (<https://osf.io/9xjt5/>).

ORCID

Jolene van der Kaap-Deeder  <https://orcid.org/0000-0003-1035-3195>

Anne Bülow  <https://orcid.org/0000-0003-3335-7447>

Joachim Waterschoot  <https://orcid.org/0000-0003-0845-9310>

Loes Keijsers  <https://orcid.org/0000-0001-8580-6000>

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX

INSTRUCTIONS

Denk aan dat laatste moment met je ouder wanneer je de volgende vragen gaat beantwoorden.

(Think about that last moment with your parent when you answer the following questions.)

ITEMS OF THE MPASS

Mijn ouder hield rekening met hoe ik over dingen dacht.
(My parent took into account how I thought about things.)

Ik kon helemaal zijn wie ik echt ben.

(I could totally be who I really am.)

Ik kreeg de ruimte om mijn mening te zeggen.

(I was given the possibility to give my opinion.)

Ik kon mijn gevoelens bij mijn ouder kwijt.

(I could express my feelings with my parent.)

ITEMS OF THE MPPCS

Mijn ouder dwong mij op een bepaalde manier te denken, voelen, of gedragen.

(My parent forced me to think, feel, or behave in a certain way.)

Mijn ouder onderbrak mij.

(My parent interrupted me.)

Ik moest van alles.

(I felt pressured to do things. *Note: As a literal translation of this item would have resulted in a loss of meaning, we freely translated this item from Dutch to English.*)

Mijn ouder bepaalde alles.

(My parent decided everything.)