

Explaining gender differences in preschoolers' attachment style

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Abstract

Gender has throughout most attachment literature not been considered an important factor in the development of individual differences in attachment. However, some studies on preschoolers, especially using story completion/narrative measures of attachment representations, have found prominent gender differences. The present study aims to replicate such gender differences, and to examine possible explanatory variables. This will be done by using a large community sample of preschoolers from Norway and testing attachment styles found with the Manchester Child Attachment Story Task (MCAST). The overall attachment classification found in the sample was secure attachment, but girls were found securely attached significantly more often than boys, and boys were significantly more often found with insecure-avoidant and disorganized attachment style compared to girls. To explain these differences, four hypothesis were then proposed and aimed to explain gender differences in attachment style; (1) methodological artefacts (measuring the content or structure of the narrative), (2) categorical versus continuous measurements, (3) gendered coping styles, and (4) gender differences in psychological capabilities and traits. Some support was found for the first hypothesis, and no support was found for the other three hypotheses.

Attachment to parents develops during the first year of life (Bowlby, 1969). Achieving a secure attachment, as opposed to insecure or disorganized attachments, have far-reaching consequences for children's psychosocial development and adjustment, e.g. mental health (Madigan, Atkinson, Laurin & Benoit, 2013; Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley & Roisman, 2010; Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg & Fearon, 2012), social integration (Pallini, Baiocco, Schneider, Madigan & Atkinson, 2014; Berlin, Cassidy & Appleyard, 2008), cognition, and even academic achievement (De Ruiter & van IJzendoorn, 1993). Why does one child become securely attached to his or her parents, whereas another child becomes insecurely attached? This is a question that has been asked by multiple researchers since Ainsworth developed her theory of attachment in the 1960s and 70s. A variety of reasons for the development of the various attachment styles have been proposed in attachment theory and research, including differences in how the parent behaves towards the child, and child and caregiver-interaction (Bowlby, 1969). Early research on attachment development assumed that the primary caregivers' responses, and especially the caregivers' sensitivity to the child's need, was the major influence of the child's attachment style. However, more recent research suggests other factors to be important, as well as including factors intrinsic to the child, for instance temperament (Torgersen, 2013) and cognitive capabilities (Stievenart, Roskam, Meunier & van de Moortele, 2014).

In his seminal work on attachment, Bowlby (1969) states that the processes behind the attachment bond are so important to the human race that whenever any of those processes differ from the norm, it is judged as pathological (Bowlby, 1969). On a theoretical basis, therefore, the child's gender has not been considered a contributing factor towards attachment style, because a secure attachment has been regarded as vital for all humans throughout life, and is therefore equally important to boys' and girls' development (Bowlby, 1969). Thus, for decades the importance of gender in the development of attachment was barely illuminated.

However, several more recent lines of research provide indirect evidence that we should indeed expect gender differences in attachment. An abundance of studies have found attachment to be related to externalizing and internalizing problems (Madigan et. al, 2013; Fearon et. al., 2010; Groh et. al., 2012) with about equal effect sizes for the two problem areas. However, a recent study involving children from 24 countries, showed in the preschool years higher scores on externalizing problems and aggressive behaviour among boys, whereas no gender differences were observed in internalizing problems (Rescorla et al., 2011). As

regards diagnosable disorders, boys have been shown to outnumber girls in the preschool years (Wichstrøm, Berg-Nielsen, Angold, Egger, Solheim & Sveen, 2012). Hence, from the gender-psychopathology literature and the attachment-psychopathology literature alone, we should in fact expect boys to be insecurely attached more often than girls.

Directly investigating gender differences in attachment, certainly delivers even more compelling evidence for gender differences than the indirect evidences cited above. Some studies do indeed report gender differences, also among young children (Stievenart et. al., 2014; Toth, Lakatos & Gervai, 2013 and for a short review, see Pierrehumbert, Santelices, Alberdi, Ongari, Stievenart, Spences, Rodriguez & Borghini, 2009). However, findings are mixed: In a number of studies, boys have more often been reported having a disorganized attachment style (consequently, girls are more often securely attached) (Page & Bretherton, 2003; Gloger-Tippelt & König, 2007), whereas some studies have found that boys are more often securely attached than girls (Schoppe-Sullivan, Diener, Mangelsdorf, Brown, McHale & Frosch, 2006) and yet others have reported no gender difference (Gloger-Tippelt, Gomille, König, & Vetter, 2002; Macfie, Toth, Rogosch, Robinson, Emde, & Cicchetti, 1999).

In a 2009-study, Pierrehumbert et. al. find girls to express more secure representations than boys do, when measuring attachment with a story completion task (*The Attachment Story Completion Task*; ASCT), and girls also produce more competent and coherent narratives of higher quality than boys. The overall dominant insecure score for boys, however, is disorganized attachment style. Moreover, girls present easier access to and better articulation about emotions, and present more caregiving themes. Boys, on the other hand, present more disorganized themes, like loss of control, catastrophes, violence, destructiveness, agitation, et cetera (Pierrehumbert et. al. 2009). Thus, the authors' conclusion, based on a review of literature and their own results, is that at least from the preschool years and measured by attachment narratives; boys are more often classified with insecure and disorganized attachment than girls.

At least three explanations for these gender differences have been proposed in literature; (1) *Methodological artefacts*, i.e. that the measurement of attachment may influence the ability to detect gender differences. Specifically, gender differences are more often found when tests involving story completion tasks are applied, whereas gender differences are seldom found when observational based tests are applied, such as the Strange Situation Procedure (Pierrehumbert et. al., 2009). Pierrehumbert and colleagues argue that story completion tasks elicit more information than observational tasks. Further, they argue

specifically that the quality/structure of the narrative could have a higher relevance for gender differences than the content of the story. When both factors are taken into account, one may better detect subtle gender differences which may be overlooked in observational studies; (2) *Categorical versus continuous measurement*. Conceptualizing and measuring attachment in a categorical way may decrease statistical power and thereby making subtle gender differences difficult to detect (DeCoster, Iselin & Gallucci, 2009), whilst measuring in a continuous way may increase statistical power and thus making gender differences easier to detect (Pierrehumbert et. al., 2009); (3) *Gendered coping styles*. Gender differences in coping strategies when facing stressful situations, may explain gender differences in attachment. Some researchers theorize that boys and girls make use of different stress-response strategies, which may influence the classification of attachment styles (Taylor, Klein, Lewis, Gruenewald, Gurung & Updegraff, 2000; Pierrehumbert et. al. 2009). Specifically, David and Lyons-Ruth (2005) suggest that boys more often revert to “fight or flight”-responses and girls “tend and befriend”-responses, when facing attachment-related stress. In attachment narrative, such “fight or flight”-responses may contain more violent and/or bizarre themes. Therefore, Pierrehumbert et al. (2009) suggest that boys consequently more often will be classified as insecure.

The above hypothesis concerns possible psychological differences between boys and girls. There is a possibility that we can identify other psychological differences explaining a gender difference in attachment style. Therefore, I will propose a fourth explanation. (4) *Gender differences in psychological capabilities and traits*. Even though parental sensitivity has traditionally been seen as the main source for variation in children’s attachment style, others have suggested that there may be a range of factors intrinsic to the child that might be important as well (e.g. Weinfield, Whaley & Egeland, 2004; Torgersen, 2013). Substantial gender differences are often observed in such intrinsic factors. Thus a range of psychological differences between boys and girls may affect the classification of attachment style, and thus produce gender differences when measuring attachment.

Although proposed, these hypotheses regarding preschoolers and story completion tasks for measuring attachment have rarely been tested, and certainly not contrasted. In the work reported herein, I will therefore test the relative merit of each of these explanations, using data from a large Norwegian community sample of four-year-olds with measures of insecure-avoidant (A), secure (B), insecure-ambivalent (C) and insecure-disorganized (D)

attachment based on a story completion task. Below, I detail each of the four proposed explanations along with the literature supporting them.

Methodological artefact: Measuring attachment according to structure and/or content. Purely behavioural/content-based methods (e.g. the Strange Situation Procedure) seem to detect less gender differences compared to content and structure-based methods (e.g. story completion tasks). Behavioural/content-based methods observe attachment behaviour only. Story completion task-based tests, however, examine attachment representations through both attachment behaviour and the structure of the representation. The structural part of the representation captures the ability to construct a coherent and competent completion of a story, and this part of the narrative may be more sensitive to gender differences than the content of the narrative. The story completion task is commonly measured by a child's narrative. A successful narrative presupposes a certain level of verbal ability in constructing a structurally coherent story, in which girls have a developmental advantage compared to boys (Hyde & Linn, 1988; Nicolopoulou & Richner, 2007). One can also argue that girls will be more familiar with the pretend-play involved in tasks using dolls, which will also help them convey a coherent story. All these features of narratives may favour girls, increasing the likelihood that they will be classified as securely attached and decreasing the likelihood that they will be classified as disorganized. I will therefore in this article compare gender differences in attachment classifications using scores based on the structure and content of the attachment narratives. The content versus structure-hypothesis as an explanation for gender differences will be supported if gender differences are absent when only content codes of the attachment narrative is used, and present when structural scores are included. Moreover, a coherent story is theorized to be related specifically to a secure attachment, whilst a non-coherent story is seen as related to an insecure-disorganized attachment style. Hence, these differences will be hypothesized to be especially strong for the B and D attachment styles.

Categorical versus continuous measurement. Pierrehumbert et. al. (2009) argues that continuous coding of attachment is more sensitive than the traditional categorical measurement of attachment. Therefore; if gender differences truly exist but are small in magnitude – they might not be detected by categorical measures, but rather by continuous measures. Toth et. al. (2013) also notes that gender differences seem to be more common when using continuous measures. Research on statistical power supports this notion, and DeCoster et. al. (2009) note that in many circumstances, categorical measures may result in decreased analytical power. Therefore, continuous measures will outperform categorical

measures. To test this hypothesis, I first operationalized the measure of attachment (a story completion task) in a categorical fashion and in a continuous fashion, and compared the resulting gender differences in either way of measuring attachment. If Pierrehumbert et al.'s (2009) proposition is correct, gender differences will emerge using a continuous measure, and the difference will be absent or less strong if a categorical measure is used.

Gendered coping styles. Attachment behaviour and attachment representations are commonly elicited by inducing social stress, e.g. in the Strange Situation this is induced by the caregiver leaving the room, and in story completion tasks this may be done by dramatizing inflicted pain or insecurity. The child's reactions to this stress through attachment behaviour and/or representations are then used to classify a child's attachment style. The "fight-or-flight" response in coping with a stressful situation is seen as the normative response in human beings. However, Taylor et. al. (2000) propose that women in stressed situations respond with tending (for example nurturing offspring) and befriending (creating relations to other social groups) - actions to protect self and offspring from harm. This alleged female coping style may promote pro-social behaviour (tend-or-befriend) and diminish the likelihood of conflict (which is a likely outcome from fight-response in the fight-or-flight strategy). This notion is supported by David and Lyons-Ruth (2005) who report that female infants approach attachment figures to a significantly larger extent than male infants. Approach and comfort seeking, and to some degree being attentive to the other's need (provided that it is not seen as role reversal), are commonly coded as sign of secure attachment. Aggressive behaviour ("fight"), certainly towards the attachment figure, or withdrawal ("flight"), however, may rather be coded as indications of a disorganized or an insecure-avoidant attachment style, respectively. Thus, by the very differences in coping styles, girls may more often be classified as securely attached whereas boys may be classified as insecure or disorganized. If differences in coping styles are driving the observed gender differences in attachment styles, gender differences in attachment should disappear or be reduced once coping styles are adjusted for. In this article, the hypothesis will be supported if girls use significantly more pro-social behaviour responses compared to boys, who are hypothesized to use aggressive behavioural responses, and if observed gender differences in attachment are reduced or vanish when social competence and aggression are adjusted for.

Gender differences in psychological capabilities and traits. Hypothesis number 3 suggests that coping styles may explain the relationship between gender and the measurement of attachment. However, there may be a range of other potential mediators related to both

gender as well as attachment style, and I will examine some of the most salient ones: language abilities, temperament, and emotion comprehension.

As already detailed in Hypothesis 1 (above), girls' more advanced language capability (Hyde & Linn, 1988) may help them articulate more coherent stories in story-completion tasks, and thus increase the probability of being classified as securely attached. Boys' comparative deficiencies in this respect may promote less coherent stories, and this increases the risk of being classified as disorganized. This hypothesis is supported by findings from a recent study by Stievenart et. al. (2014) who found that girls are more often classified as securely attached compared to boys, when measuring attachment by a story completion/narrative approach, and importantly; when controlling for language abilities in a subsample of their population, the gender differences disappeared. I therefore will examine whether adjustment for language skills will reduce or obliterate observed gender differences in attachment.

When children grow, attachment behaviour also changes, from more fixed behavioural patterns, e.g. signalling and approach behaviour, to more complex behaviour by asking or indicating need for assistance, comfort or help. Conceivably, children who can forecast the reaction of their caregivers may better adapt their attachment behaviour, and therefore be more successful in receiving alleviation from their distress. Contrary, children who have problems reading the emotions of their parents could also be more difficult for parents to 'read', thus increasing the probability of mismatched responses. Research has established a clear female advantage in understanding other people's emotions, i.e. emotion comprehension (Bosacki & Moore, 2004; Ontai & Thompson, 2002; Zajdel, Bloom, Fireman & Larsen, 2013). Therefore, girls' advanced emotion understanding may increase the probability of receiving sensitive parenting, thereby increasing the probability of being securely attached and decreasing their probability of disorganization.

The relationship between temperament and attachment has been studied to some extent among infants (Vaughn, Bost & van IJzendoorn, 2008), but to a far lesser degree among preschoolers. Although studies conflict for infants, the overall conclusion is that attachment and temperament are two different domains, and that it is difficult to conclude how one can affect the other (Vaughn et. al. 2008). However, beyond infancy, one might envision that a difficult temperament may substantiate a child developing an insecure attachment, by impeding the caregivers' sensitive responses to the children's needs. Torgersen (2013) concluded that the temperament may have some influence on attachment

style, but simultaneous interaction effects (for example more or less sensitive parents) make it difficult to predict attachment style based on temperament only. I therefore add the temperamental traits of negative affect, surgency and effortful control as possible explanations for a relationship between gender and attachment.

To sum up, in this research I will first examine if gender differences are present in a large community sample of 4 year olds. Second, if gender differences are found, each of the four proposed explanations; methodological artefacts (measuring content or structure), categorical versus continuous measurements, gendered coping styles and gender differences in psychological capabilities and traits, will be tested individually.

Method

Participants and recruitment

All children born in the city of Trondheim, Norway in 2003 and 2004 were invited to participate in the study. A letter with an invitation including the Strengths and Difficulties Questionnaire (SDQ) 4-16 version (Goodman, 1997), which is a screening measure of mental health problems among children, were sent to their homes, and parents brought the completed SDQ to the ordinary health check-up for 4-year-olds. As almost everyone eligible for the study attended the health check-up (97.2%), this is considered a community sample. Parents with insufficient Norwegian language skills were excluded. The parents were then informed of the study by health nurses using procedures approved by the Regional Committee for Medical and Health Research Ethics, and then written consents were obtained. Among eligible families, consent rate was 82.1 %.

To increase variability and thus statistical power, SDQ scores on the symptom scales (i.e., emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems) were divided into four strata using cut offs of 0-4, 5-8, 9-11 and 12-40. With a random number generator, 38.1 %, 49.1 %, 71.4 % and 89.2 % of children in strata 1-4, respectively, were selected to participate in the further data collection. Of the 1250 children (and parents) selected a total of 936 (74.9%) parent-child dyads met 2-4 weeks thereafter, for further testing and examination at the university. Drop-out rates following recruitment did not differ across SDQ-strata ($X^2 = 5.70$, $df = 3$, $p = .13$) or by gender ($X^2 = 0.23$, $df = 1$, $p = .63$).

Table 1 describes the characteristics of the participating parent-child dyads. As can be seen, there were equal amounts of boys and girls attending the clinical assessment. The mean age of the child attending the clinical assessment was approximately 4.5 years (54.88 months,

with the youngest child being 48.17 months and oldest being 67.81 months. The majority of children came to the clinical assessment accompanied by their biological parent, 11 children came with their adoptive parent, 2 children came with their stepparent, 1 child came with a grandparent and 3 children were accompanied by their foster parents. The mean number of siblings of the attending child was 1.35, the maximum number of siblings were 9, and minimum number of siblings 0.

Instruments

Attachment. The Manchester Child Attachment Story Task (MCAST; Green, Stanley, Smith & Goldwyn, 2000) was used to measure children's attachment styles. MCAST uses narrative doll-play and conversation. The child initially chooses two dolls, one to represent the parent accompanying the child to the university (the mommy/daddy doll) and the NN (the name of the child) doll. Procedurally, the task is to play through five stories/vignettes with the two dolls; the administrator starts the play and the child completes. The first vignette is a non-attachment-related vignette (called the breakfast vignette); this is to make sure the children understands the task and is able to follow the instructions. This is then followed by four attachment-related distress stories. The stories begin with everyday-events, in which something bad/scary suddenly happens (e.g., the child is awakened by a nightmare/lost at a shopping mall). These stress inductions are designed to activate the child's attachment system, and aims to facilitate specific attachment-related thoughts and behaviours comparable to the use of separation in the Strange Situation procedure. When the story climaxes, the administrator asks, "what happens next?" to facilitate the completion of the story by the child. After the story is completed, the interviewer then asks the child four questions: "Can you tell me how the child-doll is feeling now?", "Can you tell me how the parent-doll is feeling now?", "Can you tell me what the child-doll is thinking now?" and "Can you tell me what the parent-doll is thinking now?". This is to clarify the intention behind the play and degree of alleviation, and to prompt mental state attributions to the dolls.

Disorganization is judged on the basis of the content of the child's story narrative, and also the child's behaviour during the narrative. Behavioural and narrative indications of disorganization include freezing or lapses at critical narrative points (e.g., reunion between child-doll and mother-doll), narratives with no goal direction or major internal contradictions (e.g., proximity-seeking then freezing), explicit expressions of child-doll's fear of the parent-doll, disoriented or bizarre reactions (themes that clearly do not relate to the vignette, and often are of a nightmare-ish quality that have no resolution in the vignette) or multiple and

incompatible strategies within a vignette (e.g., freezing, stilling, incomplete movements), or unexplained and sudden shifts into contradictory behaviour out of context (e.g. a sudden attack on the mother-doll out of context).

The coding process focuses both on the *content* and the *structure* of the narratives (Green, Stanley, Goldwyn & Smith, 2007). Each vignette is rated on 33 codes consisting mostly of nine-point scales. There are four broad groups that the ratings are sorted into: 1) The attachment-related behaviour; like patterns of proximity, details of caregiving, self-care and displacement, conflict and reversal behaviours, and degree of alleviation; 2) Narrative coherence and whether or not a story is presented in a competent way; 3) Disorganized phenomena; behaviours that are identified in the detailed content of the child's doll-play, and in its own verbal and non-verbal behaviour; 4) Additional ratings are made of bizarreness, predominant affect, of the child's mentalizing ability (being able to see into states of mind and motivation of the dolls) and of meta-cognition (reflecting the story and its significance).

A number of findings underscore the reliability (Barone et. al., 2009) and validity of MCAST measures of attachment. Not only are MCAST scores stable over time; they correlate in expected ways with other key attachment measures (Green et al., 2000). Disorganization in particular predicts comparatively decreased social competence (Hygen, Guzey, Belsky, Berg-Nielsen & Wichstrøm, 2014), and correlates with independent teacher ratings of classroom behaviour (Goldwyn, Stanley, Smith, Green, 2000). In addition, Futh, O'Connor, Matias, Green & Scott (2008) found that disorganization in the children's attachment narratives in the MCAST were significantly associated with teacher-and parent-reported problems.

All test administrators and coders in this study have been trained and reliability checked by Jonathan Green. The doll-play was videotaped. Coders (n=7) had at least a bachelor's degree in related fields and were unaware of any information regarding the child. Regular meetings with master coders were held to avoid rater drift.

Categorical coding. The coded results are used to identify both an overall strategy, and the categorical attachment-style ratings for each attachment-related vignette. The overall interview classification is decided by the predominant classification throughout the four vignettes. If two or more of the vignettes are coded as insecure or disorganized, the whole interview must then be rated as insecure or disorganized (e.g. the codes BBCC for the four attachment vignettes will give C as overall interview classification) Ten percent of MCAST vignettes were re-coded by blinded raters. For the categorical coding, the inter-rater reliabilities were A $k = .62$, B $k = .77$, C $k = .57$, and D $k = .57$.

Continuous coding. Following a procedure described by Wichstrøm, Belsky & Berg-Nielsen (2013) and Hygen et al. (2014), the primary categorization was coded as 1 (present) or 0 (absent) in each of the four vignettes, whereas a secondary classification was coded as 0.5 (present) or 0 (absent). Attachment scale scores were computed as the average score across the four vignettes for the primary and secondary scores (range 0-1). Hence, a child who attained a primary classification of D on two vignettes and a secondary classification of D on one vignette would be given a D score of $(1 + 0 + 1 + 0.5)/4 = .625$. Inter-rater reliability between multiple pairs of raters of continuous was as follows for the different attachment styles: A-scale: ICC=.71, B-scale: ICC=.79, C-scale: ICC=.70, and ICC=0.73 for the D-scale.

Content coding. The child's behaviour and content of the narrative during doll play in each vignette is used to classify the child into each of the four attachment strategies (Green, et. al., 2007). It is assumed that most children will be in a state of distress when starting on their part of the story, and will be wishing to reduce this distress. The chosen strategy and how effective it is in relieving that distress, is of equal interest. Rating aims to use the spontaneous behaviours played out by the child during the doll-play. Behaviours that are included in content scoring, include proximity seeking, self-care/self-soothing behaviour, caregiver warmth, caregiver control and more. The classification includes both representations of child and parental behaviour (Green et. al., 2007). A continuous score of A, B, C and D were computed according to the descriptions above. Inter-rater reliability between multiple pairs of raters of dimensional was as follows: A-scale: ICC=.83, B-scale: ICC=.88, C-scale: ICC=.76, and ICC=0.81 for the D-scale.

Structure coding. These are ratings based on narrative coherence during the child's spontaneous narrative in the test situation, and relevant characteristics include the internal consistency of the story, quantity (whether the story is full or brief), relevance of the story and the clarity/orderliness of the narrative (whether the child is focused on the narrative and stays to the here and now-demands without being distracted) (Green et. al., 2007). ICC was .90.

Explanatory variables.

Social competence. Social skills were measured using the 39-item Social Skills Rating System (SSRS) (Gresham & Elliot, 1990) which were completed by the parents. The SSRS measures four dimensions: *cooperation* ($\alpha = .74$) (e.g., helping others, sharing materials, complying with rules/directions, etc.); *responsibility* ($\alpha = .66$) (e.g., the ability to communicate with adults, respect for property or work, etc.); *assertion* ($\alpha = .73$) (e.g., appropriately express feelings when wronged, receive criticism well, participate in organized

group activities, etc.); and *self-control* ($\alpha = .81$) (e.g., appropriately respond to teasing, taking turns, compromising, etc.). There were also recorded teacher-ratings on social competence (Gresham & Elliot, 1990), consisting of three dimensions; *cooperation* (e.g., keeps desk clean without being reminded, finishes tasks within time limits, $\alpha = .82$), *assertion* (e.g., invites others to join activities, initiates conversations with peers, helping the teacher without being told, $\alpha = .83$), and *self-control* (e.g., controls temper in conflict situations, waits for his or her turn, $\alpha = .87$).

Aggressive behaviour. Ratings of aggressive behaviour was measured by the aggressive behaviour narrow band scale of the Children's Behaviour Checklist (CBCL), which was completed by the parents ($\alpha = .88$) (Achenbach, 1991), the 1.5-5 year (CBCL/1.5-5) version was used. Teacher's Report Form (TRF/ 1.5-5); Achenbach, 1991) was used to measure teacher-ratings of children's aggression ($\alpha = .93$).

Language. Language was measured by the Peabody Picture Vocabulary Test (PPVT-III). This Norwegian version of PPVT-III (Dunn & Dunn, 1997) measures the child's receptive language ability. The test administrator states a word describing one of four drawn pictures displayed on a page, and then asks the child to point to or say the number of the picture that the word describes. The test consists of 4 practice items and 204 test items arranged in order of difficulty. The PPVT-III has demonstrated good validity and reliability (Dunn & Dunn, 1997). In this study, Cronbach's alpha was .98.

Emotion comprehension. The Test of Emotion Comprehension (TEC: Pons & Harris, 2000) is designed for children aged 3-11, and consists of nine components: Recognition, External cause, Desire, Belief, Reminder, Regulation, Hiding, Mixed, and Morality. A short story accompanied by cartoon scenarios is read aloud to the child. At the end of each story, the child is asked to indicate the emotional response of the story protagonist by pointing to one of four cartoon faces that represent different emotions. Recognition and External cause include five test items. Desire includes four test items, whereas Belief, Reminder, Regulation, Hiding and Mixed consist of one test item each, and finally Morality includes two items. The components increase in difficulty. Previous studies have shown that the nine components on the TEC are scalable (index of consistency $I = 0.68$ (Pons, Harris & de Rosnay, 2004) and analysis by the Mokken scale also yielded satisfactory results, $H = 0.40$, $Rho = 0.68$ (Albanese, et. al., 2006)). As the TEC items are dichotomous α is not strictly applicable and provide the lower bound of reliability ($\alpha = 0.61$) whereas the Theta coefficient is applicable to categorical variables and provide the upper bound of reliability ($\theta = 0.95$).

Temperament. Temperament is measured by The Children's Behaviour Questionnaire (CBQ; Rothbart, Ahadi, Hershey & Fisher (2001)) long version. The parent was asked to rate his or her child's behaviour during the last 6 months. Based on factor analysis (Rothbart, et. al., 2001), the CBQ operates with temperamental factors divided in three broad dimensions (Negative Affect/NA, Surgency/SU and Effortful Control/EC) based on 15 subscales. The broad dimension NA is defined as the mean of the narrow scales of Discomfort, Sadness, Fear, Anger/Frustration, and Soothability (reversed); the broad dimension SU is measured as the mean of the narrow scales of Impulsivity, High Intensity Pleasure, Activity Level, Shyness (reversed); whereas the broad dimension EC is computed as the mean of Smiling/Laughter, Inhibitory Control, Attentional Focusing, Low Intensity Pleasure, and Perceptual Sensitivity. The Cronbach's α values for NA, EC and SU were .87, .84, and .91, respectively.

Results

Because the study applied a stratified sampling approach, i.e. oversampling children with mental health problems, all analyses were performed using sampling weights which were the inverse of the drawing probability to arrive at correct population estimates. Moreover, the Horvitz-Thompson estimator was applied to provide corrected standard errors. The Complex Samples module of SPSS 19.0 was used throughout the analysis.

Gender differences. First, is gender differences found in the present study? Table 2 outlines information regarding the attachment categories, with continuous scoring, content scoring and structural scoring. As can be seen, more than half of the children were classified as securely attached, whereas very few children were classified as ambivalent. Table 2 presents results using continuous measures of attachment, analysing differences in mean scores between boys and girls. Large gender differences were detected for secure, insecure-avoidant and disorganized attachment styles, explaining up to 11% of the variance in attachment. Table 3 reveals pronounced gender differences also when categorical classification of attachment was applied: Almost twice as many girls as boys were securely attached, whereas boys were more often avoidant or disorganized. No gender difference in ambivalent attachment was seen.

Methodological artefact: Measuring attachment according to structure and/or content. The structure versus content hypothesis posits that gender differences should be absent when only content aspects of the attachment situation were used. They should,

however, be present when the structure of the narrative is applied for coding. Table 2 shows that gender differences were present when both content and structure scores were used, with the exception of content-based C-codes. However, inspection of the R^2 s show that the gender differences appeared to be substantially stronger when structure was used, than when content-based codes were applied, albeit this was not directly tested. This finding suggests that the strong form of the hypothesis, i.e. that how attachment was measured could explain why all gender differences were discarded. However, a weaker form of Hypothesis 1, i.e. that measurement type could explain part of the gender difference, seems to receive some support.

Explaining the gender difference in attachment: Categorical versus continuous measures. The results already presented in Tables 2 and 3 directly address the question whether continuous or categorical scoring matters in the detection of gender differences. In our sample, both approaches yielded significant gender differences in A, B and D attachment styles, regardless of whether measured with categorical or continuous measures, but not for the C attachment style. This means that Hypothesis 2 was rejected.

Gendered coping styles. To determine whether gender differences in social competence and aggression could account for the observed gender differences, I conducted three sets of stepwise General Linear Model Analyses, one for each of the attachment styles previously shown to have gender differences (i.e. A, B, and D). In these analyses, gender was entered first and in a second step, four parent- and three teacher-rated social skills-dimensions, as well as parent- and teacher-ratings of aggressive behaviour, were entered. This hypothesis would be supported, if gender differences were diminished or disappeared when this second step was introduced. As can be seen in Table 4, the gender differences were unaffected when controlling for coping styles, and thus, Hypothesis 3 was not supported.

Gender differences in psychological capabilities and traits. To examine this hypothesis, I used the same formula as above, with three sets of stepwise General Linear Model Analyses, again focusing only on attachment style A, B and D, as C had shown no gender differences. Again, gender was entered first, and then the ratings of language ability, emotion comprehension and temperament. The results are outlined in Table 5, and also here, no major reduction of gender differences was found with regard to any of the three hypothesized traits measured. Hypothesis 4 was thus also rejected.

Discussion

As outlined above, gender differences in attachment have been reported in some studies (Toth et. al, 2013; Pierrehumbert et. al. 2009; Page & Bretherton, 2003; Gloger-Tippelt & König, 2007; Schoppe-Sullivan et. al. 2006), whereas others have found gender to be unrelated to attachment (e.g. Macfie et. al. 1999). With one notable exception (Pierrehumbert et. al. 2009), research finding gender differences have utilized small (e.g. Toth et. al. 2013 with $n=84$) or high risk samples (e.g. Carlson, Cicchetti, Barnett & Braunwald, 1989). This article therefore first aimed to determine whether gender differences could be found also when using a large community sample of preschoolers. Second, four possible explanations for such a difference have been suggested; (1) methodological artefacts (measuring content or structure), (2) categorical versus continuous measurements, (3) gendered coping styles, and (4) gender differences in psychological capabilities and traits, and tested in this study. Large gender differences in A, B and D types of attachment were detected. The results did lend some support to the content versus structure hypothesis, whereas no support was found for the latter three hypotheses.

Gender differences? The gender differences found in the present study were quite pronounced, regardless of how attachment was measured, i.e. categorical versus continuous, or taking into account the content versus the structure of the attachment behaviour and narrative. Boys were almost twice as often categorized as avoidant and three times as often categorized as disorganized, compared to girls. Not surprisingly, then, girls were almost twice as often securely attached. The present results closely echo those of Pierrehumbert et. al. (2009), which also examine preschoolers. They report significant gender differences for secure, insecure avoidant and disorganized attachment styles, and no significant gender differences in ambivalent attachment was seen, with gender explaining up to 14 % of the variance in attachment classifications, as compared to up to 11% in the present study.

Explanations

Methodological artefact: Measuring attachment according to structure and/or content. Pierrehumbert et. al. (2009) proposes that measuring both the content and the structure of the narrative may be more sensitive to gender differences than merely the content. However, although proposed as an explanation, this was not tested, as I have done in the present study. Recall that the structure codes in the present study included narrative coherence, internal consistency in the story, quantity (full or brief story), the relevance of the story and the clarity/orderliness of the narrative (whether the child is focused on the narrative

and stays to the here and now demands. Content codes, however, were based on the extent of proximity seeking, self-care/self-soothing behaviour, caregiver warmth, and caregiver control. The results reported herein strongly indicate that gender differences are larger when structural coding is applied, as opposed to purely content-based codes. Still, this is obviously not the only explanation for the observed difference, as gender differences are present in content measures as well. There has been found very few gender differences in studies using the Strange Situation Procedure (Toth et. al., 2013, Pierrehumbert et. al. 2009), this phenomenon could be caused by the differing testing methods, but it is also possible that gender differences may develop with age, at least until preschool or the early school years. Pierrehumbert et. al. (2009) attempted to test such an age hypothesis, by dividing their sample of boys in an “older” and “younger” group (the mean age difference between the groups were 14 months). They found that there is a higher security score in the “older” group, but age can only explain a small part of the gender difference when tested statistically (Pierrehumbert et. al. 2009). One can argue that 14 months is not a large enough difference in age to thoroughly examine this possible explanation, and that this could be in need of further investigations. However, it should be noted that narratives must be used when measuring attachment among pre-schoolers and older children, whereas such narratives are inappropriate with infants and toddlers. Thus, the measurement of attachment and age will be confounded, making it difficult to disentangle measurement and age explanations for the gender difference.

Categorical versus continuous measures. In this work, I proposed and examined whether categorical measurements make gender differences less detectable as opposed to applying continuous measures. This hypothesis was first proposed in the Pierrehumbert et. al. (2009) study and discussed in Toth et. al. (2013), and the former study examine whether a coding procedure based on continuous measures would be sensitive to gender differences, but does not contrast this with categorical measures. This comparison is therefore tested in the present study. As already noted, the gender differences in the present study is pronounced when both sorts of measurements are used, even though one cannot at the present time compare them directly, as continuous and categorical measures depend on differing statistical analyses. Hence, the alleged loss of statistical power with categorical measures cannot explain gender differences. Although, it is likely that decreased power is implied, and the categorical measures are also less reliable than the continuous measures, the gender differences are large enough to be detected even with non-optimal measures.

Gendered coping styles. The hypothesis explored the proposition that boys and girls use different coping styles when in stressful situations (Taylor et. al., 2000; David & Lyons-Ruth, 2005), exemplified as “fight-or-flight”-responses in boys (involving possibly more aggressive behaviours) and “tend-or-befriend”-responses (pro-social behaviours) in girls. The possibility that this gender difference could explain the gender difference in attachment is proposed in Pierrehumbert et. al.’s (2009) study, which finds boys’ play to involve both agitated behaviours and inhibited emotions more often, whilst the girls’ play showed more caregiving attitudes. This, however, was not tested statistically. Toth et. al. (2013) also discuss the possibility of differing reactions in boys and girls in emotional stressful situations, and how girls might be more likely to react with affectionate behaviour. In the present study, this proposition is tested formally with parent- and teacher-ratings of a child’s social competence and aggression. Rather strong gender differences are found in social competence and aggression. However, this gender difference does not explain the observed gender differences in attachment.

Gender differences in psychological capabilities and traits. The coping styles hypothesis noted above is but part of a broader category of explanations involving possible 3rd variables. In the present work, I test a number of salient psychological capabilities and traits chosen from literature on attachment theory and child development as potential 3rd variables; language capability, emotion comprehension, and temperament. These capabilities and traits, as measured in the present study, cannot explain any of the gender differences when tested.

Limitations

The results should be interpreted in the context of several limitations. First, some of the attachment measures involved, most notably the categorical classifications, have modest reliability. Yet, gender differences are detected. It is therefore possible that reported gender differences in attachment styles are somewhat underestimated.

Second, although a range of possible 3rd variables are examined, and none of them prove to have any explanatory power in the present study, it is important to remember that still unmeasured and untested factors can explain the gender difference. Factors such as cognitive maturity, restlessness in the test situation, interactions between parent and child, among others, could possibly affect gender differences in ratings of attachment.

Third, as noted above, some sort of storytelling must be involved when measuring preschoolers’ attachment and these are also used in the MCAST content codes. Thus, the content coding involved here cannot be purely behavioural, as in the Strange Situation. It may

be that the story telling and the use of dolls favour girls in some ways, which was not possible to adjust for in the present study, because we had no information about the children's experience with doll-play or symbolic-play.

Fourth, there is also a possible issue with a potential bias in the coding, namely that all coders of the MCAST in the present study are female. Even though the coders are certified, there is a possibility that female coders may introduce a bias in how boys' behaviour is rated, possibly producing or exaggerating gender differences. I cannot overlook how female coders may perceive boys' spontaneous play as more violent, and may easier classify the narratives as disorganized, or that boys unfamiliar with doll-play may be perceived as avoidant. The gender differences found in attachment styles can even be mirroring social differences in normative development between boys and girls (Toth et. al., 2013). Young boys have to some extent been shown to have higher rates of violent themes and fantasies in spontaneous play (Dunn & Hughes, 2001), which could increase the risk of boys being classified as disorganized in story completion tasks, without actually being disorganized

To conclude, utilizing a large and representative population sample, the present study documented large gender differences in insecure-avoidant, secure and disorganized attachment in 4-year olds. Despite efforts to explain these differences, they were by and large left unexplained. We therefore do not know whether the observed gender differences in attachment during preschool are due to measurement issues or are true differences yet to be explained.

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Table 1.

Sample characteristics

Sample characteristics		%
Gender of child	Male (n=468)	50.0
	Female (n=468)	50.0
Gender of parent attending clinical assessment	Male (n=140)	15.2
	Female (n=782)	84.8
Attending parent's highest completed education	Junior high school (10 th grade)	.5
	Some education after junior high school	6.2
	Senior high school (13 th grade)	16.7
	Some education after senior high school	3.4
	Some college or university degree	7.7
	Bachelor degree	6.2
	College degree (3-4 years study)	34.1
	Master degree or similar	21.1
	PhD completed or ongoing	4.1
Attending parent's socio-economic status	Leader	5.5
	Professional, higher level	25.5
	Professional, lower level	39.8
	Skilled workers	25.5
	Farmers/fishermen	.6
	Unskilled workers	3.1

Table 2

Gender differences in continuous measures of attachment, structure and content.

	Boy		Girl		<i>t</i>	<i>p</i>	<i>df</i>	<i>R</i> ²
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>				
Continuous measures								
Avoidant (A)	.25	.01	.18	.01	5.36	<.001	805	.026
Secure (B)	.40	.01	.61	.01	-11.32	<.001	805	.107
Ambivalent (C)	.09	.01	.08	.01	.39	.70	816	.001
Disorganized (D)	.27	.01	.13	.01	11.02	<.001	816	.106
Content measures	.11	.01	.03	.005	7.53	<.001	805	.05
Structure measures	4.43	.05	5.36	.05	-12.86	<.001	778	.135

Table 3

Gender differences in categorical classifications of attachment

Attachment Style	Total	Boys	Girls	χ^2 (1, 810)	<i>p</i>
Avoidant (A)	23.7 %	29.9 %	18.3 %	15.05	< .001
Secure (B)	53.6 %	38.3 %	66.7 %	65.28	< .001
Ambivalent (C)	6.8 %	7.2 %	6.5 %	.17	.59
Disorganized (D)	16.0 %	24.6 %	8.5 %	38.66	< .001

Table 4

Effect of social competence on gender differences in attachment

	Avoidant (A)			Secure (B)			Disorganized (D)		
	B	SE	p	B	SE	p	B	SE	p
Model 1: Gender	.07	.01	<.001	-.21	.022	<.001	.137	.015	<.001
Model 2: Gender + social competence and aggressive behaviour									
Gender	.08	.02	<.001	-.21	.022	<.001	.14	.02	<.001
Parent: Cooperation	.002	.004	.63	-.001	.006	.843	.002	.004	.584
Parent: Assertiveness	-.005	.003	.15	.008	.005	.120	-.006	.004	.116
Parent: Responsibility	-.002	.004	.60	.002	.006	.747	.000	.004	.972
Parent: Self-control	-.002	.004	.67	.005	.006	.406	-.004	.004	.311
Teacher: Cooperation	.001	.004	.80	-.008	.005	.124	.002	.004	.527
Teacher: Assertiveness	-.004	.003	.185	.011	.004	.008	-.002	.003	.409
Teacher: Self-control	.006	.003	.042	-.001	.005	.814	-.004	.003	.178
Parent: Aggressive behaviour	-.002	.002	.356	.000	.002	.838	.000	.002	.767
Teacher: Aggressive behaviour	-.001	.002	.731	.001	.002	.752	-.001	.001	.358

Table 5
Effect of language capability, emotion comprehension, and temperament on gender differences in attachment

	Avoidant (A)			Secure (B)			Disorganized (D)		
	B	SE	p	B	SE	p	B	SE	p
Model 1: Gender	.07	.01	<.001	-.21	.022	<.001	.137	.015	<.001
Model 2: Gender + language capability									
Gender	.07	.01	<.001	-.21	.02	<.001	.140	.01	<.001
Language capability	-.001	.00	.010	.002	.00	<.001	-.001	.00	<.001
Model 3: Gender + emotion comprehension									
Gender	.07	.01	<.001	-.21	.02	<.001	.141	.01	<.001
Emotion comprehension	-.005	.004	.238	.021	.006	<.001	-.013	.004	.002
Model 4: Gender + temperament									
Gender	.07	.01	<.001	-.21	.02	<.001	.141	.01	<.001
Negative affect	-.028	.01	.074	.034	.02	.113	.006	.01	.677
Surgency	-.038	.01	.002	.22	.01	.180	.007	.01	.482
Effortful control	-.030	.01	.094	.65	.02	.014	-.020	.01	.215