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Parent attachment, childrearing behavior, and child attachment: Mediated effects predicting preschoolers' externalizing behavior

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ABSTRACT

Attachment theory provides an interesting background for thinking about externalizing behavior (EB) in early childhood and for understanding how parenting influences the child's outcomes. The study examined how attachment and parenting could be combined to explain preschoolers' EB. Data were collected from 117 preschoolers aged from 4 to 6 clinically referred for EB and their parents from a middle-high income population. Child attachment was measured with the *Attachment Q-set*; parent's remembered attachment in the family of origin with the *CaMir*. Child attachment played a crucial role in mediating the link between parent attachment and EB as well as the link between parenting and EB. Paternal attachment displayed a direct and an indirect effect through controlling parenting and child attachment on child EB. Maternal attachment was a distal predictor associated with EB through child attachment, and independent of controlling parenting. These results are discussed with their applied and scientific implications.

Externalizing behavior (EB) is characterized by agitation, opposition, aggression provocation, negative thoughts and transgression of the social norms (Achenbach & Rescorla, 2000). EB is the most common and persistent type of behavioral problem in childhood, predicting, in the most severe cases, other forms of psychopathology in later years and interfering with the child's personal, social and academic development (Owens & Shaw, 2003). Research in developmental psychopathology has tried to assess why EB occurs at an early age, and has demonstrated the importance of attachment and parenting frameworks. Attachment theory provides an interesting background for thinking about EB in early childhood and for understanding the mechanisms whereby parenting can influence behavioral outcomes. By the end of the first year of life, four patterns of attachment, one secure, two insecure (avoidant and ambivalent) and one disorganized can be distinguished, reflecting the history of a child's early interactions with their primary caregivers. Children's early experiences with their caregivers are related to their subsequent behavioral adaptation, and experiences of ineffective parenting may increase the risk of negative outcomes (Bowlby, 1988, 1989).

Parenting, attachment and EB: Direct effects

In line with attachment and parenting frameworks, earlier research has consistently demonstrated direct associations between three sets of variables (parent and child attachment patterns, and parentincxug) and children's behavior. Indeed, an insecure parent attachment pattern was related to low behavioral adaptation in their children (e.g., Cohn et al., 1992). A recent meta-analysis provided evidence that both insecure and disorganized attachment increased risk for EB (Fearon et al., 2010). An ineffective parent behavior pattern was associated with EB, because parenting is generally considered an important factor linked to children's outcomes (e.g., Casas et al., 2006; Patterson, 1982). Interrelations were also consistently displayed between the three sets of variables (parent and child attachment patterns, and parenting): between parent and child attachment in the intergenerational perspective of attachment transmission (e.g., Benoit & Parker, 1994; DeKlyen, 1996; Gloger-Tippelt et al., 2002); between parent attachment and parenting behavior (e.g., Adam et al., 2004; Karavasilis et al., 2003; Van Ijzendoorn, 1995); and between parenting behavior and child attachment (e.g., Barnett et al., 1998; Lounds et al., 2005; Van Ijzendoorn et al., 1999). In summary, previous data have shown that parent and child attachment and parenting are interrelated and that these variables are consistently associated with EB (DeVito & Kopkins, 2001; Greenberg et al., 2001). Most of these studies used the *Strange Situation Procedure* (Ainsworth et al., 1978) as a measure of child attachment and the *Adult Attachment Interview* (George et al., 1996) as a measure of parent attachment. Only Gloger-Tippelt et al. (2002) using both the *Strange Situation Procedure* (Ainsworth et al., 1978) and a story completion task and Karavasilis et al. (2003) using questionnaires were exceptions.

Most of these direct effects are well documented. However, it is now assumed that children's developmental outcomes are better predicted by a combination of factors at different ecological levels than by single factors (Greenberg et al., 2001). The aim of the current study was, therefore, to contribute to this field by examining whether and how

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attachment with an inter-generational perspective and parenting behavior could be combined to explain EB in preschoolers clinically referred for behavioral problems. An investigation of the relationships between parent and child attachment and parenting behavior in the preschool years is also lacking (DeVito & Kopkins, 2001). And the contribution of father–child attachment security to children's outcomes is very sparsely documented (Fearon et al., 2010). This study, therefore, examined the direct and indirect effects of the three variables (parent and child attachment, and parenting) on EB in a sample of preschoolers who were referred for EB problems, and in their mothers and fathers separately.

Parenting, attachment and EB: Indirect and mediated effects

Indirect and mediated effects of parent and child attachment, parenting behavior and child EB have been studied in several previous studies.

Parenting behavior–child attachment–child EB

Several recent findings have highlighted mediated effects of child attachment, parenting behavior and EB. Vando et al. (2008) hypothesized that hostile parenting, when children were 4-years-old, mediated the relationship between child attachment status measured at 1-year-old with the *Strange Situation Procedure* (Ainsworth et al., 1978) and child conduct problems 6 years later. This mediational model was not supported. In contrast, two other studies conducted with adolescents postulated that it was child attachment assessed with self-report questionnaires that mediated the relationship between parenting and child behavior. Doyle and Markiewicz (2005) verified longitudinally that attachment insecurity mediated the effects of parenting, in particular warmth, on EB. Bosmans et al. (2006) also found that attachment towards the mother and father mediated the relationship between negative control parenting and adolescent problem behavior. No mediation of positive parenting was found in this study.

Parent attachment–parenting behavior–child attachment

Van Bakel and Riksen-Walraven (2002) considered parent attachment, parenting behavior and child attachment among other variables in a large model with 15-month-old infants. Indirect pathways through parental personality, parental education and partner support were found between parent attachment security measured with questionnaires and the quality of parenting behavior, which in turn predicted child attachment security measured with the *Attachment Q-Set* (Waters & Deane, 1985).

Other recent findings have highlighted mediated effects among parent attachment, parenting behavior and child attachment. Parent attachment, assessed by the *Adult Attachment Interview* (George et al., 1996) were thought to influence their relationships with their child through the formation of stable internal working models (Cohn et al., 1992). It was hypothesized that parents with an unresolved state of mind regarding attachment were likely to display poorly adapted parenting behavior towards their children. This could result in disorganized strategies by the children for dealing with stress and emotions when the attachment system was activated. Goldberg et al. (2003) tested this hypothesis in a broad-ranging sample of 197 middle class mother–infant dyads. Mother attachment at the *Adult Attachment Interview* (George et al., 1996) and child attachment at the *Strange Situation Procedure* (Ainsworth et al., 1978) were both related to maternal behavior, but the regression analyses failed to find evidence of a mediation role of maternal behavior. In contrast, in a later study with a high-risk sample of 82 adolescent mother–infant dyads, Madigan et al. (2006) demonstrated that disrupted maternal behavior in play sessions mediated the association between a mother's unresolved representation of attachment at the *Adult Attachment Interview* (George et al., 1996) and a child's disorganized attachment at the *Strange Situation Procedure* (Ainsworth et al., 1978).

Parent attachment–child attachment–child EB

DeKlyen (1996) studied the link between mother and child attachment in the prediction of EB. American clinic-referred preschoolers were considered in this study. Three-way associations between these variables were explored and contributed little to the explanation of association patterns. Although the link between maternal attachment at the *Adult Attachment Interview* (George et al., 1996) and EB was significant, the additional influence of maternal attachment on EB disappeared once the significant relation between child attachment in a separation-reunion task and EB was taken into account. Interpretation of the results suggested that the influence of mother attachment on preschoolers' EB could be mediated by preschooler attachment behavior but without a formal test of mediation.

Parent attachment–parenting behavior–child EB

The role played by parent attachment as a causal variable was also studied by Cowan et al. (1996) who examined how it was related to parenting behavior and EB in children. In their results, parent attachment history at the *Adult Attachment Interview* (George et al., 1996) was associated with parenting behavior towards preschoolers that served as a significant predictor of a child's EB. In this study, only indirect pathways from parent attachment history to child EB through parenting were displayed, but without formal tests of mediation.

Parent attachment–parenting behavior–child attachment–child EB

Progress was finally made by Madigan et al. (2007) in the attempt to combine parenting and attachment frameworks in the prediction of EB. They proposed a single model including the four sets of variables: parent attachment, parenting behavior, child attachment and child EB. Mothers with unresolved attachment representations at the *Adult Attachment Interview* (George et al., 1996) displayed disrupted maternal behavior during play sessions towards their children resulting in disorganized patterns of attachment in children at the *Strange Situation Procedure* (Ainsworth et al., 1978) that finally contributed to explain their EB. In this model, both disrupted maternal behavior and child disorganized attachment mediated the relationship between mothers' unresolved attachment representations and child EB in a high-risk sample of 64 adolescent mother–infant dyads. This mediation model was reported to be the more parsimonious.

The current study

In an effort to better understand the mechanisms underlying EB within a broader model involving both attachment and parenting frameworks, the present study extends previous research in several ways.

First, most of the previous research examined associations between parenting and attachment in infancy (Barnett et al., 1998). Within this early developmental period, parenting was mainly addressed through the parent's responsiveness or sensitivity. Other research is needed to expand the data regarding the types of parenting that are associated with attachment during the preschool period. In this context, the present study focuses on parenting practices through childrearing behavior.

Second, most previous results were drawn from data obtained using the *Strange Situation Procedure* (Ainsworth et al., 1978) for measuring child attachment behavior, and the *Adult Attachment Interview* (George et al., 1996) for measuring parent attachment. Among the studies that have been reviewed, only those of Gloger-Tippelt et al. (2002) and Van Bakel and Riksen-Walraven (2002) with infants and those of Bosmans et al. (2006), Doyle and Markiewicz (2005) and Karavasilis et al. (2003) with adolescents were exceptions. Gloger-Tippelt et al. (2002) and Van Bakel and Riksen-Walraven (2002) respectively used a story completion task and the AQS. Bosmans et al. (2006), Doyle and Markiewicz (2005) and Karavasilis et al. (2003) used self-report questionnaires. Additional studies are needed to confirm the previous results using other measures of attachment. As in Van Bakel and Riksen-Walraven (2002) , the French

version of *Attachment Q-set* (AQS) (Pierrehumbert et al., 1995a; Pierrehumbert et al., 1995b; Waters & Deane, 1985) is used for measuring child attachment. In their recent meta-analysis, Fearon et al. (2010) reported that the AQS had a strongest effect size with EB compared to the *Strange Situation Procedure* (Ainsworth et al., 1978). The *Cartes pour les Modèles Individuels de Relation* (CaMir) (Miljkovitch et al., 2005; Pierrehumbert et al., 1996) is used for measuring parent's remembered attachment security in family of origin. The CaMir constitutes an interesting complement to other questionnaires designed to measure adult cognition regarding attachment. In comparison with other instruments, the CaMir has several specificities such as the measurement of past, present and prospective experiences, its applicability to any age from adolescence to late adulthood and to any familial structures, as well as its Q-sorting procedure that in particular limits the impact of social desirability during the completion.

Third, most of the previous data were collected from mothers. The present study collected data simultaneously from mothers and fathers in an attempt to explore the similarity of direct and indirect effects among the four sets of variables (parent and child attachment, childrearing and EB) in the two subsamples. The need for research on the contribution of father–child attachment to children's development was recently stressed by Fearon et al. (2010).

Fourth, most of previous findings were drawn from non-referred children or at-risk mothers (e.g., adolescent mothers). The study by DeKlyen (1996) where American clinic-referred preschoolers have been considered is one exception from the studies that have been reviewed. In the current study, the interrelations between the four sets of variables were studied in a sample of preschoolers who had been referred by their parents for assessment and medically examined on the grounds of behavioral disorders (fidgetiness, disobedience, confrontation, provocation and aggressiveness). The recent meta-analysis of Fearon et al. (2010) demonstrated that relations between attachment and EB were higher in clinical samples than in normally developing children.

The current study examined several hypotheses that were generated from studies reviewed in the introduction section. Some of these studies demonstrated that parent and child attachment and parenting were directly related to child EB. Significant interrelations among parent and child attachment and parenting were also demonstrated. Other studies of indirect pathways empirically supported the mediational roles of child attachment and parenting in the link between parent attachment and child EB. Furthermore, the mediational role of parenting in the link between parent and child attachment, and of child attachment between parenting and child EB, received empirical support. Finally in an effort to go further in the combination of attachment and parenting frameworks for the prediction of child EB, Madigan et al. (2007) showed that parenting mediated the relation between parent and child attachment, and that child attachment in turn mediated the relation between parenting and EB.

Hence the current study examined both direct and mediated effects. It was firstly hypothesized that preschooler EB will be related to both mother and father attachment, to both mother and father childrearing behavior, and to child attachment. Second, parental childrearing behavior and child attachment were both expected to mediate the effects of parent attachment on child EB. Third, parental childrearing behavior was also expected to mediate the relationship between parent attachment and child attachment, and child attachment was expected to mediate the relationship between parental childrearing behavior and child EB in a single hypothetical model considering the four sets of variables. This last hypothetical model is presented in Fig. 1.

Method

Sample

This study was part of the longitudinal H2M-child research program, which is attempting to identify early predictors of EB in children. The research was conducted by the Institute of Research in Psychological Sciences at the *Université catholique de Louvain* (Belgium) with the collaboration of the Saint Luc university clinic in Brussels (Belgium) (see http://www.uclouvain.be/h2m-children.html for more details about the research program). Data were collected from a group of 117 young children (78% boys) aged from 4 to 6 who had been referred to a clinician because of their EB (arousal, opposition, agitation, aggressiveness, and noncompliance), from both their parents, and from their preschool teacher. The referral had to have been made by a physician on the basis of EB problems at home and/or at school that was the immediate and principal reason for the referral. Children with substantial language delays or developmental disorders were excluded from the sample. At the time they were recruited, all the children were attending normal school.

The parents were informed about the study and that they were participating in a longitudinal research program. They were assured that the data would remain confidential. Informed consent was obtained from all the adult participants.

The data presented here came from the first two waves of assessment: at the outset of the research program (T1, $N = 117$), and at the 12-month follow-up (T2, $N = 87$). Attrition is common in longitudinal research. We obtained complete data from 75% of our sample at T2. Comparisons of families with complete and incomplete data revealed no systematic differences in either socio-demographic variables or the variables under investigation.

At the time of recruitment, the mean age of the children was 50.93 months ($SD = 11.42$) (boys: 50.01 months, $SD = 11.01$; girls: 54.15 months, $SD = 12.43$). The educational level of the parents was measured as the total number of years of schooling successfully completed, counting from first grade onward. The mean educational level was 14.33 years ($SD = 2.95$, range 6–21) for the mothers and 14.76 years ($SD = 2.47$, range 6–20) for the fathers. The sample mostly comprised families of middle to high socio-economic status. In the French-speaking part of Belgium, middle-class parents who are worried about their young child's behavior usually seek advice from a pediatrician who checks for a possible neurological or biological origin of the problem, for instance epilepsy or allergy. Families with low socio-economic status are less likely to consult a doctor for such a problem. They are more often referred to social services who can help with problems with children, but are also used to dealing with financial, marital and housing concerns, and so do not form part of our sample. If no medical cause is found by the pediatrician, a psychological origin of the problems is suspected, but neither diagnosis nor treatment is provided before the age of 7. When the child is 7 years old, if the behavioral problems persist, a multidisciplinary assessment combining language, executive functions and socio-emotional assessment is carried out. This can lead to a diagnosis such as attention deficit and/or hyperactivity disorder, and in turn to a drug and/or therapy treatment. This way of treating referrals for EB is a matter of Belgian policy in the French-speaking part of Belgium: children as young as 4-year-old can be referred for behavioral problems to a pediatrician or to mental health services but in absence of neurological or biological origin of the problem, neither diagnosis nor systematic treatment is provided.

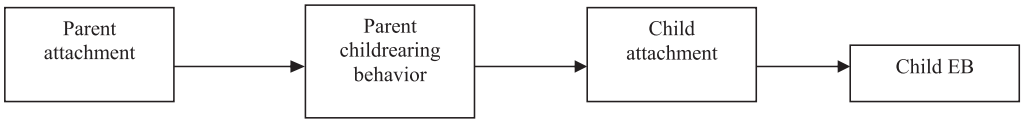

Fig. 1. Hypothetical model.

In this context, the referred children in our sample had not undergone any systematic treatments between the two waves of assessment, although a few of them had taken part in psychomotor activities conducted by physiotherapists. The frequency of such activities and their relation to childrearing behavior, attachment and externalizing behavior were controlled for in this study, and found not to have any significant effect on the variables under consideration.

Most of the children lived in two-parent families (87%), but 13% of the parents were separated or divorced. In Belgium, it is common for both parents to work outside the home and to be involved in family responsibilities and child care. In our sample, only 12% of the mothers and 13% of the fathers were not employed, whereas 16% of the mothers and 7% of the fathers were employed part-time.

At T1, parents were asked to separately complete two questionnaires assessing their own attachment relationships and their child-rearing behavior towards the target child. They were also asked at T1 to provide a joint rating of their child's attachment security. One year after referral (T2), the parents separately and the preschool teacher were asked to complete a questionnaire related to the target child's EB.

Measures

Parent attachment was assessed by each mother and each father separately using the CaMir (Miljkovitch et al., 2005), a new self-reporting assessment procedure (72 items) aimed at measuring an adult's cognition regarding attachment. It is designed to investigate participants' remembered attachment in the family of origin: their ratings of past and present experiences, their personal interpretations of their parents' attitudes during childhood and their impact, and finally their views about family functioning. For ease of reference in the results and discussion sections, "parent's remembered attachment in the family of origin" will be labeled as "parent attachment".

The 72 items of the CaMir were sorted by each parent into a forced five-category distribution according to the applicability of each item to his/her particular experiences. This distribution led to three continuous scores (autonomous-secure, avoidant, and preoccupied) that were obtained by correlating the parent's individual Q-sort description with the criterion sort provided by experts for a prototypically autonomous-secure, avoidant or preoccupied adult. Only the autonomous-secure score was used in the present paper, in order to limit the number of constructs in the models and to conceptually correspond to the secure score of the child attachment measure. Items that are high in the autonomous-security criterion sort include for example "As a child, I always knew I could find support from the people who were close to me.", "As a child, the people close to me made me feel they enjoyed spending time with me.", "As a child, I was encouraged to share my feelings.", and "My parents have always trusted me.".

The CaMir was first validated with 202 adults (Pierrehumbert et al., 1996). Convergent validity was reported in a sub-sample between the scores obtained with the CaMir and with the *Adult Attachment Interview* (Main & Goldwyn, 1985/1994) coded with the Kobak Q-sort procedure ($r = .68$) (Kobak et al., 1993). Convergent validity was also reported in another sub-sample between adults' autonomous-secure CaMir scores and their child's secure score obtained with the *Strange Situation Procedure* (Ainsworth et al., 1978) as well as with the *Attachment Q-set* (Waters & Deane, 1985), respectively $r = .53$ and .72. Good psychometric properties were also displayed in a recent study conducted with 496 adults. The internal consistency of the autonomous-secure subscale (assessed by Cronbach's α) was .93 and the autonomous score allowed adults from a community sample to be discriminated from parents of children displaying externalizing behavior (Stievenart et al., submitted for publication).

Child attachment was assessed using the *Attachment Q-Set* (AQS) previously published by Waters and Deane (1985). The AQS is an observational measure of attachment. The French version of the AQS (Fr-AQS) (Pierrehumbert et al., 1995a; Pierrehumbert et al., 1995b) was used to describe the preschoolers' attachment behavior. This instrument covers a broad range of secure base and exploratory behaviors as well as affective responses in a large variety of situations and settings. Items that are high in the security criterion sort include, for example, "Child uses mother's facial expressions as a good source of information when something looks risky or threatening.", "Child follows mother's suggestions readily even when they are clearly suggestions rather than orders", or " Child is strongly attracted to new activities and new toys". Because of time and material constraints, the coding was not done as usually recommended by a trained observer (Van Ijzendoorn et al., 2004). After some systematic information from the clinical research assistants about the content of the Fr-AQS and the way of coding it, the 79 items were sorted by the two parents together. This is a good procedure for partially controlling the shared-method variance in the models tested. First, among the 79 items in the Fr-AQS, 44 items concern child attachment behavior in relation to the mother. The coding made by the mother and the father together was therefore considered to be a more valid assessment of child attachment than completion by the mother only. The degree of objectivity regarding these cards was hence thought to differ between mothers and fathers. Second, a common coding was preferable regarding the use of the secure score in both mothers and fathers mediational models. Completion by the mother only had different implications regarding shared-method variance in the models for fathers and those for mothers.

Items were sorted into a forced nine-category distribution according to the applicability of each item to their particular child. This distribution led to a continuous score obtained by correlating the child's individual Q-sort description with the criterion sort provided by experts for a prototypically secure infant. The psychometric properties of the AQS have been reported to be good. In a meta-analysis of 139 studies with 13,835 children, Van Ijzendoorn et al., 2004 demonstrated moderate convergent validity with the *Strange Situation Procedure* ($r = .31$) and moderate predictive validity with maternal sensitivity measures ($r = .37$). In line with these results, the validation study of the Fr-AQS highlighted convergent validity with the *Strange Situation Procedure* (Pierrehumbert et al., 1995a).

Parental childrearing behavior was assessed using the EPEP (Meunier & Roskam, 2007) that was completed separately by the mothers and the fathers regarding their own behavior toward the target child. The EPEP is based on previous studies by Van Leeuwen and Vermulst (2004) and Patterson (1982), and contains 35 items relating to nine factors: Positive Parenting, Monitoring, Rules, Discipline, Inconsistent Discipline, Harsh Punishment, Ignoring, Material Rewarding, and Autonomy. A 5-point Likert-type scale was provided under each item, with responses ranging from *never* to *always*. Recently validated on 493 French-speaking mothers and fathers of normally-developing children, the EPEP scale has good psychometric properties. The internal consistency of the subscales (assessed by Cronbach's α) ranged from .65 to .89; the total percentage of variance explained by the nine factors was 64.3%; test–retest correlations for a sample of 45 parents varied between .51 and .84; and the items were not correlated with social desirability.

A confirmatory factor analysis (CFA) of the nine factors was conducted in the validation study to reduce the number of constructs. A model was specified in which a Supportive parenting factor was composed of Positive Parenting, Autonomy, Monitoring, and Rules, whereas a Controlling parenting factor was composed of Discipline, Harsh Punishment, Material Rewarding, Inconsistent Discipline and Ignoring. The CFA demonstrated an acceptable fit to the data with all the estimated factor loadings being significant. These results suggest that the EPEP can be used with the bifactorial structure related to the two concepts of support and negative control (Meunier & Roskam, 2007).

Child externalizing behavior (EB) was assessed separately by the two parents and the preschooler teacher by completing the fourth subscales (angry, aggressive, egotistical, and oppositional behavior) of the *Profil Socio-Affectif* (PSA) related to EB (Dumas et al., 1997). The PSA is the French version of the *Social Competence and Behavior Evaluation: Preschool Edition* (SCBE) (LaFreniere & Dumas, 1995), formerly known as the *Preschool Socio-Affective Profile* (LaFreniere et al., 1992). This instrument has a developmental background, emphasizing the functional meaning of affect in regulating social interactions. It provides 6-point Likert-type scales under each item, ranging from *almost never occurs* to *almost always occurs* and was designed to assess patterns of social competence, emotional regulation and expression, and adjustment in children aged from 30 to 78 months (LaFreniere et al., 1992). In the original validation study (LaFreniere et al., 1992), EB factors emerged from four clusters: angry, aggressive, egoistical, and oppositional. Subsequent studies confirmed the construct validity of the PSA across different cultures (LaFreniere & Dumas, 1995) and different samples (LaFreniere et al., 1992). The French adaptation of the scale was validated on a sample of 800 preschoolers (387 girls and 413 boys), and demonstrated good properties with high internal consistency, a large amount of variance explained by the factors, high inter-judge agreement, good test–retest correlations, and no correlation with social desirability. The ratings from the mother, the father and the preschool teacher were combined using principal component analysis. A single factor was produced for EB. The factor analysis combining reports from parents, teachers and clinicians yielded meaningful factor loadings. The single factor EB explained a large proportion of the variance (59.61%). Factor loadings were high for all three informants: .86 for the mother, .87 for the father, and .53 for the preschool teacher.

Statistical analyses

Preliminary analyses were computed in order to highlight significant relationships between the predictor variable, the outcome variable and the mediators, which are conditions for testing the mediation. If there is no relationship between the predictor and the outcome variables, there is no significant effect to mediate (Holmbeck, 1997). Bivariate correlations were then computed between all the variables used in the mediation models.

The models in which the tests were performed involved: 1) direct effect between parent autonomous attachment and child EB; 2) mediation by parental childrearing behavior and child attachment security in the link between parent autonomous attachment and child EB; and finally 3) mediation by parental childrearing behavior of the link between parent autonomous attachment and child attachment security, and mediation by child attachment security of the link between parental childrearing behavior and child EB. These three steps were necessary because the analysis was based on a complex model involving two mediators (parental childrearing behavior and child attachment security) and the first mediator (parental childrearing behavior) also mediating the link between the distal predictor (parent autonomous attachment) and the second mediator (child attachment security), whereas the second mediator (child attachment security) mediates the link between the first mediator (parental childrearing behavior) and the outcome (child EB). Data from paternal autonomous attachment and childrearing behavior and from maternal autonomous attachment and childrearing behavior were considered in separate models. The models were computed with the manifest variables because the Q-sort procedure used in the CaMir and the AQS does not allow for the computation of latent variables. Testing for mediation was performed by testing the indirect effect of the causal variable through the hypothesized mediator using the Sobel (1982) test (MacKinnon, 2008). Additional goodness-of-fit indices were used in conjunction with the χ^2 statistic to determine the acceptability of the models: the Akaike Information Criterion (AIC), the comparative fit index (CFI) (Marsh et al., 1988) and the root-mean-square error of approximation (RMSEA) (Byrne, 1998). For AIC, ranging from $-\infty$ to $+\infty$ and generally used to compare competing models, the model with the lowest AIC is preferred. For CFI, values close to 0.90 or greater are desirable whereas RMSEA should preferably be less than or equal to 0.05 (Hu & Bentler, 1999).

The main statistical analyses were carried out using SEM software AMOS 17.0 (Arbuckle, 2007). The present study partially controlled for shared-method variance: all the analyses were conducted separately for the mothers and the fathers, a multi-informant strategy (with the mother, the father and the preschool teacher separately) has been used for child EB to reduce measurement errors (Chaplin, 1991), and a common rating was made by the two parents about their child attachment security. To this extent, shared-method variance between parent and child variables was partially controlled. Such a procedure was not feasible for the parental variables, which tapped individuals' representations of their personal attributes (attachment and childrearing behavior).

Data were also checked for normality. The results indicated univariate normality for all the variables measured. Finally, incomplete data, which are almost inevitable in social science, were treated as random and the full-information maximum-likelihood (FIML) method, using all the available data to estimate the parameters of the model (by calculating the log-likelihood of the data for each observational unit separately), was used to estimate the missing data (Allison, 2003).

Results

Preliminary analyses

The results of the bivariate correlations are presented in Table 1. The correlations partially confirmed our main hypothesis because the preschoolers' EB was related to attachment of both mother and father, to childrearing behavior of both mother and father, but only to controlling and not supportive behavior, and to child attachment.

Table 1
Bivariate correlations between the maternal (M) and the paternal (F) variables.

	1. Parent attachment		2a. Supportive childrearing behavior		2b. Controlling childrearing behavior		3. Child attachment	4. Child EB
	M	F	M	F	M	F		
1.M	–	.61***	.10	−.02	−.09	−.25*	.33**	.25*
1.F		–	.19	.11	−.10	−.29**	.27**	.36**
2a.M			–	.33***	−.04	−.17	.11	.14
2a.F				–	−.12	−.03	.00	.06
2b.M					–	.40***	−.24**	−21*
2b.F						–	.27**	−.15†
3.							–	.31***
4.								–

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

The bivariate associations between the variables in the models indicated that conditions for testing the mediation were met for mothers and fathers with controlling childrearing behavior, except for the association between maternal attachment and controlling child-rearing behavior ($r = -.09$) that was non-significant and for the association between paternal controlling childrearing behavior and EB that was marginally significant. However, supportive childrearing behavior from mothers or fathers was not associated with EB ($r = .14$ and .06 for mothers and fathers, respectively). Supportive childrearing behavior was also not associated with the exogenous variable, parental attachment security ($r = .10$ and .11 for mothers and fathers, respectively), or with mediator child attachment security ($r = .11$ and .00 for mothers and fathers, respectively). Because the conditions were not met for the supportive childrearing behavior, only the models implying maternal or paternal controlling child-rearing behavior were finally tested.

Mediation models

For mothers, 1) the direct effect between maternal autonomous attachment and child EB was marginally significant ($\beta = .25$, $p < .10$). 2) The model that tested mediation by maternal controlling childrearing behavior and child attachment security in the link between maternal autonomous attachment and child EB did not fit the data well ($\chi^2(1) = 5.40$, $p < .05$; AIC = 31.407; CFI = 0.75; RMSEA = 0.20). When indirect effects of the causal variable (maternal autonomous attachment) through the hypothesized mediators (maternal controlling childrearing behavior and child attachment security) on the outcome (child EB) were included in the model, the direct effect of maternal autonomous attachment on child EB was no longer significant ($\beta = -0.09$, $p > .10$). Because the relationship between maternal autonomous attachment and maternal childrearing behavior was not significant ($\beta = -0.17$, $p > .10$), a mediation role of maternal childrearing behavior between maternal autonomous attachment and child EB could not be considered. In contrast, because the relationship between maternal autonomous attachment and child attachment security was significant ($\beta = .34$, $p < .01$), as was the relations between child attachment security and child EB ($\beta = -.25$, $p < .01$), a mediation role of child attachment security in the link between maternal autonomous attachment and child EB was tested with the Sobel test that supported the mediation model ($z = -1.88$, one-tailed $p < .05$).

A more parsimonious model was tested where the links between maternal autonomous attachment and maternal childrearing behavior and between maternal autonomous attachment and child EB were constrained to zero ($\chi^2(3) = 7.58$, $p < .10$; AIC = 29.577; CFI = 0.74; RMSEA = 0.11); there was no significant change in model fit between the two models ($\Delta\chi^2(2) = 2.18$, $p > .10$). Fig. 2 depicts the more parsimonious model where the link between maternal autonomous attachment and child EB is mediated by child attachment security and where maternal controlling childrearing behavior has a direct effect on child EB.

3) The model that tested mediation by child attachment security in the link between mother's controlling childrearing behavior and child EB, fit the data better with good indices ($\chi^2(2) = 0.98$, $p > .10$; AIC = 24.98; CFI = 1.00; RMSEA = 0.00) indicating a significant improvement in model fit between the two last models ($\Delta\chi^2(1) = 6.60$, $p < .05$). When an indirect effect of the causal variable (maternal controlling childrearing behavior) through the hypothesized mediator (child attachment security) on child EB security was included in the model, the direct effect of maternal controlling childrearing behavior on child EB was no longer significant ($\beta = .14$, $p > .10$). The Sobel test indicated that child attachment security could be considered as a mediator in the link between maternal controlling childrearing behavior and child EB ($z = 2.01$, one-tailed $p < .05$).

Fig. 3 depicts the final model for mothers where the link between maternal autonomous attachment and child EB is mediated by child attachment security and the link between maternal controlling childrearing behavior and child EB is mediated by child attachment security.

For fathers, 1) the direct effect between paternal autonomous attachment and child EB was significant ($\beta = 0.36$, $p < .01$). 2) The model that tested mediation by paternal controlling childrearing behavior and child attachment security of the link between paternal autonomous attachment and child EB did not fit the data well ($\chi^2(1) = 6.20$, $p < .01$; AIC = 32.20; CFI = 0.74; RMSEA = 0.21). When indirect effects of the causal variable (paternal autonomous attachment) through the hypothesized mediators (paternal controlling childrearing behavior and child attachment security) on the outcome (child EB) were included in the model, the direct effect of paternal autonomous attachment on child EB was only marginally significant ($\beta = -0.25$, $p < .10$). The Sobel test indicated that paternal controlling childrearing behavior could not be considered as a mediator in the link between paternal autonomous attachment and child EB ($z = -0.09$, one-tailed $p > .10$) and child attachment security could be considered as a mediator in the link between paternal autonomous attachment and child EB ($z = -1.59$, one-tailed $p < .05$).

A more parsimonious model was tested where the link between paternal childrearing behavior and child EB, which was not significant ($\beta = .01$, $p > .10$), was constrained to zero ($\chi^2(2) > 6.20$, $p < .05$;

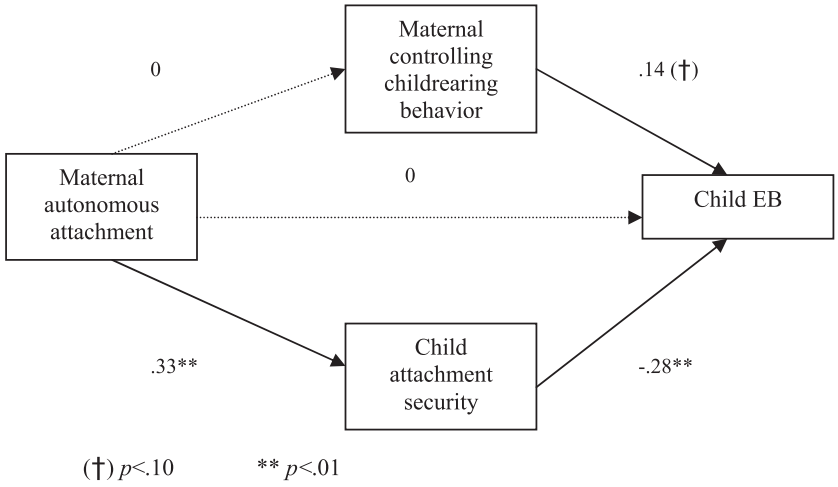

Fig. 2. Model for mothers where the link between maternal autonomous attachment and child EB is mediated by child attachment security and where maternal controlling childrearing behavior has a direct effect on child EB.

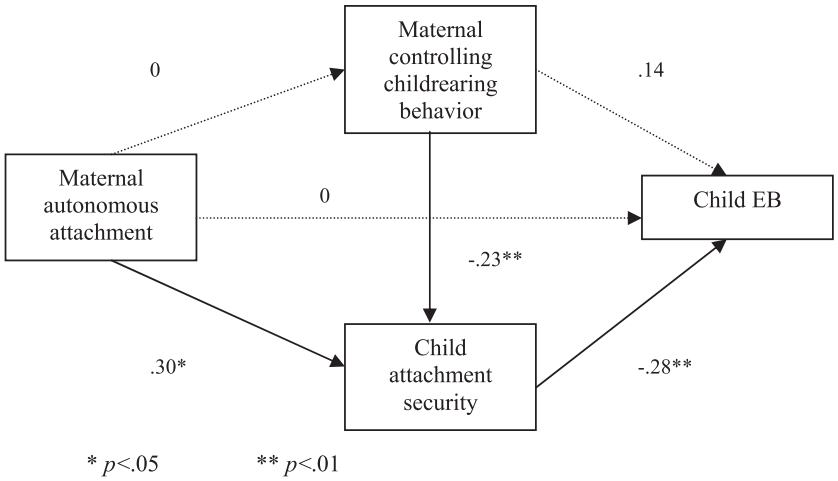

Fig. 3. Final model for mothers where the link between maternal autonomous attachment and child EB is mediated by child attachment security and the link between maternal controlling childrearing behavior and child EB is mediated by child attachment security.

AIC > 30.21; CFI > 0.80; RMSEA > 0.13); there was no significant change in model fit between the two models ($\Delta\chi^2(1) > 0.00$, $p > .10$).

Fig. 4 depicts the more parsimonious model where the link between paternal autonomous attachment and child EB is mediated by child attachment security and where paternal autonomous attachment has direct effects on both paternal controlling childrearing behavior and child EB.

3) The model that tested mediation by paternal controlling childrearing behavior as the link between paternal autonomous attachment and child attachment security and the indirect effect through child attachment security as the link between paternal controlling childrearing behavior and child EB fit the data better with good indices ($\chi^2(1) > 0.001$, $p > .10$; AIC > 26.00; CFI > 1.00; RMSEA > 0.00). When an indirect effect of the causal variable (paternal autonomous attachment) on child attachment security through the hypothesized mediator (paternal controlling childrearing behavior) was included in the model, the direct effect of paternal autonomous attachment on child attachment security was no longer significant ($\beta > 0.12$, $p > .10$). The Sobel test indicated that paternal controlling childrearing behavior could be considered as a mediator in the link between paternal autonomous attachment and child attachment security ($z > 1.59$, one-tailed $p < .05$).

A more parsimonious model was tested where the link between paternal autonomous attachment and child attachment security was constrained to zero ($\chi^2(2) > 0.68$, $p > .10$; AIC > 24.68; CFI > 1.00; RMSEA > 0.00); there was no significant change in model fit between the two models ($\Delta\chi^2(1) > 0.68$, $p > .10$).

Fig. 5 depicts the final model for fathers where the link between paternal autonomous attachment and child attachment security is mediated by paternal controlling childrearing behavior and where child attachment security is involved in an indirect effect of paternal controlling childrearing behavior on child EB.

Discussion

The main purpose of the current research was to examine whether and how attachment and parenting could be combined to explain EB in preschoolers clinically referred for behavioral problems. In some literature, attachment was reported to mediate the relationship between childrearing behavior and EB (Bosmans et al., 2006; Doyle & Markiewicz, 2005). Also, parental attachment was related to child EB as a distal predictor through parenting behavior and child attachment security (Cowan et al., 1996; DeKlyen, 1996; Madigan et al., 2007). The present study is in line with this existing evolution in the literature moving from the direct effects of one predictor on EB to the effect of a combination of several factors in the fields of attachment and parenting on prediction of EB. This attempt to assess the effects of a combination of

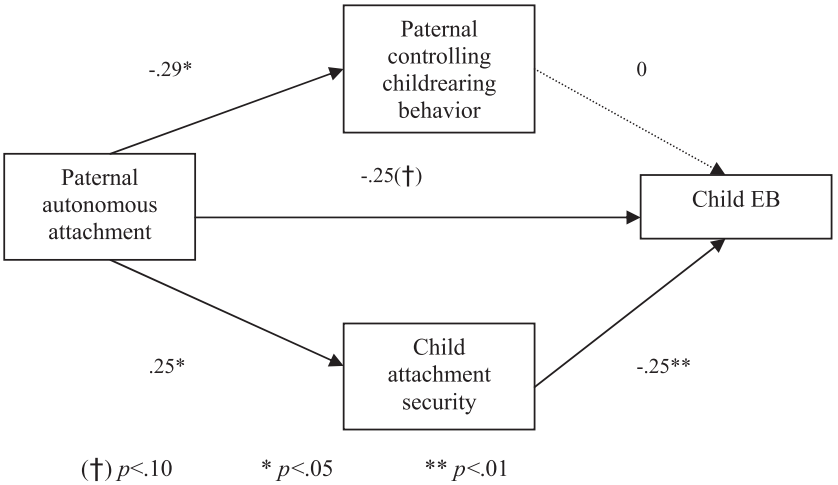

Fig. 4. Model for fathers where the link between paternal autonomous attachment and child EB is mediated by child attachment security and where paternal autonomous attachment has direct effects on both paternal controlling childrearing behavior and child EB.

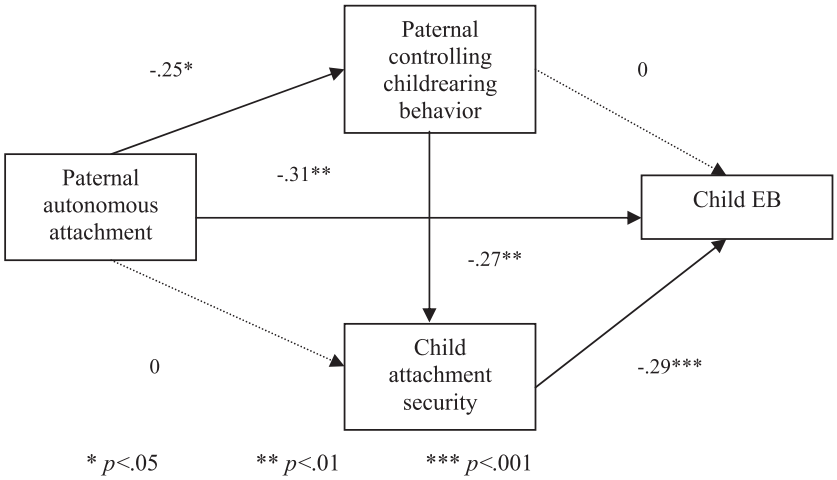

Fig. 5. Final model for fathers where the link between paternal autonomous attachment and child attachment security is mediated by paternal controlling childrearing behavior and where child attachment security is involved in an indirect effect of paternal controlling childrearing behavior on child EB.

factors was made in a sample of clinically referred preschoolers, their parents, and their teacher as an additional informant.

The results of previous studies made it possible to generate certain hypotheses that were partially verified. EB was related to parental attachment, to parental childrearing behavior (controlling but not supportive parenting behavior) and to child attachment security. The degree of child attachment security was observed to play an important role in mothers and fathers in relation to their own attachment representations, their childrearing behavior, and their child's behavioral problems. Indeed, child attachment was seen to mediate the effect of parental attachment on EB and to mediate the relationship between maternal childrearing behavior and child EB. It was also involved in an indirect effect of paternal childrearing behavior. The important role of child attachment could be partly explained by both the measurement and the sample that have been used. Fearon et al. (2010) in their meta-analysis indeed showed that the AQS (Waters & Deane, 1985) evidenced the strongest effect sizes. The authors also demonstrated that the effect size was higher in clinical than in nonclinical samples. They moreover suggested that attachment–behavior problem association was amplified by important developmental changes that take place around the beginning of the third year. All these reasons could explain the important role played by child attachment in our models in comparison to studies using other behavioral assessment of child attachment in normally developing infants.

Contrary to what was suspected from reports by Cowan et al. (1996) and Madigan et al. (2007), parental childrearing behavior – for mothers or fathers – was not observed to be a mediator in the relationship between parental attachment and child EB. However, paternal, but not maternal, childrearing behavior did mediate the relationship between paternal autonomous attachment and child attachment. These results are only partially in line with those of Madigan et al. (2006), which were obtained in adolescent mother–infant dyads. It could be that the comparability between the results that have been displayed in the current study and those of previous studies was limited due to measurement. Both Cowan et al. (1996) and Madigan et al. (2006, 2007) used the AAI (Main & Goldwyn, 1985/1994) as a measure of parent attachment, the SSP (Ainsworth et al., 1978) as a measure of child attachment and play sessions in laboratory as a measure of parenting. Other measures of attachment, AQS (Waters & Deane, 1985; Pierre-humbert et al., 1995a; Pierrehumbert et al., 1995b) and CaMir (Pierrehumbert et al., 1996), and of parenting, EPEP questionnaire (Meunier & Roskam, 2007) were employed in the present study.

The results that we obtained in the mediation models differed between mothers and fathers in several ways. For the fathers, the final model that fit the data best (see Fig. 5) suggested both a direct and an indirect effect of paternal autonomous attachment through parental childrearing behavior (which mediated the link between paternal autonomous attachment and child attachment) and child attachment (which was involved in an indirect effect of paternal childrearing behavior on child EB) on child EB. In summary, the results stress the important role played by paternal attachment history, which was seen to directly and indirectly impact on child behavioral adaptation. Fathers with an autonomous attachment were associated with children who displayed fewer behavioral problems but they were also reported to be less engaged in highly-controlled coercive childrearing strategies in daily interactions with their child. The quality of their parenting behavior in turn was seen to promote a secure attachment profile in their child who, consequently, displayed fewer EB problems.

For the mothers, the results suggested that child attachment mediated both the relationship between maternal autonomous attachment and child EB and the relationship between maternal childrearing behavior and child EB. However, the two causal variables (maternal autonomous attachment and childrearing behavior) were unrelated, suggesting that mothers' childrearing behavior was less dependent on their attachment history than was fathers'. Mothers' childrearing behavior is probably influenced by factors other than their own attachment history, such as their child's characteristics, their personality traits and sources of information (books, media, and relatives' advice). Unlike fathers, mothers seem to be able to disentangle their own affective history from the childrearing strategies they display toward their child. Because childrearing behavior did not mediate the link between maternal attachment and child attachment as expected, other mediators such as maternal sensitivity or emotional competences should be tested in future research. Moreover, the direct effect of maternal attachment on child EB was not significant, in contrast to what was observed for the fathers. In such a case, maternal attachment history seemed to display only a distal effect through child attachment on child EB. This effect was coherent with the inter-generational perspective of attachment transmission.

Such results are particularly interesting not only because, in contrast to maternal variables, paternal variables have rarely been studied, but also because previous knowledge about mother–child relationships led us to expect more significant effects associated with maternal than with paternal attachment. Nevertheless, our results underscore the importance of the father's contribution on child behavioral outcomes and should encourage further empirical studies to systematically consider the effects of both parents in the prediction of child behavioral outcomes. Moreover, our data should stimulate professionals to request the involvement of both parents in parenting

programs knowing that such programs are more willingly followed by mothers than by fathers.

In agreement with Bosmans et al. (2006), no relationship was found between supportive parenting and the other sets of variables in our study. These authors suggested that both the absence and exaggerated levels of supportive parenting could lead to behavioral difficulties in adolescents. The results that were obtained with preschoolers rather suggest that controlling childrearing behavior (referring to harsh punishment, inconsistent discipline, ignoring or material rewarding) could be seen as a risk factor for EB whereas the protective role of supportive childrearing behavior to counter EB (referring to demands for autonomy, setting rules or monitoring) was not supported. This observation needs empirical replication because it runs counter to what is generally recommended in the cognitive-behavior tradition of parenting programs. Indeed, these programs have generally assumed that recourse to supportive childrearing behavior and removal of coercive strategies would be complementary approaches to teach appropriate strategies of behavior management to the parents (Briesmeister & Schaefer, 2007; Graham, 1998).

Additional interesting information was given by the bivariate correlations. These data indicated that among the couples, correspondence between the levels of autonomous attachment of the two parents was moderate. The same result was obtained for supportive and controlling parenting suggesting that parents shared, to a certain extent, the same level of quality of attachment as well as a certain parenting consistency in their childrearing behavior. Nevertheless, there were differences in the mediation models between mothers and fathers. Further studies are needed to replicate these results and to confirm the differences that we obtained between the maternal and the paternal predictors. In addition, as suggested by both these bivariate correlations and other very recent empirical research, further mediating models should encompass data concerning couple relationship, which may be a "missing link between adult attachment and children's outcomes" (Cowan & Cowan, 2009). Couple variables could therefore mediate the relationship between parental autonomous attachment (especially for the mothers) and childrearing behavior, which, in turn, predicts child EB. Couple functioning seems to be one of the most promising fields that could be combined with both attachment and parenting frameworks in the prediction of child behavioral problems (Cowan et al., 2009; Dickstein et al., 2009).

In conclusion, finding evidence for mediation models is relevant both for research and intervention purposes. In terms of research, mediation models allow the effects of several variables from more than one theoretical background to be considered simultaneously and to broaden our predictive power for EB. In terms of applied impact, mediation models allow for rethinking of parent training programs traditionally driven in the cognitive-behavior tradition and focused on parent thoughts and childrearing behavior. Mediation models would engage professional in intervention to take into account the quality of parent–child relationships as well as attachment bonds in an intergenerational perspective in these programs.

However, the limitations of this study, conducted in a sample already high in EB and using relatively new measures of attachment, suggest that further research to replicate these models is necessary. Hence, the unusual sample of referred but not treated preschoolers raises questions about the generalizability of the results beyond clinically referred children with EB. Similar models should be tested among parent–child dyads that vary according to the level of child EB, SES and child age. Also, the use of relatively new measures of attachment probably limits the comparability of the current study to the ones that precede it. Additional studies employing the CaMir are therefore necessary to confirm its psychometrical properties making it available for further empirical studies. From the very first validation study to now, the instrument was indeed infrequently used in research. Until now, three studies using the French version of the CaMir have been reviewed (Miljkovitch et al., 2005; Philippe et al., 2006; Philippe et al., 2007). All of these highlighted both the conceptual validity and the discriminant properties of the CaMir. An English version of the CaMir (Miljkovitch et al., 2005) is also available as well as a Spanish (Garrido et al., 2009) and an Italian (Molina et al., 2007) version. Replications would finally consider completion of the AQS by a trained observer rather than parents. Psychometrical properties were indeed seen to be higher in the former case. Parents could be considered as biased observers (Van Ijzendoorn et al., 2004).

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