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Young children with significant developmental delay differentiate home observed attachment behaviour towards their parents

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Abstract

Background: The hallmark of attachment is that contact, proximity and relief from stress are sought from specific individuals, laying important groundwork for healthy socioemotional functioning. This study investigated the extent to which differentiated attachment behaviour can be observed in young children with significant developmental delay (DD).

Method: Video-taped observations of the parent-child and stranger-child interaction were conducted at home and complemented with questionnaires in 20 families with a child with significant DD (age 2–7 years with an average DD of 49 months).

Results: Children displayed more intense and persistent contact-seeking, contact-maintaining and resistant behaviour in the episodes with their parent compared to the episodes with the stranger. Parent-reported secure attachment behaviour was slightly more characteristic towards mother compared to father.

Conclusions: Even children with significant DD develop differentiated attachment behaviour. Detailed observations may support parents in identifying the interactions that make the attachment relationship with their child special.

KEYWORDS

attachment behaviour, parent-child relationship, severe or profound intellectual disability, significant developmental delay, young children

1 | INTRODUCTION

Accumulating research shows that children¹ with severe or profound intellectual disabilities are at increased risk for the development of challenging behaviour (Janssen, Schuengel, & Stolk, 2002; Poppes, van der Putten & Vlaskamp, 2010). There is a broad agreement in the literature that problems in emotion regulation (ER) are at the core of numerous mental health and behavioural problems in the general population (Bradley, 2000; Gross & Munoz, 1995). ER shapes the experience and expression of emotions (Gross, 2014). Research has

only paid limited attention to ER in persons with intellectual disability.

In typically developing children, the involvement of primary caregivers in the developing affect regulatory system is generally accepted (e.g., *attachment theory*; Bowlby, 1969/1982a). The attachment figure helps regulate stress when children seek proximity and support (Bowlby, 1969/1982a; Cassidy, 1994). Although attachment theory might be helpful to understand the ER strategies of children with intellectual disability, little is known whether attachment theory can be applied to children with significant developmental delay (DD) and empirical research remarkably lags behind compared to typically developing children (Howe, 2006; McClure, Halpern, Wolper, & Donahue, 2009; Schuengel, Kef, Damen, & Worm, 2010; Vos, De Cock, Munde, et al., 2013a). The current study is one of the

¹To improve readability, "child(ren)" is written, whereas "infant(s) and young child(ren)" are intended.

This study met the ethical procedures and standards of the KU Leuven, Belgium.

first attempts in studying parent-child attachment in young children with significant DD² by (a) identifying behaviours that could reflect (differentiated) attachment behaviours, and by (b) providing a first exploration of the association between these behaviours and variables that are known to be linked with individual differences in attachment security.

According to attachment theory, children under almost any circumstances develop lasting, affectional ties with their primary caregivers, such as their parents (Ainsworth & Wittig, 1969; Bowlby, 1969/1982a). Young children are securely attached to their caregivers to the extent that their interactive behaviours towards these caregivers are predicated on trust in them. This feeling of trust encompasses the trust in their parent as source for support in exploring the world, but also the trust that their parent will support them in dealing with emotions, engendered in the process of exploration (Ainsworth, 1979; Dujardin et al., 2016). When parents react sensitively to their child's emotional cues, children develop secure attachment (Ainsworth, Blehar, Waters, & Wall, 1978; Atkinson et al., 1999). This is characterized by expectations about the availability of their parent, presumably giving way to feelings of security and positive emotion (Ainsworth, 1979; Bowlby, 1969/1982a). On the contrary, in case parental sensitivity is unpredictable or absent, children are likely to develop insecure attachment relationship (Atkinson et al., 1999; Bowlby, 1969/1982a).

Attachment development is expressed in specific attachment behaviour, which is thought to be regulated by the attachment behavioural system (Ainsworth, Blehar, Waters, & Wall, 2015; p. 5). Different behavioural patterns reflect secure versus insecure attachment development and contribute to the interpersonal context to which children are exposed (Schuengel, De Schipper, Sterkenburg, & Kef, 2013). *Secure* attachment behaviours aim to establish proximity and support seeking after distress (e.g., after separation). Examples are differential crying, smiling, moving towards the parent, or (non-verbally) asking to be picked up and comforted (Ainsworth, 1964). Other patterns of attachment behaviour are *resistance* (e.g., showing anger when offered physical contact and comfort), *avoidance* (e.g., diverting attention away from attachment figures and their whereabouts; Ainsworth et al., 2015), and attachment *disorganization* (e.g., simultaneous display of avoidance and resistance, showing fearful responses during reunion with the parent; Main & Solomon, 1990). These attachment behaviours are seen as relationship-specific organizations of the attachment behavioural system (Ainsworth, 1964). A relationship between two persons is considered to be an attachment relationship if the history of interactions between those persons reflects both the display of attachment behaviours and the response to those behaviours (Schuengel et al., 2013).

Considering Bowlby's presupposition of attachment as an "*integral part of human nature*" (Bowlby, 1982b, p. 669), attachment could

provide an important framework for understanding the socioemotional development of children with disabilities. In line with this notion, Janssen et al. (2002) developed a theoretical model, that is the stress-attachment model, to explain how challenging behaviour in people with severe or profound intellectual disability possibly originates from the interplay between (a high vulnerability for) psychological stress and (insecure) attachment.

Early findings have suggested that the potential for attachment relationships to protect against the risks associated with intellectual disability (e.g., limited skills to cope with stress autonomously; Chaney, 1996; Gerstein et al., 2011; Janssen et al., 2002) and related risk factors, may be undermined by the heightened propensity for attachment relationships to be insecure, disorganized or even disordered (Atkinson et al., 1999; Howe, 2006; Schuengel & Janssen, 2006). Various explanations have been given for the heightened risk of insecure attachment (e.g., Atkinson et al., 1999; Naber et al., 2007; Schuengel & Janssen, 2006). Howe's (2006) transactional model, for example, includes vulnerabilities related both to the child and the parent. Children with a significant DD, especially those who communicate at pre- or protosymbolic level, have difficulties signalling their needs (De Schipper & Schuengel, 2010; Potharst et al., 2012; Schuengel et al., 2010). The idiosyncratic signals make it more difficult for parents to respond sensitively (Moran, Pederson, Pettit, & Krupka, 1992; Schuengel et al., 2010). Because parental sensitivity is a known determinant of attachment security (Ainsworth et al., 1978), secure attachment development is jeopardized in these children (De Wolff & Van IJzendoorn, 1997). In addition, parents may suffer from prolonged distress (De Belie & Hove, 2005) and often have unresolved reactions regarding their child's disability (Barnett et al., 1999, 2006; Feniger-Schaal & Oppenheim, 2013; Howe, 2006; Marvin & Pianta, 1996). Moreover, parents often feel uncertain about their role as primary caregiver when raising a child with a severe disability (Vlaskamp, Maes, & Penne, 2011).

Despite the importance of secure attachment in children with a significant DD, there remains a gap in current knowledge concerning the occurrence and nature of attachment behaviour towards parents. One of the factors explaining the gap is the children's limited or specific behavioural repertoire due to cognitive, motor and sensory impairments (Nakken & Vlaskamp, 2007; Schuengel & Janssen, 2006), making it hard to identify attachment behaviour in this group. In spite of attachment development being one of the first challenges in typical development (Berk, 2018), it requires cognitive maturation (e.g., the ability to differentiate social behaviour, to build coherent expectation patterns; Cassidy, 2008; Schuengel & Janssen, 2006). As severe cognitive impairment is one of the characteristics of children with DD, it remains a fundamental empirical question whether attachment relationships develop in the same way.

Schuengel and Janssen (2006) described the limited number of studies which supported the possibility of children with severe disabilities to exhibit attachment behaviour (possibly in a specific/characteristic or atypical way). For example, the studies of De Schipper and colleagues (De Schipper & Schuengel, 2010; De Schipper, Stolk, & Schuengel, 2006) described the expression of attachment

²The term "significant developmental delay (DD)" is used, because reliable IQ-tests and established norms are lacking at the very low end of the spectrum of intellectual functioning (Resing & Blok, 2002; Weis, 2014). Hence, in this article, the term "significant DD" is used when referring to (young) children, while the term "severe or profound intellectual disabilities" is used when referring to adults. However, the same level of cognitive functioning is implied.

behaviour among youth with a moderate-to-severe intellectual disability. These authors observed a clear occurrence of selective attachment behaviour towards professional support workers, who in this manner acted as a secure base for their clients. The studies also revealed that the source of individual differences in attachment behaviour is not only linked to child characteristics, but to caregiver characteristics as well. Generally, the largest body of literature concerns children with Down's syndrome (Schuengel & Janssen, 2006). They reveal a similar pattern of responses to separation from their parent, although more blunted, delayed and less intense (Cicchetti & Serafica, 1981; Thompson, Cicchetti, Lamb, & Malkin, 1985). The manifestation of their attachment behaviour is less clear due to their communicative and attachment-related deficits (e.g., deviations in smiling, eye contact; Atkinson et al., 1999; Schuengel & Janssen, 2006). However, children with Down's syndrome typically show a range in intellectual ability (Guéant et al., 2005), and therefore, it remains an open question whether it is even possible to identify attachment behaviours in children with significant DD.

Corresponding to this open question, the current study had two aims. The first aim was to examine the extent to which young children with significant DD displayed attachment behaviour towards their parents and the extent to which they differentiated in behaviour according to their interaction partner. More specifically, the present authors tested whether parents' self-report indicated more attachment behaviour towards one of the parents and whether differences can be observed in child behaviour towards the parent compared to an unfamiliar person. Based on Bowlby's assumption (1982b) that attachment is an integral part of human nature, the present authors predicted children with a significant DD to show more attachment behaviour towards their parents compared to a stranger (Ainsworth, 1964; De Schipper et al., 2006) and that individual differences would resemble those in typically developing children. The current research studied attachment behaviour in two different manners, both parent-reported secure attachment behaviour and observations. Although the present authors expected that classical attachment measures might not be completely applicable to encompass the potentially idiosyncratic ways in which children employ their impaired cognitive, sensory, and motor abilities (Schuengel & Janssen, 2006), the present authors decided, as a first step, to use attachment behaviours described for typically developing children as a heuristic. This implies that the present authors designed a procedure that was inspired by the Strange Situation Procedure (SSP; Ainsworth et al., 1978). During the SSP, a sequence of episodes (including two separations from and two reunions with the parent) in a laboratory playroom is closely observed to discern patterns in the child's behaviour (Ainsworth & Wittig, 1969).

The second aim of this study was to provide a first exploratory look at the difference in attachment behaviours according to child (i.e., gender, developmental age, autism, epilepsy, motor and visual disabilities) or parent characteristics. In line with previous studies (e.g., John, Morris, & Halliburton, 2012; Rutgers, Bakermans-Kranenburg, Van IJzendoorn, & Berckelaer-Onnes, 2004; Schuengel & Janssen, 2006), the present authors expected autism and developmental delay to be

negatively associated with the amount of secure attachment behaviour towards their parent. Regarding parent characteristics, the present authors predicted a strong association between parents' self-reported sensitivity and individual differences in attachment behaviour based on Ainsworth's et al. (1978) core assumption that sensitive parenting is the main factor determining these differences. More specifically, the present authors predicted sensitivity to be positively associated with secure attachment behaviour at home (Ainsworth et al., 1978; Atkinson et al., 1999; Waters, 2002b).

2 | METHOD

2.1 | Participants

To recruit participants, 80 care organizations (e.g., daycare centres, home support services) were asked to send invitational letters to parents of children meeting the following inclusion criteria: (a) Children were between one and 7 years old; (b) Children had a significant cognitive DD (associated with the description of a severe or profound intellectual disability); (c) Children lived at home with their parent(s). Children varied in the presence and nature of additional disabilities. They were excluded when their communication reached symbolic level. Children's developmental delay in Table 1 was based on case file data and on recent test results (i.e., <1 year before the home visit). For seven children, test results on intellectual functioning were lacking. However, clinical judgement of their professional caregivers confirmed that they meet the inclusion criteria.

Altogether, the sample comprised 23 families who gave consent to participate, recruited from 14 care organizations. Two of these children were excluded due to the child's substantially higher developmental level (i.e., developmental age higher than half of their chronological age and IQ > 70); one child was later on excluded due to the language barrier during the home visit.

The sample included 13 boys (65%) and seven girls (35%, see Table 1), with a chronological age ranging from 2 years and 1 month (25 m) to 6 years 11 months (83 m, $M = 55.80$, $SD = 17.22$). The mean developmental age of the children ($n = 14$) was 11.11 months ($SD = 3.43$), ranging from 6 to 16.50 months. This resulted in an average cognitive delay of 49.04 months ($SD = 16.90$). The cognitive delay had various aetiologies and came along with different additional disabilities: Autism ($n = 6$, 30%), epilepsy ($n = 10$, 50%) and visual ($n = 5$, 25%), auditory ($n = 1$, 5%) and/or motor ($n = 14$, 70%) problems. All children attended daycare centres or went to special education schools, at least part time, and had the Belgian nationality. One child was adopted from China at age 2. Mothers had a mean age of 37.20 years ($SD = 4.03$), slightly below the mean age of the fathers ($M = 38.42$, $SD = 4.78$). Almost half of the mothers worked fulltime ($n = 9$, 45%), in comparison with 95% ($n = 18$) of the fathers. All but two of the children cohabited with both biological parents. About 60% of the children had one ($n = 10$) or two ($n = 2$) siblings, the remaining 40% were the only child ($n = 8$). With regard to parity, 11 children (55%) were their biological mothers' firstborn.

TABLE 1 Overview of children's characteristics (N = 20)

| Child number | Gender | Chronological age in months | Developmental age in months ^a | Additional disabilities ^b | | | | |
|--------------|--------|-----------------------------|--|--------------------------------------|-------|--------|----------|----------|
| | | | | Autism | Motor | Visual | Auditory | Epilepsy |
| 1 | Boy | 32 | - | - | x | - | - | x |
| 2 | Boy | 58 | 12 | - | x | - | - | - |
| 3 | Girl | 25 | 9 | - | x | x | - | - |
| 4 | Boy | 77 | 11 | - | x | - | - | - |
| 5 | Boy | 26 | 9 | - | - | - | - | - |
| 6 | Girl | 76 | 15 | - | x | x | - | - |
| 7 | Girl | 51 | 6 | - | x | x | - | x |
| 8 | Boy | 64 | - | - | x | - | - | x |
| 9 | Boy | 48 | - | x | - | - | - | - |
| 10 | Boy | 60 | 9 | - | - | - | - | x |
| 11 | Boy | 45 | - | - | x | - | - | - |
| 12 | Girl | 65 | 7.5 | - | x | - | - | x |
| 13 | Girl | 54 | 16.5 | x | - | - | - | x |
| 14 | Girl | 76 | 13 | x | x | - | - | x |
| 15 | Boy | 54 | 9 | x | x | - | - | x |
| 16 | Boy | 34 | - | - | x | x | - | x |
| 17 | Boy | 83 | 8 | - | x | - | - | - |
| 18 | Girl | 72 | 16.5 | x | - | - | x | - |
| 19 | Boy | 65 | 14 | x | - | - | - | - |
| 20 | Boy | 51 | - | - | x | x | - | x |

^aRegular testing of cognitive functioning is not common in Flanders (Belgium) at young age. In case the administration of a test of cognitive functioning was >1 year ago, results were not included in this study. (-) to indicate that results were not included in this column of the table.

^b(-) additional disability was not present; (x) additional disability was present.

2.2 | Design and procedure

Written permission from the parents and data concerning attachment behaviour and other variables were obtained by a single home visit of approximately one and a half hour, conducted by the first author. First, participants received full explanation of the study and signed for informed consent. Next, parents completed a questionnaire on general background information. Subsequently, a semi-structured interaction between one parent and the child, based on the Strange Situation Procedure (Ainsworth & Wittig, 1969), was video-recorded. The home visit ended with two questionnaires regarding attachment behaviour and parental support. The Social and Societal Ethics Committee (SMEC, KU Leuven) granted ethical approval for the protocol (G-2015 06 258).

2.3 | Measures

2.3.1 | Secure base safe haven observation list (SBSHO, De Schipper, Schuengel, Stolk, & Janssen, 2004)

The SBSHO is a questionnaire, consisting of 20 items that describe secure attachment behaviour from the child towards his/her caregivers.

Parents are asked to evaluate the extent to which the child uses the parent as a secure base and a safe haven (De Schipper & Schuengel, 2007). Items were selected from the well-known Attachment Q-sort (Waters, 1987, 1995). The SBSHO was originally developed as an observation list for use by professional support workers in group care settings (De Schipper et al., 2004). Some adaptations were necessary to make the questionnaire suitable for parents. Therefore, four parents of young children and three experts on persons with profound intellectual and multiple disabilities revised the SBSHO. Items were slightly rewritten to make them more applicable to the home environment and/or the target group (e.g., "the child approaches" was replaced by "the child initiates contact by vocalizing, looking or smiling"). Two examples of items are as follows: "Physical contact helps to comfort my child" and "When my child initially thinks something is scary, I can reassure him/her" (De Schipper & Schuengel, 2010, p. 595). Parents separately scored each item using seven-point Likert-type ratings, ranging from one (*not at all characteristic for my child*) to seven (*very characteristic for my child*). Furthermore, each item consisted of two parts: Part A included behaviour to the parent himself/herself, while part B included behaviour to the other parent. Secure attachment behaviour was characteristic for a child when he/she obtained a high score. In line with De Schipper and Schuengel (2010), six scores were computed regarding secure attachment behaviour

for each child: Attachment behaviour towards mother (self-report), attachment behaviour towards father (self-report), attachment behaviour towards mother according to father, attachment behaviour towards father according to mother, total composite of attachment behaviour averaged across informants, and an independent composite of attachment behaviour with one informant. In order to assess preference in attachment behaviour, which refers to the extent to which the child's behaviour varies between mother and father (De Schipper & Schuengel, 2010), absolute difference scores were computed between the self-reported scores of the caregiver (part A) and their judgement towards the other parent (part B). The absolute difference scores were then averaged and resulted in a composite score for preference behaviour. Internal consistency of the adapted SBSHO was good for both caregivers (mother $\alpha_A = 0.91$, $\alpha_B = 0.91$; father $\alpha_A = 0.91$, $\alpha_B = 0.90$).

2.3.2 | Scoring system for interactive behaviours in the strange situation (SSIB; Ainsworth et al., 1978; Waters, 2002a)

Analogous to Kermoian and Leiderman (1986) and Marvin, Vandevender, Iwanaga, Levine, and Levine (1977), the SSIB was applied in the naturalistic environment, more specifically at home, to take into account the impact of the child's disability on mobility. Each recording consisted of five sequential episodes: (1) *Free play* between the child and the parent (5–10 min); (2) *Separation*: The parent said goodbye and left the room (2–3 min); (3) *Reunion*: The parent was reunited with his/her child and continued the free play (5 min); (4) *2nd Separation and free play with stranger*: The researcher attempted to make contact, after the parent left; (5) *2nd Reunion*. The exact number of minutes was adjusted to the reaction of the child to achieve moderate arousal rather than extreme distress (Waters, 2002a). The length of the recording in minutes ($M = 20.85$, $SD = 3.32$) was tested as potential confounder in preliminary analyses. For each child, the first author assigned one general score ranging from one (*little or no occurrence of the described interactive behaviour*) to seven (*marked, persistent, or intense occurrence of the described interactive behaviour*) for each episode separately based on the video-recording. The number on the seven-point scale that reflected the interactive behaviour of the child in that specific episode the most was registered. The assigned scores in Episodes 1, 3 and 5 and Episodes 2 and 4 referred to interactive behaviour towards the primary caregiver and towards the stranger, respectively (see Table 2). Four rating scales describing interactive behaviours were included, which were all judged on intensity and persistence: (1) *Proximity- and contact-seeking*: to which extent does the child take initiative in (re)gaining contact or proximity? (2) *Contact-maintaining behaviour*: to which extent does the child attempt to maintain physical contact? (3) *Resistant behaviour*: to which extent does the child display resistant, angry-pouting behaviour towards his interaction partner? (4) *Avoidant behaviour*: to which extent does the child avoid proximity or interaction with his interaction partner? (Waters, 2002a). Previous research showed high interrater reliability for the SSIB in various subpopulations (e.g., young

TABLE 2 Overview of episodes during the play interaction

| Episode | Content of episode | Interaction partner |
|---------|--|-------------------------------------|
| 1 | Free play | Parent ^a |
| 2 | 1 st Separation | Stranger (on distance) ^b |
| 3 | 1 st Reunion | Parent ^a |
| 4 | 2 nd Separation + Free play | Stranger ^b |
| 5 | 2 nd Reunion | Parent ^a |

^aEpisode 1, 3 and 5 were coded for behaviour towards parent. ^bEpisodes 2 and 4 were coded for behaviour towards stranger.

typically developing children, Vaughn & Waters, 1990; neurologically impaired children, Stahlecker & Cresci Cohen, 1985).

2.3.3 | Comprehensive early childhood parenting questionnaire (CECPAQ)-Parental support (Verhoeven, Van Baar, Deković, & Bodden, 2010)

To assess parents' self-perceived sensitivity and responsiveness, the subscale parental support from the general parenting questionnaire CECPAQ was selected. Parental Support consists of 13 items, which operationalizes three subdomains: affection ($n = 4$ items, e.g., "I tell my child that he/she makes me happy"), sensitivity ($n = 4$, e.g., "I know what my child wants or how he/she is feeling") and responsiveness ($n = 5$, e.g., "When my child is scared, I'm able to comfort him/her"). Both parents separately responded to each item on a 6-point Likert-type scale, going from one (*Never*) to six (*Always*). The CECPAQ shows good internal consistency ($\alpha = 0.88$) and temporal stability, as well as preliminary evidence of criterion validity (Verhoeven, Deković, Bodden, & van Baar, 2017). Internal consistency of the subscale Parental Support was high in the current study (mother $\alpha = 0.90$, father $\alpha = 0.87$).

2.4 | Statistical analysis

First, to identify behaviours that could reflect attachment behaviours, descriptive statistics (mean, standard deviation, median or range of scores) are presented, both for parents' self-report (SBSHO) and for observations (SSIB). Pearson's correlations were used to investigate the similarity between the response patterns towards mother and father on the SBSHO. Further, to determine preference to mother or father, a one sample sign test with test value 0 was conducted on the preference composite of the SBSHO. A non-parametric test was conducted because the preference composite scores were not normally distributed. With regard to the observations (SSIB), Wilcoxon signed-rank tests for paired data were performed on each scale to determine the differentiation of children's behaviour according to their interaction partner (parent vs. stranger). The present authors opted for a computation of exact significance values using SPSS, because of small sample size (Field, 2009). The effect was judged as significant when the probability level was below

TABLE 3 Descriptive statistics and correlations on parent-reported attachment behaviour (SBSHO)

| Secure attachment behaviour | Min | Max | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|------|------|------|------|-------|-------|-------|-------|----|---|
| 1. Mother's self-report | 2.35 | 6.58 | 4.77 | 1.15 | 1 | | | | | |
| 2. Father's self-report | 2.40 | 6.40 | 4.35 | 1.10 | 0.58* | 1 | | | | |
| 3. Towards father according to mother | 2.15 | 6.16 | 4.53 | 1.15 | 0.96* | 0.61* | 1 | | | |
| 4. Towards mother according to father | 2.70 | 6.55 | 4.55 | 1.10 | 0.68* | 0.96* | 0.66* | 1 | | |
| 5. Total composite across informants | 2.41 | 6.20 | 4.55 | 1.01 | 0.90* | 0.87* | 0.91* | 0.91* | 1 | |
| 6. Independant composite with one informant | 2.45 | 6.28 | 4.54 | 1.03 | 0.90* | 0.86* | 0.92* | 0.91* | 1* | 1 |

* $p < 0.01$, two-tailed.

0.05. Spearman's rank correlations were used for evaluating the association between the observed contact seeking and maintaining behaviour (SSIB) and parent-reported secure attachment behaviour (SBSHO) in order to test whether both measurements represent the same concept. Here also, non-parametric statistics were chosen due to violation of the non-normality assumption on the observed scales (SSIB). All effect sizes were judged conform the guidelines of Field (2009; $r = 0.10 = \text{small}$; $r = 0.30 = \text{medium}$; $r = 0.50 = \text{large}$). Second, to explore the association between differences in attachment behaviour according to child and parent characteristics, only descriptive statistics (mean and standard deviation) of a partial sample were reported. Due to the small sample size of the partial samples (defined by a specified variable), multivariate analyses with child characteristics were not conducted. Pearson's correlations (in case of normality; SBSHO, CECPAQ) and Spearman's correlations (in case of non-normality; SSIB) were used to explore the association between specified variables and both parent-reported and observed attachment behaviour. Finally, a multiple linear regression was conducted to predict parent-reported attachment behaviour (SBSHO) using self-reported parental support (CECPAQ).

3 | RESULTS

3.1 | The expression of attachment behaviour

3.1.1 | Parent-reported attachment behaviour (SBSHO)

Table 3 presents the descriptive statistics and Pearson's correlations regarding the various parent-reported secure attachment scores of each respondent. In general, parents reported secure attachment behaviour to be only slightly characteristic on a scale of one (*not at all characteristic*) to seven (*very characteristic*) for their child ($M = 4.55$, $SD = 1.01$)³. The total composite score across in-

formants ranged from 2.41 to 6.20. Interestingly, both mother ($M = 4.53$, $SD = 1.15$) and father ($M = 4.55$, $SD = 1.10$) evaluated the attachment behaviour towards their partner almost equal. However, mother's self-report ($M = 4.77$, $SD = 1.15$) indicated children were more likely to display secure attachment behaviour towards themselves, compared to father's self-report ($M = 4.35$, $SD = 1.10$). The preference composite ($M = 0.26$, $SD = 0.25$) furthermore differed significantly from a test value of 0 using an exact one-sample sign test, $p < 0.001$. This indicated a slight preference in attachment behaviour towards mother. As Table 3 shows, all correlations between the scores for secure attachment behaviour were statistically significant at the 0.01 level. For that reason, the following analyses only included the total composite score across informants. An ordering of items from most to least characteristic across all participants is presented in Table 4.

3.1.2 | Observed attachment behaviour (SSIB)

As expected, the intensity and persistence of attachment behaviour exhibited by children differed according to their interaction partner during the play interaction (see Table 5). A series of exact Wilcoxon signed-rank tests for paired data indicated that they significantly showed more intense and persistent attachment behaviour (except for avoidant behaviour) towards their parents in comparison with a stranger: Proximity- and contact-seeking behaviour, $z = -3.24$, $p < 0.001$, $r = -0.51$; contact-maintaining behaviour, $z = -3.70$, $p < 0.001$, $r = -0.59$; resistant behaviour, $z = -3.24$, $p < 0.001$, $r = -0.51$; and avoidant behaviour, $z = -1.16$, $p = 0.26$, $r = -0.18$.

3.1.3 | Consistency between parent-report (SBSHO) and observation (SSIB)

With regard to the consistency between parent-reported secure attachment behaviour (SBSHO), and the observed behaviour towards the parent (SSIB), Spearman's rho was not significant for proximity- and contact-seeking behaviour, $r(18) = -0.00$, $p = 0.996$; and for contact-maintaining behaviour, $r(18) = -0.07$, $p = 0.76$.

³A score of 4 on the seven-point Likert-type rating of the SBSHO, refers to the description "nor characteristic, nor not characteristic for my child," while a score of 5 refers to "slightly characteristic for my child."

TABLE 4 Overview of most to least characteristic items on parent-reported attachment behaviour (SBSHO)^a

| Item ^b | Item number | Min | Max | Mean | SD |
|--|-------------|------|------|------|------|
| Physical contact with me/other parent helps to comfort my child. | 1 | 4.00 | 7.00 | 6.18 | 0.91 |
| When my child is frightened or sad, (s)he is easily comforted by me/other parent. | 22 | 4.00 | 7.00 | 5.93 | 0.85 |
| I/other parent am/is able to comfort my child by paying attention and talking to him/her. | 4 | 3.50 | 7.00 | 5.88 | 0.78 |
| When my child is bored, (s)he comes to me/other parent looking for something to do or (s)he seeks contact. | 13 | 2.00 | 7.00 | 5.23 | 1.42 |
| When my child is ill or hurt, (s)he stays closer to me/other parent or seeks more contact than on other days. | 17 | 2.00 | 7.00 | 5.19 | 1.37 |
| When my child thinks something is scary, I/other parent can reassure him/her. | 12 | 1.25 | 7.00 | 5.15 | 1.37 |
| When I/other parent come(s) home, my child immediately 'greet(s)' me/other parent. | 21 | 1.00 | 7.00 | 4.85 | 2.01 |
| When my child is tired, (s)he stays closer to me/other parent or seeks more contact than when (s)he is not tired. | 15 | 1.00 | 7.00 | 4.83 | 1.76 |
| On days my child feels uneasy, my child often stays near to me/other parents or (s)he seeks contact. | 10 | 1.50 | 7.00 | 4.79 | 1.40 |
| When my child finishes with an activity or toy, (s)he returns to me/other parent for play, for a hug, for a touch, or for help finding something else to do. | 5 | 1.50 | 7.00 | 4.71 | 1.84 |
| When my child is scared of something or something startles him/her, (s)he seeks contact with me/other parent. | 3 | 1.00 | 7.00 | 4.70 | 1.56 |
| My child keeps track of my/other parent's location when (s)he plays. | 8 | 1.00 | 7.00 | 4.51 | 1.92 |
| My child looks at me/other parent when something exciting or dangerous is happening. | 2 | 1.50 | 6.50 | 4.41 | 1.41 |
| When I/other parent move(s) out of sight, my child follows me (physically or with the eyes) and/or continues play in that area. | 14 | 1.00 | 7.00 | 4.41 | 1.89 |
| My child uses me/other parent as a 'base' from which to explore the environment. | 6 | 1.00 | 6.25 | 3.99 | 1.65 |
| My child makes sure that I/other parent know(s) where (s)he is. | 16 | 1.00 | 7.00 | 3.65 | 1.75 |
| When I/other parent is present, my child is willing to talk to new people, show them toys or to show them what (s)he can do. | 18 | 1.00 | 7.00 | 3.64 | 1.81 |
| My child readily follows my/other parent's suggestions, even when they are clearly suggestions rather than instructions. | 7 | 1.00 | 6.75 | 3.50 | 1.47 |
| When my child finds something new to play, (s)he draws my/other parent's attention to it or shows it from a distance. | 19 | 1.00 | 6.00 | 2.75 | 1.44 |
| When other children bother my child, (s)he seeks contact with me/other parent. | 11 | 1.00 | 6.50 | 2.61 | 1.57 |

^aFor each item mother's and father's report on both A-item and B-item were averaged across all children. ^bItems were shown in concise form. Item 9 and 20 were excluded in line with De Schipper and Schuengel (2007, 2010).

3.2 | The association between child and parent characteristics and attachment behaviour

3.2.1 | The association between child characteristics and attachment behaviour

The total composite score (SBSHO) of secure attachment behaviour was not significantly associated with developmental age, $r(13) = 0.35$, $p = 0.22$, or severity of cognitive delay, $r(13) = 0.01$, $p = 0.97$. Regarding other child characteristics, descriptive statistics

showed that boys ($M = 4.48$, $SD = 0.33$) received a slightly lower score than girls ($M = 4.69$, $SD = 0.25$). Further, children without epilepsy ($M = 4.84$, $SD = 0.26$) or without autism ($M = 4.69$, $SD = 0.29$) were rated a bit higher on the SBSHO than children with epilepsy ($M = 4.26$, $SD = 0.36$) or with autism ($M = 4.23$, $SD = 0.30$). On the contrary, when children had an additional visual ($M = 4.77$, $SD = 0.35$) or motor ($M = 4.77$, $SD = 0.27$) impairment, parents reported the items of the SBSHO to be more characteristic for their child, compared to children without visual ($M = 4.48$, $SD = 0.28$) or motor ($M = 4.04$, $SD = 0.37$) impairment.

TABLE 5 Descriptive statistics on observed attachment behaviour (SSIB)

| Scale | M_{parent}^a | SD_{parent} | Mdn_{parent} | M_{stranger}^b | SD_{stranger} | Mdn_{stranger} |
|---|-----------------------|----------------------|-----------------------|-------------------------|------------------------|-------------------------|
| 1. Proximity- and contact-seeking behaviour | 3.03 | 1.54 | 3.50 | 1.90 | 1.17 | 1.25 |
| 2. Contact-maintaining behaviour | 3.05 | 1.23 | 2.83 | 1.63 | 0.67 | 1.50 |
| 3. Resistant behaviour | 2.85 | 1.35 | 2.50 | 1.98 | 0.90 | 1.75 |
| 4. Avoidant behaviour | 2.95 | 1.16 | 3.00 | 2.60 | 1.47 | 2.25 |

^aAveraged across Episodes 1, 3 and 5. ^bAveraged across Episodes 2 and 4.

Developmental age was significantly associated (using Spearman's Rho) with observed proximity- and contact-seeking behaviour both towards the parent, $r(13) = 0.59$, $p = 0.03$, and towards the stranger, $r(13) = 0.55$, $p = 0.04$. Children's cognitive delay was significantly negatively associated with the amount of avoidant behaviour towards the stranger, $r(13) = -0.56$, $p = 0.04$. Other correlations between developmental age, cognitive delay and the four subscales of the SSIB were not statistically significant. The mean and standard deviations of each subscale of the SSIB (towards parent, towards stranger and the difference as per interaction partner) according to child characteristics are presented in Table 6. Apart from some exceptions, in children without additional disabilities (no epilepsy, no autism, no visual or motor impairments), there is a higher level of differentiation in attachment behaviour shown to the parent and to the stranger. The influence of auditory disabilities was not included in this study, because only one child was diagnosed with such impairment.

3.2.2 | The association between parenting and attachment behaviour

As shown in Table 7, both mothers and fathers assessed themselves to be regularly or frequently supportive of their child. The self-reports of both parents on this questionnaire were moreover significantly associated among each other, $r(18) = 0.71$, $p < 0.001$, and with the total composite score of the SBSHO (correlations ranged between 0.55 and 0.79 and were significant at the 0.01 level). Table 8 presents the results of two separate multiple regressions on the total composite score of the SBSHO. Both parental support of mothers and fathers in general, $F(1,17) = 16.96$, $p < 0.001$, and the subcomponents of parental support, $F(1,13) = 6.14$, $p < 0.001$ (Verhoeven et al., 2010), especially maternal sensitivity ($\beta = 0.64$), predicted the total composite score of SBSHO well.

Self-reported parental support was not significantly associated with the amount of contact-seeking and maintaining, resistant or avoidant behaviour (correlations ranged between $|0.01|$ and $|0.42|$

with significance values between 0.98 and 0.07). The only exception was mother-reported affection, which was significantly negatively correlated with the amount of contact-maintaining behaviour, $r(19) = -0.55$, $p = 0.01$.

4 | DISCUSSION

The current study found individual differences in attachment behaviour, both in parent-reported and in observed behaviour, among children with significant developmental delay (DD). Furthermore, children differentiated in attachment behaviour between their attachment figures (mother vs. father) and between their primary caregiver and a stranger (parent vs. stranger). Children's developmental age was not significantly associated with parent-reported secure attachment behaviour, but lower developmental age predicted lower observed contact- and proximity seeking behaviour towards parent and stranger. In general, children with additional disabilities (comorbid with the cognitive delay) showed less differentiation in attachment behaviour towards the parent versus the stranger.

With regard to the first aim, namely identifying behaviours that reflect attachment behaviour, parent-report indicated that secure attachment behaviour was overall only slightly characteristic among children with significant DD. Individual differences, even within this small sample, were strong. The average scores ranged from "barely or not characteristic for my child" (score 2) to "characteristic for my child" (score 6). Across children, parents judged that the SBSHO-items "Physical contact with me helps to comfort my child" (Item 1) and "When my child is scared or sad, he/she is easily comforted (by picking him/her up or by cuddling, he/she stops crying and recovers him-/herself)" (Item 22) were most characteristic. Drawing attention when finding a new toy (Item 19) or seeking contact when being bothered by other children (Item 11) were least characteristic. Independent observations supported this finding that there is evidence for attachment behaviour and individual differences therein. The sample received a score of around three on average with regard to observed

TABLE 6 Descriptive statistics on observed attachment behaviour (SSIB) according to child characteristics with *M* (*SD*)

| | Proximity- and contact-seeking | | | Contact-maintaining | | |
|--------------------------|--------------------------------|------------------|----------------------------|---------------------|------------------|----------------------------|
| | Towards parent | Towards stranger | Difference parent-stranger | Towards parent | Towards stranger | Difference parent-stranger |
| Gender | | | | | | |
| Male | 2.62 (0.35) | 1.65 (0.29) | 1.02 (0.32) | 2.95 (0.27) | 1.62 (0.23) | 1.39 (0.27) |
| Female | 3.81 (0.68) | 2.36 (0.50) | 1.55 (0.49) | 3.24 (0.63) | 1.64 (0.09) | 1.60 (0.63) |
| Epilepsy | | | | | | |
| No | 3.73 (0.32) | 2.30 (0.40) | 1.50 (0.40) | 3.40 (0.47) | 1.80 (0.27) | 1.60 (0.47) |
| Yes | 2.33 (0.54) | 1.50 (0.31) | 0.90 (0.36) | 2.70 (0.27) | 1.45 (0.12) | 1.32 (0.30) |
| Autism | | | | | | |
| No | 2.62 (0.37) | 1.57 (0.26) | 1.15 (0.30) | 2.64 (0.25) | 1.43 (0.10) | 1.26 (0.28) |
| Yes | 4.00 (0.64) | 2.67 (0.54) | 1.33 (0.59) | 4.00 (0.56) | 2.08 (0.40) | 1.92 (0.64) |
| Visual impairment | | | | | | |
| No | 3.18 (0.37) | 1.87 (0.29) | 1.36 (0.32) | 3.04 (0.33) | 1.70 (0.19) | 1.39 (0.32) |
| Yes | 2.60 (0.84) | 2.00 (0.63) | 0.73 (0.43) | 3.07 (0.56) | 1.40 (0.19) | 1.67 (0.59) |
| Motor impairment | | | | | | |
| No | 4.28 (0.20) | 2.17 (0.53) | 2.11 (0.60) | 4.22 (0.48) | 1.91 (0.44) | 2.31 (0.58) |
| Yes | 2.50 (0.41) | 1.79 (0.30) | 0.81 (0.23) | 2.55 (0.24) | 1.50 (0.10) | 1.10 (0.26) |

attachment behaviour towards their parent. This implies a desire to achieve or maintain physical contact, but a weak effort to accomplish this, as well as slight or isolated resistance and avoidance (Waters, 2002a). Despite the fact that these results are in line with parents' self-report, individual differences were not significantly associated. Possible explanations for the absent association may be the social desirability bias affecting the SBSHO, the low variability in scores on the SBSHO, the downsides of the SSIB (see below) or the fact that the (play)interaction, given the short time period, did not elicit sufficient attachment behaviour in most of the children. Given the strongly delayed response pattern of children with significant DD (Vlaskamp et al., 2011), a longer observation period may be required to reliably establish individual differences in attachment behaviour. Moreover, while most parents did not regard the (play)interaction with separations as a stressful event for their child, the SBSHO explicitly questioned the child's behaviour in stressful events. Weak associations between parent-reported measures and observational measures are common in parenting research (Bornstein, Cote, & Venuti, 2001; Metsäpelto & Pulkkinen, 2005), and thus, both methodologies serve complementary purposes (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000).

The current study moreover provides support for the presence of differentiated attachment behaviour, which corroborates Ainsworth's concept (1964) of relationship specificity. First, findings on parent-reported attachment behaviour suggested that children were more likely to express attachment behaviour towards their mother compared to their father. This is in line with the finding of De Schipper and Schuengel (2010), who also reported selective attachment behaviour of people with intellectual disability towards one of their professional support workers. Second, results on the

observed attachment behaviour showed a clear differentiation in attachment behaviour towards the parent versus towards the stranger. The present authors observed more intense and persistent proximity- and contact-seeking, contact-maintaining, resistant and avoidant behaviour in the parent-child interaction, compared to the stranger-child interaction. This result is in line with Sterkenburg's research (2008) in the professional caregiving context, in which she concluded that children with profound intellectual disability and visual impairments showed more proximity seeking behaviour (especially during peaks of arousal) towards the experimental therapist with whom they had built an attachment relationship, compared to the control therapist. The difference in attachment behaviour towards the parent and the stranger in the current study was statistically significant for proximity- and contact-seeking and maintaining behaviour and resistant behaviour, but not for avoidant behaviour. These findings support the interpretation that the interactive behaviours of children with significant DD and their parents may be interpreted as attachment behaviours. This is particularly relevant in view of the concerns of parents regarding their role as primary caregivers (Vlaskamp et al., 2011).

With regard to the second aim, namely to explore the association between attachment behaviour and child and parent characteristics, mostly descriptive analyses were reported in the current study due to the limited sample size. Parent-reported secure attachment behaviour (SBSHO) was not significantly associated with developmental age or the severity of cognitive delay, contrary to previous findings (e.g., De Schipper & Schuengel, 2010). This may be the case because data on intellectual functioning was available for only 14 children (see Table 1), which subsequently resulted in a low statistical power (Maxwell, Kelley, & Rausch, 2008). While epilepsy

| Resistant | | | Avoidant | | |
|----------------|------------------|----------------------------|----------------|------------------|----------------------------|
| Towards parent | Towards stranger | Difference parent-stranger | Towards parent | Towards stranger | Difference parent-stranger |
| 2.95 (0.36) | 1.92 (0.22) | 1.06 (0.24) | 3.10 (0.36) | 2.61 (0.47) | 1.41 (0.30) |
| 2.67 (0.57) | 2.07 (0.43) | 0.74 (0.28) | 2.67 (0.33) | 2.57 (0.41) | 0.57 (0.27) |
| 3.07 (0.36) | 2.00 (0.37) | 1.07 (0.22) | 3.03 (0.29) | 2.40 (0.45) | 1.43 (0.37) |
| 2.63 (0.49) | 1.95 (0.26) | 0.83 (0.29) | 2.87 (0.45) | 2.80 (0.50) | 0.80 (0.25) |
| 3.07 (0.39) | 2.21 (0.25) | 0.96 (0.22) | 2.79 (0.24) | 2.36 (0.40) | 1.33 (0.29) |
| 2.33 (0.39) | 1.42 (0.20) | 0.92 (0.33) | 3.33 (0.68) | 3.17 (0.54) | 0.61 (0.28) |
| 3.07 (0.36) | 1.93 (0.23) | 1.16 (0.21) | 3.16 (0.30) | 2.60 (0.39) | 1.13 (0.27) |
| 2.20 (0.49) | 2.10 (0.43) | 0.30 (0.12) | 2.33 (0.46) | 2.60 (0.70) | 1.07 (0.50) |
| 2.94 (0.53) | 2.00 (0.43) | 1.02 (0.30) | 3.06 (0.32) | 3.17 (0.67) | 1.28 (0.46) |
| 2.81 (0.38) | 1.96 (0.23) | 0.92 (0.23) | 2.90 (0.35) | 2.36 (0.37) | 1.05 (0.27) |

and autism were associated with less parent-reported secure attachment behaviours, children with visual and motor impairments were rated slightly higher in parent-reported secure attachment behaviours than children without these respective diagnoses. These results slightly differ from the associations between child characteristics and the observed attachment behaviour (SSIB). In line with what was expected from previous research (e.g., De Schipper & Schuengel, 2010; De Wolff & Van IJzendoorn, 1997), developmental age was commensurate with the level of proximity- and contact-seeking behaviour. Similar to results on the parent-reported SBSHO, children without epilepsy showed more intense and persistent instances of proximity- and contact-seeking and contact-maintaining behaviour compared to children with such diagnosis. It is interesting, however, that children with autism scored higher on proximity- and

contact-seeking or contact-maintaining behaviour towards their parent. Results indicate that these children exhibited more secure attachment behaviour and less insecure attachment behaviour compared to children without autism. These findings complement previous research (e.g., Rutgers et al., 2004) that found that autism in itself, regardless of the DD, was not associated with the classification of the quality of the attachment relationship. Without drawing any causal conclusions on quality of attachment, the descriptive data would suggest that child characteristics may be important factors in the expression of attachment behaviour.

During the semi-structured observation paradigm, the presence or absence of comorbid disorders seemed to determine the extent to which it was possible to use the SSIB coding system to identify differences in how children behaved towards the parent compared towards the stranger. For example, whereas children with additional motor disabilities interacted with the parent and the stranger in a more similar fashion, children with full (loco)motor ability differentiated more pronounced between these two interaction partners, especially with regard to proximity seeking and maintaining. Whereas one might argue that these child characteristics genuinely influence the differentiation of attachment behaviour, another possible explanation may be the fact that the scales of SSIB are highly physical and thus result in a lower susceptibility for children with (loco)motor impairments (due to motor or visual disabilities). In that respect, it can be argued that children with motor impairment do indeed differentiate, but show it in a different way. Consistent with this idea, Blacher and Bromley (1987) suggested that physically impaired children exhibit alternative expressions for certain attachment behaviours (e.g., fussing upon a distance) with yet the same intention as the more (loco)motor variant. These kinds of behaviours were, however, not

TABLE 7 Descriptive statistics of parental support

| | Min | Max | M | SD |
|-------------------------|------|------|------|------|
| Parental support mother | 3.38 | 5.77 | 4.69 | 0.66 |
| Parental support father | 3.31 | 5.54 | 4.31 | 0.41 |
| Affection mother | 4.25 | 6.00 | 5.16 | 0.55 |
| Affection father | 3.50 | 6.00 | 4.64 | 0.75 |
| Responsiveness mother | 2.40 | 6.00 | 4.45 | 0.84 |
| Responsiveness father | 2.80 | 5.40 | 4.17 | 0.78 |
| Sensitivity mother | 3.25 | 5.50 | 4.50 | 0.73 |
| Sensitivity father | 2.75 | 5.50 | 4.15 | 0.74 |

TABLE 8 Two separate multiple regressions on the total composite score SBSHO

| | F | Sig. | β | t | df | p | R ² | Adjusted R ² |
|-------------------------|-------|------|---------|-------|----|------|----------------|-------------------------|
| Regression 1 | | | | | | | | |
| Parental support mother | 16.96 | 0.00 | 0.40 | 2.00 | 17 | 0.06 | 0.67 | 0.63 |
| Parental support father | | | 0.49 | 2.44 | 17 | 0.03 | | |
| Regression 2 | | | | | | | | |
| Affection mother | 6.14 | 0.00 | 0.13 | 0.47 | 13 | 0.64 | 0.74 | 0.62 |
| Affection father | | | 0.22 | 1.17 | 13 | 0.26 | | |
| Responsiveness mother | | | -0.18 | -0.57 | 13 | 0.58 | | |
| Responsiveness father | | | 0.33 | 1.30 | 13 | 0.22 | | |
| Sensitivity mother | | | 0.64 | 2.30 | 13 | 0.04 | | |
| Sensitivity father | | | -0.11 | -0.37 | 13 | 0.72 | | |

recorded with the SSIB, which requires a minimal motor competence (Tessier, Tarabulsy, Larin, Laganière, & Gagnon, 2002).

With regard to parent factors, parent-reported secure attachment behaviour (SBSHO) was significantly associated with self-reported parental support (CECPAQ). Moreover, especially maternal sensitivity predicted the total composite score of the SBSHO, which extends the view that maternal sensitivity is the main predictor of attachment security (Bowlby, 1982b; Waters, 2002b). On the contrary, analyses on observed attachment behaviour (SSIB) did not reveal the same association with parental support. A social desirability bias, possibly influencing both parent-reported questionnaires, or an interpretation bias, which may lead parents to over-interpret unintentional behaviour of their child, could be plausible explanations for the higher degree of agreement between the two questionnaires compared to the observation (Monette, Sullivan, & Dejong, 2011). Solely mother-reported affection was negatively associated with the child's observed contact-maintaining behaviour. One possible explanation could be that children do not feel the need or get the learning opportunities to maintain physical contact, because their mother is already installing a highly physical, intimate contact. Affection is indeed operationalized by rather physical items such as "*I cuddle, kiss and hug my child without any reason.*" Another possible explanation might be that, due to high parental affect, children feel more competent and therefore explore more (Verschueren, Marcoen, & Schoefs, 1996). Using the parent as secure base from which a child can explore is an important feature of secure attachment (Ainsworth, 1979; Bowlby, 1969/1982a).

The current study encountered several methodological concerns, and several limitations should be acknowledged. First, even if the present authors grant the point that the SBSHO is a reliable and well-validated tool in the professional caregiving context (De Schipper & Schuengel, 2010), our application of the SBSHO in the family setting may have elicited social desirability bias. Moreover, parents frequently pointed at the difficulty to match the unique behaviours of their children to the abstract item descriptions. Given these considerations, results on the questionnaire should be

interpreted with caution. Second, in the current study, the present authors did not double code for the SSIB to establish inter-rater reliability, as the present authors regarded the SSIB as a standardized instrument which was consistently applied across all video fragments by the first author and as the current study does not make any statements on quality of attachment. It is interesting to note that some concerns regarding the applicability of the coding system SSIB to the target group of children with significant DD were raised during coding. First, the SSIB was insufficient to capture the subtlety in behaviour, certainly at the lowest scores. This insufficiency could be discerned both within one interaction partner (e.g., some children smiled and glanced at their parent at the start of reunion, while others did not react in any way, but both received the lowest score on the scale proximity- and contact-seeking behaviour), as well as between two interaction partners (e.g., although children were more actively smiling or vocalizing towards the parent, they received the same score towards the researcher due to a lack of more pronounced behaviour). Second, the highest scores of the SSIB often require (loco)motor behaviour (Tessier et al., 2002), which was not possible for a large group of physically impaired children. Third, the SSIB demands interpretation of the observer (e.g., "*gives the impression of liking it*"; Waters, 2002a,b; p. 6). Therefore, the present authors suggest a coding system of attachment behaviour, which is more subdivided at the lowest scores, which accounts for additional disabilities by building in alternative (non-locomotor) behaviours and which is merely based on observable behaviour in future research. In that respect, the research base would benefit from establishing specific reliability for a version of the SSIB, which is adapted to meet the abovementioned concerns regarding children with severe disabilities in order to be able to make adequate and justifiable judgements on quality of attachment in future.

Besides these concerns regarding the measures, the current study is limited by the fairly small sample size, due to low prevalence rates of severe disabilities and high non-response of parents. Reasons behind non-participation were often practical (e.g., busy work schedule) or emotional (e.g., parents were not able to or

willing to cope with the study's sensitive subject). However, as recruitment happened indirectly through care organizations, barriers experienced by parents did not reach us systematically. In addition, the (play)interaction differed from the Strange Situation Procedure (SSP; Ainsworth & Wittig, 1969), both by reducing the number of episodes and by conducting the interaction in the naturalistic environment. Whereas the use of the SSP in naturalistic environment limits the comparability with previous research, it was necessary in the current study for two reasons. First, the present authors felt that the presence of a strange person and the video equipment would already elicit a considerable amount of stress, given that the threshold for stress activation in children with significant DD is lower than in typically developing children (Janssen et al., 2002). In this respect, the present authors did not opt for a laboratory playroom to avoid unnecessarily high levels of stress. Second, it is not self-evident for parents to travel with their child with severe disabilities (and often motor restrictions) to the research unit, so the present authors aimed to reduce their burden by coming to their home. As the SSIB was used in an exploratory manner, the participants could not be classified according to attachment security in the current study. Finally, the sample of children with significant DD in the current study was highly heterogeneous with respect to developmental age, motor competence and additional disabilities. While this heterogeneity characterizes the target group (Nakken & Vlaskamp, 2007), this might result in small partial groups, defined by specified variables, and makes it more difficult to draw general conclusions.

Two implications, both for clinical practice and the research base, emerge from this study. First, the results of this study support the expression of differentiated attachment behaviour and indirectly suggest the development of an attachment relationship between children with significant DD and their parents. This hopeful finding might address the uncertainty of parents regarding their role as primary caregivers (Vlaskamp et al., 2011) and strengthen their self-efficacy. These insights might furthermore benefit the practice of home support services by paving the way for parental counsellors to use attachment theory as their framework. Sterkenburg's (2008; Schuengel, Sterkenburg, Jeczynski, Janssen, & Jongbloed, 2009) Attachment-Based Behaviour Therapy is an example of an intervention which is based on the value of developing a secure attachment bond in dealing with behavioural problems. Moreover, home visit observations could provide parents with insights about the subtle interactions which make their relationship with their child special, that is different from interactions with a stranger. Second, this study contributes to the existing research base by drawing attention to certain methodological issues concerning the measure of attachment behaviour in severely disabled children. More specifically, the present authors advise an instrument which is sensitive to subtle behavioural differences, incorporates alternative behaviours for each item and does not depend on an assessment of the child's intentions. Psychophysiological measurements are one way to address these issues (Vos, De Cock, Petry, Van Den Noortgate, & Maes, 2013).

The attachment perspective on parent-child interactions in children with a significant DD deserves further attention. Future research would benefit from focusing on two different research lines. The first line of research involves the in-depth characterization of subtle expressions of attachment behaviour in children with significant DD. This requires the operationalization or adaptation of coding schemes which are applicable for use in children with severe and multiple disabilities and are able to grasp subtle behavioural differences. There is great merit in providing detailed descriptions of attachment behaviour to investigate attachment relationships in this target group and subsequently its association with ER or behavioural problems (Clegg & Sheard, 2002; De Schipper & Schuengel, 2010; Janssen et al., 2002). Another issue to cover in this research line would be to further investigate the way individual differences in attachment behaviour could be predicted by various child characteristics. The second line of future research should reveal the underlying psychophysiological processes of stress activation and the role of the primary caregiver in the emotional life of children with a significant DD. This research would be particularly fruitful in the most severely disabled children, who are impeded in their behavioural expression to a higher extent.

In summary, even at the level of significant DD, children develop differentiated attachment behaviour. Individual differences therein exist and are mostly associated with the presence of comorbid disabilities besides the cognitive delay. The current study suggests the development of an attachment bond, in the context of which children consider their parent as an attachment figure. Observations in the home setting may support parents in identifying interactions that make their relationship with their child unique.

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CONFLICT OF INTEREST

The present authors do not have any conflict of interest in publishing the results of our study.

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