

Secure base script knowledge and video-feedback intervention to promote positive parenting-sensitive discipline

Annemieke M. Witte^{a,b,*}, Jana Runze^{b,c}, Marinus H. van IJzendoorn^{b,d,e}, Marian J. Bakermans-Kranenburg^{b,f,g}

^a *Clinical Child & Family Studies, Faculty of Behavioral and Movement Sciences, Vrije Universiteit, Amsterdam, the Netherlands*

^b *Leiden Consortium on Individual Development, Leiden University and Vrije Universiteit Amsterdam, the Netherlands*

^c *Research Institute of Child Development and Education, University of Amsterdam, the Netherlands*

^d *Research Department of Clinical, Education and Health Psychology, Faculty of Brain Sciences, UCL, London, United Kingdom*

^e *Department of Psychiatry, Monash University, Melbourne, Australia*

^f *William James Centre for Research, ISPA University Institute of Psychological, Social and Life Sciences, Lisbon, Portugal*

^g *Center for Attachment Research, The New School for Social Research, New York, United States*

ARTICLE INFO

Keywords:

Randomized controlled trial
Parenting intervention
Twins
Attachment representations
Parental behavior
Parental attitudes

ABSTRACT

This preregistered randomized controlled study investigated the effects of Video-Feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD) on parents' secure base script knowledge (SBSK). Furthermore, we examined whether effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior and parents' attitudes toward these behaviors were moderated by SBSK at baseline. Families ($n = 445$) with pre- and school-aged children ($n = 890$) were randomized to receive VIPP-SD or telephone calls. Results showed no effects of VIPP-SD on SBSK. Furthermore, there was no moderation of effects on sensitive caregiving or sensitive discipline behavior by SBSK. VIPP-SD promoted positive attitudes toward sensitive caregiving and sensitive discipline behavior. The latter effect was moderated by SBSK: parents with lower SBSK showed the strongest improvements in positive attitudes toward sensitive discipline behavior. This effect was driven by a subgroup of younger children. These findings highlight the potential importance of tailoring interventions to meet the specific needs of parents with varying levels of SBSK.

Introduction

Drawing on the concept of internal working models of attachment (Bowlby, 1982), scholars proposed that early experiences with caregivers are internalized into a cognitive script, also referred to as the secure base script (Waters et al., 2021; Waters & Waters, 2006). The secure base script represents a temporal-causal schema for seeking and receiving effective support from attachment figures during times of need (Waters & Waters, 2006). Research has linked secure base script knowledge to behavior in romantic relationships (Dagan et al., 2021; Waters, Brockmeyer, & Crowell, 2013) and parent-child relationships (Waters & Roisman, 2019). With respect to parenting, higher levels of secure base script knowledge have been associated with more sensitive caregiving (Coppola, Vaughn, Cassibba, & Costantini, 2006; Hawkins, Madigan, Moran, & Pederson, 2015; Huth-Bocks, Muzik, Beeghly, Earls,

& Stacks, 2014; Raby, Waters, Tabachnick, Zajac, & Dozier, 2021; Witte, Runze, Van IJzendoorn, & Bakermans-Kranenburg, 2023) and more sensitive discipline behavior (Witte, Runze, Van IJzendoorn, & Bakermans-Kranenburg, 2023). Sensitive caregiving is defined as a caregiver's ability to accurately detect and interpret children's signals and to respond to these signals in an adequate and timely manner (Ainsworth, Bell, & Stayton, 1974). Sensitive discipline involves strategies such as distraction, empathy, and inductive reasoning (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017). Importantly, secure base script knowledge can be improved through attachment learning experiences (Bosmans et al., 2022; Bosmans, Bakermans-Kranenburg, Vervliet, Verhees, & Van IJzendoorn, 2020). However, few studies have investigated whether attachment-based interventions are effective in increasing secure base script knowledge in parents. This preregistered randomized controlled study used data from two pre-test assessments

* Corresponding author at: Van der Boerhorststraat 7, 1081 BT Amsterdam, the Netherlands.

E-mail addresses: a.m.witte@vu.nl (A.M. Witte), j.runze@uva.nl (J. Runze), marinusvanijzendoorn@gmail.com (M.H. van IJzendoorn), contact@marianbakermanskranenburg.nl (M.J. Bakermans-Kranenburg).

<https://doi.org/10.1016/j.appdev.2024.101651>

Received 16 August 2023; Received in revised form 12 April 2024; Accepted 23 April 2024

Available online 8 May 2024

0193-3973/© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

(T1, T2) and one post-test assessment (T3) and included a combined sample of parents with pre-school (T1; $M_{\text{age}} = 3.76$, $SD = 0.57$; Euser et al., 2021) and school-aged twin children (T1; $M_{\text{age}} = 7.92$, $SD = 0.66$; Runze, Van IJzendoorn, Vrijhof, & Bakermans-Kranenburg, 2022b) to address the following research questions: (1) Is the VIPP-SD program effective in increasing parents' secure base script knowledge? (2a) Does secure base script knowledge moderate any intervention effects on observed sensitive caregiving or sensitive discipline behavior and (2b) does secure base script knowledge moderate any intervention effects on parental attitudes toward sensitive caregiving or sensitive discipline behavior?

The secure base script

Secure base script knowledge is shaped (in part) by the care received from attachment figures (Waters & Roisman, 2019). More specifically, individuals who have received sensitive caregiving are more likely to develop secure base scripts in which attachment figures are available to relieve distress by providing effective help and support (Schoenmaker et al., 2015; Steele et al., 2014; Vaughn et al., 2016; Waters, Ruiz, & Roisman, 2017). Conversely, individuals who have received insensitive, inconsistent, or harsh caregiving are more likely to have limited or ineffective understanding of the secure base script (Nivison et al., 2021; Waters & Waters, 2006; see also Waters et al., 2021). Once developed, the secure base script serves as a cognitive framework for guiding expectations of self and others and shaping interpersonal behavior (for an overview, see Waters & Roisman, 2019).

The Attachment Script Assessment (ASA; Waters & Waters, 2006) was introduced to measure the extent to which an individual has knowledge of the secure base script. During the assessment, participants are asked to tell stories using a set of words that are developed to prompt secure base script content. A well-developed secure base script includes eight temporal-causal elements: (1) the child (or partner) is constructively engaged in the environment, (2) the child (or partner) faces a threat that disrupts constructive engagement and/or leads to distress, (3) the child (or partner) signals distress, (4) the parent (or partner) accurately interprets the signal and offers help, (5) the help is accepted, (6) the help offered by the parent (or partner) is effective in tackling the obstacle, (7) the help is effective in easing the distress, and (8) constructive engagement in the environment is resumed (Waters & Waters, 2006). Prior studies (Coppola et al., 2006; Dykas, Woodhouse, Cassidy, & Waters, 2006; Hawkins et al., 2015; Steele et al., 2014) reported moderate to strong correlations between scores on the ASA and coherence and security scores on the Adult Attachment Interview (George, Kaplan, & Main, 1985) – a psychometrically sound instrument for assessing attachment representations in adulthood (Bakermans-Kranenburg & Van IJzendoorn, 1993).

Modifying secure base script knowledge through interventions

Although secure base script knowledge shows moderate stability across adulthood (Vaughn et al., 2006; Waters et al., 2021; Waters et al., 2017), there still appears to be an opportunity for change as secure base scripts have sufficient flexibility to integrate new attachment information (Bosmans et al., 2020; Bosmans et al., 2022). For instance, parents who were randomly assigned to the Attachment Biobehavioral Catch-Up intervention (ABC; Dozier & Bernard, 2019) – an attachment-based intervention using both in-the-moment live feedback and video-feedback, aimed at promoting nurturing behavior in parents at risk for neglecting or maltreating their children – showed an increase in their secure base script knowledge, which in turn predicted more sensitive interactions with their 8-year-old children (Raby et al., 2021). Yet, it remained unclear whether the ABC intervention exerted short-term effects as parents' secure base script knowledge and sensitive caregiving were measured approximately 7 years after parents completed the intervention (Raby et al., 2021). Furthermore, the study did not report

intent-to-treat analysis, which could have affected the findings.

Two studies examining mechanisms of change in secure base script knowledge have focused on children. For instance, a longitudinal study including four waves of data collection at 1-year intervals, showed that minor and frequently occurring stressful life events at waves 3 and 4 predicted higher levels of secure base script knowledge in children who were on average 11 years old at wave 1 (Waters et al., 2019). Possibly, children can make use of minor stressful life events by practicing the secure base script, that is, seeking and receiving effective help from attachment figures, which may then lead to greater knowledge of the secure base script (Waters et al., 2019). Furthermore, an experimental study demonstrated that immediately after completing a single attachment-related cognitive interpretation bias training, 9- to 12-year-old children reported greater trust in their mother's availability and recalled attachment-related memories more positively, although no immediate effects on children's secure base script knowledge were found (De Winter, Saleminck, & Bosmans, 2018). Based on the findings described by Raby et al. (2021) and Waters et al. (2019), it is not far-fetched to suggest that parents can increase their secure base script knowledge when they are provided with information and a context in which they can practice the secure base script. However, at this point, the time frame for changes in secure base script knowledge is still unknown.

Video-feedback intervention to promote positive parenting and sensitive discipline

In the current study, we examined whether VIPP-SD (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017) can improve parents' secure base script knowledge. VIPP-SD integrates theory and research from attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982) and coercion theory (Patterson, 1982) into a brief protocolized intervention program in which parents receive individualized video-feedback with the aim of promoting sensitive caregiving and sensitive discipline behavior (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017). Sensitive caregiving and sensitive discipline behavior foster positive child outcomes (e.g., Ferguson, 2013; Madigan et al., 2019; Rodrigues et al., 2021) and have been found to represent related but somewhat different aspects of parental behavior (Euser et al., 2020; Lecuyer-Maus, 2000; Joosen, Mesman, Bakermans-Kranenburg, & Van IJzendoorn, 2012). With respect to attachment theory, VIPP-SD aims to support sensitive caregiving, according to Ainsworth et al. (1978) definition of sensitivity. That is, parents are encouraged to accurately observe and interpret their child's behavior and to respond in a prompt and appropriate manner. Video recordings are used to illustrate, for example, the difference between a child's attachment and explorative behavior. In this way, parents learn how they can be a secure base when their child needs them, and to support exploration of the environment when the child is at ease. With respect to coercion theory, VIPP-SD encourages parents to use sensitive discipline strategies to prevent or stop coercive cycles in which parents and children reinforce maladaptive behavior in each other. For example, parents are supported to show empathy for the child by sharing the feelings of their child, and to use inductive reasoning, distraction, and positive reinforcement in limit-setting situations. The intervention can be implemented with the sensitive discipline component (VIPP-SD) or without the sensitive discipline component (VIPP; for parents and infants up to one year old). The intervention can also be slightly adapted to meet the needs of specific target groups, including parents of children with autism (iBASIS-VIPP; Whitehouse et al., 2021), parents of children with visual or visual-and-intellectual disabilities (VIPP-V; Platje, Sterkenburg, Overbeek, Kef, & Schuengel, 2018) and professionals in daycare centers (VIPP-CC; Groeneveld, Vermeer, Van IJzendoorn, & Linting, 2011).

Despite the focus of VIPP-SD on improving actual parenting behavior, it may also provide an opportunity for parents to enhance their secure base script knowledge. Parents receiving VIPP-SD may

develop a more complete secure base script by internalizing the information and video-feedback with respect to sensitive caregiving (see Raby et al., 2021 who provide a similar reasoning for the ABC intervention). A sensitive caregiving response is an important aspect of a well-developed secure base script, and increasing awareness of what sensitive caregiving responses entail may foster secure base script knowledge in parents. Furthermore, a positive effect of VIPP-SD on parents' secure base script knowledge may suggest that an increase in secure base script knowledge is an underlying cognitive mechanism through which VIPP-SD exerts enduring positive effects on sensitive caregiving and sensitive discipline behavior.

Secure base script knowledge as a moderator of intervention effects

A series of meta-analyses of 25 randomized control trials conducted with >2000 families showed that VIPP-SD is effective in enhancing sensitive caregiving and sensitive discipline behavior as well as parents' attitudes toward these parenting behaviors in both typical and at-risk families (Van IJzendoorn, Schuengel, Wang, & Bakermans-Kranenburg, 2023). VIPP-SD was also found to be effective in promoting children's attachment security, which may be the result of parents providing more sensitive caregiving and sensitive discipline (Van IJzendoorn et al., 2023). Yet, the studies included in this meta-analysis did not address whether parents' secure base script knowledge moderated any intervention effects of VIPP-SD. There is, however, some evidence that individuals with insecure attachment representations may benefit specifically from interventions with video-feedback. For instance, in a quasi-experimental study, the effects of VIPP-R (i.e., VIPP with an additional focus on parents' attachment experiences) on sensitive caregiving were moderated by mothers' attachment representations: mothers with an insecure attachment representation increased in sensitive caregiving from pre- to post-test, while mothers with a secure attachment representation showed similar levels of sensitive caregiving at pre- and post-test (Cassibba, Castoro, Costantino, Sette, & Van IJzendoorn, 2015). Furthermore, a study following a single-case experimental design showed that professional caregivers with secure attachment representations became more responsive to their clients during the baseline period, whereas caregivers with insecure attachment representations (i.e., preoccupied or dismissing) only improved their level of responsiveness after receiving coaching with a video-feedback program named "Contact" (Janssen, Riksen-Walraven, & van Dijk, 2002; Schuengel, Kef, Damen, & Worm, 2012). These findings, although warranting further investigation in randomized controlled trials, point to the possibility that VIPP-SD is more effective in improving sensitive caregiving and sensitive discipline behavior as well as attitudes toward these behaviors in parents with lower pre-intervention levels of secure base script knowledge.

The present study

In the present study, we focused on secure base script knowledge in parents with twin children who participated in previous randomized controlled trials examining the effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior (Euser et al., 2021; Runze et al., 2022b) and their attitudes toward these behaviors (Runze et al., 2022b). Although the twins were not oversampled for behavior problems, parents of twins often report difficulties in dividing their attention, responding to distressing situations, or setting limits for two children of the same age. Therefore, they could benefit from parenting support (Fearon, Bakermans-Kranenburg, & Van IJzendoorn, 2010). In parents of pre-school children, VIPP-SD enhanced sensitive discipline behavior but not sensitive caregiving (Euser et al., 2021). Potential effects on parental attitudes toward sensitive caregiving and sensitive discipline behavior were not examined. In parents with school-aged children, VIPP-SD did not enhance sensitive caregiving or sensitive discipline behavior, but improved parents' attitudes toward sensitive caregiving,

which may be an important first step toward a change in sensitive behavior (Runze et al., 2022b). Moreover, significant effects on child conduct problems and hair cortisol levels were found in children aged 6 and 10 years at the time of the intervention (Runze, Pappa, Van IJzendoorn, & Bakermans-Kranenburg, 2022a). However, in these studies it remained unclear whether intervention effects were moderated by parental secure base script knowledge.

In sum, the present preregistered randomized controlled study included a combined sample of parents with pre-school and school-aged twin children to examine the following three research questions: (1) Is the VIPP-SD program effective in increasing parents' secure base script knowledge? (2a) Does secure base script knowledge moderate any intervention effects on observed parental sensitive caregiving or sensitive discipline behavior? (2b) Does secure base script knowledge moderate any intervention effects on parental attitudes toward sensitive caregiving or sensitive discipline behavior? We hypothesized that secure base script knowledge of parents who receive VIPP-SD would increase more from pre-test to post-test as compared to the secure base script knowledge of parents in the control condition. Furthermore, we hypothesized that the effects of VIPP-SD on parents' sensitive caregiving and sensitive discipline behavior and their attitudes toward these behaviors would be moderated by secure base script knowledge, such that parents with lower secure base script knowledge at baseline would benefit more from the VIPP-SD program than parents with higher levels of secure base script knowledge.

Method

Participants

The sample included 445 families with same-sex twins between approximately 3 and 10 years old at the time of recruitment. Families participated in the Leiden Consortium on Individual Development (LCID; Crone et al., 2020), an experimental cohort-sequential study. Families participated in one of the two longitudinal twin cohorts: the Early Childhood Twin Cohort (ECC) or the Middle Childhood Twin Cohort (MCC). The parent who spent most time with the children (i.e., primary parent) participated in the study. Families who responded positively to recruitment invitations, distributed via municipal records in the western part of the Netherlands, were assessed for eligibility. Families had to meet the following inclusion criteria: parents and children had to be fluent in speaking Dutch, and both parents and grandparents had to be of European descent. Families were excluded in case one or both twin children met one of the following exclusion criteria: congenital disabilities, psychological disorder, chronic illness, hereditary disease, visual/hearing impairment, or having an IQ below 70. These exclusion criteria were used because of their interference with children's abilities to perform the tasks that were administered during the yearly assessments. Sample characteristics for the total group, and for the intervention group and control group separately are presented in Table 1 (see Runze et al., 2022a for the sample characteristics of the ECC and MCC separately). Families received a financial compensation for their participation in each phase of the study. Moreover, families' travel expenses were covered, and children received a small gift after completion of each research visit. Parents provided written informed consent prior to the start of the study. The study received ethical approval from the central committee on research involving human subjects in the Netherlands (CCMO; ECC: NL49069.000.14; MCC: NL50277.058.14). The trial, study design, and the analyses were pre-registered on the Open Science Framework (see https://osf.io/mebsd/?view_only=8c6add49e9ba4576a4b568cc74ed03f9). See Fig. 1 for a CONSORT flowchart of enrollment, intervention allocation, follow-up, and data-analyses.

Table 1
Sample characteristics for the total group, and for the intervention group and control group separately.

	Characteristics	Total	Intervention group	Control condition
Twin characteristics	Age in years <i>M (SD)</i> ECC at T1	3.76 (0.57)	3.74 (0.62)	3.77 (0.53)
	Age in years <i>M (SD)</i> MCC at T1	7.92 (0.66)	7.94 (0.66)	7.92 (0.67)
	Sex (% boys)	46.5	46.7	46.4
	Country of birth (% masked for blind review)	99.1	100	98.5
	Zygoty (% Monozygotic; MZ)	57.5	58.0	57.2
Family characteristics	Sex primary parent (% female)	91.2	87.9	93.4
	SES (%)			
	Low SES	7.7	6.9	8.2
	Middle SES	42.7	44.8	41.3
	High SES	49.7	48.3	50.6
	Age primary parent <i>M (SD)</i>	38.59 (5.12)	38.69 (5.24)	38.54 (5.05)
	Country of birth primary parent (% masked for blind review)	96.6	97.7	95.9
	Educational level primary parent			
	Lower and Intermediate vocational	31.7	35.1	29.5
	Higher vocational, university bachelor	41.4	38.5	43.4
	Post higher vocational, university master	26.9	26.4	27.2
	Number of other children in the family (%)			
	0	32.6	29.3	34.7
	1	47.4	48.9	46.5
	2	16.2	19.0	14.4
	≥ 3	3.4	2.9	4.5
	Primary parents' marital status (%)			
	Married or registered partnership (%)	72.2	65.5	77.0
	Cohabiting (%)	22.7	29.3	18.6
	Single parent (%)	4.7	5.2	4.5
	Parental psychopathological symptoms T1 <i>M (SD)</i>	0.23 (0.27)	0.20 (0.22)	0.25 (0.30)
	Parental psychopathological symptoms T2 <i>M (SD)</i>	0.30 (0.38)	0.25 (0.28)	0.33 (0.43)
Parental psychopathological symptoms T3 <i>M (SD)</i>	0.27 (0.28)	0.24 (0.26)	0.29 (0.28)	

Note. ECC = Early Childhood Cohort, MCC = Middle Childhood Cohort, SES = socioeconomic status.

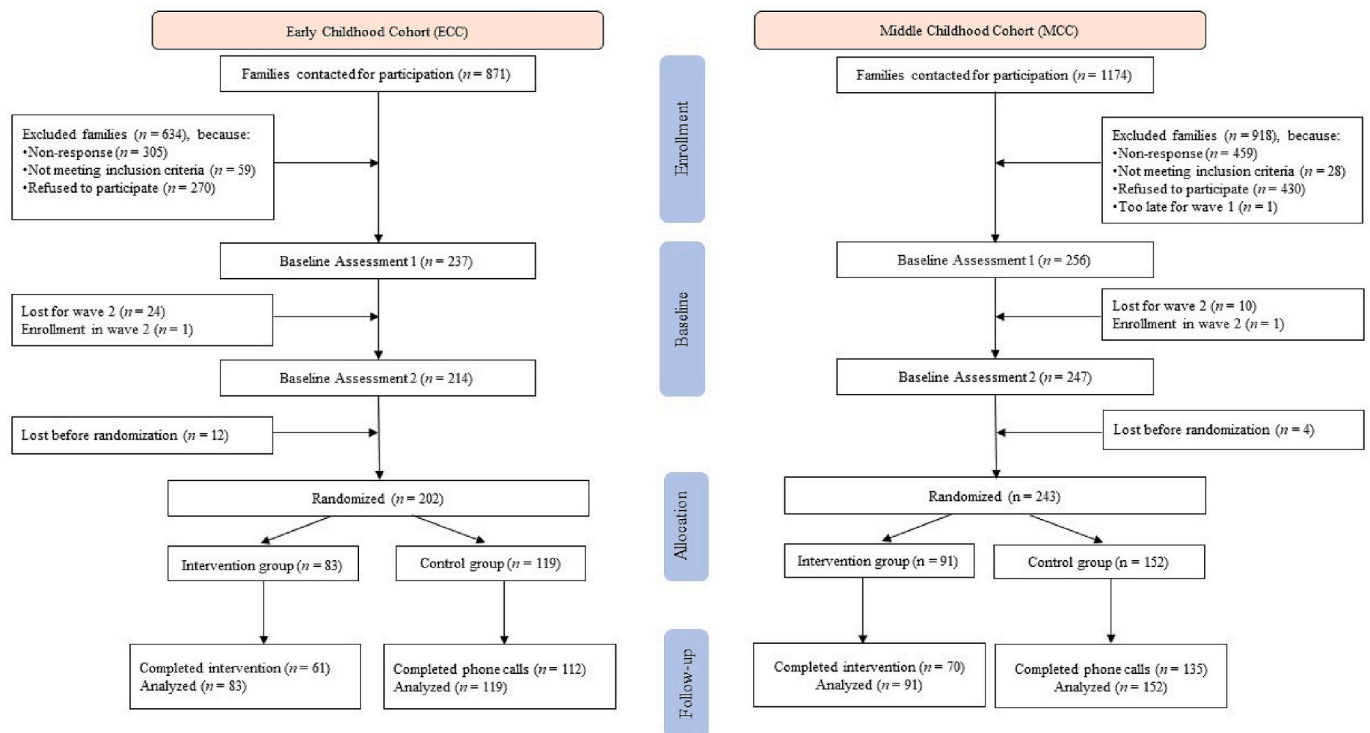


Fig. 1. CONSORT flowchart of the randomized controlled trials for the Early Childhood Cohort (ECC) and Middle Childhood Cohort (MCC), adapted from Runze et al. (2022a)

Procedure

Families were invited for six yearly waves of data collection (two pre- and four post-test assessments). Additionally, after each assessment, families were asked to conduct ambulatory assessments at home. After

two pre-test assessments (T1 and T2), a random 40% of the sample was assigned to the receive Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD; Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017). A 40–60 split was chosen because VIPP-SD had to be implemented by trained interveners within a

relatively short period of time. Approximately one month after completion of VIPP-SD intervention, families participated in the first post-test assessment (T3). In the present study, we included data from pretest 1 (T1), pretest (T2) and posttest 1 (T3). Data on secure base script knowledge were collected at T2 and T3. Data on sensitive caregiving and sensitive discipline behavior and attitudes toward these behaviors were collected at T1, T2, and T3. Data for the ECC were collected between 2014 and 2017 and data for the MCC were collected between 2015 and 2018. Data were collected at the families' home (ECC; T1, MCC; T2) or at the laboratory (ECC: T2, T3, MCC: T1, T3).

Randomization

An independent researcher, who was not involved in data collection or data coding, randomized the sample at the family level in a ratio of 2:3, using a computer-generated randomized block sequence (for details see Euser et al., 2021 and Runze et al., 2022b). To prevent selective attrition, randomization was performed after all families had completed pretest 2 (T2). Prior to randomization, interveners and participants were blind to condition assignment but this was not the case afterwards due to the open-label design of the study. To avoid potential bias, researchers involved in data collection and data coding always remained blind to condition assignment. In total, 174 families were assigned to the intervention condition (39%) and 271 families were assigned to the control condition (61%).

Experimental condition

In the experimental condition, participants received an age-appropriate adaptation of VIPP-SD. Minor changes were made to the original VIPP-SD so that the intervention could be implemented in families with school-aged twins. For instance, age-appropriate toys and games were used and interaction settings (to be used as footage for the video feedback) were adapted to contexts in which a parent interacts with two children at the same time. VIPP-SD consists of five thematic sessions in which families are visited at home by an intervener with biweekly intervals. All interveners completed an extensive training program and used a standardized manual to implement the intervention (Manual VIPP-SD, version 3.0; Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2015). The manual describes the structure, themes, tips, and exercises for each session. At the start of each session, the intervener videotaped approximately 15 min of standardized parent-child interactions, such as playing a game or reading a book together. Between sessions, the intervener selected video fragments and prepared feedback and comments regarding the specific theme to be discussed in the following session. For example, the intervener may explain that when the parent plays with their child, the child's overtures are responded to, which makes children feel understood. The intervener might say: "A toy does not smile back, you do!" (Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2018, p.8) or "It is great to see what your child comes up with when it is playing with toys. You may try to leave the initiative with the child. What are they going to do with the toys? Let your child surprise you". In the next session, after filming new material, the intervener gave feedback on the selected video fragments collected during the previous session. The video-feedback was focused on positive parent-child interactions: the intervener highlighted moments during which positive parenting was visible (e.g., the child reaches for a pawn on the boardgame, the parent notices the reach and gives the pawn to the child, and the child responds with a happy smile). The intervener also explicitly acknowledged that the parent was the expert on their own children. The first four sessions were conducted with the primary parent only. The fifth session was a booster session, in which all previous themes were repeated and integrated with each other. The partner of the primary parent was invited to join the booster session to stimulate partner support during the implementation of (new) positive parenting behaviors. For a more detailed description of the themes and methods see Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017. For fidelity

purposes, all interveners kept logbooks outlining whether they adhered to the VIPP-SD protocol. Logbooks were checked and discussed during regular intervention meetings.

Control condition

Families in the control group received telephone calls from a research assistant during the same time period and with the same frequency as families in the experimental condition. The number of contacts with the research team was thus the same for families in the intervention and control condition. Research assistants followed a standardized semi-structured interview protocol and asked parents specific and general questions about the development and daily lives of their twins. Research assistants offered no information or advice about parenting or child development but were allowed to refer parents to online parenting information or to the Dutch organization for parents with multiples (Nederlandse Vereniging voor Ouders van Meerlingen; NVOM) when parents had questions about twin children's development specifically.

Measures

Secure base script knowledge

At T2 and T3 (but not at T1), parental secure base script knowledge was measured with the Attachment Script Assessment (Waters & Waters, 2006). Parents were asked to tell four stories using prompt word sets. Each set contained a title and a list of 12 prompt-words organized in three columns (see Supplementary Table 1 for more details). The prompt words imply a prototypical story line, but parents were free to change the order of the words and to leave words out if they wanted to. For each prompt word set, the parent was given 2 min to review the words and to prepare a story. Parents first completed a practice story using a prompt word set designed to elicit a neutral story (this story was not coded). Following the practice story, parents completed three stories that were designed to prompt secure base script knowledge. To reduce participant burden, we included three stories instead of four stories (Waters & Waters, 2006). Two prompt word sets focused on the mother-child relationship (Baby's Morning, Doctor's Office) and one prompt word set focused on the adult-adult relationship. The latter prompt word set was different at T2 and T3, such that parents completed 'The Accident' at T2 and 'Jane & Bob's Camping Trip' at T3. Parents were asked to tell their best possible stories, to tell stories of approximately one page in length, and to include as many details and elaborations as possible. The stories were audio recorded and subsequently transcribed verbatim. Each story was coded on a 7-point rating scale for the extent to which parents included elements of a secure base script (Waters and Waters, 2006). Stories including extensive and detailed descriptions of secure base script content received the highest scores (6–7). Stories with minimal or no secure base script content received moderately low scores (3). Stories with unusual or atypical content or disjointed stories received the lowest scores (1–2). Each story was double coded, and scores assigned by the two coders were averaged. A consensus score was created through discussion when scores differed 1.5 point or more. Scores on the three stories were significantly correlated (T2; r s between 0.38 and 0.40, T3; r s between 0.37 and 0.49), which aligns with previous studies reporting significant correlations between scores on the four stories (r s' between 0.28 and 0.63; Hawkins et al., 2015; r s between 0.33 and 0.59; Raby et al., 2021), as well as with findings that secure base script knowledge is consistent across different attachment relationships (Waters, Bosmans, Vandevivere, Dujardin, & Waters, 2015). Scores on the three scores were averaged to obtain an overall score for secure base script knowledge. Cronbach's alphas were 0.65 at T2 and 0.70 at T3. Autobiographical stories were not coded for secure base script knowledge. Inter-coder reliability (Intraclass Correlation Coefficient; ICC, single measures, absolute agreement) was adequate. In the ECC, mean ICC between the expert coder and trained coders was 0.75 at T2 ($n = 4$ coders) and 0.77 at

T3 ($n = 4$ coders). In the MCC, mean ICC between the expert coder and trained coders was 0.82 at T2 ($n = 3$ coders) and 0.89 at T3 ($n = 6$ coders). Stories were coded by researchers, research assistants with a Master of Science (MSc) in either psychology or child and family sciences, and advanced bachelor and master students in child and family sciences. Coders were allowed to score more than one story of the same parent as all information that could identify the parent was omitted. A different group of coders was involved in coding pre- and post-test data. Two outliers ($z < -3.29$) for secure base script knowledge at T2 were winsorized.

Sensitive caregiving

At T1, T2, and T3, sensitive caregiving was observed while parent-child dyads participated in a computerized version of a structured cooperative drawing task: the Etch-A-Sketch (Cents et al., 2014). The primary parent performed the task once with the youngest twin-sibling and once with the oldest twin-sibling (random order). The parent-child dyad was instructed to reproduce three printed examples that increased difficulty. To avoid practice effects, different sets of printed examples were used for each parent-child dyad and at each timepoint. Two buttons could be used to draw horizontal lines and two to draw vertical lines. Diagonal lines could be drawn by simultaneously pressing one of the buttons that draws a horizontal line and one of the buttons that draws a vertical line. The parent and child could decide together who controlled which pair of buttons. Three minutes after the start of the task, the computer gave instructions to start with the second drawing. The duration of the task was 8 min and 10 min for the ECC and MCC, respectively. The video-taped interactions were coded for sensitive caregiving using the Erickson 7-point rating scales for supportive presence (1 = parent is highly unsupportive, 7 = parent is highly supportive) and intrusiveness (1 = parent is non-intrusive, 7 = parent is highly intrusive) (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990), which reflect two important dimensions of sensitive caregiving. Scores on the intrusiveness scale were recoded so that higher scores indicate lower levels of intrusiveness. Scores on the intrusiveness and supportive scales were significantly correlated, $r(T1) = 0.57$, $r(T2) = 0.54$, $r(T3) = 0.56$. Therefore, scores on the supportive presence and intrusiveness scales were averaged as an indicator of sensitive caregiving. Coders were trained by an expert coder, were blind to condition assignment, and did not code more than one parent-child interaction from the same family. At T1, T2, and T3, ICC with the expert coder was adequate for both the ECC and MCC. In the ECC, mean ICC between the expert coder and trained observers was 0.82(T1), 0.83(T2) and 0.74(T3) for supportive presence and 0.80(T1), 0.77(T2), 0.75(T3) for intrusiveness (see Euser et al., 2021 for more details). In the MCC, mean ICC with the expert coder was 0.77(T1), 0.74(T2), and 0.72(T3) for supportive presence and 0.77(T1), 0.73(T2), and 0.73(T3) for intrusiveness (see Runze et al., 2022b for more details, including the number of coders at each timepoint). Observations were coded by researchers, research assistants with a MSc in either psychology or child and family sciences, and advanced bachelor and master students in child and family sciences.

Sensitive discipline behavior

At T1, T2, and T3, sensitive discipline behavior was observed while parent-child dyads participated in a 'Don't touch task' (ECC; Van Der, Bakermans-Kranenburg, & Van IJzendoorn, 2002; Euser et al., 2016) or a 'Do-Don't task' (MCC; Van Der, Bakermans-Kranenburg, & Van IJzendoorn, 2002; Runze et al., 2022b). The primary parent performed the task once with the youngest twin-sibling and once with the oldest twin-sibling (random order). In the ECC, a research assistant handed the parent a bag of toys and a card with the written instruction to put all the toys in front of the child on the floor and to make sure that the child did not touch any of the toys for the following two minutes. After two minutes, the parent was instructed to let the child know that play was allowed but only with the least attractive toy. After another two minutes, the child was permitted to play with all the toys (not coded). The

total duration of the task for the ECC was 4 min. In the MCC, the parent received a laptop, and the child received a small box with perlerbeads. Instructions were provided to the parent which included that the parent had to watch a video (i.e., a video that most children find enjoyable) and to make sure that the child did not watch the video but sorted perlerbeads by color instead. The total duration of the task for the MCC was 8 min. Videos of parent-child interactions were coded for supportive presence with scores ranging from 1 (parent completely fails to provide sensitive discipline) to 7 (parent skillfully provides positive discipline) using an adapted version of the revised Erickson scales (Egeland et al., 1990). A parent who completely fails to provide sensitive discipline may respond to their child's non-compliant behavior with frustration and impatience (e.g., "Why is it so hard to do this simple task? I cannot concentrate with you fussing about it. Just do it and stop complaining"). A parent who skillfully provides sensitive discipline uses non-coercive strategies such as explaining the rules of the task (e.g., "Ok, we have to team up. While I'm watching a video, you are the captain of the perlerbeads sorting team. Your goal is to organize them all by color"), using compliments (e.g., "Great job sorting the blue perlerbeads! Can you sort the yellow colors as well?") or empathy (e.g., "I understand that sorting perlerbeads may not be your favorite thing to do right now") while at the same time ignoring non-compliant behavior (e.g., ignoring that the child has turned his back and crossed its arms). Parent-child interactions were also coded for laxness with scores ranging from 1 (parent shows no laxness throughout the interaction) to 5 (parent shows a lack of commands and directions throughout the interaction). In line with previous research (Yagmur, Mesman, Malda, Bakermans-Kranenburg, & Ekmekci, 2014), we found highly right-skewed distributions and scores were therefore not included in the analyses. Coders were trained by an expert coder, were blind to condition assignment, and did not code more than one parent-child interaction from the same family. At T1, T2, and T3, ICC with the expert coder was adequate. In the ECC, mean ICC with the expert coder for positive discipline was 0.92(T1), 0.74(T2) and 0.79(T3) (see Euser et al., 2021 for more details). In the MCC, mean ICC with the expert coder for positive discipline was 0.77(T1), 0.84(T2), and 0.79(T3) (see Runze et al., 2022b for more details, including the number of coders at each timepoint). Observations were coded by researchers, research assistants with a MSc in either psychology or child and family sciences, and advanced bachelor and master students in child and family sciences.

Parental attitudes toward sensitive caregiving and sensitive discipline behavior

At T1, T2, and T3, the primary parent completed the Dutch version of the Parenting Attitudes Questionnaire (PAQ; Van Zeijl et al., 2006), which assessed attitudes toward sensitive caregiving and sensitive discipline behavior. Parents rated 20 items on a 10-cm visual analog scale, which ranged from 0 (totally disagree) to 100 (totally agree). An example item for sensitive caregiving is "In my opinion, I should praise my child at least once every day". An example item for sensitive discipline is "My child must learn that I will get angry when he/she does not listen to me (recoded)". A principal component analysis with varimax rotation indicated that eight items loaded on the sensitive caregiving scale, 11 items loaded on the sensitive discipline scale, and one item did not load on any of the scales. These results were in accordance with Runze et al. (2022b), except for one additional item that loaded on the sensitive discipline scale. Two scale scores were computed, one for attitudes toward sensitive caregiving and one for attitudes toward sensitive discipline behavior. For consistency purposes, we did not include the additional item on the sensitive discipline scale. Because factor loadings were not equal across measurements, we calculated McDonald's omega instead of Cronbach's alpha (Viladrich, Angulo-Brunet, & Doval, 2017). Omega values above 0.70 are generally considered acceptable (Viladrich et al., 2017). Omegas were 0.59(T1), 0.62(T2), and 0.66(T3) for attitudes toward sensitive caregiving. Omegas were 0.50(T1), 0.65(T2) and 0.59(T3) for attitudes toward sensitive discipline

behavior. Test-retest reliabilities were r 's ≥ 0.55 for attitudes toward sensitive caregiving and r 's ≥ 0.45 for attitudes toward sensitive discipline behavior. At T1, one outlier ($z < -3.29$) for attitudes toward sensitive caregiving and one outlier ($z < -3.29$) for attitudes toward sensitive discipline behavior were winsorized. Furthermore, at T3, three outliers (all $z < -3.29$) for attitudes toward sensitive caregiving were winsorized. Finally, at T2, data for one parent was treated as missing due to unrealistic values (i.e., all 100's or 0's). Higher scores indicated more positive attitudes toward sensitive caregiving and sensitive discipline behavior.

Psychopathological symptoms of the primary parent

Following CONSORT guidelines (Moher et al., 2010), we refrained from testing whether the intervention and control group differed on background variables and depressive symptoms, as this is not an appropriate method for confounder adjustment (De Boer, Waterlander, Kuijper, Steenhuis, & Twisk, 2015). That is, the random assignment of participants to different groups makes any background differences across the intervention and control group random. Having said that, we performed robustness analyses in which we controlled for parents' psychopathology symptoms because this approach aligns with earlier studies of Euser et al. (2021) and Runze et al. (2022b). Prior to each assessment (T1, T2, T3), primary parents completed the Dutch version of the Brief Symptom Inventory (BSI; Derogatis, 1993). Parents rated 21 items on a five-point scale ranging from 0 = not at all to 4 = a lot. Scores were averaged to create an overall score, with higher scores indicating more psychopathology symptoms. Cronbach's alpha indicated good internal consistency at all timepoints (T1; $\alpha = 0.88$, T2; $\alpha = 0.93$ and T3; $\alpha = 0.87$). In accordance with Euser et al. (2021) and Runze et al. (2022b), missing data were imputed using the Expectation Maximization function in SPSS with age, sex of the primary parent, sex of the children, parental education, and psychopathology symptoms as predictors. Scores were log-transformed to approach a more normal distribution.

Missing data

Rates of missing data per variable were as follows: Sensitive caregiving, T1; 1.7%, T2; 1.7%, T3; 9.4%. Sensitive discipline behavior, T1; 2.1%, T2; 2.0%, T3; 11.2%. Secure base script knowledge, T2; 4.9%, T3; 12.1%. Attitudes toward sensitive caregiving, T1; 8.1%, T2; 5.6%, T3; 18.7%. Attitudes toward sensitive discipline behavior, T1; 18.7%, T2; 8.1%, T3; 5.6%. Psychopathological symptoms, T1; 8.8%, T2; 5.8%, T3; 14.8%. Due to the hierarchical structure of the data (i.e., repeated measurements nested within families), we performed Little's Missing Completely at Random Test (MCAR) separately for child 1 and child 2. Results indicated that data were missing completely at random for child 1 ($\chi^2(775) = 770.46, p = .539$) and child 2 ($\chi^2(720) = 749.84, p = .214$). Missing data were handled using Full Information Maximum Likelihood (FIML) estimation, which includes all available data points to estimate statistical parameters.

Data-analytic strategy

To account for the hierarchical structure of the data, we conducted linear mixed models in SPSS (version 27) thereby adhering to the intent-to-treat principle. First, we fitted linear mixed models to examine effects of VIPP-SD on parents' secure base script knowledge. We started with fitting an intercept only model with two levels (time of assessment, parent) and an unrestricted within subject (co)variance structure to calculate the intraclass correlation coefficient (ICC). Next, we fitted a model with time (T2, T3; dummy coded), condition (intervention or control group) and the interaction term between condition \times time as fixed effects. Condition was coded as 0 = intervention condition and 1 = control condition.

Thereafter, we fitted linear mixed models in SPSS to examine whether the effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior and parents' attitudes toward these behaviors were

moderated by secure base script knowledge at baseline (T2). First, we fitted an intercept only model with three levels (time of assessment, parent, child) and an unrestricted within subject (co)variance structure to calculate the ICC. Next, we fitted linear mixed models for each outcome variable (four in total) with time and time² as fixed and random effects. Time was coded 1,2,3 and Time² was coded as 1,4,9. Time² was included to test for quadratic growth over time because the intervention was implemented between T2 and T3. Condition and secure base script knowledge were included as fixed effects. We added lower-level interaction terms and the three-way interaction term of condition \times time² \times secure base script knowledge. A significant three-way interaction term indicates a moderation effect. All predictor variables, except condition and time², were standardized at the between-subject level using z-score standardization. For all models described above, we performed robustness analyses. First, we conducted analyses in families who completed all five intervention or control sessions. Second, we performed robustness analyses controlling for parents' psychopathologic symptoms. A p -value lower than 0.05 was used as a threshold for statistical significance.

The software program G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) was used to compute what effects could be detected as significant. Sample size was 445 families, alpha was set at 0.05 and power was set at 0.80. This resulted in a detectable effect size of Cohen's $f = 0.07$, equivalent to Cohen's $d = 0.14$. In the study of Raby et al. (2021), the effect size of the ABC intervention on parental secure base script knowledge was $d = 0.41$. This effect size is larger than our detectable effect size. Therefore, the present study is likely to have sufficient power to detect effects of VIPP-SD on parents' secure base script knowledge. To determine power for our secondary aim, alpha was set at 0.05 and power was set at 0.80. Number of tested predictors was 1 (i.e., moderation effect) and total number of predictors was 8. This resulted in a detectable effect size of Cohen's $f^2 = 0.02$, indicating that we had sufficient power to detect small effect sizes. It is important to note G*power does not take into account the nested structure of the data. Therefore, the results of the power analysis should be interpreted with caution and may only reflect an estimated indication of the power for detecting moderation effects.

Results

Descriptive statistics of the outcome variables are presented in Table 2 and correlations between the study variables are presented in Table 3. Secure base script knowledge was relatively stable over time ($r = 0.33, p < .001$). Furthermore, sensitive caregiving was positively related to secure base script knowledge across time (range $r = 0.10$ – $0.18, p < .001$). Similarly, sensitive discipline behavior was positively related to secure base script knowledge across time, (range $r = 0.10$ – $0.34, p < .001$). Finally, attitudes toward sensitive caregiving at T1 and T2 were positively correlated with secure base script knowledge across time (range $r = 0.12$ – $0.15, p < .05$).

Research Question 1: Is the VIPP-SD program effective in increasing parents' secure base script knowledge?

The ICC in the intercept only model with two levels showed that 33% of the variance in secure base script knowledge could be attributed to the parent, indicating that the scores within a parent were more similar to each other than scores between parents. There were no significant effects of time ($\beta = -0.02, p = .427$), condition ($\beta = -0.10, p = .074$), or condition \times time ($\beta = 0.01, p = .790$), indicating that VIPP-SD did not significantly affect parents' secure base script knowledge (see Table 4). Separate analyses per cohort are presented in Supplementary Table 2.

Research Question 2a: Does secure base script knowledge moderate any intervention effects on observed sensitive caregiving or sensitive discipline behavior?

The ICC in the intercept only model with three levels showed that 47% of the variance in sensitive caregiving could be attributed to the parent, indicating that the scores within a parent were more similar to each other than scores between parents. Additionally, 0% could be attributed to the child level. Therefore, only time and family were

Table 2
Means and standard deviations of outcome variables for the intervention and control group.

Outcome variable	Group	T1	T2	T3
Secure base script knowledge	Intervention	a	3.92 (0.64)	3.90 (0.69)
	Control	a	4.02 (0.66)	4.00 (0.73)
Attitudes toward sensitive caregiving	Intervention	66.75 (14.46)	67.85 (13.86)	73.62 (14.14)
	Control	67.40 (12.70)	68.01 (13.34)	69.70 (11.87)
Attitudes toward sensitive discipline behavior	Intervention	60.00 (12.13)	60.10 (12.20)	62.43 (11.99)
	Control	59.39 (11.87)	58.91 (12.76)	58.93 (11.52)
Parental sensitive caregiving	Intervention	Child 1 3.82 (1.34)	Child 2 3.64 (1.33)	Child 1 3.93 (1.33)
	Control	3.91 (1.26)	3.87 (1.29)	4.01 (1.35)
Sensitive discipline behavior	Intervention	4.63 (1.59)	4.56 (1.53)	4.37 (1.54)
	Control	4.70 (1.44)	4.85 (1.47)	4.32 (1.66)
		Child 1	Child 2	Child 1
		3.88 (1.36)	3.92 (1.40)	3.92 (1.40)
		4.03 (1.32)	4.12 (1.33)	4.03 (1.32)
		4.23 (1.44)	4.33 (1.37)	4.23 (1.44)
		4.18 (1.49)	4.42 (1.52)	4.18 (1.49)

Note. T1 = Pre-test assessment 1, T2 = Pre-test assessment 2, T3 = Post-test assessment. ^a Not assessed at T1.

Table 3
Pearson correlations between main study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Sensitive caregiving (T1)													
2. Sensitive caregiving (T2)	0.46**												
3. Sensitive caregiving (T3)	0.45**	0.48**											
4. Sensitive discipline behavior (T1)	0.17**	0.16**	0.17**										
5. Sensitive discipline behavior (T2)	0.15**	0.19**	0.24**	0.44**									
6. Sensitive discipline behavior (T3)	0.19**	0.24**	0.28**	0.37**	0.53**								
7. Attitudes toward sensitive caregiving (T1)	0.15**	0.14**	0.12**	0.11**	0.10**	0.11**							
8. Attitudes toward sensitive caregiving (T2)	0.18**	0.16**	0.16**	0.11**	0.07*	0.11**	0.57**						
9. Attitudes toward sensitive caregiving (T3)	0.09*	0.12**	0.11**	0.08*	0.05	0.10**	0.55**	0.61**					
10. Attitudes toward sensitive discipline (T1)	0.05	0.15**	0.14**	0.03	0.11**	0.07*	-0.07	-0.01	0.04				
11. Attitudes toward sensitive discipline (T2)	0.05	0.16**	0.11**	0.08*	0.16**	0.07*	0.02	-0.09	0.00	0.58**			
12. Attitudes toward sensitive discipline (T3)	-0.01	0.11**	0.11**	0.08*	0.19**	0.18**	0.03	-0.05	0.01	0.45**	0.59**		
13. Secure base script knowledge (T2)	0.13**	0.10**	0.15**	0.13**	0.11**	0.10**	0.07	0.15**	0.13*	-0.02	-0.03	-0.07	
14. Secure base script knowledge (T3)	0.16**	0.11**	0.18**	0.24**	0.28**	0.34**	0.07	0.12*	0.12*	0.07	0.10	0.03	0.33**

Note. ** $p < .001$, * $p < .05$.

Table 4
Results of multilevel model testing the effects of VIPP-SD on secure base script knowledge.

Secure base script knowledge				
Predictor	Estimate	SE	p	95% CIs
Intercept	4.01	0.03	< 0.001	[3.94, 4.08]
Condition	-0.10	0.06	0.074	[-0.21, 0.01]
Time	-0.02	0.03	0.427	[-0.07, 0.03]
Time × condition	0.01	0.04	0.790	[-0.07, 0.09]

included as levels in subsequent analyses. Time was a significant predictor ($\beta = 0.33, p = .020$), indicating change in sensitive caregiving over time. The interaction between condition and quadratic time was non-significant, suggesting that the intervention did not affect sensitive caregiving. Results showed a main effect of secure base script knowledge ($\beta = 0.16, p = .025$), indicating that parents with more secure base script knowledge interacted with their twin children in a more sensitive manner (see Table 5). The interaction effect condition × secure base script knowledge × quadratic time was non-significant, implying that parents' secure base script knowledge did not moderate the effects of VIPP-SD on sensitive caregiving. Separate analyses per cohort are presented in Supplementary Table 3.

The ICC in the intercept only model with three levels indicated that 47% of the variance in sensitive discipline behavior could be attributed to the parent, whereas 0% could be attributed to the child level.

Table 5
Results of multilevel model testing whether effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior are moderated by secure base script knowledge.

Sensitive caregiving				
Predictor	Estimate	SE	p	95% CIs
Intercept	4.33	0.21	<0.001	[3.91, 4.75]
Time	0.33	0.14	0.020	[0.05, 0.61]
Time ²	-0.07	0.04	0.090	[-0.16, 0.01]
Condition	-0.11	0.11	0.321	[-0.34, 0.11]
Condition × Time ²	0.00	0.01	0.800	[-0.03, 0.02]
SBSK	0.16	0.07	0.025	[0.02, 0.30]
Condition × SBSK	0.00	0.11	0.992	[-0.22, 0.23]
SBSK × Time ²	0.00	0.01	0.815	[-0.02, 0.02]
Condition × SBSK × Time ²	0.01	0.01	0.576	[-0.02, 0.04]
Sensitive discipline behavior				
Predictor	Estimate	SE	p	95% CIs
Intercept	3.53	0.28	< 0.001	[2.99, 4.07]
Time	-0.82	0.18	<0.001	[-1.18, -0.46]
Time ²	0.19	0.06	<0.001	[0.09, 0.30]
Condition	-0.12	0.14	0.358	[-0.39, 0.14]
Condition × Time ²	0.01	0.02	0.652	[-0.03, 0.04]
SBSK	0.25	0.08	0.003	[0.09, 0.42]
Condition × SBSK	-0.13	0.14	0.335	[-0.40, 0.14]
SBSK × Time ²	-0.01	0.01	0.189	[-0.04, 0.01]
Condition × SBSK × Time ²	0.02	0.02	0.387	[-0.02, 0.05]

Therefore, only time and family were included as levels in subsequent analyses. Time and quadratic time were significant (time: $\beta = -0.82, p < .001$, and quadratic time: $\beta = 0.19, p < .001$), implying change in sensitive discipline behavior over time (see Table 5). The interaction effect between condition and quadratic time was non-significant, suggesting that the intervention did not affect sensitive discipline behavior. Results showed a significant main effect of secure base script knowledge ($\beta = 0.25, p = .003$), indicating that parents with more secure base script knowledge used more sensitive discipline strategies. The interaction effect condition \times secure base script knowledge \times quadratic time was non-significant, implying that parents' secure base script knowledge did not moderate effects of VIPP-SD on sensitive discipline behavior. Separate analyses per cohort are presented in Supplementary Table 4.

Research Question 2b: Does secure base script knowledge moderate any intervention effects on parental attitudes toward sensitive caregiving or sensitive discipline behavior?

The ICC in the intercept only model with three levels showed that 55% of the variance in parental attitudes toward sensitive caregiving could be attributed to the parent, indicating that the scores within a parent were more similar to each other than scores between parents. In the models with parental attitudes toward sensitive caregiving as outcome variable, time and quadratic time were not included as random effects as this resulted in misfit of the model. Results showed a significant main effect of condition ($\beta = -2.82, p = .049$), suggesting differences in attitudes toward sensitive caregiving across the intervention and control condition. Furthermore, there was a significant interaction between quadratic time and condition ($\beta = 0.90, p < .001$), indicating that VIPP-SD significantly increased positive attitudes toward sensitive caregiving in the intervention group (see Fig. 2). We found no moderation effects by parental secure base script knowledge (see Table 6). Separate analyses for each cohort are presented in Supplementary Table 5.

For parental attitudes toward sensitive discipline behavior, the ICC in the intercept only model with three levels showed that 55% of the variance could be attributed to the parent, indicating that the scores within a parent were more similar to each other than scores between parents. In the models with parental attitudes toward sensitive discipline behavior as outcome variable, time was not included as a random effect as this resulted in misfit of the model. There was a significant interaction effect between condition and secure base script knowledge ($\beta = 3.43, p = .016$), suggesting that differences in attitudes toward sensitive caregiving among parents in the intervention and control group were impacted by their secure base script knowledge. In addition, results showed a moderation effect by parental secure base script knowledge as the interaction between condition \times secure base script knowledge \times quadratic time was significant ($\beta = -0.44, p = .021$). Parents with lower secure base script knowledge benefitted most from the VIPP-SD, as they showed the strongest improvements in positive attitudes toward

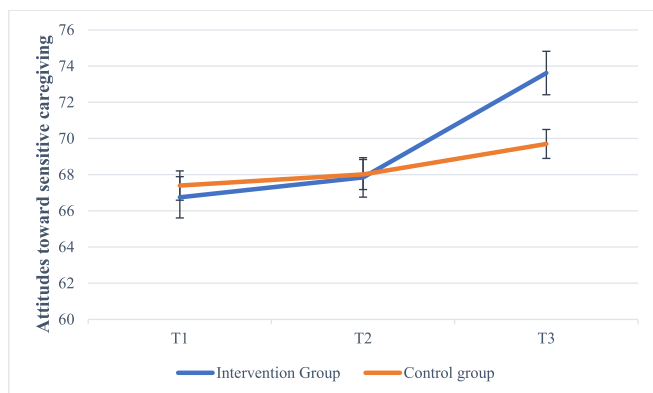


Fig. 2. VIPP-SD increases parental attitudes toward sensitive caregiving. Note. Error bars display standard errors.

Table 6

Results of multilevel model testing whether effects of VIPP-SD on attitudes toward sensitive caregiving and sensitive discipline behavior are moderated by secure base script knowledge.

Parental attitudes toward sensitive caregiving				
Predictor	Estimate	SE	p	95% CIs
Intercept	65.60	1.94	<0.001	[61.79, 69.41]
Time	-0.64	1.05	0.541	[-2.71, 1.42]
Time ²	0.50	0.37	0.177	[-0.23, 1.22]
Condition	-2.82	1.43	0.049	[-5.63, -0.02]
Condition \times Time ²	0.90	0.19	<0.001	[0.53, 1.27]
Secure base script knowledge	0.92	0.88	0.300	[-0.82, 2.65]
Condition \times Secure base script knowledge	0.13	1.45	0.927	[-2.70, 2.97]
Secure base script knowledge \times Time ²	0.09	0.12	0.419	[-0.13, 0.32]
Condition \times Secure base script knowledge \times Time ²	0.10	0.19	0.587	[-0.27, 0.48]
Parental attitudes toward sensitive discipline behavior				
Predictor	Estimate	SE	p	95% CIs
Intercept	58.81	1.77	<0.001	[55.33, 62.29]
Time	-0.33	0.94	0.728	[-2.17, 1.52]
Time ²	0.05	0.33	0.878	[-0.60, 0.70]
Condition	0.09	1.40	0.946	[-2.65, 2.84]
Condition \times Time ²	0.31	0.19	0.099	[-0.06, 0.67]
Secure base script knowledge	-1.37	0.86	0.113	[-3.07, 0.33]
Condition \times Secure base script knowledge	3.43	1.41	0.016	[0.66, 6.21]
Secure base script knowledge \times Time ²	0.09	0.12	0.423	[-0.13, 0.32]
Condition \times Secure base script knowledge \times Time ²	-0.44	0.19	0.021	[-0.81, -0.07]

sensitive discipline behavior. Furthermore, independent of secure base script knowledge, parents held more positive attitudes toward sensitive discipline behavior following completion of the VIPP-SD program (see Fig. 3). Separate analyses per cohort are presented in Supplementary Table 6 and showed that this effect was driven by participants from the early child cohort.

Robustness analyses

Results of the model examining whether the effects of VIPP-SD on parents' attitudes toward sensitive caregiving were moderated by parents' secure base script knowledge showed that condition was not a significant predictor anymore when including only families who completed all five intervention or control session and when we controlled for parents' psychopathologic symptoms. Furthermore, results of the model examining whether the effects of VIPP-SD on parents' attitudes toward sensitive discipline were moderated by parents' secure base script knowledge showed that the moderation effect fell short of significance ($\beta = -0.31, p = .132$) when including only families who completed all five intervention or control sessions. For all other models, results did not yield different conclusions when including only families who completed all five intervention or control sessions or when we controlled for parents' psychopathologic symptoms.

Discussion

In this preregistered randomized controlled study, we investigated

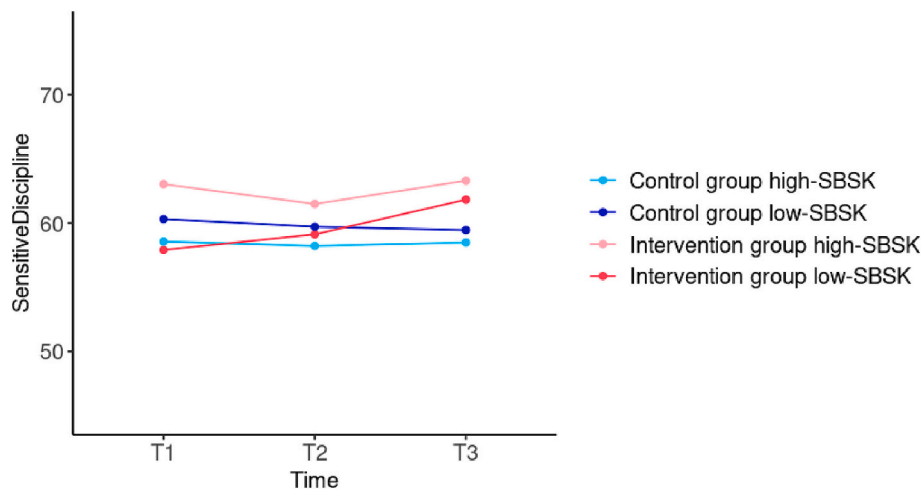


Fig. 3. Parents with lower secure base script knowledge benefit most from the VIPP-SD to promote positive attitudes toward sensitive discipline behavior. Note. SBSK = Secure Base Script Knowledge.

the effects of VIPP-SD on parents' secure base script knowledge. Furthermore, we examined whether the effects of VIPP-SD on observed sensitive caregiving and sensitive discipline behavior and parents' attitudes toward these behaviors were moderated by secure base script knowledge at baseline. Contrary to our expectations, there were no effects of VIPP-SD on secure base script knowledge. In line with our hypothesis, we found that VIPP-SD was effective in increasing parental attitudes toward sensitive caregiving and that the effects of VIPP-SD on parental attitudes toward sensitive discipline behavior were moderated by secure base script knowledge at baseline, such that parents with lower secure base script knowledge showed the strongest improvements in positive attitudes toward sensitive discipline behavior. Finally, we found no moderation by secure base script knowledge of the (non-significant) effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior.

The present study provided no evidence that VIPP-SD was effective in improving secure base script knowledge of parents with twin children. One possible explanation is that parents do not immediately internalize the information and video-feedback with respect to sensitive caregiving in their secure base script. This process may require additional time as well as continuous practice and positive reinforcement. In the present study, the post-test assessment took place approximately one month after completion of VIPP-SD, which might be too early to observe intervention effects on secure base script knowledge. Currently, the time frame for changes in secure base script knowledge is still unknown. Nevertheless, effects of the intervention may emerge after completion of the intervention, resulting in so-called sleeper effects (Van Aar, Leijten, Orobio de Castro, & Overbeek, 2017). Furthermore, it should be noted that we observed non-significant effects of VIPP-SD on sensitive caregiving and sensitive discipline behavior. Improvements in sensitive caregiving and sensitive discipline behavior may serve as prerequisites for the development of a more comprehensive, consolidated and readily accessible secure base script. A previous study demonstrated that the Attachment Biobehavioral Catch-Up intervention (ABC; Dozier & Bernard, 2019) improved sensitive caregiving indirectly via parental secure base script knowledge (Raby et al., 2021). However, it remained unclear whether the intervention first altered secure base script knowledge or sensitive caregiving. Furthermore, in the study of Raby et al. (2021) sensitive caregiving and secure base script knowledge were measured approximately 7 years after the intervention, which is considerably later than the timeframe used in the present study. Parents might need more time to incorporate the newly learned behaviors into their behavior repertoire, especially when they have been using specific parenting behaviors for many years (as might be the case with parents of school-

aged children). Future longitudinal studies which repeatedly assess secure base script knowledge and parenting behavior are needed to gain a better understanding of the potential intervention effects over time and the temporal interplay between improvements in secure base script knowledge and parenting behavior. Furthermore, it is worth noting that VIPP-SD has been developed to improve sensitive caregiving and sensitive discipline behavior (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017) and does not directly target secure base script knowledge. Perhaps intervention components that explicitly address the importance of a well-developed secure base script need to be incorporated to find positive effects on parents' secure base script knowledge.

In line with previous studies (Waters et al., 2019; Vaughn et al., 2006; Waters et al., 2021; Waters et al., 2017), we found that parents' secure base script knowledge was relatively stable across time. Moreover, secure base script knowledge was positively correlated with observed sensitive caregiving and parents' attitudes toward sensitive caregiving. Whereas previous studies have consistently reported a positive relationship between secure base script knowledge and sensitive caregiving (Coppola et al., 2006; Hawkins et al., 2015; Huth-Bocks et al., 2014; Raby et al., 2021; see also Witte, Runze, Van IJzendoorn, & Bakermans-Kranenburg, 2023), research examining associations between secure base script knowledge and attitudes toward sensitive caregiving have been scarce. One study showed that coherence scores as assessed with the Adult Attachment Interview (AAI; Hesse, 2016; Main, Kaplan, & Cassidy, 1985), but not secure base script knowledge, were positively associated with interview ratings of supportive parenting (Waters, Raby, Ruiz, Martin, & Roisman, 2018). In addition, building on previous findings of Witte, Runze, Van IJzendoorn, & Bakermans-Kranenburg, 2023, we showed that parents with more secure base script knowledge used more sensitive discipline strategies (e.g., empathy, inductive reasoning) during interactions with their twin children. Together, our findings suggest that parental secure base script knowledge shapes different parenting dimensions, including sensitive caregiving, sensitive discipline behavior and parents' attitudes toward sensitive caregiving.

As expected, we found that the effects of VIPP-SD on parents' attitudes toward sensitive discipline behavior were moderated by secure base script knowledge, such that parents with lower secure base script knowledge displayed the largest improvements in positive attitudes toward sensitive discipline behavior. These findings are consistent with evidence showing that individuals with insecure attachment representations benefitted most from interventions using video-feedback (Casibba et al., 2015; Schuengel et al., 2012). Furthermore, these findings highlight the potential importance of tailoring interventions to meet the

specific needs of parents with varying levels of secure base script knowledge. Having said that, it should be noted that the effects of VIPP-SD on sensitive caregiving, sensitive discipline behavior and attitudes toward sensitive caregiving were not moderated by parental knowledge of the secure base script.

Results showed that VIPP-SD positively affected parental attitudes toward sensitive caregiving. This positive effect was previously observed in the sample of Runze et al. (2022b). Replicating this finding in a combined and larger sample of parents with pre-school twin children (Euser et al., 2021) and school-aged twin children (Runze et al., 2022b) adds to the existing evidence for the effectiveness of VIPP-SD in enhancing parental attitudes toward sensitive caregiving (Van IJzendoorn et al., 2023). It can be hypothesized that changes in behavior precede changes in attitudes that align with the modified behavior. This would make the cognitive dissonance gap between behavior and attitudes smaller. However, the theory of planned behavior (Ajzen, 1991), emphasizes that changes in attitudes stimulate changes in behavior, which may be an easier preliminary step to take than changing actual behavior. VIPP-SD focuses on parenting behavior, but also encourages parents to reflect on their own behavior and to verbalize about the potential effects of their behavior on the child. These mentalizing aspects of the intervention may have influenced parents' attitudes toward sensitive caregiving and may be a potential mechanism for improved parenting behavior at later timepoints. Of note, Euser et al. (2021) reported that VIPP-SD promoted sensitive discipline in parents of pre-school twin children. This result did not emerge in the present study, possibly because we included a combined sample (i.e., families with both pre- and school-aged children) and tested a model that included different interaction terms (i.e., interaction terms to examine moderation by secure base script knowledge instead of moderation by parental temperament as in Euser et al., 2021).

A potential explanation for why the positive effects of VIPP-SD on attitudes toward sensitive discipline behavior (but not sensitive caregiving) were moderated by secure base script knowledge is the more complex nature of sensitive discipline compared to sensitive caregiving. Sensitive discipline runs against the intentions of the child to explore and push limits. The parent is required to strike a subtle balance between allowing for autonomy in exploring the environment and protecting the child and others against negative behaviors and potential risks (e.g., dangerous objects or situations). Parents with less secure base script knowledge might have more room for improvement. This explanation finds some support in Fig. 3, which shows that intervention group parents with less secure base script knowledge had relatively low scores on positive attitudes toward sensitive discipline behavior at baseline. Of course, this moderation effect should be considered exploratory and requires replication in future research. Positive attitudes toward sensitive caregiving increased to the same extent in the total intervention group, independent of secure base script knowledge (see Fig. 2), suggesting that the intervention brought new insights for all parents.

The present study has several important strengths, including the randomized controlled design with two baseline assessments, inclusion of a relatively large sample size and observational measures of sensitive caregiving and sensitive discipline behavior. Furthermore, the present study was preregistered at the Open Science Framework (OSF), ensuring transparency and reproducibility of the results. Regarding limitations and suggestions for future research, the present study focused on the short-term effects of VIPP-SD on secure base script knowledge. Future studies may investigate the longer-term effects of VIPP-SD on secure base script knowledge to determine whether intervention effects remain absent or exert sleeper effects (Van Aar et al., 2017). Furthermore, the children that participated in the present study were considerably older than the age range for which VIPP-SD was originally developed (i.e., two and three-year-old children). Future studies may therefore replicate this study in sample of families with younger singletons. Additionally, we included three secure base script prompt word sets instead of the full set of four prompt word sets (Waters & Waters, 2006). Although, three sets

of prompt words have been reliably and validly used to measure secure base script knowledge in children during middle childhood (Waters et al., 2015; Waters et al., 2019), administration of the full set may add to the internal consistency of the measure. Also, the majority of the sample comprised partnered mothers from middle to high socioeconomic status (SES) backgrounds with moderate knowledge of the secure base script. Parents from different backgrounds and with lower pre-intervention levels of may benefit more from the intervention. Also, McDonald's omega values for the questionnaire measuring parents' attitudes were modest, indicating potential concerns about the reliability and robustness of our findings. Finally, we did not measure the amount of time spent on the intervention and control condition. However, meta-analytic evidence indicated that the effects of VIPP-SD were not moderated by type of control condition (telephone calls versus care as usual). Based on these findings and considering the way in which the control condition was set up (i.e., number of contacts was similar for intervention and control groups), we believe that chances are small that the reported effects of VIPP-SD on parents' attitudes toward sensitive caregiving and sensitive discipline can be attributed to differences in time spent in the intervention and control condition.

In conclusion, the present study showed that VIPP-SD was effective in increasing parental attitudes toward sensitive caregiving, and this effect was independent of parents' secure base script knowledge. Furthermore, the effects of VIPP-SD on parental attitudes toward sensitive discipline behavior were moderated by secure base script knowledge, such that parents with lower secure base script knowledge benefitted most from the intervention to promote positive attitudes toward sensitive discipline behavior. There was no moderation of behavioral outcomes by parental secure base script knowledge. Finally, we found no short-term effects of VIPP-SD on parents' secure base script knowledge. Future studies may explore whether there are longer-term effects of VIPP-SD on secure base script knowledge, and whether these effects precede changes in parenting behavior and attitudes or whether improvements in parenting behavior and attitudes lead to enhancements in secure base script knowledge.

CRediT authorship contribution statement

Annemieke M. Witte: Writing – original draft, Visualization, Methodology, Formal analysis, Data curation. **Jana Runze:** Writing – review & editing, Visualization, Investigation, Data curation. **Marinus H. van IJzendoorn:** Writing – review & editing, Funding acquisition, Conceptualization. **Marian J. Bakermans-Kranenburg:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

None

Data availability

Data will be made available on request.

Acknowledgements

We thank the participating families for their enthusiastic involvement in the Leiden Consortium on Individual Development (L-CID). We are also grateful to the data-collection and data-processing team, including all current and former students, research assistants, PhD students and post-doctoral researchers for their dedicated and invaluable contributions. Marinus H. van IJzendoorn, Eveline Crone, and Marian J. Bakermans-Kranenburg designed the L-CID experimental cohort-sequential twin study "Samen Uniek" as part of the Consortium on Individual Development (Gravitation grant 2013-2023 awarded by the Dutch Ministry of Education, Culture, and Science, and the Netherlands Organization for Scientific Research, Nederlandse Organisatie voor

Wetenschappelijk Onderzoek; Grant number 024.001.003). We thank Saskia Euser for training observers to code parental sensitivity, sensitive discipline, and parental secure base script knowledge. The study design, hypotheses and analysis plan were preregistered at the open science framework (OSF) (https://osf.io/mbsd/?view_only=8c6add49e9ba4576a4b568cc74ed03f9). Pseudonymized data will be shared upon request. The data will be shared after approval of the request for data sharing and when a Data Transfer Agreement (DTA) has been signed by both parties. The analysis code and research materials are available upon request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appdev.2024.101651>.

References

- Ainsworth, M. D., Bell, S., & Stayton, D. (1974). Mother infant attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of a child into a social world*. Cambridge: Cambridge University Press.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. N. (1978). *Patterns of attachment: A psychological study of the strange situation*. Lawrence Erlbaum.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (1993). A psychometric study of the adult attachment interview: Reliability and discriminant validity. *Developmental Psychology*, 29(5), 870–879. <https://doi.org/10.1037/0012-1649.29.5.870>
- Bosmans, G., Bakermans-Kranenburg, M. J., Vervliet, B., Verhees, M. W. F. T., & Van IJzendoorn, M. H. (2020). A learning theory of attachment: Unraveling the black box of attachment development. *Neuroscience & Biobehavioral Reviews*, 113, 287–298. <https://doi.org/10.1016/j.neubiorev.2020.03.014>
- Bosmans, G., Vlierberghe, L., Bakermans-Kranenburg, M., Kobak, R., Hermans, D., & Van IJzendoorn, M. (2022). A learning theory approach to attachment theory: Exploring clinical applications. *Clinical Child and Family Psychology Review*, 25. <https://doi.org/10.1007/s10567-021-00377-x>
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry*, 52(4), 664.
- Cassibba, R., Castoro, G., Costantino, E., Sette, G., & Van IJzendoorn, M. H. (2015). Enhancing maternal sensitivity and infant attachment security with video feedback: An exploratory study in Italy. *Infant Mental Health Journal*, 36(1), 53–61. <https://doi.org/10.1002/imhj.21486>
- Cents, R. A. M., Kok, R., Tiemeier, H., Lucassen, N., Székely, E., Bakermans-Kranenburg, M. J., ... Lambregtse-van den Berg, M. P. (2014). Variations in maternal 5-HTTLPR affect observed sensitive parenting. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 55(9), 1025–1032. <https://doi.org/10.1111/jcpp.12205>
- Coppola, G., Vaughn, B. E., Cassibba, R., & Costantini, A. (2006). The attachment script representation procedure in an Italian sample: Associations with adult attachment interview scales and with maternal sensitivity. *Attachment & Human Development*, 8(3), 209–219. <https://doi.org/10.1080/14616730600856065>
- Crone, E. A., Achterberg, M., Dobbelaar, S., Euser, S., van den Bulk, B., der Meulen, M. V., ... van IJzendoorn, M. H. (2020). Neural and behavioral signatures of social evaluation and adaptation in childhood and adolescence: The Leiden consortium on individual development (L-CID). *Developmental Cognitive Neuroscience*, 45, Article e100805. <https://doi.org/10.1016/j.dcn.2020.100805>
- Dagan, O., Buisman, R. S. M., Nivison, M. D., Waters, T. E. A., Vaughn, B. E., Bost, K. K., ... Roisman, G. I. (2021). Does secure base script knowledge mediate associations between observed parental caregiving during childhood and adult romantic relationship quality and health? *Attachment & Human Development*, 23(5), 643–664. <https://doi.org/10.1080/14616734.2020.1836858>
- De Boer, M. R., Waterlander, W. E., Kuijper, L. D., Steenhuis, I. H., & Twisk, J. W. (2015). Testing for baseline differences in randomized controlled trials: An unhealthy research behavior that is hard to eradicate. *International Journal of Behavioral Nutrition and Physical Activity*, 12, 1–8. <https://doi.org/10.1186/s12966-015-0162-z>
- De Winter, S., Saleminck, E., & Bosmans, G. (2018). Interpretation bias in middle childhood attachment: Causal effects on attachment memories and scripts. *Behaviour Research and Therapy*, 102, 16–24. <https://doi.org/10.1016/j.brat.2017.12.004>
- Derogatis, L. R. (1993). *Brief symptom inventory: administration, scoring, and procedures manual*. National Computer Systems.
- Dozier, M., & Bernard, K. (2019). *Coaching parents of vulnerable infants: The attachment and biobehavioral catch-up approach*. Guilford Publications.
- Dykas, M. J., Woodhouse, S. S., Cassidy, J., & Waters, H. S. (2006). Narrative assessment of attachment representations: Links between secure base scripts and adolescent attachment. *Attachment & Human Development*, 8(3), 221–240. <https://doi.org/10.1080/14616730600856099>
- Egeland, B., Erickson, M. F., Clemenhagen-Moon, J. C., Hiester, M. K., & Korfmacher, J. (1990). 24 months tools coding manual. In *Project STEEP-revised 1990 from mother-child project scales*.
- Euser, S., Bakermans-Kranenburg, M. J., van den Bulk, B. G., Linting, M., Damsteegt, R. C., Vrijhof, C. I., ... van IJzendoorn, M. H. (2016). Efficacy of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline in Twin Families (VIPP-Twins): Study protocol for a randomized controlled trial. *BMC psychology*, 4(1), 33. <https://doi.org/10.1186/s40359-016-0139-y>
- Euser, S., Bosdriesz, J. R., Vrijhof, C. I., van den Bulk, B. G., van Hees, D., de Vet, S. M., ... Bakermans-Kranenburg, M. J. (2020). How heritable are parental sensitivity and limit-setting? A longitudinal child-based twin study on observed parenting. *Child Development*, 91(6), 2255–2269. <https://doi.org/10.1111/cdev.13365>
- Euser, S., Vrijhof, C. I., Van den Bulk, B. G., Vermeulen, R., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2021). Video-feedback promotes sensitive limit-setting in parents of twin preschoolers: A randomized controlled trial. *BMC Psychology*, 9(1), 46. <https://doi.org/10.1186/s40359-021-00548-z>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Fearon, R. M. P., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2010). Jealousy and attachment: The case of twins. In S. L. Hart, & M. Legerstee (Eds.), *Handbook of jealousy* (1st ed., pp. 362–386). Wiley. <https://doi.org/10.1002/9781444323542.ch16>
- Ferguson, C. J. (2013). Spanking, corporal punishment and negative long-term outcomes: A meta-analytic review of longitudinal studies. *Clinical Psychology Review*, 33(1), 196–208. <https://doi.org/10.1016/j.cpr.2012.11.002>
- George, C., Kaplan, N., & Main, M. (1985). *Adult attachment interview [Unpublished manuscript]*. Department of Psychology, University of California.
- Groeneveld, M. G., Vermeer, H. J., Van IJzendoorn, M. H., & Linting, M. (2011). Enhancing home-based child care quality through video-feedback intervention: A randomized controlled trial. *Journal of Family Psychology*, 25(1), 86–96. <https://doi.org/10.1037/a0022451>
- Hawkins, E., Madigan, S., Moran, G., & Pederson, D. R. (2015). Mediating and moderating processes underlying the association between maternal cognition and infant attachment. *Journal of Applied Developmental Psychology*, 39, 24–33. <https://doi.org/10.1016/j.appdev.2015.04.001>
- Hesse, E. (2016). The adult attachment interview: Protocol, method of analysis, and empirical studies: 1985–2015. In J. 3. *Handbook of attachment: Theory, research, and clinical applications* (pp. 553–597).
- Huth-Bocks, A. C., Muzik, M., Beeghly, M., Earls, L., & Stacks, A. M. (2014). Secure base scripts are associated with maternal parenting behavior across contexts and reflective functioning among trauma-exposed mothers. *Attachment & Human Development*, 16(6), 535–556. <https://doi.org/10.1080/14616734.2014.967787>
- Janssen, M. J., Riksen-Walraven, J. M., & van Dijk, J. P. M. (2002). Enhancing the quality of interaction between deafblind children and their educators. *Journal of Developmental and Physical Disabilities*, 14(1), 87–109. <https://doi.org/10.1023/A:1013583312920>
- Juffer, F., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2017). Pairing attachment theory and social learning theory in video-feedback intervention to promote positive parenting. *Current Opinion in Psychology*, 15, 189–194. <https://doi.org/10.1016/j.copsyc.2017.03.012>
- Juffer, F., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2018). Video-feedback intervention to promote positive parenting and sensitive discipline (VIPP-SD): Development and meta-analytic evidence of its effectiveness. In H. Steele, & M. Steele (Eds.), *Handbook of Attachment-based Interventions* (pp. 1–26). The Guilford Press.
- Joosen, K. J., Mesman, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2012). Maternal sensitivity to infants in various settings predicts harsh discipline in toddlerhood. *Attachment & Human Development*, 14(2), 101–117. <https://doi.org/10.1080/14616734.2012.661217>
- Juffer, F., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2015). *Manual video-feedback intervention to promote positive parenting and sensitive limit-setting (VIPP-SD) (version 3.0)*.
- Lecuyer-Maus, E. A. (2000). Maternal sensitivity and responsiveness, limit-setting style, and relationship history in the transition to toddlerhood. Issues in Comprehensive Pediatric Nursing. *Nursing*, 23(2), 117–139. <https://doi.org/10.1080/01460860050121439>
- Madigan, S., Prime, H., Graham, S. A., Rodrigues, M., Anderson, N., Khoury, J., & Jenkins, J. M. (2019). Parenting Behavior and Child Language: A Meta-analysis. *Pediatrics*, 144(4), Article e20183556. <https://doi.org/10.1542/peds.2018-3556>
- Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development*, 50(1/2), 66–104. <https://doi.org/10.2307/3333827>
- Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gøtzsche, P. C., Devereaux, P., ... Altman, D. G. (2010). CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. *BMJ*, 340, c869. <https://doi.org/10.1136/bmj.c869>
- Nivison, M. D., Facompré, C. R., Raby, K. L., Simpson, J. A., Roisman, G. I., & Waters, T. E. A. (2021). Childhood abuse and neglect are prospectively associated with scripted attachment representations in young adulthood. *Development and Psychopathology*, 33(4), 1143–1155. <https://doi.org/10.1017/S0954579420000528>
- Patterson, G. R. (1982). *Coercive family process* (Vol. 3). Castalia Publishing Company.
- Platje, E., Sterkenburg, P., Overbeek, M., Kef, S., & Schuengel, C. (2018). The efficacy of VIPP-V parenting training for parents of young children with a visual or visual-intellectual disability: a randomized controlled trial. *Attachment & Human Development*, 20(5), 455–472. <https://doi.org/10.1080/14616734.2018.1428997>
- Raby, K. L., Waters, T. E. A., Tabachnick, A. R., Zajac, L., & Dozier, M. (2021). Increasing secure base script knowledge among parents with attachment and biobehavioral catch-up. *Development and Psychopathology*, 33(2), 554–564. <https://doi.org/10.1017/S0954579420001765>

- Rodrigues, M., Sokolovic, N., Madigan, S., Luo, Y., Silva, V., Misra, S., & Jenkins, J. (2021). Paternal sensitivity and children's cognitive and socio-emotional outcomes: A meta-analytic review. *Child Development, 92*(2), 554–577. <https://doi.org/10.1111/cdev.13545>
- Runze, J., Pappa, I., Van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2022a). Conduct problems and hair cortisol concentrations decrease in school-aged children after VIPP-SD: A randomized controlled trial in two twin cohorts. *International Journal of Environmental Research and Public Health, 19*(22). <https://doi.org/10.3390/ijerph192215026>
- Runze, J., Van IJzendoorn, M. H., Vrijhof, C. I., & Bakermans-Kranenburg, M. J. (2022b). Replicating a randomized trial with video-feedback to promote positive parenting in parents of school-aged twins. *Journal of Family Psychology, 36*(4), 490–501. <https://doi.org/10.1037/fam0000961>
- Schoenmaker, C., Juffer, F., van IJzendoorn, M. H., Linting, M., van der Voort, A., & Bakermans-Kranenburg, M. J. (2015). From maternal sensitivity in infancy to adult attachment representations: A longitudinal adoption study with secure base scripts. *Attachment & Human Development, 17*(3), 241–256. <https://doi.org/10.1080/14616734.2015.1037315>
- Schuengel, C., Kef, S., Damen, S., & Worm, M. (2012). Attachment representations and response to video-feedback intervention for professional caregivers. *Attachment & Human Development, 14*(2), 83–99. <https://doi.org/10.1080/14616734.2012.661213>
- Steele, R. D., Waters, T. E. A., Bost, K. K., Vaughn, B. E., Truitt, W., Waters, H. S., ... Roisman, G. I. (2014). Caregiving antecedents of secure base script knowledge: A comparative analysis of young adult attachment representations. *Developmental Psychology, 50*(11), 2526–2538. <https://doi.org/10.1037/a0037992>
- Van Aar, J., Leijten, P., Orobio de Castro, B., & Overbeek, G. (2017). Sustained, fade-out or | sleeper effects? A systematic review and meta-analysis of parenting interventions for disruptive child behavior. *Clinical Psychology Review, 51*, 153–163. <https://doi.org/10.1016/j.cpr.2016.11.006>
- Van Der, Mark, I.L., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2002). The role of parenting, attachment, and temperamental fearfulness in the prediction of compliance in toddler girls. *British Journal of Developmental Psychology, 20*(3), 361–378. <https://doi.org/10.1348/026151002320620299>
- Van IJzendoorn, M. H., Schuengel, C., Wang, Q., & Bakermans-Kranenburg, M. J. (2023). Improving parenting, child attachment, and externalizing behaviors: Meta-analysis of the first 25 randomized controlled trials on the effects of video-feedback intervention to promote positive parenting and sensitive discipline. *Development and Psychopathology, 35*(1), 241–256. <https://doi.org/10.1017/S0954579421001462>
- Van Zeijl, J., Mesman, J., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Juffer, F., ... Alink, L. R. A. (2006). Attachment-based intervention for enhancing sensitive discipline in mothers of 1- to 3-year-old children at risk for externalizing behavior problems: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 74*(6), 994–1005. <https://doi.org/10.1037/0022-006X.74.6.994>
- Vaughn, B. E., Verissimo, M., Coppola, G., Bost, K. K., Shin, N., McBride, B., ... Korth, B. (2006). Maternal attachment script representations: Longitudinal stability and associations with stylistic features of maternal narratives. *Attachment & Human Development, 8*(3), 199–208. <https://doi.org/10.1080/14616730600856024>
- Vaughn, B. E., Waters, T. E. A., Steele, R. D., Roisman, G. I., Bost, K. K., Truitt, W., ... Booth-Laforce, C. (2016). Multiple domains of parental secure base support during childhood and adolescence contribute to adolescents' representations of attachment as a secure base script. *Attachment & Human Development, 18*(4), 317–336. <https://doi.org/10.1080/14616734.2016.1162180>
- Viladrich, C., Angulo-Brunet, A., & Doval, E. (2017). A journey around alpha and omega to estimate internal consistency reliability. *Anales de Psicología, 33*(3), 755–782. <https://doi.org/10.6018/analesps.33.3.268401>
- Waters, H. S., & Waters, E. (2006). The attachment working models concept: Among other things, we build script-like representations of secure base experiences. *Attachment & Human Development, 8*(3), 185–197. <https://doi.org/10.1080/14616730600856016>
- Waters, H. S., Waters, T. E., Waters, E., Thompson, R. A., Simpson, J. A., & Berlin, L. J. (2021). *From internal working models to script-like attachment representations. Attachment: The fundamental questions* (pp. 111–119).
- Waters, T. E. A., Bosmans, G., Vandevivere, E., Dujardin, A., & Waters, H. S. (2015). Secure base representations in middle childhood across two Western cultures: Associations with parental attachment representations and maternal reports of behavior problems. *Developmental Psychology, 51*(8), 1013–1025. <https://doi.org/10.1037/a0039375>
- Waters, T. E. A., Brockmeyer, S. L., & Crowell, J. A. (2013). AAI coherence predicts caregiving and care seeking behavior: Secure base script knowledge helps explain why. *Attachment & Human Development, 15*(3), 316–331. <https://doi.org/10.1080/14616734.2013.782657>
- Waters, T. E. A., Facompré, C. R., Dagan, O., Martin, J., Johnson, W. F., Young, E. S., ... Roisman, G. I. (2021). Convergent validity and stability of secure base script knowledge from young adulthood to midlife. *Attachment & Human Development, 23*(5), 740–760. <https://doi.org/10.1080/14616734.2020.1832548>
- Waters, T. E. A., Facompré, C. R., Van de Walle, M., Dujardin, A., De Winter, S., Heylen, J., ... Bosmans, G. (2019). Stability and change in secure base script knowledge during middle childhood and early adolescence: A 3-year longitudinal study. *Developmental Psychology, 55*, 2379–2388. <https://doi.org/10.1037/dev0000798>
- Waters, T. E. A., Raby, K. L., Ruiz, S. K., Martin, J., & Roisman, G. I. (2018). Adult attachment representations and the quality of romantic and parent-child relationships: An examination of the contributions of coherence of discourse and secure base script knowledge. *Developmental Psychology, 54*(12), 2371–2381. <https://doi.org/10.1037/dev0000607>
- Waters, T. E. A., & Roisman, G. I. (2019). The secure base script concept: An overview. *Current Opinion in Psychology, 25*, 162–166. <https://doi.org/10.1016/j.copsy.2018.08.002>
- Waters, T. E. A., Ruiz, S. K., & Roisman, G. I. (2017). Origins of secure base script knowledge and the developmental construction of attachment representations. *Child Development, 88*(1), 198–209. <https://doi.org/10.1111/cdev.12571>
- Whitehouse, A. J. O., Varcin, K. J., Pillar, S., Billingham, W., Alvares, G. A., Barbaro, J., ... Hudry, K. (2021). Effect of preemptive intervention on developmental outcomes among infants showing early signs of autism: A randomized clinical trial of outcomes to diagnosis. *JAMA Pediatrics, 175*(11), e213298. <https://doi.org/10.1001/jamapediatrics.2021.3298>
- Witte, A. M., Runze, J., Van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2023). Parents' secure base script knowledge predicts observed sensitive caregiving and discipline toward twin children. *Journal of Family Psychology, 37*(1). <https://doi.org/10.1037/fam0001091>
- Yagmur, S., Mesman, J., Malda, M., Bakermans-Kranenburg, M. J., & Ekmecki, H. (2014). Video-feedback intervention increases sensitive parenting in ethnic minority mothers: A randomized control trial. *Attachment and Human Development, 16*(4), 371–386. <https://doi.org/10.1080/14616734.2014.912489>

Further-reading

- Bost, K. K., Shin, N., McBride, B. A., Brown, G. L., Vaughn, B. E., Coppola, G., ... Korth, B. (2006). Maternal secure base scripts, children's attachment security, and mother-child narrative styles. *Attachment & Human Development, 8*(3), 241–260. <https://doi.org/10.1080/14616730600856131>
- Groh, A. M., & Roisman, G. I. (2009). Adults' autonomic and subjective emotional responses to infant vocalizations: The role of secure base script knowledge. *Developmental Psychology, 45*, 889–893. <https://doi.org/10.1037/a0014943>
- Waters, H. S., Corcoran, D. M., & Waters, T. E. A. (2018). Maternal secure base script knowledge and judgments of mother-child interactions. *Monographs of the Society for Research in Child Development, 83*(4), 106–120. <https://doi.org/10.1111/mono.12394>