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Video-feedback Intervention to promote Positive Parenting adapted to Autism (VIPP-AUTI): A randomized controlled trial

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Abstract

In a randomized controlled trial, we evaluated the early intervention program Video-feedback Intervention to promote Positive Parenting adapted to Autism (VIPP-AUTI) with 78 primary caregivers and their child (16–61 months) with Autism Spectrum Disorder. VIPP-AUTI is a brief attachment-based intervention program, focusing on improving parent–child interaction and reducing the child's individual Autism Spectrum Disorder–related symptomatology in five home visits. VIPP-AUTI, as compared with usual care, demonstrated efficacy in reducing parental intrusiveness. Moreover, parents who received VIPP-AUTI showed increased feelings of self-efficacy in child rearing. No significant group differences were found on other aspects of parent–child interaction or on child play behavior. At 3-months follow-up, intervention effects were found on child-initiated joint attention skills, not mediated by intervention effects on parenting. Implementation of VIPP-AUTI in clinical practice is facilitated by the use of a detailed manual and a relatively brief training of interveners.

Keywords

autism spectrum disorders, early intervention, joint attention, parent training, parent–child interaction, preschool children, randomized controlled trial, sensitivity, video-feedback

Introduction

In a randomized controlled trial, we tested the effects of an attachment-based, short-term video-feedback intervention adapted to families of a child with Autism Spectrum Disorder (ASD) on sensitive parenting, parental attitudes, and children's joint attention and play skills.

ASD is a neurodevelopmental disorder, including core deficits of stereotypic behavior, social and communication impairments (American Psychiatric Association (APA), 2013). Sensitive parenting is the extent to which parents adequately respond to the needs of their child and it is found to be associated with the quality of a child's attachment relationship (Ainsworth, 1978; Bakermans-Kranenburg et al., 2003). An attachment relationship is the affective bond between an infant and its primary caregiver, which is formed for protection and survival (Bowlby, 1969; Cassidy and Shaver, 2008). In young children with ASD, high prevalences of insecure and disorganized attachment relationships have been observed (Naber et al., 2007; Rutgers et al., 2004).

As related to attachment security, parental sensitivity may be negatively affected by the unusual affective behavior of children with ASD (Dawson et al., 1990) and children's deficits in processing social information (Gervais et al., 2004; Magrelli et al., 2013; Noens and Van Berckelaer-Onnes, 2005; Ploog, 2010). Parents need to

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adjust their communication for mutual interaction with their child explicitly, both verbally and non-verbally (Doussard-Roosevelt et al., 2003; Kasari et al., 1988). However, explicit, directive communication could result in intrusiveness. Intrusiveness refers to a form of overstimulation and of interrupting child behavior in less sensitive ways. Maternal intrusiveness has been found more present in infants with socio-emotional problems compared to non-clinical infants (Dollberg et al., 2010) and is associated with less frustration tolerance in non-clinical toddlers (Feldman et al., 2011). Wan et al. (2012) found higher levels of directiveness, referring at an intrusive interaction style, in parents already in the pre-diagnostic phase of infants at risk of ASD (siblings of a child with ASD) versus low-risk controls. Moreover, the quality of early parent–infant interactions has been found to be associated with a later ASD-diagnosis of infants who were at risk (Wan et al., 2013), supporting a reciprocal influence of nature and nurture in the etiology of ASD (Strathearn, 2009). In families who have a child with ASD, the quality of parent–child interaction, including parental sensitivity, has been found related to parent's feelings of self-efficacy (Kuhn and Carter, 2006) and child socio-emotional development in domains covering joint attention (Bruinsma et al., 2004; Claussen et al., 2002; Kasari et al., 2010; Siller and Sigman, 2002) and play skills (Marcu et al., 2009; Naber et al., 2008a). In the following three paragraphs, parental feelings of self-efficacy, child joint attention, and play development will be described in the context of ASD.

Parental self-efficacy refers to parents' perceived confidence in their competence to child rearing (Bandura, 1995). Parental self-efficacy is negatively associated with parental distress while raising a child with ASD (Bekhet et al., 2012; Giallo et al., 2011; Kuhn and Carter, 2006; Pakenham et al., 2004). Lower levels of parental self-efficacy could increase parental distress to manage their child's atypical developmental needs. An important developmental skill is joint attention, which shows deficiencies in young children with ASD (Naber et al., 2008b).

Joint attention, as part of infant's communication and language development, refers to a triadic relation between self, other, and object. Two types of joint attention are distinguished: (a) responding to joint attention (RJA) and (b) initiating joint attention (IJA). RJA is defined as the child's ability to follow and share another person's visual attention leads (e.g. gazing, pointing, etc.). IJA refers to the child's ability to create or indicate spontaneously another person's visual attention to share (e.g. Mundy et al., 2009). Communication skills are also reflected in child play behavior, which corresponds to various developmental aspects, such as cognitive, linguistic, emotional, and social development (Jordan, 2003).

During the first 2 years of life, child level of play behavior developed from simple object manipulation to symbolic (make-believe or pretend) play (Ungerer and Sigman, 1981). Infants with ASD showed atypical play development (Jarrold et al., 1993, 1996; Rutherford and Rogers, 2003), corresponding with restricted interests or deviations in their use of toys (Ungerer and Sigman 1981; Van Berckelaer-Onnes, 2003; Williams, 2003; Wulff, 1985).

Parents play an essential role in early interventions that promote the developmental skills of children with ASD (Tonge et al., 2014). Interaction and communication improvement within the family context seem to be important conditions for optimal development of young children with ASD. Previous studies based on parent-mediated early interventions for children with ASD demonstrated improvement on parent–child interaction, and children's social communication skills (McConachie and Diggle, 2007; Oono et al., 2013). For example, a communication-focused intervention, using video-feedback, demonstrated efficacy on parent–child social communication (Green et al., 2010). Furthermore, Wallace and Rogers (2010) recommended individualized interventions for infants and toddlers with ASD, focusing on responsive, sensitive parent–child interactions in the home setting. However, parent-mediated interventions are mostly part of comprehensive intervention programs, teaching parents to implement special treatment techniques with the child (Steiner et al., 2012). Parent training based on attachment theory and research, particularly aiming at enhancing the quality of parent–child interaction, is lacking. Such parent training might also be effective in promoting parental feelings of efficacy in taking care of a child with ASD and subsequently help to optimize cognitive and socio-emotional development of children with ASD within the boundaries of their disorder.

In a collaborative project of University Medical Center Utrecht (UMC Utrecht, Department of Psychiatry) and Leiden University (Center for Child and Family Studies), we designed an intervention program to support parents of children with ASD in interacting with their child: Video-feedback Intervention to promote Positive Parenting adapted to Autism (VIPP-AUTI). The program is an adapted version of the original VIPP (Juffer et al., 2008). VIPP has previously been adapted and validated to be used in various families of (non-ASD) infants, toddlers, and preschoolers (Juffer et al., 2009; Moss et al., 2011; Stein et al., 2006). For example, an adapted version of VIPP focusing on maternal sensitivity and discipline (VIPP-Sensitive Discipline) showed that enhanced maternal positive discipline predicted decreased child externalizing at follow-up 1 year later (Bakermans-Kranenburg et al., 2008). Generally, during infancy to preschool age, interventions targeting parental sensitivity to the child's changing developmental needs have been found to be effective in promoting early parent–child interaction (Landry et al., 2008). VIPP-AUTI aims to enhance parental sensitivity

for the child's signals, taking the autistic features into account, using video-feedback. The intervener videotapes actual parent–child interactions at home, and in a next session watches and discusses carefully selected video-recorded episodes of parent–child interactions together with the parent. Video-feedback provides the parent with an opportunity to reflect on his or her interactions with the child and the responses of the child to the interaction, with an emphasis on positive, successful interaction sequences. VIPP-AUTI thus enables the parent to have a look in the mirror as a stimulus to intensify parental self-reflection and mentalization. The program focuses on parents' understanding and management of the manifest symptoms of young children with ASD, including deficits in early development of play and joint attention skills.

Hypotheses

In a randomized controlled trial, we investigated the efficacy of VIPP-AUTI. The primary objective was enhancing the quality of the observed parent–child interaction. The intervention used feedback on videotaped interaction patterns of the specific parent and child. We hypothesized that feedback may help parents to understand the needs of their child and adapt their behavior accordingly. Secondary objectives concerned improved self-reported feelings of parental competence due to the focus on positive interaction sequences. Awareness of successful interaction patterns may compensate for parental daily hassles (PDH) in child rearing. Moreover, we examined intervention effects on child joint attention and play skills. We hypothesized that VIPP-AUTI would improve child joint attention and play skills via enhanced quality of parent–child interaction and parental adequate stimulation. We expected to find positive effects of VIPP-AUTI on child outcomes at the follow-up assessment (rather than at the immediate post-test), based on findings in previous VIPP-related intervention studies (Bakermans-Kranenburg et al., 2008; Klein Velderman et al., 2006), showing that changes in parental attitudes and behavior need some time to settle before observable changes in the child's behavior are present. We assumed that changes in child behavior can be expected when parents show a durable, consistent shift in the margins of their behavior repertoire. Moreover, deficits of social information processing in children with ASD (Magrelli et al., 2013) may prolong children's response considerably.

Method

Sample

A total of 78 children with ASD (86% boys) and their primary caregivers (90% mothers), who we refer to as parents, participated in this study. Middle to high level of socio-economic status (SES) (96%), based on level of education, employment, and income per postal area (SCP/The Netherlands Institute for Social Research, 2010), was characteristic of the majority of the participating families. Parental age ranged from 25 to 52 years (M = 36.6, standard deviation (SD) = 5.04). Most parents were married couples (82%) with Dutch nationality (90%). Children's age ranged from 16 to 61 months (M = 43.0, SD = 9.96). More than half of the children were first born (59%). Children's developmental level ranged from low to above average functioning (M = 73.7, SD = 22.03). Age equivalent of children's language development was 32 months on average (M language comprehension = 32.8 months, SD = 17.08, and M language production = 32.1 months, SD = 16.07). In 53% of the children, the interval between the children's chronological age and the age equivalent of their language development was more than 6 months. Of the total sample, 12% of the children were raised bilingually.

Diagnosis. Children were diagnosed as having ASD by a board-certified child psychiatrist according to extensive developmental history, all medical files, a semi-structured observation (autism diagnostic observation schedule–Generic (ADOS-G)), and classification of the Diagnostic and Statistical Manual of Mental Disorders–4th Edition–Text Revision (DSM-IV-TR; APA, 2000). Of these, 68% of the children were diagnosed with Autistic Disorder (AD) and 32% were diagnosed with Pervasive Developmental Disorders Not Otherwise Specified (PDD-NOS).

Procedure

Primary caregivers, commonly parents, of newly ASD-diagnosed children were invited to participate in the study by the researchers after receiving participant information via a staff member. Of the invited families (N = 157), 50% did not participate. Main reasons for non-participation were receiving other formal support of external facilities, non-preference for home training, or expected burden of research assessments. Inclusion criteria were (a) children 0–5 years old, diagnosed with ASD at the university hospital, and their primary caregiver, (b) a permanent residence, (c) the child and its primary caregiver lived at the same address, and (d) written informed consent was given by both parents. Exclusion criteria were (a) primary caregivers who did not speak or understand the Dutch language, (b) primary caregivers who did not care for their child themselves, and (c) children with interfering comorbid medical problems. Comorbid medical problems were considered as interfering when current therapy aimed at other than ASD-related concerns, for example, a hospital admission to treat severe epileptic seizures. The inclusion period was from June 2008 to April 2012. After randomization,

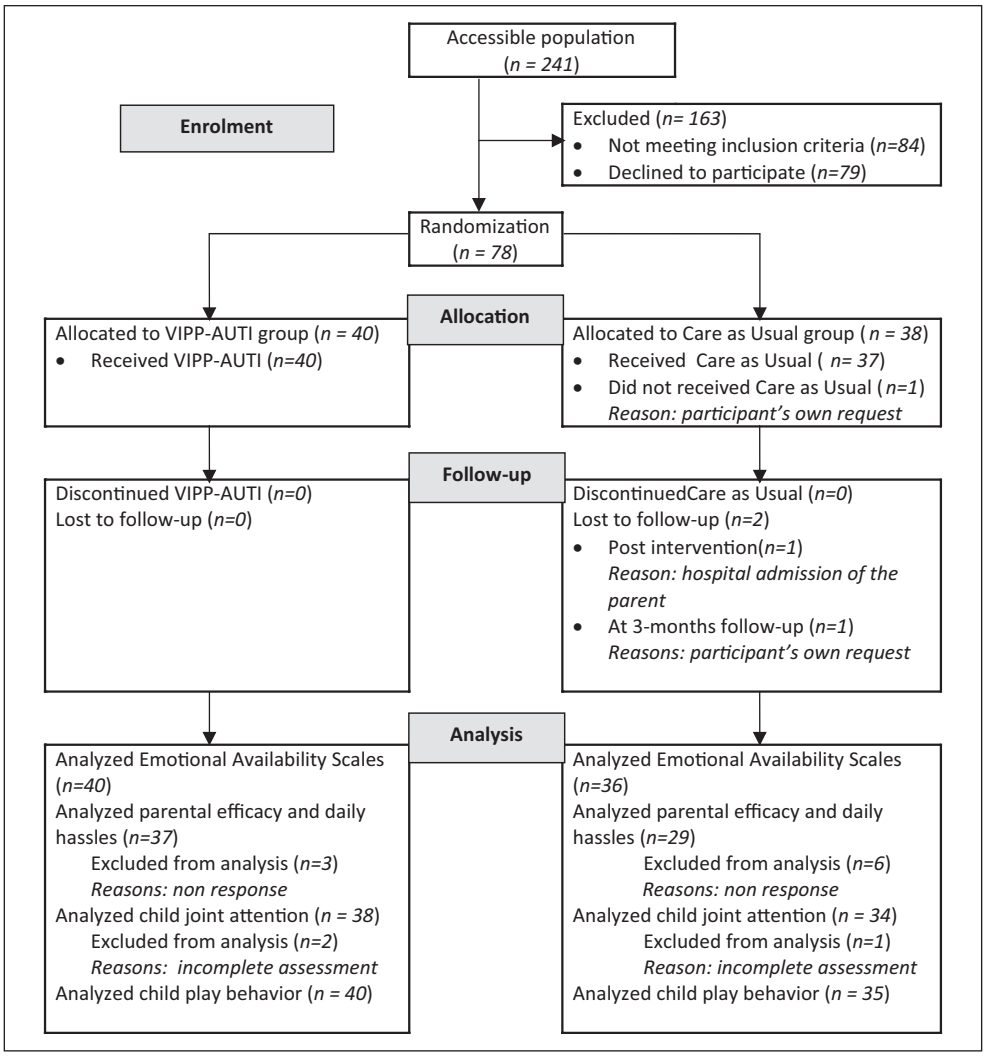

Figure 1. CONSORT Flow Diagram of enrolment, intervention allocation, follow-up, and data analysis.

all but one family remained involved in the trial until endpoint. Another two families were lost to follow-up assessment after 3 months (see Figure 1: CONSORT Flow Diagram (Schulz et al., 2011)).

After baseline assessments, participants were randomly divided into the experimental group (VIPP-AUTI) or control group (Care as Usual, CU). Randomization by computer-generated tables was done by a staff manager, who was not involved in the research project. The randomization procedure comprised random assignment to two groups, indicated by number. The staff manager was aware of the study aim (comparing two interventions), but did not know which number referred to the experimental or control group. Since both groups received home visits, parents were unaware whether they received the experimental intervention or CU. At baseline (T1) and endpoint (T2), parent–child interactions, child joint attention skills, and child play behavior were videotaped at the university hospital and at home by the researchers. After a no-treatment, 3-month follow-up period (T3), child joint attention skills were assessed at the university hospital and child play behavior was observed at home. At the same time points (T1, T2, and T3), parents were asked to complete questionnaires, including on self-efficacy and daily hassles (Table 1). Demographic data were collected during the diagnostic phase prior to the study. The study protocol was approved by the ethics committee of the UMC Utrecht.

Treatment

Control group (CU). After parents received an ASD diagnosis of their child at the Department of Psychiatry of the UMC Utrecht, home-based nursing care was usually offered. Over a period of at most 6 months, the participants in the CU group received this usual home training, with a mean of five home visits of approximately 1.5 h each. Based on parents' preferences, a variation of the number of home visits was restricted to at least three and at most

Table 1. Time point, type, and place of outcome measurements.

Outcome	Baseline	Endpoint	Follow-up
Primary outcome			
Parent–child interaction	Video at home	Video at home	
Secondary outcomes			
Parental self-efficacy	Questionnaire	Questionnaire	
Parental daily hassles	Questionnaire	Questionnaire	
Child joint attention	Video at the hospital	Video at home	Video at the hospital
Child play behavior	Video at home	Video at home	Video at home
Client satisfaction			Questionnaire

Table 2. Themes of the VIPP-AUTI program.

	Sensitivity themes of VIPP	Adapted themes of autism
Session 1	Attachment and Exploration	Mastery motivation and play
Session 2	"Speaking for the child"	Joint attention
Session 3	"Sensitivity chain"	Daily problems and routine
Session 4	Sharing emotions	Emotions and (stereotypical) behavior
Session 5	Booster session	Booster session

VIPP-AUTI: Video-feedback Intervention to promote Positive Parenting adapted to Autism.

seven visits. In line with the preferred number of visits, the frequency of home visits varied, with intervening periods between 1 and 4 weeks. The care was meant to support parents individually with respect to practical issues of parenting a child with ASD. In response to parents' actual questions about rearing their child, the interveners gave advice in an eclectic way, based on behavioral and family therapeutic interventions. Three interveners provided the CU during the trial period.

Experimental group (VIPP-AUTI). Over a period of 3 months, participants received VIPP-AUTI, comprising five home visits of 60–90 min each at a 2-weekly frequency. During the home visits, video-feedback was provided, using film fragments of parent–child (play and meal-time) interactions videotaped in the previous session. According to the intervention protocol, issues regarding the child's behavior and interaction with the parent were discussed with the parent. The autistic traits and the individual characteristics of the child were highlighted.

The first four sessions each had their own theme. Additionally, feedback on themes of previous sessions was integrated into every new session. The last home visit was a booster session, in which the partner of the primary caregiver was invited to join the video-feedback. The first intervention session focused on exploration versus attachment, teaching parents to recognize and acknowledge the differences between exploratory behavior and contact seeking, and addressed the importance to support the child's motivation and play behavior with respect to the child's competences. In the second session, including the theme "speaking for the child" and joint attention, the intervener supported the parent to verbalize the child's facial expressions and non-verbal cues in order to stimulate parents' recognition of the child's (often subtle) signals and communication patterns. During the third session, the intervener introduced "sensitivity chains" that is parents' adequate responding to (positive and negative) child behavior, and discussed daily problems and routines when rearing the child. The fourth session centered on sharing emotions by encouraging parents' affective attunement to the positive and negative emotions of their child, including interpretations of the child's stereotypic behavior. The fifth session aimed at integration and consolidation of all feedback and advices given in the previous sessions (see Table 2).

Two interveners were trained to implement the intervention and received weekly feedback sessions of all visit preparations with the researchers (I.P. and F.N.) during the intervention phase. In addition to this supervision, treatment fidelity was checked in approximately 20% of the cases during regular expert meetings (with Bakermans-Kranenburg (M.J.B-K.) and Van IJzendoorn (M.H.v.IJ.)), at which the intervener's preparations of the home visits with the associated film fragments were reviewed and discussed. No standard video recordings of the feedback sessions were made to avoid interference with the therapeutic relationship. The interveners who provided VIPP-AUTI or CU were professionals with bachelor/master degrees (in nursing, social work, or psychology), and they had more than 3 years work experience at the Department of Child and Adolescent Psychiatry of the university hospital. They

provided home training according to guidelines (CU) or protocol (VIPP-AUTI) at the same clinical level.

Additional treatment. In addition to both CU and VIPP-AUTI, multi-disciplinary staff members (family counselors, nurses, and social workers) provided two group meetings with parents for psycho-education about ASD in general. Furthermore, the psychiatrist prescribed medication to treat comorbid problems by indication. Parents also received support from external care providers (e.g. speech language therapists) and most of the children attended (special) daycare. A minority of children (n = 11) did not attend school or daycare, partly for age-related reasons, but also because of behavioral difficulties in regular settings (daycare or elementary school).

Baseline measures

ADOS-G. The ADOS-G (Lord et al., 2000) quantifies deficits across the autism spectrum, controlling for effects of language and cognitive delay, in individuals with significant impairments. The ADOS-G consists of four modules assessing five test domains: communication, social reciprocity, play, stereotypic behavior, and other problems. In the current study, children were assessed using module 1 (n = 42) and module 2 (n = 36), based on their level of expressive language. Overall total scores of the revised algorithm (ADOS-2) include the cumulative score of Social Affect and Restricted and Repetitive Behavior (De Bildt et al., 2009, 2011; Gotham et al., 2007, 2008; Oosterling et al., 2010). The level of autism spectrum-related symptoms was indicated by the comparison score of the ADOS-2, which ranges from score 3–4 = low, via score 5–7 = moderate to score 8–10 = high level of symptoms (Corsello et al., 2012). The child psychiatrist, who was certified for ADOS-reliability, administered the ADOS-G during the diagnostic phase, prior to this study.

Mullen scales of early learning (MSEL). The MSEL (Mullen, 1995) is a standardized developmental test that yields a mental age score for children between 3 and 68 months of age. The MSEL assesses five domains, one measuring cross motor skills (not used in the current study), and four cognitive domains: (a) visual reception, (b) fine motor skills, (c) receptive language, and (d) expressive language. The early learning composite standard score is a combination of non-verbal (domains 1 and 2) and verbal composites (domains 3 and 4), ranging from low (< 70) to high developmental functioning (> 70). The test was administered by a certified clinical psychologist.

Language development. The Reynell test for Dutch language comprehension (Van Eldik et al., 1995) and the Schlichting test for Dutch language production (Schlichting et al., 1995) were administered individually by a certified psychologist or speech language therapist. The Reynell and Schlichting tests evaluate receptive and expressive language, respectively, for children between 14 and 75 months of age. If children were not able to do these tests (n = 26, 33%), the psychologist or speech language therapist collected parental reports using the Dutch versions of the MacArthur-Bates Communicative Developmental Inventories (CDIs; Fenson et al., 1993, 2007; N-CDIs; Zink and Lejaegere, 2002, 2007). The CDIs consist of three forms, corresponding with different age groups: (a) "Word and Gestures" (8–16 months of age), (b) "Word and Sentences" (16–30 months of age), and (c) "CDI-level III" (30–37 months of age), assessing vocabulary comprehension and production. The inventories were also used for children beyond the specified age ranges when they had impaired language development (Fenson et al., 1994). The validity of the measure has been shown in children with and without language delay (Heilmann et al., 2005), and in children with ASD (Charman et al., 2003; Luyster et al., 2007). In the current study, language development was based on the converted age equivalents of total language comprehension scores of the Reynell or N-CDI, and total word-production scores of the Schlichting or N-CDI.

Symptom checklist (SCL-90). The SCL-90 (Arrindell and Ettema, 1986) is a 90-item self-report questionnaire, rated on a 5-point scale to indicate mental health status of the parents. The instrument measures agoraphobia, anxiety, depression, somatic complaints, insufficiency in thinking and acting, distrust and interpersonal sensitivity, hostility, sleeping problems, and a rest-category, concerning nine items which are not scaled, such as eating disorders and feelings of guilt. The total score on psychoneuroticism is based on the sum of all sub-categories. Psychoneuroticism indicates a general level of psychoneurotic-somatic complaints. Internal consistency has been found high; Cronbach's alpha 0.80–0.90 (Arrindell and Ettema, 1986: 95). In this study, the norm table of the typical population was used; ranging from very low (score 90) to very high non-wellbeing (score ⩾ 183). In this sample, internal consistency of the total scale (Cronbach's alpha) was 0.97. Missing items on the total scale were less than 5% (a maximum of two items per subscale and no items on the subscale sleeping problems). In these cases, the (estimated) scores on each subscale were computed based on the available scores (Arrindell and Ettma, 1986: 97).

SES. SES was based on status scores 2010 of postal areas. Status scores were derived from level of education, employment, and income per postal area by a national organization (SCP/The Netherlands Institute for Social Research, 2010). Higher status scores refer to higher SES.

Primary outcome measure

Parental emotional availability scales (EAS). The observer-rated parental EAS (Biringen et al., 2000) were used to assess parental emotional responsiveness to their child's needs from a transactional and systemic perspective (Biringen, 2000; Biringen and Easterbrooks, 2012). The EAS consist of four scales of parenting behavior: (a) sensitivity, (b) structuring, (c) non-intrusiveness, and (d) non-hostility. The scale "sensitivity" of the parent is coded on a 9-point rating scale. High sensitivity (maximum of 9) refers to a parent's responsiveness to the child's emotional signals and flexible communication. Parental "structuring" is coded on a 5-point rating scale, with score 1 indicating no structuring to score 5 indicating a high level of structuring. High levels of structuring refer to parental ability to support learning and exploration with respect for the child's autonomy. Maximum scores of structuring are assigned when parents not only respond to the child's verbal cues, but also to non-verbal cues. Parental "non-intrusiveness" is coded on a 5-point rating scale with maximum scores of 5 for parents who are available for the child without interfering, overprotective, or overwhelming behaviors. High levels of intrusiveness (score 1) refer to parents who control the interaction substantially and show limited respect to child's autonomy. "Non-hostility" is also coded on a 5-point rating scale. Parents receive high scores (maximum 5) when no negative emotions (e.g. impatience, discontent, rolling the eyes, etc.) are shown. The scale for non-hostility was extremely skewed (*Skewness* = −2.36, standard error (*SE*) = 0.27) and transformations did not substantially improve the skewness. Thus, this scale was excluded from further analysis, leaving observations of parental sensitivity, structuring, and non-intrusiveness.

Parent–child interactions were videotaped during 15 min of a semi-structured play-situation. Parents were asked to play with the child as they normally do, using three different sets of toys. The play sessions were coded by five trained observers (students with bachelor degree in child and family studies), who were unaware of the intervention type parents received (VIPP-AUTI or CU). Intercoder reliability for pre-coded randomly chosen observations (10% of all data) was good (mean intra-class correlations: sensitivity $r = 0.77$, structuring $r = 0.78$, non-intrusiveness $r = 0.77$). Pretest and posttest sessions of the same dyad were coded by different observers who were unaware whether the session they coded was a baseline or endpoint assessment.

Secondary parental outcome measures

Parental efficacy questionnaire (PEQ). The PEQ is a 22-item, self-report questionnaire on a 5-point rating scale which ranges from score −2 = no self-efficacy, −1 = low self-efficacy, 0 = mild self-efficacy, 1 = high self-efficacy, 2 = very high self-efficacy (possible scores range from −44 to 44). The PEQ is based on Bandura's general theory of personal efficacy (Bandura, 1997), and adapted to parenting by M.H.v.IJ., M.J.B-K., and Juffer (unpublished manuscript, 1999). The instrument assesses parents' feelings of competence in child rearing, particularly under stressful circumstances. Previously, in a sample of 89 parents of a child with ASD, internal consistency (Cronbach's alpha) was 0.87 (Rutgers et al., 2007). In this sample, Cronbach's alpha for internal consistency was 0.87 as well.

PDH. The PDH is a 20-item instrument developed by Crnic and Greenberg (1990) to assess the strains and stresses accompanying child rearing. Internal consistency (Cronbach's alpha) has been found to be 0.81–0.91 (Crnic and Greenberg, 1990). It contains descriptions of typical everyday life events in parent–child interactions, rated by the parent on a 5-point rating scale for frequency of occurrence of the hassle (scores 0–80). A score of 0 indicates no daily hassles, and a score of 4 refers to high levels of daily hassles. In this sample, Cronbach's alpha for internal consistency was 0.90.

Client satisfaction questionnaire (CSQ-8). The CSQ-8 (Attkisson and Zwick, 1982) is a self-report questionnaire to assess treatment-satisfaction of clients in mental health services with an internal consistency (Cronbach's alpha) of 0.93. The Dutch version of the CSQ-8 showed the same satisfactory psychometric properties as the original, English language questionnaire and was found suitable to use in Dutch populations (De Brey, 1983; De Wilde and Hendriks, 2005). The CSQ-8 contains eight items scored on a Likert scale with 1 = quite dissatisfied, 2 = indifferent or mildly dissatisfied, 3 = mostly satisfied, and 4 = very satisfied. Examples of response options include "To what extent has our program met your needs?" and "Have the treatment you received helped you to deal more effectively with your problems?" We administered the CSQ-8 at follow-up (T3). Cronbach's alpha for internal consistency was 0.92 ($N = 71$).

Secondary child-outcome measures

EAS. Besides the parental scales, the EAS *(Biringen et al., 2000)* includes rating scales for child responsiveness and involvement. "Responsiveness" is rated as the intensity and the quality of the child's reactions to the parent's bids, while "involvement" reflects the child's attempts to engage the parent in interactions. Child responsiveness and child involvement are coded on 7-point rating scales, ranging from 1 = no involvement or responsiveness to 7 = high levels of involvement or responsiveness. Intercoder reliability of five blind-rated coders for 10% pre-coded randomly chosen observations was mean intra-class correlations: responsiveness $r = 0.73$ and involvement $r = 0.75$.

Early social and communication scales (ESCS). The ESCS (Mundy et al., 2003) scores are based on videotaped semi-structured interaction to measure joint attention. High scores on the ESCS refer to better joint attention skills. Joint attention behaviors, behavioral requests, and social interaction behaviors are evoked by different types of play tasks initiated by the experimenter. The assessment was performed according to protocol. The child was seated opposite to the investigator at a small table. The experimenter presented the child with an array of novel toys. The toys at assessing IJA included three small wind-up toys and five hand-operated toys (e.g. a balloon and a picture book). To assess RJA, posters were positioned on the walls to the left, right, and behind the child for a gaze-following task and four hand-operated toys were used (e.g. a small car and a ball). Throughout the session, only one toy at a time was presented to the child. The original scoring methods as described in the manual were followed with lower scores for lower level joint attention behavior (e.g. makes eye contact and reaches for a toy) and higher scores for higher level joint attention behavior (points at something while maintaining eye contact and offers a toy while maintaining eye contact). IJA, which refers to the frequency with which the child uses eye contact, pointing and showing to initiate shared attention to objects or events, and RJA, which refers to the child's skill in following the tester's line of vision and pointing gestures, were rated. Based on 13% of randomly chosen cases, the intra-class correlation coefficient of two independent coders, blind to each child's experimental condition, was 0.92 for IJA and 0.94 for RJA.

Play behavior. Children's play behavior was observed during a 15-min videotaped free-play session. The children were provided with a standardized set of toys including a tea set (cups, saucers, teapot, and spoons), a doll and related attributes, cars, a garage, a puzzle, a pop-up toy, a spinner, and a book. The parent was instructed to passively monitor while the child was playing. When the child was seeking contact or interaction, the parent was allowed to respond in a natural way. Play behavior was coded using the ethogram of Naber et al. (2008a), based on an ethogram previously developed by Ungerer and Sigman (1981). The video segments were watched and coded by trained students for toy preference and level of play category; (a) manipulative, (b) relational, (c) functional, and (d) symbolic play, every 10 s during 15 min. The highest level of play shown (ranging from 1 to 4) and variation in play by toy preference were used in analyses. Based on 16% of randomly chosen cases, intra-class correlation coefficients of three independent coders, unaware of the child's experimental condition, for level of play and variation in toy preference were 0.71 and 0.99, respectively.

Analyses

To check for baseline differences of the experimental and control group, independent sample *t*-tests and chi-square tests were performed, using the Statistical Package for the Social Science, version 20. Variables with significant differences at baseline were taken into account in further analyses. The effect of VIPP-AUTI was assessed by using repeated measures multivariate analysis of covariance (MANCOVA), comparing baseline scores with post-intervention scores. The primary outcome measure was parental emotional availability (EAS-parental scales), with VIPP-AUTI or CU as a between-subjects factor and time as a within-subject factor, and parent and child characteristics showing significant group differences at baseline as covariates. Secondary outcome measures were parental efficacy (PEQ) and PDH with VIPP-AUTI or CU as a between-subjects factor and time as a within-subject factor, and pertinent covariates. Similar analyses were done for child responsiveness and child involvement (EAS-child scales). To assess the effect of VIPP-AUTI on the development of child joint attention and play behavior from baseline to follow-up, we performed a repeated measures multivariate analysis of variance (MANOVA) with VIPP-AUTI versus CU and school attendance as between-subjects factor and time as within-subjects factor. The development of IJA across baseline and follow-up (differential quotient of IJA sum scores) for VIPP-AUTI and CU groups with and without school attendance was analyzed by comparing group means. Finally, an independent sample *t*-test was performed to compare parents' satisfaction with treatment (CSQ-8) in the VIPP-AUTI and CU groups.

Results

Baseline differences

No significant differences between the VIPP-AUTI and CU group were found for parent and child gender or age, sociodemographics, parental mental health, parental efficacy, PDH, child autism characteristics, and child cognitive and language developmental level (see Table 3). Neither group differences were found in use of medication (VIPP-AUTI group $n = 1$ and CU group $n = 3$), nor in additional treatment during the intervention period (χ^2 (1, $N = 76$) = 0.49, $p = 0.50$; VIPP-AUTI group $n = 19$ and CU group $n = 20$).

However, significant group differences were found on father's employment and child's school attendance. Fathers in the VIPP-AUTI group worked fewer hours per week ($M = 34$; $SD = 11.5$) than fathers of the CU group ($M = 41$; $SD = 10.0$), t (70) = 2.79, $p < 0.01$). Finally, regardless of age, more children in the CU group visited school ($n = 10$) than children in the VIPP-AUTI group (n

Table 3. Background and baseline variables in experimental and control groups.

Primary caregiver characteristics	Group				*t*	*p*
	VIPP-AUTI (*n* = 40)		CU (*n*= 38)			
	M	*SD*	*M*	*SD*		
Age (years)	36.80	04.84	36.42	05.30	0.33	0.74
Parental employment (hours p/w)	20.70	15.10	17.45	12.85	1.02	0.31
SES (< −0.99 = low status; > 1.33 = high status)	00.99	00.71	00.95	00.97	0.22	0.83
Parental efficacy (PEQ total score; range −44–44)	23.39	09.11	21.62	12.21	0.71	0.48
Parental stress (PDH total score; range 0–80)	23.71	12.62	22.57	13.81	0.37	0.71
Psychoneuroticism (SCL-90 total score; range: from 90 to ⩾183)	127.70	36.33	131.17	35.16	0.42	0.67
Child characteristics						
Age (months)	42.16	09.02	43,80	10.92	0.72	0.47
Autism-related symptoms (ADOS-2 comparison score; range 3–10)	06.97	02.09	07.30	01.94	0.70	0.49
Developmental level (MSEL composite standard score)	74.63	23.50	72.68	20.61	0.39	0.70
Language comprehension age equivalent (months)[a]	32.77	16.41	32.88	18.04	0.03	0.98
Language production age equivalent (months)[a]	33.71	15.89	30.22	16.35	0.85	0.40

VIPP-AUTI: Video-feedback Intervention to promote Positive Parenting adapted to Autism; CU: Care as Usual; ADOS: autism diagnostic observation schedule, MSEL: Mullen scales of early learning (range < 70 low functioning to > 70 high functioning), PDH: parental daily hassles, PEQ: parental efficacy questionnaire, SCL-90: symptom checklist, SES: socio-economic status.
[a]Missing values VIPP-AUTI: *n* = 2 and CU: *n* = 3.

= 4), χ^2 (1, N = 76) = 3.99, $p < 0.05$. Father's employment and children's school attendance were included as covariates in further analyses.

Primary outcome variable

Intervention effects on parental interactive behavior (EAS-parental scales). A significant time by group effect was found for parental non-intrusiveness, F (1, 72) = 4.30, p = 0.04, η^2 = 0.06 (d = 0.49). After the intervention, the parents who received the VIPP-AUTI program showed decreased intrusiveness, whereas intrusiveness increased in the CU group. Parental sensitivity (F (1, 72) = 0.34, p = 0.56, η^2 = 0.00) and parental structuring (F (1, 72) = 0.30, p = 0.59, η^2 = 0.01) did not show significant intervention effects (for mean values, see Table 4).

Secondary outcome variables

Intervention effects on parental self-efficacy (PEQ) and daily hassles (PDH). A significant time by group interaction effect was found for parental self-efficacy, F (1, 62) = 5.66, p = 0.02, η^2 = 0.08 (d = 0.61). Parents in the VIPP-AUTI group showed an increase in their feelings of competence after the intervention, whereas parents in the CU group did not show change over time. No interaction effect between time and group was found for daily hassles, F (1,62) = 0.00, p = 0.98, η^2 = 0.00 (see Table 4). Daily hassles showed no significant correlations with parental self-efficacy or sensitivity.

Intervention effects on child interactive behavior (EAS-child scales) at endpoint. No significant intervention effects were found on child responsiveness (F (1, 72) = 0.05, p = 0.83, η^2 = 0.00) and child involvement (F (1, 72) = 0.08, p = 0.78, η^2 = 0.00) (see Table 4).

Intervention effect on children's joint attention (ESCS) at follow-up. The three-way interaction of group by school attendance by time was significant for IJA, F (8, 61) = 2.35, p = 0.03, partial η^2 = 0.24. The three-way interaction of group by school attendance by time for RJA was not significant, F (5, 64) = 1.84, p = 0.12, partial η^2 = 0.13 (for mean values see Table 5).

In particular, for children who did not attend school, the intervention was effective in increasing IJA behavior between baseline and follow-up, F (8, 49) = 2.41, p = 0.03, partial η^2 = 0.28 (see Figure 2 for development of child IJA over time in groups with and without school attendance). No significant correlation was found between child IJA and parental non-intrusiveness (r = 0.12).

Intervention effect on children's play behavior at follow-up. No significant three-way interaction of group by school attendance by time for level of play and play variation across baseline and follow-up assessment was found, F(2,70) = 0.44, p = 0.65 partial η^2 = 0.01 (see Table 5). For children who did not attend school, no significant interaction of group by time was found either, F (2, 58) = 0.15, p = 0.86, partial η^2 = 0.01.

Table 4. Repeated measures MANOVA of parent–child interactive behavior by EAS and parental perceived feelings of efficacy and daily hassles.

EAS Primary outcome: Parent	Baseline		Endpoint		Group × Time			
	VIPP-AUTI *n* = 40	CU *n* = 36	VIPP-AUTI *n* = 40	CU *n* = 36				
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*df*	*p*	η^2
Non-intrusiveness	3.76 (0.82)	4.11 (0.59)	4.06 (0.89)	3.94 (0.92)	4.30	1	0.04	0.06
Structuring	3.71 (1.0)	3.83 (0.81)	3.74 (0.90)	3.82 (0.85)	0.30	1	0.59	0.01
Sensitivity	6.16 (1.63)	6.54 (1.40)	6.34 (1.35)	6.36 (1.41)	0.34	1	0.56	0.00
Secondary outcome: Child								
Responsiveness	4.94 (1.49)	5.00 (1.51)	5.25 (1.31)	5.19 (1.52)	0.05	1	0.83	0.00
Involvement	4.77 (1.49)	4.88 (1.49)	5.02 (1.47)	4.99 (1.63)	0.08	1	0.78	0.00
Secondary outcomes: Parental perceived feelings	VIPP-AUTI *n* = 37	CU *n* = 29	VIPP-AUTI *n* = 37	CU *n* = 29	Group × Time			
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*df*	*p*	η^2
Efficacy (PEQ)	23.37 (9.21)	22.97 (11.11)	27.78 (7.71)	24.13 (8.59)	5.66	1	0.02	0.08
Daily hassles (PDH)	24.33 (12.92)	22.36 (13.66)	24.78 (12.29)	23.24 (11.68)	0.00	1	0.98	0.00

MANOVA: multivariate analysis of variance; VIPP-AUTI: Video-feedback Intervention to promote Positive Parenting adapted to Autism; EAS: emotional availability scales; *df*: degrees of freedom; *SD*: standard deviation; PEQ: parental efficacy questionnaire; PDH: parental daily hassles.
Higher scores on the EAS indicate higher levels of emotional availability; parental non-intrusiveness and structuring range 1–5, sensitivity range 1–9, child responsiveness and involvement range 1–7. Higher scores on PEQ and PDH refer to higher levels of efficacy (range: −44 to 44) and higher prevalence of daily hassles (range: 0 to 80), respectively.

Parental treatment-satisfaction (CSQ-8) at follow-up. At follow-up, 3 months after the endpoint of the intervention, all parents reported to be satisfied or very satisfied with both VIPP-AUTI and CU, without any group difference, t (69) = −0.75, p = 0.46 (VIPP-AUTI group M = 24.6; SD = 4.5; CU group M = 25.4; SD = 4.7).

Discussion

In this randomized controlled trial with families raising a child with ASD, the attachment-based intervention VIPP-AUTI demonstrated to be partly effective on parental interactive behavior, reported feelings of child rearing, and child developmental skills as compared to CU. The program, based on insights from attachment theory and developmental problems in children with ASD, decreased observed parental intrusiveness towards the child, and it increased (self-reported) parental efficacy feelings in parenting a child with ASD. The children who did not attend school were found to have enhanced IJA skills at 3-month follow-up. No group differences were found in levels of parental sensitivity and structuring, child interactive behavior and in daily hassles reported by the parents post intervention, and in child play development at follow-up.

Parents demonstrated significantly decreased intrusiveness after receiving VIPP-AUTI, resulting in a medium effect size, which is in the same range as effect sizes of VIPP for other populations in previous studies (Juffer et al., 2009). Intrusiveness refers to qualities of overdirectiveness, overstimulation, interference, or overprotectiveness, undermining the child's autonomy (Biringen et al., 2000). One plausible explanation for parents of a child with ASD to become intrusive might be that the parent is emphasizing too much his or her role as a teacher who should help the child to prevent further developmental and language delays (Safe et al., 2012; Tsai et al., 2008). The parent teaches the child rather than allowing the child to play and learn from its experiences in his or her own tempo (Jordan, 2003; Pajareya and Nopmaneejumruslers, 2011). As a result, parents could develop a directive interactive style. Although parental directiveness could be considered to be functional in stimulating the child's attention and response (Marfo, 1990), such interaction could be a risk for overstimulation and intrusiveness. Previously, Wan et al. (2012) found a directive, less sensitive interaction style to infants in mothers with an older child with autism. It might be difficult to distinguish functional directiveness from overstimulation, in particular with children who do not express their needs in a clear-cut way. In the current study, the VIPP-AUTI program supported parents to understand the ASD characteristics of their child, and focused on the child's competences and needs. This empathic understanding may have offered parents room to step back in order to guide the child in its own pace, in other words, to become less intrusive. In addition, low parental intrusiveness could enhance relaxed and joyful

Table 5. Repeated measures MANOVA of Joint Attention (as indicated on scores by the early social communication scales) and play behavior of groups at baseline and follow-up.

Joint attention	Group				Group × Time × School			
	VIPP-AUTI (*n* = 38)		Care as Usual (*n* = 34)					
	M	*SD*	*M*	*SD*				
	Baseline							
IJA[a]	31.45	07.12	34.32	05.68				
RJA[b]	48.05	17.03	50.56	14.93				
	Endpoint							
IJA[a]	33.79	06.98	36.09	06.08				
RJA[b]	48.63	17.18	54.06	13.24				
	Follow-up				*F*	*df*	*p*	η^2
IJA[a]	33.42	06.86	34.41	05.70	2.35	8	0.03	0.24
RJA[b]	51.68	17.38	52.94	17.95	1.84	5	0.12	0.13
Play behavior	(*n* = 40)		(*n* = 35)					
	Baseline							
Play level	3.13	0.69	3.20	0.68				
Play variation	6.88	2.14	6.91	2.11				
	Endpoint							
Play level	3.30	0.69	3.26	0.66				
Play variation	6.32	2.20	6.66	2.03				
	Follow-up				*F*	*df*	*p*	η^2
Play level	3.27	0.60	3.29	0.62	0.03	1	0.87	0.00
Play variation	5.83	2.28	6.46	2.09	0.78	1	0.38	0.01

MANOVA: multivariate analysis of variance; VIPP-AUTI: Video-feedback Intervention to promote Positive Parenting adapted to Autism; *SD*: standard deviation; *df*: degrees of freedom.
Higher scores of IJA and RJA indicate better joint attention skills. Play level scores ranges from low (score 1) to high level (score 4). Play variation scores refer to the number of used toys (varying from 1 to 12 toys).
[a]IJA: Initiating Joint Attention sum scores.
[b]RJA: Responding Joint Attention sum scores.

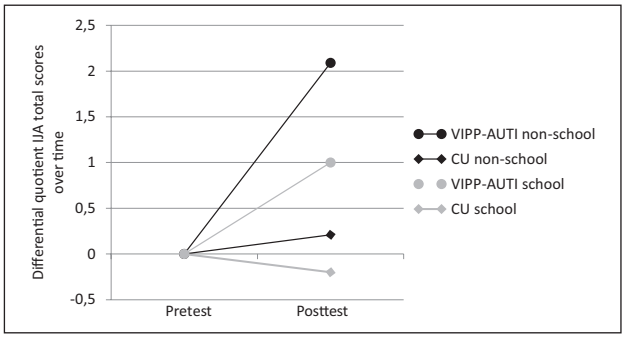

Figure 2. Development of initiating joint attention (as indicated by scores on the early social communication scales) across baseline and follow-up for experimental (VIPP-AUTI) and control (CU) groups with and without school attendance.
VIPP-AUTI: Video-feedback Intervention to promote Positive Parenting adapted to Autism; CU: Care as Usual.

parent–child interactions and thereby contributed to the child's exploring behavior. Also during play, reduced intrusiveness enabled parents to follow the child's lead and intentions. In line with previous successful interventions, like "Floor time" play sessions (Solomon et al., 2007; Wieder and Greenspan, 2003) and Pivotal Response Treatment (Koegel et al., 2013; Steiner et al., 2013), such parental interactive behavior is now understood as basic in guiding the child towards better social-communicative skills.

Parents who received the VIPP-AUTI intervention also reported increased parental self-efficacy (feelings of competence in child rearing) compared to parents receiving CU. Mother–child synchronous interaction was previously found to be associated with mother's positive thoughts and feelings about their child with ASD (Hutman et al., 2009) During the video-feedback, with a focus on synchronous and non-intrusive parent–child interaction, some parents explicitly mentioned regaining confidence in their parenting. They described that the videotaped episodes showed their child's unexpected (often subtle) responsiveness to parental initiatives. Positive effects of VIPP-AUTI on both

non-intrusiveness and parental efficacy may amplify its influence on positive parent–child relationships.

At endpoint, no group differences in levels of children's responsiveness and involvement were found. It should be noted that the intervention was not aimed directly at the children but at their parents, resulting in a possibly therapeutic delay. Furthermore, our measurement of child interactive behavior included a global assessment of child responsiveness and involvement, and did not capture all aspects of child interactive behavior. ASD-related symptoms might be mitigated through increased positive interaction with the parent, but we did not assess this. It should be noted however that other intervention studies (e.g. Dawson et al., 2010; Green et al., 2010) did not find overall treatment effects on ASD symptoms (as measured using the ADOS).

VIPP-AUTI focused specifically on parents' awareness of child's joint attention skills (such as "speaking for the child" starting from the second session, and play behavior in the four sessions of filmed play interactions). Three months post intervention, the children of parents who received the VIPP-AUTI intervention demonstrated higher levels of IJA than children whose parents received usual home training. Intervention effects on RJA were however not significant. An explanation may be that IJA and RJA follow different pathways in social neurocognitive development (Mundy et al., 2009), accompanied by differences in intervention susceptibility. Furthermore, an association between the quality of parent–child relationship and infants' IJA rather than RJA was found previously (Claussen et al., 2002), which is in line with our results.

In our sample, school attendance was a factor, because more children in the control group visited school than did children in the VIPP-AUTI group. The efficacy of VIPP-AUTI on children's IJA was demonstrated especially in children who attended daycare instead of school. It is possible that the underlying factor explaining the results is the amount of time the parent and child spent together. Children who visited daycare spent fewer hours per week outside their home environment than children attending primary school. Thus, children who did not attend school spent more hours at home, and potentially profited more from intervention effects on parenting. Our study included however only 14 children attending school, and replication of the moderating effect of school attendance in a larger sample is badly needed.

The effect of VIPP-AUTI on children's IJA could not be explained by parental non-intrusiveness as a mediating variable, given the absence of an association between parental non-intrusiveness at endpoint and children's joint attention at follow-up. Additional parent-centered factors, beyond our study focus, for example, parental states of mind, might have acted as mediators. VIPP-AUTI aimed at promoting parents' understanding of the autistic traits of their child, and addressed aspects of parental states of mind, such as mind-mindedness or insightfulness. Mind-mindedness refers to parents' attuned comments to the child's state of mind (Meins et al., 2003), and is associated with social-cognitive development of the child (Meins et al., 2013). Parental insightfulness focuses somewhat broader on the relation between positive parenting and parents' empathic insight in their children's motives underlying their behavior (Oppenheim and Koren-Karie, 2002). VIPP-AUTI might have enhanced maternal insightfulness of their children as the video-feedback stimulates parental reflection on the interactions with the child. Video-feedback functions as a mirror for mentalizing dyadic interactions. In future studies with VIPP-AUTI, the potential mediating role of mind-mindedness and insightfulness in changing children's developmental outcome should be examined.

No significant intervention effect was found on children's play behavior. Children in both groups showed the same levels of play and variation in play. Whereas VIPP-AUTI addressed enjoyable engagement and awareness of the child's interests to improve children's play development, more active, direct, and systematic teaching strategies may be needed, including a play context with peers (Jung and Sainato, 2013). Also, baseline child characteristics might have influenced the intervention effects. In samples of children with other developmental delays, susceptibility to directive or non-directive interventions has been found to be associated with children's self-esteem and emotional or behavioral problems (Lahav et al., 2013). Children with few problems have been found to benefit from non-directive stimulation rather than from directive stimulation, whereas children with considerable problems responded better to a directive intervention. Overall, optimizing parent–child interaction, which is the aim of VIPP-AUTI, may serve as a base for choosing additional treatment targeting at improving play behavior of children with ASD.

We found positive effects of VIPP-AUTI compared to CU, which included fairly extensive home training. In both groups, parents were satisfied with the treatment. The efficacy of VIPP-AUTI on decreased parental intrusiveness and increased parental self-efficacy may be ascribed to differences between CU and the VIPP-AUTI program. CU was demand driven, which might have elicited a focus on problematic parenting situations, whereas VIPP-AUTI aimed at highlighting positive parent–child interactions. Moreover, using video-feedback of parent–child interactions in the VIPP-AUTI program allowed parents to interpret and mentalize their own interactions with their child more intensively than through verbal communication as in CU.

Regarding implementation of the VIPP-AUTI program, its feasibility is facilitated by its standardization,

using a detailed manual, relatively brief training, and short duration. Intervention compliance was high; all participants received the five complete home visits in a period of 3 months. This finding is consistent with a groundbreaking study of Green et al. (2013), in which a preventive, interaction-focused intervention with elements of the VIPP program, for infants at risk of ASD, demonstrated feasibility, acceptability, and initial evidence at enhancing aspects of parental interactive behavior.

Some limitations need to be addressed. Since this study was single center, intervention efficacy cannot be generalized to centers with other CU programs. CU in the current child psychiatry center consisted of rather intensive treatment, so the effects of VIPP-AUTI may be larger in settings with less intensive CU. Furthermore, the majority of included parents had middle to high SES, and was married. The homogeneity of this sample requires further research of intervention efficacy in families with more heterogeneous sociodemographic characteristics. Third, we only examined relatively short-term effects on parenting and child outcomes. Long-term effects should be established. Finally, at baseline, the level of parental interactive behaviors in both groups was moderate to high, which might have created a ceiling effect preventing significant improvements on all parenting subscales.

In sum, VIPP-AUTI was tested in a randomized controlled trial using a detailed intervention manual and an equally intensive CU program for the control group. VIPP-AUTI was shown to be partly effective for families of children with ASD. Parents receiving the VIPP-AUTI program demonstrated increased self-efficacy and lower levels of parental intrusiveness, compared to parents who received CU. Three months later, a treatment-specific effect of VIPP-AUTI was found on enhanced IJA in children with ASD. We suggest that VIPP-AUTI can provide early and effective support in families of children with ASD.

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