Naughty or clumsy? Negative parental attributions in the context of child abuse risk

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Chapter 4

Are negative parental attributions predicted by situational stress? From a theoretical assumption towards an experimental answer.

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Abstract

In an experimental within-subjects research design we studied the theoretical assumption that stress predicts negative parental attributions, which until now was mainly studied using cross-sectional study designs. During home-visits to 105 families, mothers and fathers were subjected to two experimental conditions and two control conditions. In the experimental conditions parents completed the Parental Attributions of Child behavior Task (PACT; a computerized attribution task) under two different stressful conditions (i.e., cognitive load and white noise), in the control conditions the PACT was completed without additional components. Furthermore, parents completed questionnaires about existing risk factors (i.e., partner-related stress, parenting stress, and abuse risk). There were no main effects of induced stress on attributions for fathers and mothers, but we found that a combination of induced situational stress (cognitive load) and high-risk resulted in the most negative parental attributions in mothers. The discussion focuses on intensity and origin of stressors, comparison between mother and father attributions, implications for interventions, and possible future research directions.

Keywords: Parental attributions, stress, high-risk, experimental design, child abuse, information processing, fathers

Introduction

According to the Social Information Processing (SIP) model, negative parental attributions (i.e., negative interpretations and evaluations of child behavior) are important predictors of subsequent disciplinary actions and potentially, harsh and abusive parenting (Milner, 1993, 2003). The model hypothesizes that physically abusive parents, relative to non-abusing parents, make more negative interpretations of child behavior (e.g., motivated by hostile intent) and more negative evaluations of this behavior (e.g., qualified as wrong and blameworthy). A large number of studies have confirmed these hypothesized differences in attributions of parents at risk for abuse or parents who are abusing versus low-risk and non-abusing parents (e.g., Burchinal, Skinner, & Reznick, 2010; De Paúl, Asla, Perez-Albeniz, & De Cadiz, 2006; Irwin, Skowronski, Crouch, Milner, & Zengel, 2014). However, far less is known about the origins of differences in parental attributions. The SIP-model reasons that the experience of stress is an important risk factor for parental attributions to become biased (Milner, 1993, 2003). Some empirical evidence was found for this theoretical assumption (Berlin, Dodge, & Reznick, 2013; Beckerman, Van Berkel, Mesman, & Alink, 2017; Haskett, Scott, Willoughby, Ahern, & Nears, 2006), although primarily based on cross-sectional data, precluding conclusions about causality. The current study aims to shed more light on the possible *causal* relation between stress and attributions using an experimental research design.

The Social Information Processing model (Milner, 1993, 2003) is a frequently used theoretical framework to describe and study cognitions of parents at risk for child abuse or parents who are abusing their children (e.g., Berlin et al., 2013; Haskett et al., 2006; Rodriguez & Tucker, 2015; Slep & O'Leary, 1998). Parental attributions are a key element of the model and is described as the cognitive process of interpretation and evaluation of the behavior of the child, thereby giving meaning to the child's behavior. The model hypothesizes that high-risk and abusive parents make different attributions about child behavior than other parents. High-risk and abusive parents are proposed to have a high predisposition to attribute responsibility and hostile intent to the child (e.g., "she spilled her food to get back at me"), and evaluate negative child behavior as being more serious, wrong, and blameworthy (e.g. "spilling food is serious wrongdoing of my child, she should know better"). Additionally, these parents are also less likely to think about alternative explanations for their child's behavior (e.g., "she spilled her food by accident, because she is too young to eat properly with a spoon") than other parents. According to the model, these attributional differences between physically abusive parents and non-abusing parents will be greatest when the child's behavior in question is ambiguous in nature, when it concerns challenging but age-appropriate child behavior, and /or minor transgressions.

It has been theorized that stress is an important risk factor for attributions to become biased. Once stress increases, parents are more likely to process information automatically,

instead of in a controlled and flexible manner (i.e., controlled processing) (Milner, 1993, 2003). During automatic processing parents rely more on fixed and rigid beliefs (e.g., "children should not spill food") and are less likely to take situational information into account (e.g., age-related constraints in child skills). When parents attribute their child's behavior automatically, they are less able to understand the child's behavior within the actual context, therefore attribute more responsibility to the child, and evaluate the child's behavior as more wrong. Empirical evidence shows that people who are (chronically) stressed 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). There is evidence that stress impairs cognitive functions such as self-control, and executive attention and memory (Diamond, 2013; Kuhlmann, Piel, & Wolf, 2005; Lupien, Maheu, Tu, Fiocco, & Schramek, 2007). Stress-related impairment in each of these cognitive functions increases the likelihood of automatic processing versus controlled processing. Parents experiencing high stress levels and having problems regulating their attention are likely to find it difficult to be attentive to situational factors and to appraise the situation in its actual context. Parents with low self-control (particularly inhibitory control), may take less time to think before they evaluate the situation or reevaluate their initial responses, and as a consequence they will rely more on fixed and rigid beliefs while attributing child behavior. Parents with an impaired working memory have difficulties seeing connections, incorporating new information into thinking, and considering alternatives (Diamond, 2013).

There is some empirical evidence that heightened stress levels are indeed related to more negative parental attributions. For example, stress experienced as a consequence of socio-economic strain (Berlin et al., 2013; Clément & Chamberland, 2009), parenting stress (Clement & Chamberland, 2008; Haskett et al., 2006; Beckerman et al., 2017), and partner-related stress (Beckerman, Van Berkel, Alink, Mesman, 2018) were found to be related to more negative parental attributions. However, the study designs were cross-sectional which precludes causality claims.

Theoretically, negative parental attributions are predicted by stress, but an alternative explanation could be that negative attributions cause stress. Parents with more negative parental attributions could also experience more stress because of their negative attributions. When parents' attributions are negatively biased it could be that in general they perceive things more negatively than other parents, and as a consequence will experience more stress. To our knowledge only two studies have manipulated stress in order to experimentally examine the effect on parental attributions. One study examined stress as a within-subject factor (i.e., the same group of parents attributed child behavior with and without a stressor; Cassles & Milner, 2000), the other examined stress as a between-subject factor (one group of parents attributed child behavior with a stressor, another without; De Paúl et al., 2006). In both studies, the same infant cry sound was used to elevate stress levels while parents evaluated vignettes of child behavior. Neither

study found an effect of the infant cry stressor on negative attributions. The authors offer multiple explanations for their findings. For example, perhaps the stimulus was not stressful enough for parents because the (intermitted) cry sound for a total duration of 3 minutes was too short, or because the crying infant was not their own (De Paúl et al., 2006). The stressor could also have been more stressful to some parents than others, based on experience (e.g., more stressful when the parent's child cried frequently during infancy). Furthermore, the authors propose that future research should study situational stressors in combination with existing stressors (i.e., risk) to expect a more robust effect on parental attributions (Cassles & Milner, 2000), and that the situational stressor should be presented simultaneously with the parental attributions, rather than in advance (De Paúl et al., 2006).

Taking into account these previous findings and directions, the aim of the current study is to extend knowledge about the relation between stress and negative attributions, overcoming previous study limitations and taking into account suggestions based on prior research. To be more specific, the first objective is to study situational stress and negative attributions in an experimental within-subjects design. Two conditions were designed to elevate stress levels: white noise and cognitive load. White noise is a random sound that has an equal intensity at different frequencies, and covers the entire range of human hearing (Carter & Mancini, 2009; Forquer & Johnsons, 2005). Cognitive load refers to the total amount of mental effort being used in the working memory (Sweller, 1988; Ayres & Paas, 2012). Both of these conditions are used and manipulated in cognitive psychology to induce stress (e.g., Hillier, Alexander, Beversdorf, 2006; Hiraoka & Nomura, 2017; Liu, Iwanaga, Shimomura, & Katsuura, 2007; Meiring, Subramoney, Thomas, Decety, & Fourie, 2014). We selected these situational stressors because they mirror real life situational stress that parents may encounter when interacting with their child (i.e., loud noises, having to think about many things at the same time) and do not give meaning to the child's behavior per se (as is the case with crying as a stressor). Moreover, we presented the stressors while parents were attributing child behavior. We expect that parents will attribute child behavior more negatively in the experimental conditions compared to the control conditions (hypothesis 1).

The second objective is to study situational stressors in combination with existing risk factors. In two of our previous studies (Beckerman et al., 2017; 2018) we examined different types of risk factors (i.e., socio-economic strain, partner-related stress, parenting stress, past childhood maltreatment, and abuse risk) in combination with negative parental attributions, and found that partner-related stress, parenting stress, and abuse risk were positively related to negative parental attributions. Therefore, in the current study we examine the interaction effects of experimentally induced stress (i.e., situational stressors) and an accumulative risk factor of partner-related stress, parenting stress, and abuse risk (i.e., existing risk factors). We expect that the effect of induced situational stress on negative parental attributions is more pronounced for high-risk parents, compared to

low-risk parents (hypothesis 2). In addition, we expect high-risk parents to attribute more negatively compared to low-risk parents, in both the experimental and control condition (hypothesis 3).

Finally, all hypotheses are tested for mothers and fathers separately. It has been suggested that fathers and mothers are not only different in their attributional styles (Chen, Seipp, & Johnston, 2008; Lansford et al., 2011), but that they also differ in their biological make-up and sociale role, and therefore respond differently to stress (Krantz, Forsman, Lundberg, 2004; Kudielka & Kirschbaum, 2005; Matud, 2004). In sum, we experimentally test whether stress affects parental attributions. We expect that both situational stress and existing risk factors (i.e., accumulative risk) are individually related to more negative parental attributions (hypothesis 1 and 3, respectively). In addition, a more prominent effect of the induced situational stress is expected on parental attributions for high-risk parents, compared to low-risk parents (hypothesis 2).

Method

Sample

Participants were recruited in several 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. 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 (see also Beckerman et al., 2018).

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 degree); 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.

Procedure

Data were collected during six home visits; three visits were planned with the mother, and three visits with the father. The order of mother and father visits was counterbalanced (i.e., MFMFMF or FMFMFM) and parents were explicitly requested not to talk about the tasks and questionnaires to each other. During the first home visit parent-child dyads were filmed and parents were asked to fill out questionnaires. During the second and third home visit parents completed the Parental Attributions of Child behavior Task (PACT), twice in the control condition and twice in the experimental condition (Table 1). In addition they were asked to fill out more questionnaires. The order of the conditions across the second and third home visits was counterbalanced between families. The order of conditions was the same for fathers and mothers within families. There was at least one month between administering the control and experimental condition to prevent carry-over effects. Parents and children received a small gift after each 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.

Table 1
PACT: Experimental versus matched control condition

Parent X	
Home visit A	Home visit B
Experimental condition	**Control condition**
PACT- Cognitive load (picture series 1)	PACT- Standard (picture series 1)
PACT- White noise (picture series 2)	PACT- Standard (picture series 2)

Note: Home visit A and B were counterbalanced, as well as the order in which parents received the cognitive load and the white noise component and the two matching control tasks within home visits

Measures

Parental Attributions of Child behavior Task. 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 consists of presentations of ten ambiguous illustrations of child behavior that can be interpreted as being either 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 answer a series of eight attribution questions as quickly as possible with a maximum of 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 elicit fast responses, 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 were used as a measure of the parent's level of negative attributions (ranging from 0-40). All questions were answered within 3500 ms. Cronbach's alphas for negative parental attributions were .95 for mothers and .94 for fathers. More detailed information about the PACT can be found in Beckerman et al. (2017). The PACT was administered to each parent four times: twice in the control condition during one home visit, and twice in the experimental condition with additional components (i.e., cognitive load and white noise) in the other home visit.

***Control condition: PACT – Standard*.** In the control condition, parents completed two versions of the PACT in its original form as described above. These two versions differed only in the pictures that were used (e.g., a child spilling chocolate cake versus a child spilling ice cream), but both contained ten ambiguous and five neutral pictures. The first administered task in the control condition was matched with the first administered task in the experimental condition (i.e., the pictures were the same), and the second task in de control condition with the second task in het experimental condition (see Table 1 for an example). From this point onwards, any comparison between an experimental and control condition always refers to the matched condition.

Experimental condition: PACT – Cognitive load. In this experimental condition parents completed the PACT that included induction of cognitive load by asking parents to remember 10 daily groceries (e.g., bread, lemonade, bananas) during the task. At the start of the task four pictures of groceries were separately displayed for 500ms each, the other six groceries appeared during the task; one after every two series of attribution questions. At the end of the task parents were asked to write down as many groceries as they could remember. Cronbach's alphas for negative parental attributions were .89 for mothers, and .91 for fathers.

Experimental condition: PACT – White noise. In this experimental condition***,*** parents completed the PACT while wearing headphones which distributed a constant white noise (85 dB; stressful without causing damage to hearing; Hillier et al., 2006; Liu et al., 2006; Dutch National Hearing Foundation, 2017). The experimenter monitored if the parents did not lower the volume or take off the headphone, which none of the participants did. Cronbach's alphas for negative parental attributions were .92 for mothers, and .93 for fathers.

Within the conditions, the two tasks were separated by a 5-minute break in which parents watched a movie with relaxing nature images (e.g., sunny beach, soft waterfall, quiet lake). The order in which the two sets of attribution drawings were used, was counterbalanced between families. For each parent, the same order of sets was used across conditions. No significant differences were found in negative attribution scores between the two different sets within the two control conditions and the two experimental conditions; for mothers (*p*s > .11) or fathers (*p*s > .08). The order in which parents received the cognitive load component and the white noise component and the two matching control tasks (i.e., task order) was also counterbalanced between families. Task order was added as a covariate to control for possible order effects.

Risk. A risk score was computed by the standardized sum of partner-related stress, parenting stress, and child abuse potential, because in our previous studies, these factors were related to negative parental attributions (Beckerman et al., 2017, 2018).

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 .88 for mothers, and .89 for fathers.

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 .88 for mothers, and .83 for fathers.

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) of 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 .86 for mothers, and .85 for fathers.

Risk composite. Based on the above mentioned risk factors, a composite risk factor was calculated for both mothers and fathers. For mothers, correlations between the risk factors were: r (104) = .21, p = .03 for partner-related stress and parenting stress; r (104) = .54, p < .00, for partner- related stress and child abuse risk; r (104) = .39, p < .00, for parenting stress and child abuse risk. For fathers, correlations between the risk factors were: r (104) = .24, p = .01, for partner-related stress and parenting stress; r (104) = .53, p < .00, for partner- related stress and child abuse risk; r (104) = .12, p = .22, for parenting stress and child abuse risk. The risk composite was computed as the standardized sum of partner-related stress, parenting stress, and child abuse risk.

Data Analyses

Data-inspection revealed one outlier (i.e. a standardized individual score lower than -3.29 or higher than 3.29; Tabachnick & Fidell, 2012) in the mother's risk composite. This value was winsorized, making it the subsequent highest score within the particular variable. All study variables were normally distributed. Repeated Measures ANCOVAs were used to test differences between attribution tasks (experimental versus matched control) and to investigate interaction effects with the risk composite.

Results

Preliminary Analysis

As previously mentioned, comparison between an experimental and control condition always refers to the matched condition, tasks are labeled as follows in the result section: Cognitive Load (CL), Control CL, White Noise (WN), Control WN. Correlations and descriptive statistics of the study variables and relevant background variables are displayed in Table 2. For mothers and fathers all four attribution tasks were positively correlated (rs ≥ .55, ps < . 00), meaning that a higher score for negative attributions on one of the attribution tasks related to a higher score for negative attributions on one of the other attribution tasks. This indicates relative stability among the different versions of the PACT. For each task, negative attributions were also positively correlated between parents (rs ≥ .40, ps < .00). In addition, mothers and fathers did not significantly differ in their negative attribution scores on the four different tasks; t(104)**= -**0.34, p =.74 (Cognitive Load), t(104)**= -**0.69, p =.49 (Control CL), t(104)**= -**0.98, p =.33 (White Noise), t(104)**= -**0.96, p =.34 (Control WN), which indicates within-family congruence in parental negative attributions. None of the background variables (i.e., age child, gender child, number of children, SES, age parent) were related to negative attributions and the risk composite, so they were not added as covariates in subsequent analyses.

Table 2

Correlations, Means, Standard Deviations and Range for Background and Study Variables (N=105)

					Father						
	1	2	3	4	5	6	7	8	9	10	*M* (*SD*)
1. Age child					.14	.13	.17	.26**	.23*	.05	3.44 (1.11)
2. Gender child	-.01				-.07	.01	.08	-.04	.00	.05	1.50 (0.50)
3. Number of children	.29**	-.05			.04	.22*	.24*	.25**	.31**	-.02	1.90 (0.74)
4. SES	.02	.04	-.03		.26**	-.03	-.02	-.03	-.08	-.31**	0.03 (1.73)
Mother											
5. Age Parent	.26**	.04	.17	.50**	.58**	-.01	-.03	.12	.03	-.10	35.14 (4.98)
6. Attributions Cognitive Load (CL)	.19	-.09	.17	.00	.19	.40**	.80**	.81**	.62**	.12	14.31 (7.50)
7. Attributions Control CL	.07	.02	.11	-.10	.14	.80**	.42**	.68**	.74**	.09	14.63 (8.16)
8. Attributions White Noise (WN)	.28**	-.03	.16	.01	.11	.65**	.55**	.59**	.77**	.15	15.74 (8.53)
9. Attributions Control WN	.23*	-.02	.11	-.08	.00	.63**	.70**	.82**	.45**	.22*	15.31 (8.91)
10. Risk Composite	.11	.03	.13	-.15	.01	.38**	.23*	.33**	.33**	.50**	0.00 (2.29)
M (*SD*)					32.70 (4.4)	14.75 (8.29)	15.08 (7.81)	16.05 (9.44)	15.54 (8.51)	0.00 (2.19)	

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.

Effects of Cognitive Load and White Noise Manipulations

To investigate the effect of the two experimental conditions on negative attributions, two Repeated Measures ANOVAs were conducted; one for cognitive load and one for white noise. The RM-ANOVAs were conducted with the repeated measures of negative parental attributions in the two conditions (i.e., experimental and control condition) of mothers and fathers (parent gender) and task order as control variable (between subjects). To investigate the interaction effect of, and the personal risk composite two RM-ANCOVAs were conducted for mothers and fathers separately, with the risk composite as additional between-subjects measure.

Cognitive Load. For cognitive load, no main effect was found for condition , $F(1, 101) = 0.25$, $p = .625$, $\eta p2 = .00$, or for parent gender, $F(1, 101) = 0.04$, $p = .84$, $\eta p2 = .00$, on negative attributions. In addition no interaction effect of condition by gender parent on negative attributions was found, $F(1, 101) = 0.36$, $p = .55$, $\eta p2 = .00$. The separate RM-ANCOVAs for mothers and fathers showed only for mothers a main effect of the risk composite, $F(1, 100) = 11.70$, $p = .00$, $\eta p2 = .11$.This indicates that mothers with higher risk composite scores, had more negative attributions in both the experimental and the control condition task. Furthermore, a significant interaction effect between condition (experimental versus control) and the risk composite was found for mothers, $F(1, 100) = 4.04$, $p = .04$, $\eta p2 = .04$ (Figure 1), meaning that a combination of experimentally induced stress and high risk yielded the highest scores on negative attributions. For fathers, no main effect, $F(1, 100) = 1.26$, $p = .27$, $\eta p2 = .00$, nor an interaction effect was found for the risk composite, $F(1, 100) = 0.12$, $p = .73$, $\eta p2 = .00$. Comparison of the $\eta 2$ for the interaction effect of the risk composite for mothers ($\eta 2 = 0.039$) and fathers ($\eta 2 = 0.001$) revealed no significant differences (p's >.23). Task order showed in none of the analyses significant main or interaction effects ($Fs \leq 1.31$, $ps > .26$)., indicating that there were no effects of the order in which experimental and control condition were administered.

White Noise. Concerning white noise, no main effect was found for condition, $F(1, 101) = 0.01$, $p = .95$, $\eta p2 = .00$, or for parent gender, $F(1, 101) = 0.42$, $p = .52$, $\eta p2 = .00$, nor was there an interaction effect between condition and parent gender, $F(1, 101) = 0.17$, $p = .68$, $\eta p2 = .00$. The separate RM-ANCOVAs for mothers and fathers showed only a significant main effect of risk for mothers, $F(1, 100) = 14.27$, $p = .00$, $\eta p2 = .12$; the higher the risk score, the more negative attributions on both the experimental and the control conditions of the white noise task. In contrast with cognitive load no interaction effect was found for condition and risk composite on negative attributions for mothers, $F(1, 100) = 0.09$, $p = .76$, $\eta p2 = .00$. The results for fathers were the same as for cognitive load, with no significant results for the main effect of risk composite, $F(1, 100) = 2.63$, $p = .11$, $\eta p2 = .03$, or the interaction effect between condition and risk composite, $F(1, 100) = 0.63$, $p = .43$, $\eta p2 = .00$. Again, a comparison of the $\eta 2$ for the interaction effect of the risk composite for mothers ($\eta 2 = 0.001$) and fathers ($\eta 2 = .006$) revealed no significant

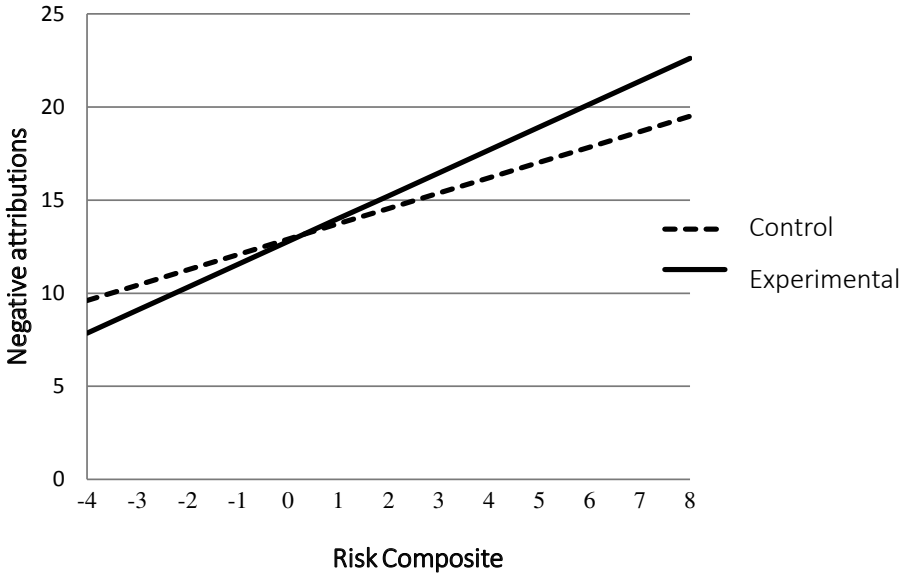

Figure 1. Interaction effect between cognitive load condition (control vs. experimental) and risk composite score on maternal negative attributions. Note: Risk composite scores are total sum scores of standardized values

differences (p's >.75). Similar to the RM-AN(C)OVAs for cognitive load no order effects were detected (Fs ≤ 3.09, ps > .08).

Discussion

The general effects of induced stress, as expected in hypothesis 1, were not found; parents did not attribute child behavior more negatively in the experimental conditions compared to the control conditions. Considering mothers, we found some proof for our other two hypotheses: the effect of induced situational stress (only for cognitive load) on negative parental attributions was more pronounced for high-risk mothers, compared to low-risk mothers (hypothesis 2), and high-risk mothers attributed more negatively compared to low-risk mothers, across both the experimental (white noise and cognitive load) and control condition (hypothesis 3). For fathers, results did not confirm hypothesis 2 or 3; risk was not related to more negative parental attributions nor did it influence fathers responses to the experimental conditions.

With this experimental study we shed more light on the theoretically assumed causal relation between stress and negative parental attributions (Milner, 1993, 2003), which until now has been primarily studied in cross-sectional research designs. Previous studies found that high-risk parents attributed child behavior more negatively compared to low-

risk parents (e.g., Beckerman et al., 2017; Berlin et al., 2013; Haskett et al., 2006), but an effect of induced situational stress on parental attributions was not found (Cassles & Milner, 2000; De Paúl et al., 2006). In this study we replicated these findings in mothers and did not find evidence for a general causal effect of stress on attributions. This might suggest that there is no causal relation between stress and negative attributions, and that the association between high risk and negative attributions indicates that parents who attribute child behavior more negatively, are also parents who experience more stress. However, we did find an interaction effect between risk (e.g., existing stress) and induced situational stress. Although induced situational stress did not seem to affect parents overall, we did find that the combination of high risk and experiencing situational stress led to more negative parental attributions. Nevertheless, this relation was only found for mothers and only for one of the two types of induced stress (i.e. cognitive load), therefore these results should be interpreted with caution and replication studies should provide more inside into these processes.

Even though no firm conclusions can be drawn from these results, we can speculate what might explain the possible combined effect of induced and existing stress on negative attributions. First, it could be that there is a threshold in the amount of stress a parent needs to experience before it taxes parental information processing; the situational stressor alone might not have been stressful enough, but the combination of existing risk and situational stress might have added up affecting parental attributions.

A second explanation could be that high-risk parents compared to low-risk parents experienced more stress when exposed to the stressor, which might have caused differences in automatic processing and subsequently differences in negative parental attributions. The SIP-model indeed reasons that high-risk parents compared to low-risk parents might be more physiological reactive to stressful stimuli and therefore may use more automatic processing, making them less attentive to situational factors and thereby negatively affecting their parental attributions (Milner, 1993, 2003). Yet another possible explanation is that automatic processing in high-risk parents may lead to different outcomes than in low-risk parents, because of differences in pre-existing schemata (i.e., general beliefs about children and parenting behavior). As a consequence of automatic processing, parents are less likely to take situational information into account and rely more on fixed beliefs, ingrained thought patterns which also have been referred to as pre-existing schemata (i.e., general beliefs about children and parenting behavior) in the SIP-model (Milner, 1993, 2003), and these schemata are thought to be negatively biased in high-risk parents. Of course, a combination of these explanations might also be at work here.

The interaction effect between risk and induced stress was found for the cognitive load condition only. In line with the previous threshold argumentation, this might indicate that only the cognitive load condition was sufficiently stressful to negatively influence parental attributions in high-risk mothers. While white noise has been found to elevate stress levels

and to lower cognitive performance (e.g., Hillier, Alexander, & Beversdorf, 2006; Ising et al., 2000; Liu, Iwanaga, Shimomura, & Katsuura, 2007), there is also evidence that white noise only negatively affects information processing from an intensity of 90dB upwards (Hillier et al., 2006; Oishi et al., 1999), and that white noise at the level of background noise might even improve cognitive performances, a process called stochastic resonance (e.g., McDonnell and Ward, 2011; Ohbayashi et al., 2017). This might indicate that our white noise stressor (85 dB; stressful without causing damage to hearing; Hillier et al., 2006; Liu et al., 2006; Dutch National Hearing Foundation, 2017) could have been too trivial to negatively influence the parental attribution.

Additionally, in comparison to white noise, cognitive load might have been a stressor that is more realistically related to daily-life situations in which parents attribute child behavior (i.e., remembering groceries, having many things on your mind). Manipulated stress that resembles real-life stress may have a greater impact than other forms of induced stress. This could be seen in line with previous findings that showed that stress was related to the child or parenting is particularly related to negative parental attributions (Beckerman et al., 2017; 2018; Dopke & Milner, 2000; Schellenbach, Monroe, & Meluzzi, 1991). Moreover, it is likely that the cognitive load condition taxed parent's working memory, and the white noise condition parent's attention. Perhaps automatic processing is more likely to occur when a particular executive function is challenged. Also, the white noise stressor was constantly present, where the cognitive load was increased (i.e., more groceries to remember) during the attribution task. A constant stressor like white noise might be more easy to ignore, whereas cognitive load constantly taxes the parent's working memory and cannot be ignored. As a consequence less resources might have been available for the task during the cognitive load condition, in comparison to the white noise condition, and therefore the cognitive load condition might have been more stressful for parents.

For fathers, no main effects were found for induced stress and risk, nor an interaction effect between induced stress and risk. A comparison between mother and father attributions within both conditions revealed that they did not differ in overall negative attributions and that they did not react differently regarding the different stressors (i.e., no difference in amount of negative attributions). In addition, a comparison between effect sizes for the stress x risk interaction also revealed no significant differences. One of our previous studies pointed in the same direction considering differences between mothers' and fathers' attributional style in relation to stress; the effects did not significantly differ, but for mothers a higher number of significant associations between stressors and negative parental attributions were found (Beckerman et al., 2018). Nevertheless, some studies suggest that mothers and fathers are different in their attributional style (e.g., Chen et al., 2008; Lansford et al., 2011; Miller, 1995), and that they respond differently to stress (Kudielka & Kirschbaum, 2005). More research is needed to further explore possible differences in mother and father attributions in relation to stress.

Some limitatons should be mentioned. First, we used convenience sampling to recruit families to partcipate in our study (see Beckerman et al., 2018). Although we tried to include families with different socioeconomic backgrounds, for example by recuiting in different neighborhoods and using social media, most of the families that enrolled had a relatively high SES. Additionally, we chose to select only families who self-identified as having a Dutch cultural background, because culture might influence parental attributions. Taken the above into consideration, generalization claims should be made cautiously and only focus on Dutch high SES families, or families with a comparable background. Similarly, the fact that our study included a low-risk sample is also a limitation. As previously suggested, to explain the absence of a main effect for induced situational stress and the interaction effect between risk and induced situational stress, it is imaginable that there is some kind of threshold of stress needed to bias parental attributions. This might also explain the small effects and the trivial differences between mothers and fathers that were found. The majority of the population experienced mild stress daily, which might even be beneficial for cognitive functioning (Kirby et al., 2013; Parihar, Hattiangady, Kuruba, Shuai, & Shetty, 2013), but when this stress becomes more severe it can have detrimental effects on cognitive performance (Kirby et al., 2013; Lupien & McEwen, 1997). Thus, for parental attributions to become biased the parent needs to experience a serious amount of stress when we apply this reasoning.

Moreover, the absence of a main effect for induced situational stress might also tell us that the task manipulations were not stressful enough or that existing stress is more important for negative attribution. As previously discussed, the intensity of the white noise stressor might have been too limited to be stressful. In addition, the cognitive load manipulation might not have been equally stressful during the whole task, because the load increased with each additional grocery to remember. The white noise condition might have been more stressful when not only the intensity was amplified, but also when the noise was infrequently presented during the task, making it more difficult to ignore. The cognitive load condition might be presented with the same amount of load during the whole task, to make the condition more stressful. We advise future research to add (physiological) measures of perceived stress to get insight in the stressfulness of a manipulation.

In conclusion, this study contributes to the knowledge about the relation between stress and negative parental attributions. In an experimental design we found some evidence that high-risk mothers may be more negatively affected in their parental attributions by situational stress, compared to low risk mothers. This may imply that stress at least partially, predicts negative attributions as proposed by the SIP-model (Milner, 1993, 2003). Moreover, we discussed the absence of a main effect for induced situational stress (i.e., there might not be a causal effect, task manipulation may not be stressful enough), and several explanations for the risk by situational stress interaction were proposed (i.e., stress threshold, physiological responsiveness to stress, and pre-existing schemata). It is

important to unravel the cause of this interaction effect and gain fundamental knowledge on how parental attributions are affected, to become able to subsequently effectively intervene. For instance, if negative parental attributions are caused by high amounts of stress, it is important to reduce stress. But if physiological responsiveness to stress and pre-existing schemata also play a role in affecting parental attributions under (minor) stressful conditions, stress reduction alone might be insufficient and interventions should also focus on becoming more resilient to stress and changing pre-existing schemata. Future research can help to unravel these issues by experimentally studying the effect of stressors with different intensities on parental attributions, measuring physiological stress responses and pre-existing schemata, in both high- and low-risk samples.

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