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**How do my parents react when I feel happy?
Longitudinal associations with adolescent depressive symptoms, anhedonia, and positive
affect regulation**

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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Abstract

Parental emotion socialization plays a role in the development of adolescents' emotion regulation and is associated with adolescents' depressive symptoms. Most research has focused on parental socialization of *negative* affect. The scarce research on parental socialization of *positive* affect (PA) shows that parental downgrading responses to adolescents' PA are associated with concurrent adolescent depression. The aims of the present study were to examine *longitudinal associations* of both maternal and paternal responses to adolescents' PA with how adolescents regulate their PA (i.e., dampening and enhancing) and with adolescents' general depressive symptoms and anhedonia. We also considered associations in the opposite direction from adolescent regulatory responses and symptoms to parental responses. In a two-wave study (one-year interval), 635 adolescents from Grade 7 completed questionnaires. Cross-sectionally, maternal and paternal responses to adolescents' PA were associated with concurrent adolescents' PA regulation as well as adolescents' depressive and anhedonic symptoms. Longitudinally, low maternal and paternal enhancing responses to adolescents' PA predicted relative increases in anhedonic symptoms and relative decreases in adolescent enhancing over time. Low maternal enhancing was also predictive of relative increases in depressive symptoms. The present study points to bidirectionality of relations as adolescents' level of depressive symptoms predicted maternal and paternal responses.

How do my parents react when I feel happy?

Longitudinal associations with adolescent depressive symptoms, anhedonia, and positive affect regulation

Adolescence is a period of increased risk for depression and depressive symptoms compared to childhood (Ge, Conger, & Elder, 2001; Hankin et al., 2015). A crucial research topic concerns the identification of factors that exacerbate the risk for depressive problems. Developmental models of depression often include parental socialization of emotion as a risk factor (e.g., Yap & Jorm, 2015); this can be defined as “parental behaviors that shape the development of children’s understanding, experience, expression and regulation of emotion” (Schwartz, Sheeber, Dudgeon, & Allen, 2012, p. 448). Socialization practices include modelling and teaching regulation strategies (Morris et al., 2007) and emotion coaching (i.e., parental efforts to help children recognize, label, validate or understand their emotions; Lunkenheimer, Shields, & Cortina, 2007). The present paper focuses on the ways in which parents respond to their adolescents’ emotions, which is a major method of socialization contributing to the development of the adolescents’ emotion regulation strategies (Morris et al., 2007) and is proposed to consequently predict depressive symptoms (Schwartz et al., 2012). However, research on parental responses as a risk for maladaptive emotion regulation and depression dominantly stems from research on negative emotions.

The Importance of Positive Affect

There are multiple reasons why parental reactions to positive emotions are also important to consider. First, reduced pleasure or enjoyment (i.e., anhedonia) is a core symptom of depression, besides increased negative affect. Moreover, anhedonia predicts a worse course of depression (Rottenberg, Kasch, Gross, & Gotlib, 2002) and non-response to treatment (Vrieze et al., 2014). Second, positive and negative affect do not lie on the ends of one and the same continuum (e.g., Watson & Tellegen, 1985). Correspondingly, positive affect has its own specific functions. Positive affect, compared to negative affect, stimulates the momentary repertoire of thoughts and actions, and creative thinking (Fredrickson, 1998), and positive affect can beneficially impact health

conditions (e.g., Moskowitz, 2003). Third, lower scores on temperamental aspects of positive affect predict prospective depressive symptoms in early adolescence (Verstraeten, Vasey, Raes, & Bijttebier, 2009).

Parental Responses to Adolescents' Positive Affect

Positive emotions can be shared with others. However, it is important to take into account the way in which the conversation partner responds to the disclosure of positive emotions. As such, parents differ in the way they respond to positive emotions of their adolescents. They can react in a way that would likely enhance or maintain the positive emotions (further called *parental enhancing*), for instance by showing interest and enthusiasm in positive news. Encouragement, emphasizing, and validating responses are other strategies that fall under the umbrella of parental enhancing (Gentzler, Ramsey, & Black, 2015; Ladouceur, Reid, & Jacques, 2002; Ng, Pomerantz, & Lam, 2007; Yap, Allen, & Ladouceur, 2008). Alternatively, parents can show downgrading responses when children feel happy (previously referred to as minimizing, invalidating, or de-emphasizing responses); for instance through minimizing the positive situation, raising concerns, or instructing to calm down (further called *parental dampening*) (e.g., Katz et al., 2014). It should be clear that none of these downgrading responses are inherently wrong or negative. The adaptiveness of downgrading responses depends on the context (e.g., calming down in church), but it does likely turn out maladaptive when it occurs too frequently, and in all sorts of contexts.

Parental Responses to Adolescents' Positive Affect and Adolescents' Affect Regulation

Parental dampening and enhancing responses to adolescents' positive affect are proposed to contribute to adolescents' own emotion regulation. According to Gross (1998, p. 275), emotion regulation refers to "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions." Through their responses to their child's emotions, parents may encourage (i.e., reinforce) or discourage (i.e., punish) their children to express their positive emotions and influence in turn how their children will handle their emotions. Put differently, the parental responses can act as a model from which adolescents develop

or shape their own regulation strategies. Yap and colleagues (2008) indeed found that girls whose mothers exhibited increased invalidating responses to their positive affect (mother-report) reported more maladaptive regulation of negative affect. Although mother-reports of enhancing types of maternal responses were unrelated to adolescents' report of emotion regulation in this study, they did relate to observations of boys' emotion regulation, such as a reduced frequency of aversive behavior during a conflictual family interaction.

The important question then is whether the way in which parents respond to their adolescents' positive affect also relates to the adolescents' own regulation of *positive* affect. This has not been examined yet. This question is relevant as not only negative affect regulation but also *positive* affect regulation has been associated with depressive symptoms (e.g., Feldman, Joormann, & Johnson, 2008; Raes, Smets, Nelis, & Schoofs, 2012) and as parental responses to their adolescents' positive affect may be of particular relevance for the development of adolescents' regulation of positive affect. These intrapersonal responses to positive affect have been categorized into the broad categories of enhancing and dampening. *Enhancing* refers to responses that are assumed to increase positive affect, for instance by focusing on positive self-qualities, on goal pursuit and on the positive emotional state. Downgrading reactions or *dampening* comes down to reducing the significance of positive emotions or positive events, and focusing on the negative aspects of the positive emotion (Feldman et al., 2008). Examples of dampening thoughts are "I probably don't deserve this" and "These good feelings won't last, you'll see".

Parental Responses to Adolescents' Positive Affect and Adolescents' Depression

Adolescent emotion regulation has been proposed as a mechanism that lies in between parental responses and adolescent depression (e.g., Yap et al., 2008). Research so far has indeed provided evidence that maternal responses to an adolescent's positive affect are related to concurrent measures of the adolescent's depressive status. Specifically, adolescent girls aged 11 to 13 years experienced increased depressive symptoms when their mothers reported more invalidation of the adolescents' positive affect (Yap et al., 2008). Depressed adolescents between 14

and 18 years old reported that their mothers exhibited more dampening of their positive affect compared to non-depressed adolescents (Katz et al., 2014). Moreover, mothers' aversive behaviors or dampening reactions to their adolescents' positive behavior in an event-planning interaction task has been associated with adolescents' depressive symptoms (adolescents aged 11 to 13; Yap et al., 2008; Yap, Schwartz, Byrne, Simmons, & Allen, 2010).

Compared to mothers, fathers have been underrepresented in research on parental responding to emotions. However, the family involvement of fathers has changed during the past decades and fathers are important parental figures that play a role in children's emotional development. As such, not only the quality of mother-child but also the quality of father-child relationships has been related to children's depressive symptoms (e.g., Milevsky, Schlechter, Netter, & Keehn, 2007). There is one study so far that included fathers' responses to adolescents' *positive* affect (adolescents aged 14 to 18; Katz et al., 2014). Both mothers and fathers of depressed adolescents were found to show more dampening of their adolescents' positive affect and were less accepting of positive affect compared to parents of non-depressed adolescents. Reduced parental enhancing in depressed adolescents compared to non-depressed adolescents was also observed, but only amongst fathers. The latter finding was consistent across reports from mother, father, and adolescent. These findings as well as the finding that mothers and fathers participate most equally in fun activities with their child compared to other types of care (Raley, Bianchi, & Wang, 2012) stress the importance of examining paternal responses to their adolescents' positive affect.

Bidirectional Parent-Child Relationships

Thus far, longitudinal research on the relation between parental responses to positive affect and adolescent characteristics is lacking. Such work would allow us to identify the directionality of the relation. Whereas we discussed parental responses as a predictor or antecedent of adolescents' symptoms, it is likely that the level of the adolescents' symptoms also impacts how parents react to future emotional displays of their adolescents. Bell's (1968) report is considered as a core call for such child effects on parents, a call that remains to be emphasized (Pardini, 2008). The idea fits with

a key transactional principle in developmental psychopathology that development is shaped by reciprocal interactions between the individual and his/her social context. Exemplary, low parental warmth has been found to predict future depressed mood in children aged 7 to 12 years; and, in turn, adolescents' depressed mood predicted less parental warmth (Hipwell et al., 2008). Speculatively, adolescents' depressed mood induces stress in the parent-adolescent relationship, leading to less adaptive parental behavior. The latter study of Hipwell and colleagues (2008) predominantly included mothers, but child characteristics have also been shown to predict paternal behavior (Flouri, Midouhas, & Narayanan, 2016). Moreover, reciprocal relations have been reported between parenting and *regulation of (negative) emotions* in early adolescents (Otterpohl & Wild, 2015).

Given that depressed mood has been associated with less adaptive parenting behavior and given cross-sectional evidence for increased parental dampening in depressed youth (Katz et al., 2014), it is plausible that adolescents' depressive symptoms or maladaptive regulatory pattern reinforces or provokes less enhancing and more dampening tendencies by their parents. Alternatively, it has recently been found that mothers of children with more depressive symptoms report *more* encouragement of their child to savor (Moran, Root, Vizi, Wilson, & Gentzler, 2018). Parents of depressed adolescents might encourage their children to do more savoring or enhancing to help them increase or sustain their positive affect.

The Relevance of Adolescence in Studying Parental Influences

Research on parental influences might, at first glance, be more relevant in children who are more dependent on their parents compared to adolescents. However, despite an increased focus on peers, most adolescents live at their parents' house, and parents remain important attachment figures and conversation partners (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996). Accordingly, it has been shown that the quality of the parent-adolescent relationship continues to play a role in mental health throughout adolescence (Steinberg, 2001). Furthermore, parenting research showed that parental behavior changes over time. For instance, positive parenting

behaviors (e.g., give a wink or smile), which are presumably the most closely linked to parental enhancing of positive affect, have been shown to decline from middle childhood through late adolescence (Loeber et al., 2000).

Adolescence is a period characterized by substantial emotional and cognitive changes. It is a period of increased emotional reactivity (Spear, 2009). Alongside the emotional turbulence, adolescents create internal strategies to regulate their emotions. Most cognitive regulatory styles require abstract reasoning. Adolescents are at the stage where they develop an increased ability to generalize and think abstractly about the self (e.g., good fortune is on my side), which can be understood within Piaget's formal-operational stage that starts roughly from age 12 on (Inhelder & Piaget, 1958). As such, abstract emotion regulation strategies may particularly start to play a role in adolescence where these response styles are in development. As indicated by Morris et al. (2007), parental socialization of emotion regulation may be particularly important during this developing stage.

General Depressive Symptoms and Anhedonic Symptoms

Depressive symptoms refer to a broad range of symptoms (e.g., eating problems, hopelessness, sadness). There is growing evidence that different symptoms should be examined separately instead of being aggregated (Fried & Nesse, 2015), for instance because they can have different correlates. Anhedonia is one such aspect of depressive symptomatology. It is a broad construct that encloses separate aspects referring to a reduced interest or pleasure in otherwise enjoyable activities (consummatory), diminished pleasure from anticipation to these activities (anticipatory), and a reduced drive or motivation to pursue positive outcomes or reward (motivational). Anhedonia can be of special relevance given that parental responses to adolescents' positive affect can be expected to contribute to adolescents' experiences of pleasurable activities.

The Present Study

We aimed to remedy several shortcomings of previous work. First, we extended cross-sectional research by using a *longitudinal* research design to examine the direction of relations

between parental responses and adolescent affect regulation on the one hand, and between parental responses to positive affect and adolescent symptoms on the other hand. Second, we specifically examined adolescents' *positive* affect regulation; that is, adolescent dampening and enhancing responses to positive affect (instead of negative affect regulation in previous research). Third, the examined adolescent symptoms concerned general depressive as well as *anhedonic* symptoms. Fourth, we examined both paternal responses and maternal responses.

The following hypotheses were made.

- (1) We expected that parental enhancing and dampening responses would positively predict concurrent and prospective adolescent enhancing and dampening, respectively.
- (2) Based on the previous cross-sectional research, we expected that increased maternal and paternal dampening would predict higher concurrent general depressive symptoms and anhedonic symptoms and relative increases in depressive and anhedonic symptoms over time. We predicted that increased paternal and maternal enhancing would relate to lower concurrent and prospective symptom levels.
- (3) We expected to find that an association between parental responses to adolescents' positive affect and symptoms would be mediated by adolescents' dampening and enhancing responses.
- (4) We expected to find reverse relations from adolescent symptoms (and dampening/enhancing) to future parental dampening and enhancing. We made no a priori prediction on whether the relation would be positive or negative, given indications in prior research for both possibilities.

Method

Participants

Adolescents in Grade 7 (i.e., first grade secondary school) from seven schools in the Dutch-speaking part of Belgium were invited to partake in the study (for another study including data of this project, see Bastin, Nelis, Vasey, Raes, & Bijttebier, 2018¹). Thirty-seven parents refused participation

of their adolescent, 18 adolescents did not give consent, and 60 adolescents were not able to participate due to other reasons (e.g., illness). Of the resulting 674 adolescents, 46 adolescents were not included in analyses because of one of the following reasons: (1) we could not identify that the adolescent completed the parental questionnaire for another mother and/or father figure at baseline and follow-up (e.g., biological mother and stepmother; $n = 16$); (2) the mother or father figure was deceased at baseline or follow-up ($n = 13$); (3) the mother or father was unknown or absent ($n = 7$); (4) the adolescent had same-sex parents for whom we could not match corresponding mothers at follow-up ($n = 1$); (5) the main variables for the present research questions were not completed at follow-up and not at baseline ($n = 2$); (6) visual inspection of the distribution of each variable revealed that seven cases were separated from the main distribution and were influential. This resulted in a final sample of 628 adolescents with a mean age of 12.73 years (ranging between 11.25 and 14.92; $SD_{age} = 0.41$), 51.6% girls.

At the one-year follow-up in Grade 8, 511 of these 628 adolescents completed the questionnaires a second time (81.4%), 51.5% girls, $M_{age} = 13.74$ years, ranging between 12.25 and 16.00, $SD_{age} = 0.37$. In addition, 70 adolescents participated for the first time as new pupils were invited to partake (for previous research with a drop-in design, see Vanhalst, Luyckx, Scholte, Engels, & Goossens, 2003). Four drop-ins were not included because their father was deceased ($n = 3$) or because it was an outlier ($n = 1$). The remaining 66 drop-ins (33 girls, $M_{age} = 14.01$ years, $SD_{age} = 0.52$, age range [13.17-15.75]) were included in the cross-lagged analyses. Participants with and without complete data were compared with the Little's Missing Completely At Random test (1988), using expectation maximization estimation. This test was not significant, $\chi^2(292) = 305.89$, $p = .28$, which is seen as an indication that data were missing at random. When examining the individual variables, the group that dropped out did not significantly differ from the group that did not drop out in the distribution of gender, $\chi^2(1) = 0.17$, $p = .90$; in mean levels of enhancing, $t(612) = 0.13$, $p = .90$; maternal enhancing, $t(144.62) = 1.28$, $p = .20$; and paternal enhancing, $t(144.94) = 0.90$, $p = .37$. Nevertheless, the drop-out group scored significantly higher on depressive symptoms, $t(621) = 3.46$,

$p < .001$; anhedonic symptoms, $t(155.54) = 2.79$, $p = .006$; dampening, $t(149.85) = 3.77$, $p < .001$, maternal dampening, $t(148.17) = 2.92$, $p = .004$; and paternal dampening, $t(611) = 2.96$, $p = .003$ (equality of variances across groups not assumed if degrees of freedom have decimals). The full-information maximum likelihood method was used to handle missing data in the cross-lagged analyses. This is an adequate method to deal with missing data (Jeličić, Phelps, & Lerner, 2009).

Depressive symptoms at baseline were in the clinically significant range for 15.6% of the adolescents (i.e., CDI score ≥ 16 ; Timbremont, Braet, & Roelofs, 2008), which is in line with previous research in the same country (18.06%; Bastin, Bijttebier, Raes, & Vasey, 2014). Moreover, 548 of the 694 adolescents (78.9%) lived together with both parents, which is also in line with a large-scale study in the country (75.3% intact families; Engels et al., 2016).

Measures

Cronbach's alphas of questionnaires are presented in Table 1 and indicate satisfactory to good internal consistency. For each (sub)scale, sum scores were calculated (Table 1).

The *Parental Responses to Adolescents' Positive Affect Scale* (PRAPAS) is a new Dutch questionnaire that assesses maternal and paternal responses to adolescents' positive affect. The questionnaire was partially based on the Responding to Adolescents' Happy Affect Scale of Katz and colleagues (2014) and the questionnaire on Parents' Responses to Children's Performance of Ng and colleagues (2007). We constructed a new scale because we wanted a questionnaire that was feasible to complete (i.e., only two hypothetical situations) but not restricted to parental responses to success at school. Two hypothetical situations in which adolescents experience positive emotions were introduced: (1) you are feeling happy because of a good grade on a test and (2) you are feeling enthusiastic because you will do something fun with friends. Adolescents indicated the plausibility that their mother and their father would use a series of responses. The answer scale ranged from 1 (*very implausible*) to 5 (*very plausible*). The PRAPAS has a parental dampening (10 items) and a parental enhancing subscale (14 items) for mothers and fathers separately (see Results). Sample parental enhancing items are: my father/mother would "say how proud he/she is of the hard work I

do”, “propose to do something fun that night”, “wish me a lot of fun”. Sample parental dampening items are: my father/mother would “say that is was just luck”, “say that I don’t deserve to do something fun”, “start to talk about things that worry me”. If adolescents had a stepmother/father or foster mother/father, they were instructed to complete the questionnaire according to the parents with whom they spend the most time. Of the included cases at baseline, five adolescents indicated to have completed the questionnaire according to their stepmother, two for their foster mother, eighteen for their stepfather, and two for their foster father.

The *Responses to Positive Affect questionnaire for Children* (RPA-C; Bijttebier, Raes, Vasey, & Feldman, 2012) is the slightly adapted, valid, and reliable, Dutch child version of the adult RPA (Feldman et al., 2008) that assesses strategies of positive affect regulation. Participants indicate how often they respond in the described way when they are feeling happy, on a four-point rating scale including *almost never* (1), *sometimes* (2), *often* (3), and *almost always* (4). The described responses measure either dampening responses to positive affect (7 items) or positive rumination, which is a form of enhancing (9 items). Sample items of dampening are “These happy feelings won’t last”, “You think about things that could go wrong”. Positive rumination refers to “recurrent thoughts about positive self-qualities, positive affective experience, and one’s favourable life circumstances” (Feldman et al., 2008, p. 509). For reasons of clarity, positive rumination will be called enhancing in the present paper. Sample items are: “Think about how strong you feel”, “Think about how proud you are of yourself”.

The *Children’s Depression Inventory* (CDI; Kovacs, 2003) is a self-report questionnaire of symptoms of depression during the past two weeks. Each of the 27 three-choice statements are coded from 0 to 2. Higher total scores indicate more severe depressive symptoms. An example item is “I am sometimes sad; I am often sad; I am always sad”. The CDI is reliable and valid and discriminates children with major depressive disorders from non-depressed children (Kovacs, 2003). The Dutch version by Timbremont et al. (2008) was used.

The *Leuven Anhedonia Self-report Scale* (LASS; see also Bastin, Nelis et al., 2018) was used to assess anhedonia. Twelve items were constructed to assess consummatory, anticipatory, and motivational aspects of anhedonia. Each statement described thoughts and feelings during the last two weeks. Participants indicated to which extent each statement is true using a rating scale ranging from *completely untrue* (1) to *completely true* (5). Sample items are: “I found little pleasure in things that I used to enjoy”, “I could get really excited in advance about fun things”, and “I was motivated to do all kinds of things”. Items were aggregated into one total anhedonia score (as in a principal component analyses, eigenvalues for the one-component solution were > 3.7 and item loadings $> .4$ at both waves, as opposed to eigenvalues ≤ 1 at both waves for three components). The LASS has good internal reliability (Bastin, Nelis et al., 2018).

Procedure

Adolescents were sent home with an invitation letter describing the study and giving parents the opportunity to decline participation. Adolescents themselves received an informed consent form prior to completion of the questionnaire booklet, which took place in collective sessions during school hours. Informed consent was obtained from all included participants. A research assistant was present to handle questions. As an incentive, participants were entered into a raffle for cinema tickets. The interval between baseline and follow-up was about 1 year; mean interval of 11.9 months, $SD = 1.3$, ranging from 9 to 13 months.

Data Analysis

As a first step, the new scale of parental responses to adolescents' positive affect was evaluated. The intended two-factor structure of the scale (i.e., parental dampening and parental enhancing) was evaluated using confirmatory factor analysis (with the item scale treated as ordinal) and was compared to a one-factor structure. Maternal and paternal responses were analyzed separately. Model fit was evaluated using the Comparative Fit Index (CFI; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993), the Standardised Root Mean square Residual (SRMR; Bentler, 1990), and the Chi-square test of model fit (χ^2). For an acceptable

model fit, the CFI exceeds .90 and preferably exceeds .95, the RMSEA is less than .08; the SRMR less than .10; and the chi-square index is preferably small (and the ratio between χ^2 and degrees of freedom preferably < 3) (Kline, 2006). Internal consistencies of resulting subscales were evaluated using Cronbach's alphas.

To examine cross-sectional associations of parental dampening and enhancing with adolescent dampening, enhancing, depressive symptoms, and anhedonic symptoms, Pearson correlations and partial correlations were calculated (SPSS Statistics 24). Zero-order correlations between baseline and follow-up measures were also examined.

To test the direction of associations, we conducted cross-lagged analyses in which associations between all variables were examined over time. Paternal and maternal responses and anhedonic and depressive symptoms were examined in separate models. All models accounted for within-time associations between all variables (at baseline and follow-up), stability paths (i.e., the variable at follow-up as predicted by its level at baseline), and cross-lagged paths. Cross-lagged coefficients can be interpreted as variable A at baseline predicting relative changes in variable B at follow-up. Gender was controlled for (at baseline and follow-up) because gender differences in depressive symptoms typically emerge in adolescence (e.g., Ge et al., 2001). Model fit was evaluated using the indices mentioned above. Confirmatory factor analysis and cross-lagged analyses were conducted in Mplus version 7 (Muthén & Muthén, 1998-2012).

Our planned mediation analyses were not conducted because either the path from parental responses to emotion regulation (i.e., predictor to mediator) or the path from emotion regulation to depressive symptoms (i.e., mediator to outcome) was not significant in each of our models (see Figures 1 and 2).

Results

Factor Structure of the Parental Responses to Adolescents' Positive Affect Scale

The one-factor model revealed an unsatisfactory model fit for both paternal and maternal responses, $\chi^2(350) = 4313.38, p < .001; CFI = .54; RMSEA = .14;$ and $\chi^2(350) = 3881.14, p < .001; CFI =$

.59; *RMSEA* = .13, respectively. Next, a two-factor model, including a parental dampening factor and a parental enhancing factor was evaluated. For *paternal* dampening and enhancing, the two-factor model revealed a suboptimal fit, $\chi^2(349) = 2134.05$, $p < .001$; *CFI* = .79, *RMSEA* = .09. Model modifications indices indicated that model fit would substantially improve if three dampening items loaded on the enhancing factor. Given that we aimed to have a pure dampening and enhancing factor, we omitted these items. In this new model, model modification indices indicated another cross-loading of one dampening item which was omitted as well. Three of these four excluded items were 'passive' dampening reactions such as my mother/father does not recognize my enthusiasm (compared to more 'active' dampening reactions such as my mother/father tells me I don't deserve to do something fun); the fourth item was 'point out what can go wrong with what we are going to do'. After deletion of these four items, the model fit was good, $\chi^2(251) = 988.35$, $p < .001$; *CFI* = .90, *RMSEA* = .07, standardized factor loadings [.35 - .77], $r_{two\ factors} = -.13$, $p = .007$. We aimed to have an identical scale for maternal and paternal responses, therefore the same model was examined for the maternal responses. This two-factor model revealed a good fit to the data, $\chi^2(251) = 848.75$, $p < .001$; *CFI* = .92, *RMSEA* = .06, standardized factor loadings [.43 - .78], $r_{two\ factors} = -.18$, $p < .001$.

The follow-up data allowed us to re-evaluate the final two-factor model. Again, the model revealed a good fit for paternal responses, $\chi^2(251) = 832.39$, $p < .001$; *CFI* = .93, *RMSEA* = .06, standardized factor loadings [.40 - .80], $r_{two\ factors} = -.26$; and for maternal responses, $\chi^2(251) = 896.14$, $p < .001$; *CFI* = .91, *RMSEA* = .07, standardized factor loadings [.42 - .79], $r_{two\ factors} = -.23$. Internal consistencies of the corresponding subscales were good, see Table 1. Mean levels of paternal enhancing and dampening were significantly lower than mean levels of maternal enhancing and dampening, respectively $t(df = 609) = 11.92$, $p < .001$, Cohen's $d = 0.48$; and $t(df = 609) = 4.57$, $p < .001$, Cohen's $d = 0.19$.

Cross-sectional Associations

Cross-sectional associations between variables are presented in Table 2. Adolescent-reported paternal and maternal dampening were positively associated with adolescent dampening, but not

associated with adolescent enhancing. Similarly, adolescent-reported paternal and maternal enhancing were positively associated with adolescent enhancing, not to dampening. All these correlations remained significant after controlling for gender and depressive symptoms.

Higher levels of adolescent-reported maternal and paternal dampening were significantly associated with more adolescent depressive symptoms, whereas adolescent-reported maternal and paternal enhancing were associated with less depressive symptoms. A similar pattern of results was found for anhedonia. The associations with symptoms remained significant when controlling for gender, adolescent dampening and enhancing, but had smaller effect sizes.

Longitudinal Associations: Cross-lagged Analyses

As the cross-lagged models included all possible paths, the models were fully saturated (zero degrees of freedom) and the fit of the models could not be established. To have an indication of model fit, non-significant paths with gender (i.e., the control variable) were trimmed in each model. This revealed an excellent fit to the data in all four models; CFI > .998; RMSEA < .02, SRMR < .02. Results of the non-trimmed models including all paths are reported (cf. approach in Bastin, Vanhalst, Raes, & Bijttebier, 2018).

Maternal responses (Figure 1). We first consider the model including depressive symptoms (PANEL A). Lower adolescent-reported maternal enhancing was here predictive of more depressive symptoms and less adolescent enhancing at follow-up. The association between adolescent-reported maternal enhancing and depressive symptoms was reciprocal such that depressive symptoms were also predictive of less prospective maternal enhancing. Adolescent-reported maternal dampening was not predictive of any of the outcome variables, but depressive symptoms were predictive of maternal dampening.

When anhedonic instead of depressive symptoms were examined (PANEL B), lower adolescent-reported maternal enhancing was predictive of future anhedonic symptoms. Contrary to depressive symptoms, this association was not bidirectional and anhedonic symptoms did not relate

to future adolescent-reported maternal dampening. Again, adolescent-reported maternal dampening was not predictive of any of the outcome variables.

Paternal responses (Figure 2). More adolescent-reported paternal enhancing predicted more adolescent enhancing. However, different from the maternal model, paternal enhancing did not relate to future depressive symptoms (PANEL A). Nevertheless, the opposite relation was replicated such that higher levels of depressive symptoms predicted less adolescent-reported paternal enhancing. Parental dampening was, again, not significantly predictive of any of the outcome variables.

When anhedonic instead of depressive symptoms were examined (PANEL B), adolescent-reported paternal enhancing predicted more adolescent enhancing and less anhedonic symptoms. Again, no evidence was found for reciprocal relations with anhedonia.

Discussion

Little is known about how parental responses to their adolescents' *positive* affect relate to adolescents' own regulation styles in response to positive affect and to depressive symptoms. This is the first *longitudinal* study in which such relations were examined and where not only general depressive symptoms, but also anhedonia, were included. Moreover, we examined both maternal and paternal responses and examined bidirectionality of the parent-adolescent relationships.

Parental Responses to Adolescents' Positive Affect and Adolescents' Affect Regulation

Cross-sectional associations. More maternal and paternal enhancing related to more concurrent adolescent enhancing. In analogy, maternal and paternal dampening were related to more concurrent adolescent dampening. All associations were found after controlling for symptomatology and could therefore not be entirely explained by a shared association with symptomatology.

Longitudinal associations. The cross-sectional enhancing results were replicated longitudinally such that more maternal and paternal enhancing predicted relative increases in adolescent enhancing. These results suggest that enhancing responses of the parents to the positive experiences

of adolescents may serve as a model for adolescents' own responses when experiencing positive affect. There is repeated evidence that depression contagion exists across peers as well as from parents to children (Hammen, Burge, & Adrian, 1991; Joiner & Katz, 1999). Although we cannot derive causal conclusions, the present results suggest that contagion can also occur from more parental enhancing to more enhancing by adolescents. The results further affirm that parental reactions to adolescents' affect are still important during adolescence and not only during childhood. As neural regions involved in emotion regulation are not fully matured in adolescence it is comprehensible that cognitive regulatory strategies are still susceptible to environmental influences.

Against hypotheses, parental dampening did not predict future adolescent dampening. Prior research is lacking. However, the results are in line with a previous study in which only child reports on parental emphasizing (cf. enhancing) responses to success at school, not parental de-emphasizing (cf. dampening), were correlated with how proud and happy fifth-grade children expected to feel after imagined successes (Ng et al., 2007). It might be that only severe levels of parental dampening have an influence. Or, influences of parental dampening might have taken place at a younger age already. For most participants, the parent-child relationship has a history of about 12 years.

It has been suggested that emotion regulation strategies are mechanisms that lie in between parental responses to adolescents' affect and adolescents' symptoms. However, we found no support for such processes in our longitudinal data (for recent cross-sectional support; see Fredrick, Mancini, & Luebke, 2018). That is, although we did find that parental enhancing predicts adolescent enhancing, we only found cross-sectional, but no longitudinal support that adolescent enhancing would predict depressive and anhedonic symptoms after controlling for relevant variables. In line with our results, the longitudinal association between enhancing and depressive symptoms was also not found in adolescents from Grade 11 and 12 (Raes et al., 2012). Nevertheless, enhancing has been related to lower prospective levels of anhedonia in adults (Nelis, Holmes, & Raes, 2015) and to less prospective depressive symptoms under times of stress in adolescents (Bijttebier et al., 2012). As already noted in previous papers, more research is needed to examine the conditions under which

dampening and enhancing are predictive of symptom development (Nelis et al., 2015; Raes et al., 2012), and accordingly, under which conditions the suggested mediational processes exist (see Moran et al., 2018).

Parental Responses to Adolescents' Positive Affect and Adolescents' Symptoms

Cross-sectional associations. In line with our hypotheses, lower levels of maternal and paternal enhancing and higher level of maternal and paternal dampening were associated with more concurrent anhedonic and depressive symptoms. Concurrent associations between parental responses to positive affect and depressive symptoms have also been found using parent reports and observational methods (Yap et al., 2008; in girls). Moreover, the present results are in line with research on horizontal relationships with peers and romantic partners in which the way of responding to disclosure of positive affect has been associated with anhedonic symptoms and relationship well-being, respectively (Bastin, Nelis et al., 2018; Gable, Reis, Impett, & Asher, 2004).

Longitudinal associations. Against predictions, maternal and paternal dampening were unrelated to future depressive symptoms (see also Raval, Luebbe, & Sathiyaseelan, 2018) and anhedonic symptoms. However, low maternal enhancing did predict relative increases in depressive symptoms over time, and both low maternal and paternal enhancing were found to predict anhedonic symptoms. As such, previously found cross-sectional associations with depressive symptoms were replicated at the longitudinal level and the results for symptoms of anhedonia reveal the importance of this specific aspect of symptomatology.

We also considered bidirectional relations between parental responses and adolescent symptoms and found evidence that adolescents' depressive symptoms do feedback on parental responses. Specifically, higher levels of depressive symptoms were predictive of relative decreases in maternal enhancing and relative increases in maternal dampening. In the father models, the relation from depressive symptoms to parental enhancing was replicated. The results are in line with previous research where depressed mood related to less adaptive parenting behavior (Hammen, 2006; Hipwell et al., 2008). The adolescents' depressed mood may create an environment of few enhancing

responses (by fathers and mothers) and increased dampening responses (by mothers). Parents may start to act in line with the adolescent's depressed mood and temper positive affect to avoid that their adolescent sets his or her expectations for the future too high. Or, according to the stress generation perspective, an individual's characteristics can create a stressful context, especially in interpersonal relationships (Hammen, 2006). As such, the depressed mood of the adolescent may weaken positive interactions with parents and reduce adaptive interaction styles between parent and child (see also Hipwell et al., 2008; and Katz et al., 2014). Our results do not support the idea that parents try to compensate depressed mood of the adolescent through enhancing responses. It would be interesting to investigate whether findings replicate using parent reports, given that Moran and colleagues (2018) found evidence for compensational behavior of parents using parent reports.

Moreover, the maternal results point to transactional processes such that maternal responses to adolescents' positive affect increase the risk for adolescent depressive symptoms, and in turn, depressive symptoms may shape parental responses. The findings fit the idea that a unidirectional view on parent-child relationships is not comprehensive as a child is not only a passive receiver of parental behaviors. Importantly, initial levels of adolescent symptoms and parental responses were controlled for in all longitudinal analyses, which has previously been reported as a gap in research on the temporal ordering of parent-child relationships (Hipwell et al., 2008).

Future Directions

Future research is needed to identify whether the results are unique for depression or whether low parental enhancing of positive affect is a transdiagnostic risk factor. A next step also concerns the identification of variables that strengthen or reduce the observed associations. It is likely that adolescents differ in how susceptible they are for the influences of parental dampening and enhancing; for instance depending on their temperament. Finally, in future research, the added value of parental responses to positive affect above parental responses to adolescent *negative* affect in the prediction of symptoms can be examined.

Implications

The results underscore the role of parental responding to adolescents' positive affect in depressive symptoms as well as in positive affect regulation. As such, the present results support parental trainings of adaptive responding to adolescents' positive affect. The bidirectional nature of the findings are also of clinical relevance given that improvements in adolescents' functioning may result in more parental enhancing. However, it is important to note that effect sizes in our study were not large, indicating that the findings should be interpreted in the light of other risk factors (i.e., equifinality principle of development). These factors concern other parental influences such as parenting strategies (Morris et al., 2007) as well as adolescent characteristics (e.g., temperament; Nelis, Bastin, Raes, Mezulis, & Bijttebier, 2016).

Strengths and Limitations

The strength of the present study lies in its longitudinal design, large sample size, and the reports on both mothers and fathers. The study has several limitations too. First, 19% of the participants dropped out at the second wave. Although the Little's MCAR test indicated a general pattern of data missing at random, the attrition group scored significantly higher on symptomatology and dampening in analyses on the separate variables. Second, we cannot conclude that associations with parental responses hold regardless of depression status of the parents. Parental depression is associated with parenting behavior and emotion socialization processes (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Comparably, parental responses and adolescent emotion regulation can (partially) share the same genetic basis. Third, all measures were adolescent reports and thus represent the perception of adolescents. Results can differ according to reports of parent or adolescent (Katz et al., 2014). This can be interpreted as error, however another viewpoint is that discrepancies between informants' reports are important in itself as they can be predictive of relevant outcomes (De Los Reyes et al., 2013). Fourth, we have no information on the frequency in which the adolescents share positive experiences with their parents. This would allow to verify whether associations are stronger for adolescents who often share (positive) experiences with their parents. Alternatively, parental

dampening and/or relative absence of parental enhancing might reduce the likelihood that adolescents will share positive experiences over time.

Conclusion

The present study underscores the importance of maternal and paternal responding to their adolescents' positive affect for adolescents' own regulation of positive affect as well as adolescents' depressive and anhedonic symptoms. The present study also points to the reverse direction of relations as adolescents' level of depressive symptoms did also feedback on maternal and paternal responses to adolescents' positive affect.

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Table 1

Descriptive Information

	Baseline				Follow-up			
	<i>M</i>	<i>SD</i>	<i>Min- Max</i>	<i>Cronbach's α</i>	<i>M</i>	<i>SD</i>	<i>Min- Max</i>	<i>Cronbach's α</i>
Paternal dampening	21.04	7.12	10-43	.79	20.14	7.10	10-44	.82
Maternal dampening	22.01	7.32	10-46	.79	21.03	7.24	10-46	.80
Paternal enhancing	46.46	10.64	14-70	.88	45.46	10.82	14-70	.90
Maternal enhancing	50.19	9.97	15-70	.87	50.12	9.53	16-70	.88
Adolescent dampening	12.98	3.73	7-26	.77	12.31	3.64	7-26	.77
Adolescent enhancing	22.63	4.82	9-36	.83	22.43	4.95	9-36	.84
Depressive symptoms	9.35	6.29	0-35	.85	9.41	6.35	0-35	.86
Anhedonic symptoms	21.68	5.70	12-42	.79	22.16	5.75	12-40	.81

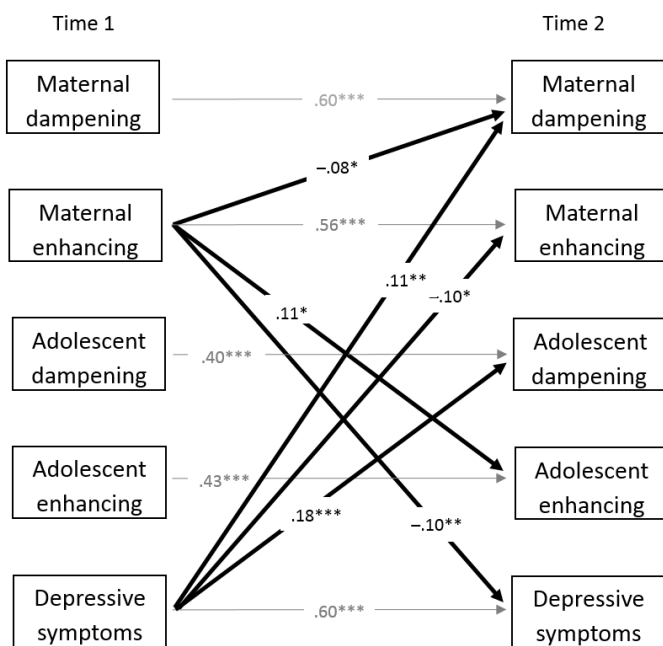
Note. Sample size varies due to missing data (569 =< N =< 623).

Table 2
Associations between all study variables of both waves.

	T1 PARENTAL RESPONSES TO ADOLESCENTS' PA				T1 ADOLESCENT REGULATION PA		T1 SYMPTOMS		T2 PARENTAL RESPONSES TO ADOLESCENTS' PA				T2 ADOLESCENT REGULATION PA		T2 SYMPT.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
T1 PARENTAL RESPONSES TO ADOLESCENTS' POSITIVE AFFECT															
1. Paternal damp. T1	-														
2. Maternal damp. T1	.70***	-													
3. Paternal enhan. T1	-.08	-.04	-												
4. Maternal enhan.T1	-.04	-.10*	.73***	-											
T1 ADOLESCENT REGULATION OF POSITIVE AFFECT															
5. Adolescent damp. T1	.35***	.41***	-.04	.02	-										
	(.29***)	(.33***)													
6. Adolescent enhan. T1	-.001	.01	.37***	.40***	.08*	-									
			(.31***)	(.35***)											
T1 ADOLESCENT SYMPTOMS															
7. Depressive sympt. T1	.24***	.30***	-.29***	-.28***	.49***	-.29***	-								
	(.09*)	(.13**)	(-.20***)	(-.21***)											
8. Anhedonic sympt. T1	.25***	.26***	-.26***	-.31***	.23***	-.32***	.38***	-							
	(.17***)	(.17***)	(-.15***)	(-.20***)											
T2 PARENTAL RESPONSES TO ADOLESCENTS' POSITIVE AFFECT															
9. Paternal damp. T2	.63***	.38***	-.16***	-.16***	.21***	-.06	.19***	.23***	-						
10. Maternal damp. T2	.41***	.61***	-.11*	-.16***	.23***	-.03	.26***	.18***	.63***	-					
11. Paternal enhan. T2	-.12**	-.10*	.61***	.45***	-.07	.24***	-.28***	-.22***	-.21***	-.11*	-				
12. Maternal enhan. T2	-.09	-.08	.38***	.57***	-.01	.25***	-.24***	-.24***	-.15***	-.18***	.69***	-			
T2 ADOLESCENT REGULATION OF POSITIVE AFFECT															
13. Adolescent damp.T2	.19***	.20***	-.07	-.08	.47***	-.05	.37***	.17***	.30***	.29***	-.11**	-.08	-		
14. Adolescent enhan. T2	.003	.01	.24***	.27***	.01	.48***	-.20***	-.23***	-.04	-.02	.32***	.35***	.003	-	
T2 ADOLESCENT SYMPTOMS															
15. Depressive sympt.T2	.15***	.19***	-.22***	-.24***	.28***	-.20***	.63***	.24***	.24***	.28***	-.35***	-.36***	.47***	-.35***	-
16. Anhedonic sympt.T2	.14**	.11*	-.23***	-.28***	.14**	-.21***	.32***	.43***	.27***	.22***	-.38***	-.40***	.26***	-.38***	.48***

Note. Partial correlations are reported in parentheses; controlling for both gender and depressive symptoms T1 in rows 5 and 6; controlling for gender and adolescent dampening and enhancing at T1 in rows 7 and 8. T1 = Baseline; T2 = Follow-up; PA = positive affect; Damp. = dampening; Enhan. = enhancing; Sympt. = symptoms. Sample size varies due to missing data (493 =< N =< 619). *** $p < .001$; ** $p < .01$, * $p < .05$

PANEL A



PANEL B

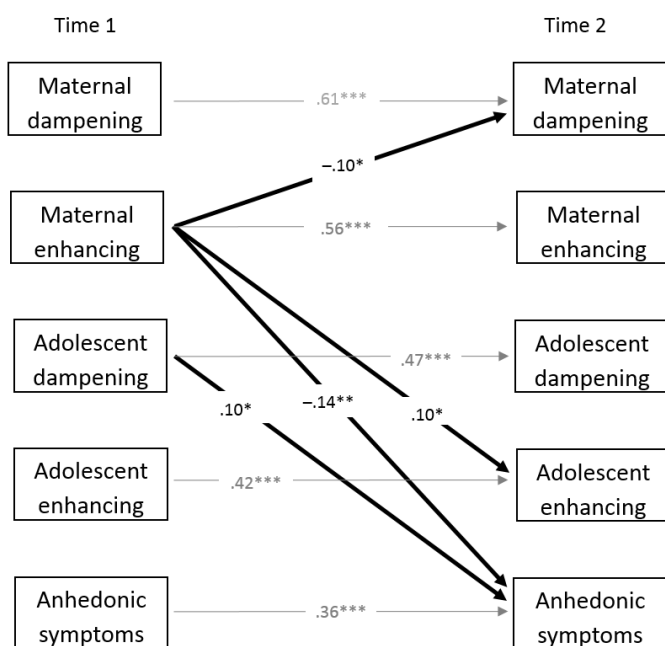
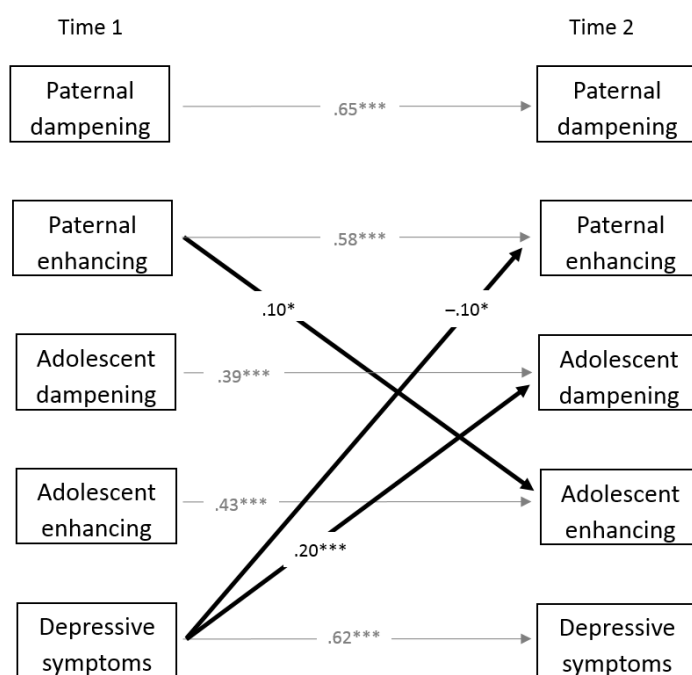


Figure 1. Mother models: Cross-lagged path models of bidirectional associations between maternal responses to adolescents' positive affect, adolescents' responses to positive affect, and depressive symptoms (**PANEL A**), or anhedonic symptoms (**PANEL B**). The models include all within-time correlations, all cross-lagged paths and are controlled for gender (baseline and follow-up); the control paths and non-significant paths are not presented for reasons of clarity.

$N = 694$. *** $p < .001$, ** $p < .01$, * $p < .05$

PANEL A



PANEL B

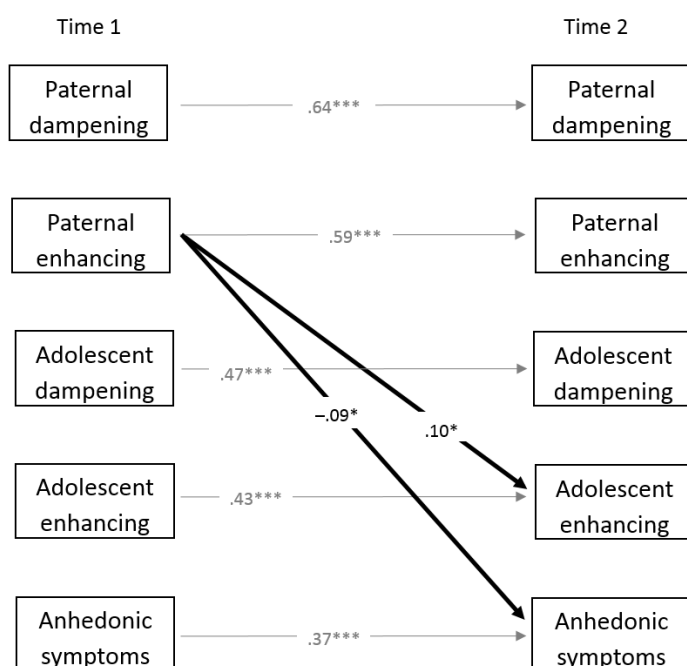


Figure 2. Father models: Cross-lagged path models of bidirectional associations between paternal responses to adolescents' positive affect, adolescents' responses to positive affect, and depressive symptoms (**PANEL A**), or anhedonic symptoms (**PANEL B**). The models include all within-time correlations, all cross-lagged paths and are controlled for gender (baseline and follow-up); the control paths and non-significant paths are not presented for reasons of clarity.

$N = 694$. $^{***} p < .001$, $^* p < .05$

Footnotes

¹ There is overlap in the correlation table of the present study and Bastin, Nelis et al. (2018).

Overlapping correlations might slightly differ due to different inclusion criteria.