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# Negative parental attributions mediate associations between risk factors and dysfunctional parenting: A replication and extension

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## ABSTRACT

The primary goal of the current study was to replicate our previous study in which was found that negative maternal attributions mediate the association between parenting stress and harsh and abusive discipline. In addition, we investigated this association in fathers, and added observational parenting data. During two home visits mothers and fathers were observed with their children (age 1.5–6.0 years), filled in questionnaires, and completed the Parental Attributions of Child behavior Task (PACT; a computerized attribution task). Similar to our previous study, negative parental attributions mediated the relation between parenting stress and self-reported harsh and abusive parenting for both mothers and fathers. For mothers, this mediation effect was also found in the relation between parenting stress and lower levels of observed supportive parenting in a challenging disciplinary task. In addition, the relation of partner-related stress and abuse risk with harsh, abusive, and (low) supportive parenting were also mediated by maternal negative attributions. When parenting stress, partner-related stress, and abuse risk were studied in one model, only parenting stress remained significant. Results are discussed in terms of the importance of targeting parental attributions for prevention and intervention purposes in families experiencing stress.

## 1. Introduction

Worldwide, millions of children are victims of child abuse and neglect (Stoltenborgh, Bakermans-Kranenburg, Alink, & Van IJzendoorn, 2015). As a result, many of these children experience serious consequences in the short term as well as in the longer term, with an increased risk for physical, psychological, and behavioral problems (e.g., Alink, Cicchetti, Kim, & Rogosch, 2012; Jonson-Reid, Kohl, & Drake, 2012). To prevent such problems later in life it is important to investigate the etiology of child maltreatment. According to the Social Information Processing (SIP) model negative parental attributions are important predictors of subsequent disciplinary actions and potentially, harsh or abusive parenting (Milner, 2003, 1993). Parents who attribute responsibility and hostile intent to the child and evaluate the behavior as more serious and wrong, are at risk for child abuse. Furthermore, disproportionately high child-related expectations, positive attitudes towards physical discipline, high stress levels, and the experience of childhood maltreatment by their own parents, are potential risk factors for negative attributions (Milner, 2003, 1993). The two latter factors were investigated in our previous study in relation to parental attributions and harsh and abusive parenting (Beckerman, Van Berkel, Mesman, & Alink, 2017). We found that the association between current experience of parenting stress and harsh and abusive discipline was mediated by negative parental attributions. No such associations were found for the other stress factors or for past childhood maltreatment. The objective of the current study was to replicate the previous study using a larger sample, and to further

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extend the findings by also including fathers, an additional risk factor (i.e., general child abuse risk), and observed parenting in addition to questionnaire data.

Parental attributions are defined as the parent's interpretation and evaluation of child behavior (Milner, 2003, 1993). The SIP model argues that judgments concerning child behaviors of parents at risk for child abuse differ, both quantitatively and qualitatively, from judgments of parents without such risk. Not only do parents at risk report more negative child behavior in daily situations, they also show differences in evaluations and attributing intentionality of child behavior compared to other parents. Parents who are at risk for child abuse may associate children's naughty or clumsy behaviors more often with internal and stable child characteristics and hostile intentions (e.g., "he spilled the milk because he wants to get back at me"). These parents are also expected to be less able to think of alternative explanations for the child's behavior (e.g., "he spilled the milk, because he is too young to hold the cup straight"). As a consequence, parents at risk for child abuse will attribute more responsibility to the child, and evaluate the child's behavior as more serious, wrong, and blameworthy compared to other parents which in turn elevates the risk for dysfunctional parenting strategies to follow (i.e., power assertive and harsh discipline; Milner, 2003, 1993).

The current experience of stress and the past experience of childhood maltreatment are important risk factors for parental attributions to become biased (Milner, 2003, 1993). Stress is thought to influence an individual's coping skills which results in automatic and rigid rather than controlled and flexible information processing. During automatic processing parents are less likely to take situational information into account. As a consequence, parents are less able to understand the child's behavior in context and will attribute more responsibility to the child, and evaluate the child's behavior as more wrong (Milner, 2003, 1993). Empirical evidence shows that people who are (chronically) stressed show cognitive impairments, such as problems in learning and memory (Kuhlmann, Piel, & Wolf, 2005; Lupien, Maheu, Tu, Fiocco, & Schramek, 2007), and are indeed more likely to process information automatically and habitually instead of in a controlled and flexible manner (Hermans, Henckens, Joëls, & Fernández, 2014; Vogel et al., 2015).

The experience of childhood maltreatment is thought to influence parental attributions through the effect it has on parents' pre-existing cognitions (i.e., general beliefs about children and childrearing (Milner, 2003, 1993). The model theorizes that these general beliefs are a result of prior experiences with children, but that they are mainly formed by experiences parents had in their own childhood with their own caregivers. It has been proposed that parents are particularly influenced by their pre-existing cognitions when they evaluate ambiguous child behavior (i.e., challenging but age-appropriate child behavior; Milner, 2003, 1993). The idea that parenting is guided by pre-existing schemata, is similar to the assumption of the attachment theory that internal working models provide a basis for parenting (Milner, 2003). According to attachment theory, mental representations of the self and others (i.e., internal working models) are formed in the context of child-caregiver relationship (i.e. attachment), and guide future thought, feelings, and behavior (Bowlby, 1969, 1973). There is indeed evidence that such intergenerational transmission of parenting occurs (Van IJzendoorn, 1992; Verhage et al., 2016).

A large number of studies have confirmed the hypothesized differences in parental attributions of parents at risk for abuse or parents who are abusing, versus low-risk and non-abusing parents (e.g., Ateah & Durrant, 2005; Burchinal, Skinner, & Reznick, 2010; Chilamkurti & Milner, 1993; De Paul, Asla, Perez-Albeniz, & De Cadiz, 2006; Irwin, Skowronski, Crouch, Milner, & Zengel, 2014; Larrance & Twentyman, 1983; Slep & O'Leary, 1998). Far less research has examined parental attributions in relation to current stress and childhood maltreatment, and its potential mediating role between risk factors and harsh and abusive parenting. Some empirical evidence is available. For example, parenting stress and socioeconomic strain were found to be associated with negative parental attributions (e.g., Berlin, Dodge, & Reznick, 2013; Haskett, Scott, Willoughby, Ahern, & Nears, 2006), and negative parental attributions were found to mediate the relation between parental abuse history and their use of harsh and abusive parenting (Dixon, Browne, & Hamilton-Giachritsis, 2005). However, most research demonstrates the direct association between current stressors or past experiences of childhood maltreatment and harsh and abusive parenting, without testing mediational pathways that include parental cognitions as suggested by the SIP-model (Stith et al., 2009).

We conducted one of the first studies exploring parental attributions as a potential mediating mechanism between daily stressors (i.e., low SES, partner-related stress, and parenting stress), parent's own history of childhood maltreatment, and harsh and abusive parenting in a general population sample (Beckerman et al., 2017). Fifty-three Dutch mothers of 2- to 6-year-old children reported on daily stressors and their experiences of childhood maltreatment and completed the Parental Attributions of Child behavior Task (PACT) a computerized attribution task (Beckerman et al., 2017). Negative parental attributions mediated the association between current experience of parenting stress and harsh and abusive discipline. This suggests that the type of stress that affects parental attribution may be quite specific to stressors that are directly related to the child or to parenting. However, several limitations of this study raise questions about the robustness of these results.

First, the sample size of the Beckerman et al. (2017) study was quite small, making it difficult to identify small effects. Second, the study only included mothers. We cannot simply apply models found for mothers to fathers, because it has been suggested that fathers are different from mothers in their parenting (mother: secure base, talk vs. father: play, exploration, discipline), in their biological makeup (different stress responses), and in the amount of time they spend with their children (although paternal involvement increased significantly since the second half of the twentieth century, on average mothers still spend more time with their children) (Kudielka & Kirschbaum, 2005; Lamb, 2010; Ramchandani & Psychogiou, 2009). Moreover, several studies suggest that attributions concerning child behavior are not only different for mothers and fathers (Chen, Seipp, & Johnston, 2008; Lansford et al., 2011), but also predict child and parenting outcomes differently (Werner, 2012; Williamson & Johnston, 2015). So, with these important notions in mind, the current study examined negative maternal as well as paternal attributions.

In addition to the limitations of small sample size and not studying fathers, only self-report questionnaires were used to measure harsh and abusive parenting. There is evidence that self-reported parenting may be subject to social desirability and is not, or only

moderately, correlated to observations of parenting (Bennett, Sullivan, & Lewis, 2006; Sessa, Avenevoli, Steinberg, & Morris, 2001). It has been suggested that observations of parenting in more stressful tasks are needed to discriminate maltreating parents from non-maltreating parents (Bennett et al., 2006). Thus, the use of observational measures that elicit challenging parenting situations is needed to reduce the limitation of social desirability to a minimum. In conclusion, a replication study addressing these issues is needed to validate and extend the initial findings and to shed more light on their robustness.

The objective of the current study was to replicate the previous study using a larger sample, and to extend the findings by also including fathers, using an additional risk factor (i.e., a general child abuse risk), and including observed parenting in addition to questionnaire data. Because many studies found general abuse risk to be associated with parental attribution (e.g., Chilamkurti & Milner, 1993; De Paul et al., 2006; Irwin et al., 2014; Rodriguez, Cook, & Jedrzejewski, 2012; Rodriguez & Tucker, 2015), we added this risk factor to our study. Finally, the separate mediation effects were tested in a multiple mediation model for mothers and fathers separately.

In sum, in this study we expect to replicate our finding of the previous study: negative maternal attributions mediate the relation between parenting stress and self-reported harsh and abusive parenting. We also expect this association to be significant when we use an observational measure of parenting. In addition, we hypothesize that maternal negative attributions mediate the association of other current risk factors (e.g., low SES and partner-related stress) and past childhood maltreatment, with parenting. Finally, we study the exact same mediation models for fathers and explore if the mediation models differ for fathers and mothers.

## 2. Method

### 2.1. Sample

We were interested in studying variance in stressors and harsh and abusive discipline within the general population, and thus recruited a non-risk sample. Convenience sampling was used. Participants were recruited in different ways in order to include families with various socio-economic backgrounds. Families were recruited through health care services, door-to-door flyer distribution and Facebook advertisements. Information about the study was provided by brochures, an internet page, and verbally by recruiters. Families could self-enroll by filling out a short questionnaire on the internet about family characteristics and were contacted by telephone within a few days. Because cultural background could influence the way parents evaluate child behavior (i.e., parental attributions), we only included families who self-identified as having a Dutch cultural background. In addition, families were eligible for participation if they had a child in the age range of 1.5–6 years old, were living in the Netherlands, and had the Dutch nationality. Exclusion criteria were mother's or father's psychopathology, severe intellectual or physical disabilities of the mother, father or the child, and not speaking the Dutch language. Participants reported on these items on the enrollment questionnaire. Anonymity was guaranteed.

The recruitment resulted in a total number of 105 participating families. In all families both mothers and fathers participated and provided all data needed for analyses. Educational level was distributed as follows for mothers: 1% low (highest education: primary school or partly secondary school), 43% average (highest education: secondary school or vocational school), 57% high (highest education: Bachelor or Master); and for fathers: 5% low, 38% average, 57% high. Parents reported their monthly net family income in categories ranging from 1 (< € 1000) to 8 (> € 4000); with intermediate steps each increasing € 500. Monthly net family income was on average between € 2500 and € 3000 (category 5; SD = 1.63 range 2–8), which is around the average family income of the Dutch population (Central Bureau for Statistics, 2017). The mothers were between 23.7 and 44.2 years old ( $M = 32.7$ ,  $SD = 4.4$ ). The fathers were between 23.6 and 51.9 years old ( $M = 35.1$ ,  $SD = 5.0$ ). The participating children were between 1.7 and 6.0 years old ( $M = 3.4$ ,  $SD = 1.1$ ), 51% were boys.

### 2.2. Procedure

Data were collected during a series of home visits, of which the first two are relevant for the current study. Two visits were planned with the mother and two visits with the father. The aim was to complete the second home visit within a week after the first home visit for both mothers and fathers. The order of mother and father visits was counterbalanced. Mother and father visits were on average 16 days apart. During the first home visit parent-child dyads were filmed and parents were asked to fill out several questionnaires. During the second home visit parents were asked to complete a computer task and fill out a second set of questionnaires. Parents and children received a small gift after the first home visit and at the end of the study the family received a gift coupon of €100 and a DVD with the recordings of the home visits with the child. Informed consent was obtained from all parents. Procedures and measures were approved by the Ethics Committee of the Institute of Education and Child studies of Leiden University.

### 2.3. Measures

#### 2.3.1. Risk factors

**2.3.1.1. Family socioeconomic status.** Mothers and fathers were asked to report their highest completed education and their monthly net family income. Mother and father education scores were computed into a total mean score, as well as their reports on family income; mean education and family income were positively correlated:  $r(104) = 0.55$ ,  $p < .01$ . Both mean education scores and mean family income scores were standardized before being summed for total family SES.

**2.3.1.2. Partner-related stress.** Parents individually completed the marital scale of the Maudsley Marital Questionnaire (MMQ; Crowe, 1978). The scale asked parents to rate 10 items about their satisfaction of the relationship with their partner on an 8-point Likert scale (0 very positive to 8 very negative). The Cronbach's alphas of the marital scale in this sample were 0.88 and 0.89 for mothers and fathers respectively.

**2.3.1.3. Parenting stress.** Parenting stress was measured with the Parenting Daily Hassles Scale (PDH; Crnic & Greenberg, 1990). Parents rated 20 statements about potential hassles related to challenging child behavior and parenting tasks that occurred in their family in the previous week on a 5-point Likert scale ranging from 0 no burden to 4 great burden. The Cronbach's alphas of the PDH scale in this sample were 0.88 and 0.83 for mothers and fathers respectively.

**2.3.1.4. Childhood maltreatment.** To measure different types of maltreatment parents may have experienced during their childhood the Childhood Trauma Questionnaire (CTQ; Thoms, Bernstein, Lobbetael, & Arntz, 2009) was used. Parents rated 24 statements assessing their experiences of emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect on a 5-point Likert scale (0 never true to 5 very often true). For analysis the total mean score was computed. Internal consistency of the total scale was  $\alpha = 0.94$  and 0.85 for mothers and fathers respectively.

**2.3.1.5. Child abuse risk.** The short version of the Child Abuse Potential Inventory (CAPI, Milner, 1986, 1990; Bouwmeester-Landweer, 2006) was used to measure child abuse risk. This scale contains a main abuse scale with 70 statements divided over 5 subscales (distress, rigidity, unhappiness, problems with family, problems with others) which parents can agree or disagree with. A troublesome answer is given a risk score ranging from 1 to 23, resulting in a maximum score of 450. Cronbach's alphas in this sample were 0.86, and 0.85 for mothers and fathers respectively.

### 2.3.2. Negative parental attributions

To assess negative parental attributions of ambiguous child behavior the Parental Attributions of Child behavior Task (PACT; Beckerman et al., 2017) was used. This computerized task consisted of presentations of ten ambiguous illustrations of child behavior that could be explained as either being naughty or clumsy, and five drawings of neutral child behavior. The children in the drawings were gender neutral and were drawn without any facial expressions, to prevent interference of these features with the interpretation of the behavior in the picture. After presenting the illustration for 4000 ms, parents were asked to quickly answer eight attribution questions within 3500 ms each; four negative questions (e.g., 'Do you think this is naughty?') and four positive questions (e.g., 'Do you think this is cute?'). By forcing parents to choose between a simple YES or NO, instead of using a scale measure, we could register a quick response, thereby simulating a realistic representation of the parent's thinking process. The frequency of affirmative responses to the four negative attribution questions for each of the ten ambiguous drawings was used as a measure for the parent's level of negative attributions (ranging from 0 to 40). Cronbach's alphas for negative parental attributions were 0.95, and 0.94 for mothers and fathers respectively. More detailed information about the PACT can be found in Beckerman et al. (2017).

### 2.3.3. Parental harsh and abusive discipline

Two measures of harsh and abusive discipline were used, one based on self-report measures and one based on observation.

**2.3.3.1. Self-report measures.** Similar to our previous study (Beckerman et al., 2017), we combined two self-report measures to assess parental harsh and abusive discipline. The first measure was the overreactivity subscale of the Parenting Scale (PS; Arnold, O'Leary, Wolff, & Acker, 1993), which reflects overreactive disciplinary actions such as displays of anger, meanness, and irritability. Parents indicated which of two statements (A and B) described their discipline tendency best on a 5-point Likert scale (ranging from 1 A completely applies to 5 B completely applies).

The second self-report measure consisted of the minor physical assault, severe physical assault, and psychological aggression subscales of the Conflict Tactics Scale Parent Child (CTSPC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). Parents rated 32 statements on a 5-point Likert scale ranging from 1 never to 5 (almost) always. Because of the absence of severe physical assault in our sample, only the subscales minor physical assault and psychological aggression were used.

Similar to our previous study (Beckerman et al., 2017), the PS overreactivity subscale and the CTSPC minor physical assault and psychological aggression subscales were combined into one score of harsh and abusive discipline for replication purposes. Subscales of the different measures were significantly correlated (all  $r_s > .47$ ,  $p_s < .01$ ). A standardized mean score was computed for fathers and mothers separately. Internal consistencies of this combined scale were for both mothers and fathers  $\alpha = .80$ .

**2.3.3.2. Observational measures.** For the observation of parental discipline a don't touch task was used (e.g., Joosen, Mesman, Bakermans-Kranenburg, & Van IJzendoorn, 2012; Van Berkel et al., 2015). Parents were given a bag with attractive toys (i.e., colorful, sound making, interactive toys) and were instructed to unpack it in front of their children. Children were not allowed to touch the toys for two minutes. After these minutes the children were allowed to play with an uninteresting toy (i.e., a grey teddy bear) for 2 min. Parental discipline was coded during this disciplinary task on three separate scales: harsh physical discipline, verbal overreactive discipline, and supportive presence. The first two scales were coded according to an adapted version of the discipline rating scales (Joosen et al., 2012; Verschueren, Dossche, Marcoen, Mahieu, & Bakermans-Kranenburg, 2006), and the last one according to the Erickson scale for parental supportive presence (Egeland, Erickson, Clemenhausen-Moon, Hiester, & Korfmacher, 1990).

Harsh physical discipline was coded as a discipline strategy when the parent used severe physical force to prevent the child from touching the toys, but also when the parent used harsh physical force to strengthen his/her demand or punish the child. Scores ranged from 1 no physically harsh acts to 5 more than one harsh act. Parents were rated as using verbal overreactive discipline when they verbally expressed irritation and/or anger towards the child, indicating they were losing their temper. Scores ranged from 1 no harsh verbal discipline to 5 almost constant irritation and/or anger.

A parent scoring low on Supportive presence represents a parent who fails to provide supportive strategies to help the child to obey; the parent might be unavailable or uninvolved and fails to be responsive to the emotional needs of the child. A high score represents a parent who is emotionally available and involved, showing positive regard and emotional support to the child by using positive strategies to help the child to not touch the toys (e.g., induction, praising, and encouraging the child; Egeland et al., 1990). Scores ranged from 0 non-supportive to 7 very supportive.

Research interns were trained by an expert to work with the discipline coding systems. Interobserver reliability was adequate; intraclass correlations (single rater, absolute agreement) between all pairs of 4 independent coders were 0.70 or higher for all three scales. Different coders rated parents in the same family to guarantee independence among ratings.

Analyses of the observation scores revealed that the behavior represented in the observational scales harsh physical discipline and verbal overreactive discipline were virtually absent in our sample (only 3 mothers and 6 fathers showed minor indications of harsh physical discipline; only 7 mothers and 13 fathers showed some verbal overreactive discipline, with scores on either scale not exceeding 2). Therefore, we could not use these variables for the analyses and only focused on observed Supportive Presence.

## 2.4. Data analysis

There were three study variables with outliers, as evidenced by standardized individual scores lower than  $-3.29$  or higher than  $3.29$  (Tabachnick & Fidell, 2012). Outliers were found for parenting stress reported by the mother ( $n = 2$ ), and partner related stress reported by the mother ( $n = 2$ ) and the father ( $n = 1$ ). These values were winsorized; making them the subsequent highest score within the particular variable. Study variables were normally distributed, except for childhood maltreatment and child abuse risk (for mothers as well as fathers), which positively skewed. To achieve normal distribution of the variables, logarithmic ( $\log_{10}$ ) transformations were used (Tabachnick & Fidell, 2012). To test mediation, the Preacher and Hayes (2004) method was applied using the online available PROCESS macro for SPSS (Hayes, 2013).

## 3. Results

### 3.1. Preliminary-analysis

Correlations and descriptive statistics of the study variables and relevant background variables are displayed in Table 1. For both mothers and fathers more negative attributions were related to more parenting stress and more harsh and abusive discipline. Mothers who reported more partner-related stress and scored higher on child abuse risk, also expressed more negative attributions. Parenting stress was positively associated with harsh and abusive parenting for both mothers and fathers. For mothers, partner-related stress was also positively correlated with harsh and abusive parenting; while for fathers family SES correlated negatively with harsh and abusive parenting. Family SES was positively related with supportive presence for both mothers and fathers. Family SES was negatively related to fathers' child abuse risk. All other risk variables (i.e., partner-related stress, parenting stress, childhood maltreatment, and child abuse risk) were positively intercorrelated for fathers and mothers, except for fathers' parenting stress with fathers' childhood maltreatment experiences and with fathers' child abuse risk. Regarding the background variables (i.e., age parent, age child, gender child, number of children), age of the child was positively related to both negative attributions of the father and harsh and abusive discipline reported by the father, so it was added as covariate in subsequent mediation analyses.

### 3.2. Mediation model

Because we were interested in replicating the results of our previous study (Beckerman et al., 2017), we first ran the exact same analysis with the same study variables (i.e., SES, partner-related stress, parenting stress, childhood maltreatment, negative parental attributions, and self-reported harsh and abusive parenting). In addition, we tested this model for fathers, for the prediction of observed supportive presence, and for the risk factor child abuse risk. Finally, the separate mediation effects were tested in a multiple mediation model for mothers and fathers separately.

#### 3.2.1. Self-reported harsh and abusive discipline

In line with our previous study (Beckerman et al., 2017) we first tested if negative parental attributions mediated the association between parenting stress and self-reported harsh and abusive discipline. One thousand bootstrap resamples were used and 95% bias corrected (BC) confidence intervals were computed. For mothers, the indirect path from parenting stress, through maternal negative attributions, to harsh and abusive discipline was significant,  $B = 0.40$ ,  $S.E. = 0.19$ , 95% BC CI = 0.13, 0.89. The direct effect of parenting stress on harsh and abusive discipline was also significant,  $B = 1.61$ ,  $S.E. = 0.45$ ,  $p < .01$ . So the relation between parenting stress and maternal harsh and abusive discipline was partially mediated by maternal negative attributions. For fathers, partial mediation between parenting stress and harsh and abusive discipline by negative attribution was found as well:  $B = 0.27$ ,  $S.E. = 0.17$ , 95% BC CI = 0.04, 0.72 (indirect effect),  $B = 1.71$ ,  $S.E. = 0.53$ ,  $p < .01$  (direct effect). The effects for mothers and



**Table 1**  
Correlations, Means, and Standard Deviations for Background and Study Variables (N = 105).

	NEGATIVE PARENTAL ATTRIBUTIONS													
	Father													
	1	2	3	4	5	6	7	8	9	10	11	12	M (SD)	
1. Age child		-.01	.29**	.02	.14	.15	-.06	.02	.00	.22*	.27**	.09	3.44 (1.11)	
2. Gender child			-.05	.04	-.07	.07	.06	.10	-.04	.03	-.11	.02	1.50 (0.50)	
3. Number of children				-.03	.04	-.06	.01	.07	.03	.30**	.16	-.03	1.90 (0.74)	
4. SES					.26**	-.17	-.06	-.18	-.46**	-.04	-.23**	.40**	0.03 (1.73)	
Mother														
5. Age Parent	.26**	.04	.17	.50**	.58**	.11	.12	-.03	.06	.07	-.04	.08	35.14 (4.98)	
6. Partner-related stress	.10	-.10	.08	-.24	-.07	.57**	.24*	.34**	.53**	.12	.16	-.07	1.21 (0.91)	
7. Parenting stress	.03	.04	.11	.06	.14	.21*	.38**	-.06	.12	.21*	.32**	.07	0.77 (0.44)	
8. Childhood maltreatment	.09	.01	.17	-.18	-.05	.24*	.26**	.05	.56**	-.01	.06	-.23*	0.37 (0.06)	
9. Child abuse risk	.07	.14	.07	-.19	-.06	.54**	.39**	.53**	.39**	.03	.17	-.25**	1.67 (0.35)	
10. Negative attributions	.16	.00	.12	-.10	.07	.22*	.27**	.11	.23*	.45**	.25**	-.18	15.38 (7.58)	
11. Harsh discipline	.34**	-.01	.21*	-.11	.03	.28**	.40**	.17	.18	.38**	.39**	-.08	0.00 (2.57)	
12. Supportive Presence	.09	.07	.08	.30**	.31**	-.03	.02	.08	-.04	-.18	-.10	.21*	5.39 (1.18)	
M (SD)					32.70 (4.4)	1.15 (0.81)	0.78 (0.51)	0.38 (0.09)	1.71 (0.34)	14.97 (7.90)	0.00 (2.53)	5.49 (1.34)		

\* $p < .05$ , \*\* $p < .01$ .

Note: Correlations below the diagonal (light grey) refer to associations between variables of the mother, correlations above the diagonal (darker grey) refer to associations between variables of the father, and correlations on the diagonal (darkest grey) reflect associations between mothers and fathers.

fathers were compared using an equality of coefficients z-test (Clogg, Petkova, & Haritou, 1995), that indicated that the mediation effects were not significantly different ( $p > .39$ ).

Second, we tested if negative parental attributions mediated the relation between harsh and abusive parenting and the other previously studied risk factors (i.e., SES, partner-related stress, parenting stress, childhood maltreatment; Beckerman et al., 2017), and the additional risk factor child abuse risk. For mothers, we found that the effect of partner-related stress was partially mediated,  $B = 0.23$ ,  $S.E. = 0.11$ , 95% BC CI = 0.06, 0.51 (indirect effect),  $B = 0.66$ ,  $S.E. = 0.29$ ,  $p < .05$  (direct effect), and the effect of child abuse risk was fully mediated by negative parental attributions,  $B = 0.63$ ,  $S.E. = 0.26$ , 95% BC CI = 0.20, 1.29 (indirect effect),  $B = 0.67$ ,  $S.E. = 0.70$ ,  $p = .34$  (direct effect). For fathers, we found no mediation effects for the other risk factors besides parenting stress. Again the mediation effects for mothers and fathers were not significantly different (all  $ps > .29$ ).

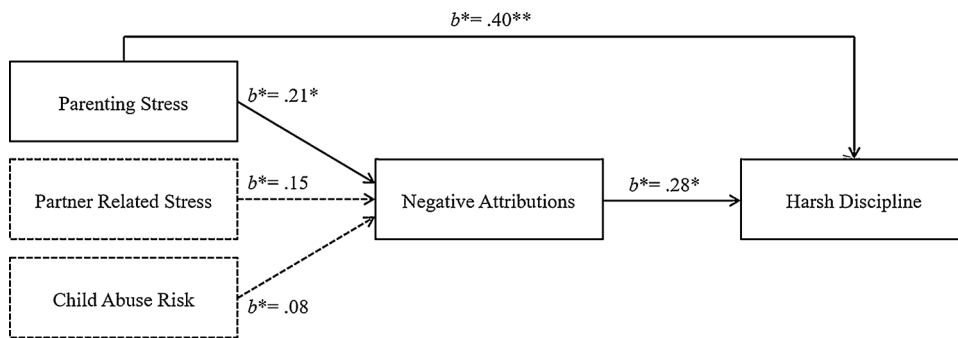
### 3.2.2. Observed supportive parenting

We examined the same mediation models for the relation between the different risk factors negative attributions and observed supportive presence as outcome variable. For mothers, we found full mediation for three risk factors: (1) parenting stress;  $B = -0.15$ ,  $S.E. = 0.08$ , 95% BC CI =  $-0.37$ ,  $-0.03$  (indirect effect),  $B = 0.22$ ,  $S.E. = 0.27$ ,  $p = .42$  (direct effect); (2) partner-related stress;  $B = -0.07$ ,  $S.E. = 0.05$ , 95% BC CI =  $-0.19$ ,  $-0.01$  (indirect effect),  $B = 0.03$ ,  $S.E. = 0.17$ ,  $p = .87$  (direct effect); and (3) child abuse risk;  $B = -0.17$ ,  $S.E. = 0.11$ , 95% BC CI =  $-0.47$ ,  $-0.02$  (indirect effect),  $B = 0.05$ ,  $S.E. = 0.39$ ,  $p = .89$  (direct effect). For fathers, no mediation was found with supportive presence as outcome variable. Similar to the previous mediation effects, no significant differences were found between the models for mothers and fathers (all  $ps > .39$ ).

### 3.2.3. Multiple mediation model

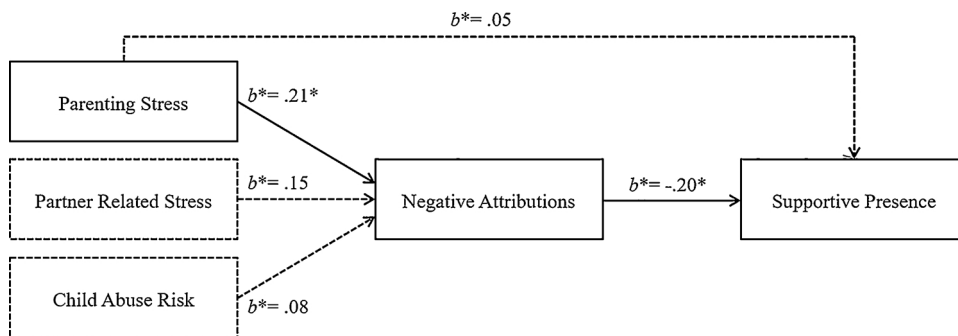
Finally, we conducted a multiple mediation analysis with all significant risk factors in one model. For mothers, two models were tested with partner-related stress, parenting stress, and child abuse risk as predictors: one with harsh and abusive parenting and one with supportive presence as outcome variable. For the first model (see Fig. 1) we found that the mediation for partner-related stress ( $B = 0.11$ ,  $S.E. = 0.11$ , 95% BC CI =  $-0.07$ , 0.39) and child abuse risk ( $B = 0.16$ ,  $S.E. = 0.24$ , 95% BC CI =  $-0.25$ , 0.72) disappeared; the relation between parenting stress and harsh and abusive parenting remained to be partially mediated by negative parental attributions,  $B = 0.29$ ,  $S.E. = 0.19$ , 95% BC CI = 0.02, 0.77 (indirect effect),  $B = 1.68$ ,  $S.E. = 0.47$ ,  $p < .01$  (direct effect).

For the second model (see Fig. 2) we found the same pattern: mediation for partner-related stress ( $B = -0.04$ ,  $S.E. = 0.05$ , 95% BC CI =  $-0.19$ , 0.02) and child abuse risk ( $B = -0.06$ ,  $S.E. = 0.10$ , 95% BC CI =  $-0.34$ , 0.08) disappeared; the relation between parenting stress and supportive presence remained to be fully mediated by negative parental attributions,  $B = -0.11$ ,  $S.E. = 0.10$ ,



**Fig. 1.** Multiple mediation model of parenting stress, partner related stress and child abuse risk on harsh discipline by negative maternal attributions.  $^*p < .05$ ,  $^{**}p < .01$ .

Note: Dashed lines are non significant associations.



**Fig. 2.** Multiple mediation model of parenting stress, partner related stress and child abuse risk on supportive presence by negative maternal attributions.  $^*p < .05$ ,  $^{**}p < .01$ .

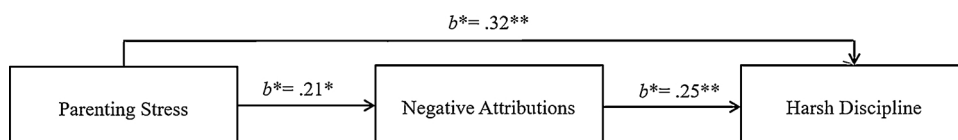
Note: Dashed lines are non significant associations.

95% BC CI =  $-0.36, -0.01$  (indirect effect),  $B = 0.23$ , S.E. =  $0.29$ ,  $p > .05$  (direct effect). For fathers, we did not perform additional mediation analyses with the separate risk factors together in one model, since only parenting stress was significantly mediated by negative parental attributions in relation to harsh discipline when individually studied (see Fig. 3).

#### 4. Discussion

We replicated the finding of our previous study, showing that the association between parenting stress and self-reported maternal harsh and abusive discipline was partially mediated by maternal negative attributions. The same partial mediation was found for fathers' harsh and abusive parenting. In addition, partner-related stress and abuse risk showed a similar effect on harsh and abusive parenting through negative attributions for mothers. Furthermore, the indirect effects on maternal self-reported harsh and abusive parenting were extended to observed maternal supportive presence. For fathers, however, no indirect effects were found for other stressors or with observed supportive presence. The stressors SES and childhood maltreatment history did not show an indirect effect for mothers or fathers. Finally, for mothers only the indirect effect of parenting stress remained significant when the other significant stressors (i.e. partner-related stress, abuse risk) were added to the model.

By replicating our previous results using a relatively large sample, including data of mothers and fathers, and using observational measures, this study adds support to the assumptions of the SIP-model (Milner, 2003, 1993), that hypothesizes that high stress levels are related to negative parental attributions, which are in turn associated with more harsh and abusive parenting and less supportive parenting. Since observed supportive presence and self-reported harsh and abusive discipline were not correlated, they each seem to represent a different construct of negative parenting instead of being two extremities on one scale. This could imply that the SIP-model is applicable to different types of dysfunctional parenting. The SIP-model is a cognitive behavioral explanation for child



**Fig. 3.** Mediation model of parenting stress on harsh discipline by negative paternal attributions.  $^*p < .05$ ,  $^{**}p < .01$ .



physical abuse, but prior comparable models also used cognitions, such as parental attributions, as mediators to explain child neglect and child sexual abuse (e.g., Azar, Miller, Stevenson, & Johnson, 2017; Crittenden, 1993; De Paul & Guibert, 2008; Howells, 1981). Therefore, it is reasonable to argue that the SIP-model could be used for explaining different types of child abuse and neglect or dysfunctional parenting (e.g., harsh parenting and lack of supportive parenting). More studies are needed to further test the applicability of the SIP-model for different types of child abuse and neglect.

Parenting stress, partner-related stress, and abuse risk were individually related to dysfunctional parenting through negative attributions for mothers. Not all indirect effects were full mediational effects as found in our previous study. Concerning harsh and abusive parenting, partial mediation was found for the risk factors parenting stress and partner-related stress. This indicates that the relation between the risk factors and harsh and abusive parenting was not fully explained by negative attributions. Other variables could further mediate the relation. For example, the SIP-model explains that next to parental attributions, processing cognitions like perception, information integration and response selection, also might function as mediators (Milner, 2003, 1993). Considering our inconsistent findings regarding full and partial mediation between risk factors and dysfunctional parenting, we encourage future research to further disentangle this relation by specifying direct and indirect effects, and by incorporating alternative mediators to the model.

Furthermore, contrary to our expectations, SES and childhood maltreatment were not related to parental attributions. Although we tried to include families with a broad range of socioeconomic backgrounds, all families were above the Dutch poverty line. On average the families in the sample had a monthly net family income that was around the average family income of the Dutch population (Central Bureau for Statistics, 2017). The absence of a relation between SES and parental attributions might be explained by the fact that there was hardly any socioeconomic strain to begin with. All families' financial situations could provide them with all basic needs like housing, food, clothing, and health insurance. The same argumentation might be true for maternal history of childhood maltreatment. To have an effect on parenting cognitions there might be a threshold - a certain amount of experienced maltreatment - that needs to be reached before it negatively influences attitudes regarding children and childrearing practices which in turn affect parental attributions.

Moreover, the results of our replication point again in the direction of parenting stress being the most influential type of stress that affects parental attributions. In our first study we only found the relation between parenting stress and abusive discipline to be mediated by negative parental attributions, no such relations were found for the other stressors or for past childhood maltreatment (Beckerman et al., 2017). In the current study, such relations were found for other stressors (i.e., partner-related stress and child abuse risk), but when studied in one model only parenting stress remained significant. For fathers, only the association between parenting stress and harsh and abusive discipline was mediated by negative parental attributions. As reasoned in our previous study, it might be that the stressor that is most directly related to parenting situations (i.e., parenting stress) is most influential. The SIP model theorizes that when parents experience stress that is related to the child, other negative emotions and cognitions (e.g., anger and hostility) will also be more at the surface when observing challenging (i.e., ambiguous) child behavior, because this reminds them of negative parenting experiences in the past (Milner, 2003; Milner, 1993). Thus, the combination of experiencing parenting stress and the trigger of negative child-related emotions and cognitions might play a role in increased parental susceptibility to automatic processing and as a result, increased bias in parental attributions (Beckerman et al., 2017; Milner, 2003, 1993).

Additionally, to understand different types of stressors that influence parental attributions, our study sheds some light on similarities and differences in parental attributions between mothers and fathers. Considering harsh and abusive parenting, for both mothers and fathers there was an indirect effect of parenting stress via negative parental attributions. For supportive presence, this indirect effect was only found for mothers. Considering partner-related stress and child abuse risk, an indirect effect on dysfunctional parenting via parental attributions was again only found for mothers.

This finding might indicate that mothers and fathers are different in their parental attributions and/or that they are differently affected by stress. As suggested, applying models found for mothers to fathers might be problematic, because of potentially different parenting styles, differences in the amount of time they spend with their children, and in their physiological reaction to stress (Kudielka & Kirschbaum, 2005; Lamb, 2010). For example, when fathers discipline the children more often than mothers do, it might be plausible that fathers attribute challenging child behavior as more wrong and blameworthy and are more likely to choose a disciplinary response in an ambiguous situation, whereas mothers might attribute the behavior as more accidental and/or piteous, and comfort the child. Or, when mothers spend more time with their children, their attributions might be based more on past child-related/parenting experiences (for better or for worse), and as such have different antecedents and therefore different patterns of associated variables compared to fathers' attributions. Although these explanations for mother and father attributional differences are plausible, for now we can only conclude that the indirect effect of stress on dysfunctional parenting via parental attributions seems to be more robust for mothers than for fathers, even though the indirect effects did not differ significantly between mothers and fathers. More studies are needed to further explore differences in mother and father attributions in relation to stress and how they predict parenting outcomes. In addition it would be interesting to study parental attributions in relation to child outcomes. Father attributions might not be different from mother attributions in relation to parenting outcomes, but they might predict child outcomes differently. Since it has been suggested that mothers and fathers each serve a different role in the family system, they might complement each other and/or influence each other in parenting and subsequently child outcomes. Future research should therefore not solely focus on attributional differences between mothers and fathers, but also incorporate interaction effects between mother and father attributions; how do they relate and interact with each other within the family system and how do they (simultaneously) influence their children?

We could not overcome all of the limitations of our previous study (Beckerman et al., 2017). For example, for replication purposes we used a comparable sample (i.e., relatively high SES parents with a Dutch cultural background) and study design (i.e., cross-

sectional). So, generalization claims are limited to comparable medium-to-high SES families, and causality claims can only be made on theoretical grounds. We used mediation according to the SIP-model to explain the link between stress, attributions and dysfunctional parenting, however other models are also plausible. For example, negative parental attributions could moderate the association between stress and dysfunctional parenting (i.e., the combination of negative attributions and stress results in dysfunctional parenting), or stress may mediate the relation between attributions and harsh and abusive parenting (i.e., negative attributions lead to the stress, which in turn leads to dysfunctional parenting).

Furthermore, we added observational measures for examining parenting, but could only use supportive parenting for analyses because harsh parenting rarely occurred in our low-risk sample. It has been recommended to use observational measures that elicit challenging parenting situations to reduce the limitation of social desirability to a minimum and to discriminate dysfunctional parenting styles from non-dysfunctional styles (Bennett et al., 2006). In line with these recommendations, we chose to observe harsh parenting and low supportive presence as dysfunctional parenting styles within a stressful ‘don’t touch’ task in addition to self-reported parenting. Harsh parenting did not show enough variability in our sample and in retrospect this might not have been the most suitable rating scale to observe dysfunctional parenting in a low-risk sample; demonstrating harsh parenting might be a more severe form of dysfunctional parenting that is more likely to occur in high-risk samples. Other rating scales that have been used in observational measures of parenting, such as intrusiveness (i.e., low respect for a child’s autonomy), hostility, and limit-setting (e.g., Egeland & Hiester, 1995) might provide more variance in a low-risk sample. Additionally, where low supportive presence might be a precursor for neglectful types of maltreatment, measurements of intrusiveness and limit-setting might be more suitable to use as precursors for child physical abuse. We encourage future research to study more heterogeneous samples concerning cultural background, SES, and risk status, and to use an experimental or longitudinal design to further explore the interplay between parental attributions and stress in relation to negative parenting.

To conclude, together with our previous study this replication and extension provide additional evidence that the effects of stress (specifically parenting stress) on different aspects of negative parenting (i.e., harsh and abusive parenting, non-supportiveness) can be (partially) explained by negative parental attributions. Therefore, we recommend that interventions aimed at preventing or decreasing the occurrence of child abuse should also target negative parental attributions. In addition, attributions as measured by our newly developed attribution task (i.e., the PACT) are related to constructs as expected based on theoretical grounds and prior research. Hence, the PACT may be used as a diagnostic tool in the assessment of strengths and limitations in parenting. Results can be used to decide to what extent a focus on parental attributions in an intervention is necessary. Further exploration of this multi-purpose use of the PACT, as well as studying the PACT with more heterogeneous and high-risk samples is recommended.

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