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Published in:
Journal of Applied Research in Intellectual Disabilities

DOI:
[10.1111/jar.12279](https://doi.org/10.1111/jar.12279)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2017

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Martens, M., Janssen, H., Ruijsenaars, A., Huisman, M., & Riksen-Walraven, J. M. (2017). Fostering Emotion Expression and Affective Involvement with Communication Partners in People with Congenital Deafblindness and Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities*, 30, 872-884. <https://doi.org/10.1111/jar.12279>

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Fostering Emotion Expression and Affective Involvement with Communication Partners in People with Congenital Deafblindness and Intellectual Disabilities

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Accepted for publication 30 March 2016

Background Recent studies have shown that it is possible to foster affective involvement between people with congenital deafblindness and their communication partners. Affective involvement is crucial for well-being, and it is important to know whether it can also be fostered with people who have congenital deafblindness and intellectual disabilities.

Methods This study used a multiple-baseline design to examine whether an intervention based on the Intervention Model for Affective Involvement would (i) increase affective involvement between four participants with congenital deafblindness and intellectual disabilities and their 13 communication

partners and (ii) increase the participants' positive emotions and decrease their negative emotions.

Results In all cases, dyadic affective involvement increased, the participants' very positive emotions also increased and the participants' negative emotions decreased.

Conclusion The results indicate that communication partners of persons with congenital deafblindness and intellectual disabilities can be successfully trained to foster affective involvement.

Keywords: affective involvement, communication, deafblind, emotions, interaction, intervention

Introduction

Affective involvement, defined as the mutual exchange of emotions between people, is indispensable for the development of emotion regulation and secure attachment relationships (for a review, see Diamond & Aspinwall 2003). Parents of very young children can foster affective involvement by recognizing their child's emotional signals and providing well-attuned responses that make their child feel understood (Stern 1985).

Reaching affective involvement is more difficult in people with congenital deafblindness (CDB) because of constraints on hearing and seeing. Their sensory impairments hamper social contact and lead to a higher risk of challenging behaviours. Affective involvement

only rarely occurs in interactions with people with CDB (Janssen & Rødbroe 2007). Yet, it has been shown possible to foster affective involvement during interactions with persons with CDB by training their educators (Janssen *et al.* 2003a; Chen *et al.* 2007). The training developed by Janssen *et al.* was based on the Diagnostic Intervention Model (DIM) for fostering harmonious interactions with people with CDB (Janssen *et al.* 2003b). The training described in the present paper is based on an extended version of the DIM, the two-phased Intervention Model of Affective Involvement (IMAI; Martens *et al.* 2014a). The IMAI-based intervention aims to foster affective involvement not only during interaction, but also during communication – defined as interaction in which meaning is transmitted

while attuning behaviours (Janssen *et al.* 2003b). For a more extensive description of the theoretical underpinnings of the IMAI, see Martens *et al.* (2014a).

The effectiveness of IMAI-based interventions with persons with CDB has been demonstrated in two studies involving a total of five participants with CDB and their 21 communication partners at Royal Dutch Kentalis, an organization specialized in communication and auditory and/or visual disabilities. In four of the five participants, an increase in affective involvement was observed, and in all five participants with CDB-positive emotions increased and negative emotions decreased (Martens *et al.* 2014b; Martens *et al.* 2014c).

Researchers stress that people with intellectual disabilities and multiple disabilities (including sensory and motor disabilities) depend on other people to attain affective and reciprocal relationships (Hostyn *et al.* 2011) and that a person-centred planning approach is needed for building such relationships (Vlaskamp & Van der Putten 2009). It is not self-evident, however, that the IMAI-based intervention is also effective for people with both CDB and intellectual disabilities. Just like people with CDB, people with CDB and intellectual disabilities show impairments of social functioning and challenging behaviours due to constraints in social interaction and communication (Carvill 2001). In people with CDB and intellectual disabilities, cognitive impairments hamper social interaction and communication even more. Also, these individuals receive services from organizations that have expertise on intellectual disabilities and/or a singular sensory disability (hearing or vision) but that often lack deafblind-specific education. As a result, their clients with CDB and intellectual disabilities are deprived of social interactions involving affective involvement (Bloeming-Wolbrink *et al.* 2012).

Brief and subtle moments of affective involvement between people with severe intellectual disabilities and their caregivers have been observed (Forster & Iacono 2014). Also, it has been shown possible to improve the quality of interaction with people with intellectual disabilities and visual impairments by training their caregivers according to the principles of Janssen *et al.*'s (2003b) DIM (Damen *et al.* 2011). Based on the above evidence, we expected that the present IMAI-based intervention would increase affective involvement between participants with CDB and intellectual disabilities and their communication partners, and increase positive emotions and decrease negative emotions in the participants.

In this study, we examined whether the IMAI-based intervention is effective for people with CDB and

intellectual disabilities by applying the intervention to four participants (henceforth referred to as 'clients') and their 13 communication partners at four different organizations that primarily focus on intellectual disabilities and/or a singular sensory disability. The research questions were as follows: (i) does the intervention increase affective involvement and positive emotions and decrease negative emotions across the four clients and (ii) is the intervention effective across the different communication partners (caregivers and caregiver assistants) and interactional situations in the four different organizations?

Method

Participants and settings

The study followed the tenets of the World Medical Association's Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects. It was approved by the Institutional Review Board of the University of Groningen and by the Institutional Review Boards of the four participating organizations. Informed consent was obtained from the parents, legal representatives and communication partners of the participating clients.

Four clients and 13 communication partners participated in the intervention. The clients will be referred to by the pseudonyms Alexander, Naomi, Alain and Kai. Inclusion criteria for the clients were as follows: (i) CDB and intellectual disabilities, (ii) behaviours that are challenging to caregivers and that impede the client's well-being including aggressive and/or self-abusive behaviours and (iii) a request for coaching for the client from the communication partners. Inclusion criteria for the communication partners were as follows: (i) working frequently with the client and (ii) having difficulties in sharing emotions with the client.

Alexander, aged 58 years, was born deaf and blind due to prematurity. He has lived in residential group homes (10 to 12 residents) run by an organization with a primary focus on intellectual disabilities since the age of 6. At age 57, Alexander moved to another group home where he lives with five other people, three of whom have deafblindness. Alexander communicates using bodily expressions, vocalizing discomfort, pushing the caregiver's hand and objects away, and pulling objects. He understands the meaning of concrete referential objects that are used in daily care and one sign that is made on his body ('goodbye'). Alexander's

level of social functioning is at around 5 months of age, and his daily living skills are at 1;6 years (Vineland Adaptive Behavior Scales (VABS), Sparrow *et al.* 1984). Alexander is easily agitated, shows compulsive and restless behaviour, tears his clothing and behaves in ways that reflect distress (e.g. vocalizing discomfort, widely flapping his arms).

Naomi, aged 49, was born deaf and visually impaired due to Congenital Rubella Syndrome. From age 48 onwards, she was totally blind. Naomi has been living in different group homes (six residents, intensive care due to challenging behaviours) run by an organization with a primary focus on intellectual disabilities since the age of 8. Since age 46, Naomi has lived in a special group home for residents with deafblindness. Naomi uses bodily expressions and vocalizations, and expresses dislikes by pushing away her caregiver's hand and objects. She understands five concrete referential objects used in her daily care. Her level of communicative and social functioning is below 11 months of age and her daily living skills vary from 1;2 to 1;4 years of age (Vineland-Z assessment: De Bildt & Kraijer 2003). Naomi frequently withdraws herself from the environment by hiding her face behind her T-shirt and repeating movements (e.g. rolling her head from left to right while lying on a mattress). Communication partners experience no mutuality in their contact with Naomi. She regularly exhibits restless behaviours (e.g. vocalizing discomfort), aggressive behaviours (e.g. stamping her feet) and self-abusive behaviours (e.g. hitting).

Alain, aged 34 and diagnosed with both Congenital Rubella and Klinefelter Syndrome, was born deaf and visually impaired. From age 13 onwards, he was totally blind. Alain lived in a group home run by an organization specialized in auditory and intellectual disabilities from the age of 7 until age 23. He moved to a group home run by an organization with expertise in visual and intellectual disabilities and in treating people with deafblindness and intellectual disabilities. In this group home, an individual approach is more common and staff are trained in deafblindness. Alain communicates by signing, gesturing, pushing and pulling, and vocalizing comfort and discomfort. He understands about 150 signs and 20 referential objects. His communication, socialization and daily living skills are at 1;8, 1;6 and 1;0 years of age, respectively (Vineland-Z assessment: De Bildt & Kraijer 2003). Due to spastic paralysis, Alain uses a wheelchair. He receives medication to regulate his extreme mood swings and aggressive (e.g. pinching and scratching the

caregiver) and self-abusive (e.g. head banging) behaviours.

Kai, aged 20, was born deaf and from 5 months of age blind due to brain haemorrhage. He lived in a group home run by an organization with expertise in caring for children with intellectual disabilities from the age of 1. Kai moved to a group home (four residents) run by an organization with expertise in visual and intellectual disabilities at the age of 18. At this group home, people with deafblindness and intellectual disabilities receive care designed specifically for people with deafblindness. Staff are trained to foster harmonious interactions (Janssen *et al.* 2003a) and use tactile sign language. Kai communicates using bodily expressions, pushing and pulling his caregiver's hand and/or objects, and vocalizing comfort. He understands the signs 'come', 'ready' and 'waiting', and concrete referential objects related to daily care. His cognitive functioning was assessed at a level of 3;5 months (Bayley Scales of Infant Development (BSID-II; Bayley 1993), and his adaptive functioning was assessed at a level of between 1 and 11 months (VABS, Sparrow *et al.* 1984). Kai has spastic cerebral paralysis and is moved in a wheelchair. He challenges his communication partners by aggressive (e.g. biting) and self-abusive (e.g. hitting) behaviours.

Thirteen communication partners (mean age 40.3, SD = 9.4) were involved in the study. Five worked with Alexander, three with Naomi, two with Alain and three with Kai. Each was qualified in a related field: nursing specialized in health care or intellectual disabilities, educational work specialized in creative therapy or general educational work. Two had received no training related to deafblindness; two others had followed no additional courses related to deafblindness before this study.

The IMAI-based intervention was applied to Alexander and Naomi in the group home and the daytime activities centre. For Alain and Kai, the intervention was applied only in the group home setting.

Intervention

The intervention (Figure 1) aimed to foster affective involvement between the clients and their communication partners by improving the communication partners' competencies in (i) recognizing affective behaviours, (ii) attuning to interactive behaviours, (iii) sharing meaning for better understanding, (iv) sharing emotions and evaluating the adequacy of their own affective behaviour during

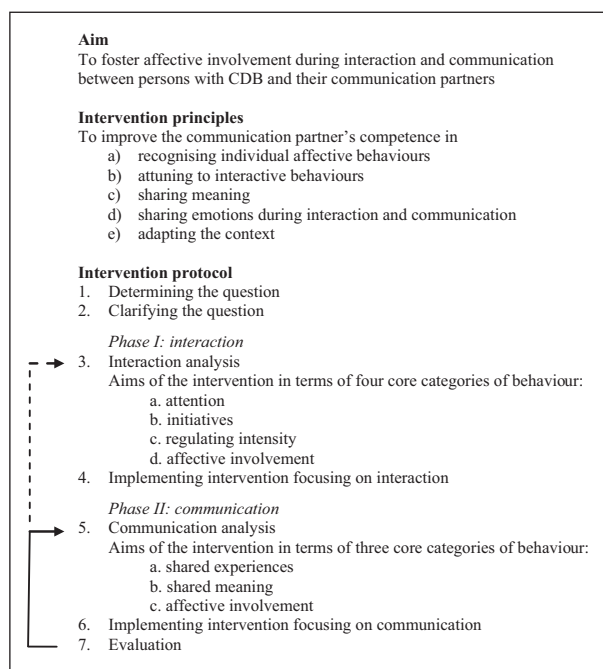


Figure 1 Intervention model for affective involvement during interaction and communication.

interaction and communication and (v) adapting the context to promote affective involvement.

The communication partners received training from four coaches familiar with the aim, intervention principles and intervention protocol of the IMAI. Each coach had 10 to 25 years' experience working with people with CDB and/or intellectual disabilities and coaching communication partners. They followed the IMAI protocol (Figure 1) to foster affective involvement during interaction (Phase I, steps 3 and 4) and communication (Phase II, steps 5 and 6). They trained the communication partners (in steps 4 and 6) using team and individual coaching. Video analysis and video feedback were the main coaching tools. Coaching also involved information transfer and role playing (Martens *et al.* 2014a).

Below, the intervention procedure is described in terms of the subsequent steps of the IMAI intervention protocol followed by the coaches:

1. *Determining the question.* The coaches received the communication partners' coaching requests.
2. *Clarifying the question.* Information was gathered on the clients' characteristics. The coach consulted the communication partners to determine relevant interactional situations and definite questions. Different situations were chosen for each client: 'dressing and having breakfast' for Alexander,

'sensory play' for Naomi, 'cooking' for Alain and 'eating' for Kai. Table 1 lists the questions.

3. *Interaction analysis.* To set intervention aims for the interaction phase (Phase I), the coaches analysed recent video recordings. The aims were related to the four core categories of interactive behaviour (Figure 1, Step 3). The definitions of the four core categories (Martens *et al.* 2014a) are as follows: (i) attention: focusing on the interaction partner, the content of the interaction and the persons and/or objects within the interaction context; (ii) initiatives: starting an interaction or raising a new idea or an issue as part of a reaction; (iii) regulating intensity: waiting while the client adapts the intensity or pace of the interaction and/or processes new information; and (iv) affective involvement: recognizing positive and negative emotions and sharing these emotions in a positive way that is perceivable for the client. Table 1 gives an overview of the questions for coaching and examples of intervention aims defined for the clients during the interaction phase.
4. *Implementing intervention focused on interaction.* The coach trained the communication partners in 10 weeks to change their interactive behaviours in accordance with the intervention aims during two 120-minute team coaching sessions and three 60-minute individual coaching sessions.
5. *Communication analysis.* New videos were analysed to formulate intervention aims for the communication phase (Phase II) in terms of the three core categories of behaviour (Figure 1, Step 5). The definitions of the three core categories (Martens *et al.* 2014a) are as follows: (i) shared experiences: elaborating on events and introducing new events so the client becomes motivated, feels secure and knows what is going to happen; (ii) shared meaning: interpreting and affirming the client's expressions of communication and using different turns to negotiate the correct meaning of an expression; and (iii) affective involvement: recognizing positive and negative emotions and sharing these emotions in a positive way that is perceivable for the client. Table 1 lists examples of intervention aims for the communication phase for each client.
6. *Implementing intervention focused on communication.* During another 10-week period, the communication partners attended two 120-minute team coaching sessions and three 60-minute individual coaching sessions. They were trained to change their behaviours during communication in accordance with the intervention aims.

Table 1 Definite questions for coaching and examples of intervention aims per client

Client	Definite questions for coaching	Examples of interventions aims	
		Phase I: Affective involvement during interaction	Phase II: Affective involvement during communication
Alexander	a) How can we foster mutuality with him? b) How can we prevent and regulate negative emotions? c) How can we improve positive emotions?	<ul style="list-style-type: none"> • The cp shares attention by co-actively touching. • The cp stays within reach and waits for Alexander's initiative to regulate negative tension. • The cp evokes mutuality by tactily imitating movements of excitement. 	<ul style="list-style-type: none"> • The cp shares experiences using hand-under-hand contact during the entire activity. • The cp uses more turns involving firm grip and short movements when sharing negative emotions. • The cp repeats rhythmical touching of an object or body part to negotiate about meaning of the expression.
Naomi	a) How can we interpret different states of emotions? b) How can we regulate restless behaviour? c) How can we enhance and extend positive mutual interactions?	<ul style="list-style-type: none"> • The cp attunes to different states of Naomi by observing her continuously and waiting for her next initiative. • The cp regulates negative tension by lowering tempo and staying available tactily. • The cp imitates vocalizations and movements in order to evoke positive emotions. 	<ul style="list-style-type: none"> • The cp adapts the context to be better able to share experiences. • The cp improves and uses different tactile strategies to make intentions clear. • The cp increases mutual, positive interactions by affirming bodily expressions and enhancing co-active acting.
Alain	a) How can we prevent negative emotions when involving him in acting? b) How can we enhance positive interactions with him and extend such interactions? c) How can we share positive emotions?	<ul style="list-style-type: none"> • The cp is predictable in taking the initiative when starting an interaction. • The cp regulates intensity by slowing actions during interaction. • The cp shares positive emotions by exaggerating movements and imitating vocalizations. 	<ul style="list-style-type: none"> • The cp co-actively supports Alain's explorative behaviour to expand on sharing experiences. • The cp uses tactile signs such as 'sweet' and 'smiling' to talk about Alain's positive emotions. • The cp uses different turns and affirms initiatives to agree about meaning.
Kai	a) How can we affirm positive expressions? b) How can we regulate negative tension? c) How can we share negative and positive emotions?	<ul style="list-style-type: none"> • The cp uses more tactile initiatives to increase mutuality. • The cp affirms positive emotions by co-actively imitating movements and rhythms. • The cp regulates negative tension by varying muscle tension during tactile contact. 	<ul style="list-style-type: none"> • The cp elaborates on experiences by involving more objects during the activity. • The cp makes mismatches (i.e. making 'jokes') to increase positive emotions. • The cp reduces negative emotions by affirming expressions and stimulating turn taking.

cp = communication partner.

7. *Evaluation.* The coaches evaluated the intervention in a separate team session, using video fragments of the first recordings at baseline and the last recordings of Phases I and II.

Study design and general procedure

We used a multiple-baseline design across subjects to examine the functional relationship between the intervention conditions (baseline, intervention Phase I, intervention Phase II and follow-up) and the occurrence of affective involvement, and the clients' expressions of negative and positive emotions (Barlow *et al.* 2009). The interactions were videotaped weekly during the baseline period, during each of the two intervention phases, and during follow-up at 2, 4 and 6 months after the end of the intervention. The situations in which the interactions were videotaped (see step 2 'clarifying the question') were the same across all measurement points. Due to the study's time limitations, follow-up measures were only taken for Alexander. Baseline measurements all started in the same week. While the baseline measurements continued for all the clients, the intervention was randomly implemented for Alexander, Naomi, Alain and Kai, in that order.

Observation procedure and measures

Observation procedure

We selected 111 videos to evaluate the effects of the intervention: 27 for Alexander, 26 for Naomi, 28 for

Alain and 30 for Kai. Tapes including continuous recording with a minimum length of 10 min were chosen for observation. The videos that were used for coaching and observer training were excluded. From the remaining tapes, for each participant four tapes from the baseline, four from Phase I, four from Phase II and three from the follow-up were randomly selected. We used the first 10 min of each recording for observational coding. Using time sampling, we noted occurrences that fit the observational categories on a 30-s interval form (Martens *et al.* 2014b,c). Four observers coded the recordings: the first author, two psychologists and a social worker. To control for observer drift, the observers read definitions prior to each recording session, they were blinded to the observation phases and the interobserver reliability rate was checked continuously.

Observational categories

We used five observational categories (Martens *et al.* 2014b,c). One was a client-communication partner category: *affective involvement*, or sharing negative and positive emotions in a way that is perceivable for the client (e.g. imitating smiling by co-actively and rhythmically moving hands). The other four categories reflect the client's emotional behaviour (for examples, see Table 2): *very negative emotions* (i.e. very restless, aggressive and self-abusive behaviours), *negative emotions* (i.e. negative tension, bad temper, compulsive or non-cooperative behaviours), *positive emotions* (i.e. exploring and cooperative behaviours) and *very positive emotions* (i.e. laughing and excitement).

Table 2 Examples of the clients' emotional behaviours in the four observation categories

<i>Client</i>	<i>Very negative emotions</i>	<i>Negative emotions</i>	<i>Positive emotions</i>	<i>Very positive emotions</i>
Alexander	Vocalizing discomfort, widely flapping arms	Pushing communication partners away, pulling on communication partners	Touching communication partner, responding to initiatives	Smiling
Naomi	Head banging, hitting face, stamping feet	Expressing restlessness by wandering around and/or undressing herself	Vocalizing comfort, touching communication partner	Smiling, laughing
Alain	Hitting communication partners, undressing himself, screaming	Vocalizing discomfort, repeating questions	Affirming initiatives, friendly touching communication partner	Laughing, flapping arms, vocalizing comfort
Kai	Biting, pinching or scratching communication partners, vocalizing discomfort	Being inactive, pushing communication partners or objects away	Touching communication partner or object, vocalizing comfort	Laughing, flapping arms, vocalizing comfort

Interobserver agreement

Prior to formal data collection, we trained the four observers until they attained 80% interobserver agreement. We computed interobserver agreement for 25% of the observed interaction episodes (Barlow *et al.* 2009) and retrained the observers when the percentage agreement fell below 80%. The mean interobserver agreement for all observation categories was 95%, with a range between 80% and 100% across the clients: for the affective involvement category, the mean agreement was 97% (range = 92–100%); for very negative emotions, it was 98% (95–100%); for negative emotions, it was 92% (86–98%); for positive emotions, it was 95% (90–98%); and for very positive emotions, it was 94% (90–100%).

Social validity

The communication partners were consulted repeatedly before, during and after the intervention to make sure they were committed to the intervention programme. We conducted evaluations during the coaching sessions and after interventions to discuss the procedure, process and results. The communication partners also expressed their satisfaction with the programme's usefulness and effectiveness by filling out an adapted version of the Social Validity Scale (Martens & Janssen 2011; following Seys 1987). A five-point Likert scale ranging from 1 (*low*) to 5 (*high*) was used for each of the 18 items, with higher ratings reflecting higher social validity (see Table 3).

Data analysis

As advocated by Horner *et al.* (2005) and Nourbakhsh & Ottenbacher (1994), descriptive and visual analysis of the present single-subject data set was the most important analysis method used in this study. Statistical tests such as time series methods were not feasible given the relatively small number of observations and the serial dependencies in the data set.

Results

Effects on behaviour

Figures 2 and 3 (left panel) show the mean occurrence and standard deviations of affective involvement (Figure 2), and of the different emotions (Figure 3) for the four clients within the baseline, Phases I and II, and

follow-up (for Alexander). The variability and trend line for the various conditions are shown in the right panel.

Affective involvement

Figure 2, left panel, suggests an increase for affective involvement in all cases relative to baseline.

For Alexander, affective involvement appeared during Phase I and slightly increased during Phase II. There were upward trends in both phases, but a steeper slope in Phase II. During follow-up, although there was a strong downtrend line, the mean occurrence increased.

For Naomi, affective involvement was observed once during baseline. The mean occurrence increased during Phase I and slightly decreased during Phase II. There were upward trends in both phases, although the slope in Phase II was relatively flat. Two high peaks were observed in sessions 14 (Phase I) and 23 (Phase II).

For Alain, affective involvement was present during baseline. It increased considerably during Phase I and remained the same during Phase II. The slopes of the trend lines show opposite directions: there was a slight upward trend during Phase I and a slight downward trend during Phase II.

For Kai, affective involvement was observed once in two sessions during baseline. The mean occurrence steadily increased during Phases I and II. There were upward trends in both phases: they involved a steep slope (Phase I) and a relatively flat slope (Phase II).

Very positive emotions and (very) negative emotions

Figure 3 shows the results for (*very*) *negative* and *very positive emotions*. *Negative* and *very negative* emotions were summed because of the low frequency of very negative emotions. The results for *positive emotions* are not depicted in Figure 3 because they suggest that we defined this category too broadly, by including too many 'neutral' behaviours next to 'real' positive emotions (see also second paragraph of the Discussion section). The means and standard deviations for *positive emotions* during Baseline, Phase I, Phase II and follow-up were as follows: for Alexander, 20.5 (0.9), 22.8 (1.6), 23.1 (2.8), 21.3 (0.5); for Naomi, 16.2 (3.8), 20.6 (1.5), 20.2 (0.8); for Alain, 22.9 (2.6), 25.3 (5.1), 24.3 (4.1); and for Kai, 20.5 (1.3), 24.1 (3.2), 22.9 (4), respectively.

The difference between very positive emotions and (very) negative emotions, computed by subtracting the occurrence of (*very*) *negative emotions* from the occurrence of *very positive emotions*, is depicted in the right panel. Positive values thus indicate that *very*

Table 3 Scores on the items of the social validity scale across communication partners per client

Item	Participant (number of respondents): Range (M)				
	Alexander (5)	Naomi (9)	Alain (10)	Kai (7)	Mean Group
Coaching communication partners					
1. Coaching communication partners to foster affective involvement is a bad/good idea	5 (5)	4–5 (4.6)	4–5 (4.7)	4–5 (4.6)	4.7
2. Coaching communication partners with video analysis and video feedback is a bad/good idea	5 (5)	4–5 (4.6)	4–5 (4.5)	4–5 (4.6)	4.7
3. Team coaching with video analysis and video feedback is not/very effective	3–5 (4.6)	3–5 (4.2)	2–4 (3.4)	4–5 (4.1)	4.1
4. Individual coaching with video analysis and video feedback is not/very effective (mark only when being coached individually)	4–5 (4.8)	5 (5)	4–5 (4.6)	4–5 (4.3)	4.7
<i>Total mean</i>	4.9	4.6	4.3	4.2	4.5
Implementing target behaviours					
5. To me, attaining shared attention was difficult/easy	4–5 (4.2)	3–4 (3.8)	3–4 (3.7)	4 (4)	3.9
6. To me, recognizing and interpreting initiatives was difficult/easy	4 (4)	3–4 (3.9)	3–4 (3.8)	4 (4)	3.9
7. To me, regulating intensity was difficult/easy	4 (4)	3–4 (3.6)	3–4 (3.2)	4 (4)	3.7
8. To me, sharing experiences was difficult/easy	2–4 (2.8)	2–4 (2.7)	1–3 (2.8)	2–3 (2.9)	2.8
9. To me, sharing meaning was difficult/easy	1–3 (2)	2–3 (2.6)	1–3 (2.6)	2–3 (2.9)	2.5
10. To me, fostering affective involvement was difficult/easy	4 (4)	3–4 (3.6)	3–4 (3.7)	4 (4)	3.8
11. Using the tactile modality during interaction and communication with the person with deafblindness was difficult/easy	4 (4)	3–4 (3.8)	3–5 (3.8)	4 (4)	3.9
12. Implementing learning points during daily practice was difficult/easy	3 (3)	3–5 (3.2)	2–4 (3)	2–4 (3)	3.1
<i>Total mean</i>	3.5	3.4	3.3	3.6	3.5
Evaluating own attitude and skills					
13. My attitude to the person with deafblindness has worsened/improved	3–5 (4.6)	4–5 (4.2)	3–5 (3.8)	3–4 (3.9)	4.1
14. The intervention worsened/improved my communicative skills regarding the behaviour targets	4–5 (4.6)	3–5 (4.1)	3–4 (3.7)	3–5 (3.8)	4.1
<i>Total mean</i>	4.6	4.2	3.8	3.9	4.1
Evaluating the client's behaviour					
15. The client's communicative skills have declined/improved	4–5 (4.6)	3–5 (3.9)	1–4 (3.2)	3–4 (3.4)	3.8
16. The client's negative emotions have increased/decreased	3–5 (4)	4–5 (4.1)	2–4 (2.7)	4–5 (4.1)	3.7
17. The client's positive emotions have decreased/increased	3–5 (4.2)	2–4 (3.4)	3–4 (3.3)	3–4 (3.7)	3.7
18. The client's challenging behaviours have increased/decreased	4–5 (4.4)	3–4 (3.9)	2–4 (3.1)	3–4 (3.7)	3.8
<i>Total mean</i>	4.3	3.8	3.1	3.7	3.8

Scores range from 1 (*low*) to 5 (*high*).

positive emotions are dominant while negative values indicate that *negative and very negative emotions* predominate. Figure 3 suggests an increase of *very positive emotions* and a decrease of *negative and very negative emotions* for all clients at the onset of the intervention relative to baseline.

Alexander's *negative and very negative emotions* disappeared during Phase I, reappeared during Phase II and slightly increased during follow-up. *Very positive*

emotions increased considerably during Phase I relative to baseline. During Phase II and follow-up, *very positive emotions* decreased but remained above baseline. The right panel shows that, although a marked change relative to baseline was observed in Phase I, the trend line in Phase I decreased. During Phase II and follow-up, the trend lines remained relatively stable. Although there is a lower trend line during follow-up compared to Phase II, it remained above baseline.

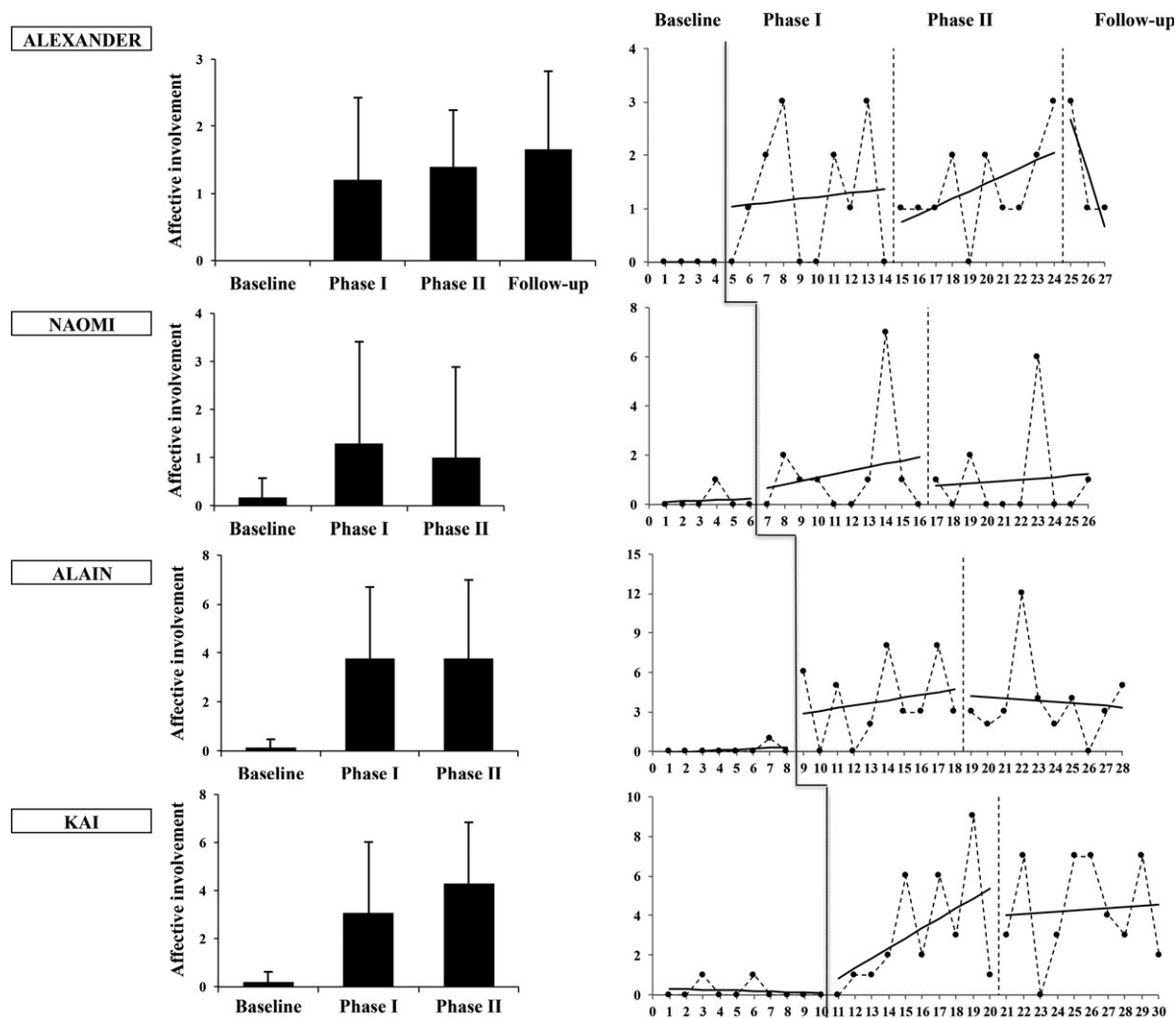


Figure 2 Affective involvement: mean occurrence and standard deviations for the intervention conditions (left), and occurrence during the separate observation sessions within the conditions (right).

For Naomi, only *negative and very negative emotions* were present during baseline. *Very positive emotions* seldom occurred during Phase I and decreased during Phase II. The right panel shows that the relatively stable trend lines are based upon positive values, although they are very close to zero.

For Alain, *negative and very negative emotions* were present during baseline, decreased considerably during Phase I and increased slightly during Phase II. *Very positive emotions* were present during baseline, increased considerably during Phase I and remained the same in Phase II. Flat trend lines are shown during all conditions, with a marked change between baseline and Phase I.

For Kai, *negative and very negative emotions* were low during baseline, decreased to almost zero during Phase I and disappeared completely during Phase II. During baseline, the level of *very positive emotions* was similar to that of *negative and very negative emotions*. During Phase I, *very positive emotions* increased considerably; they decreased during Phase II (staying high above baseline). Both Phases I and II showed upward trends, although the slope of Phase I is much steeper than in Phase II.

Social validity

Table 3 shows the scores of the social validity scale. Intervening on coaching by means of video analysis and

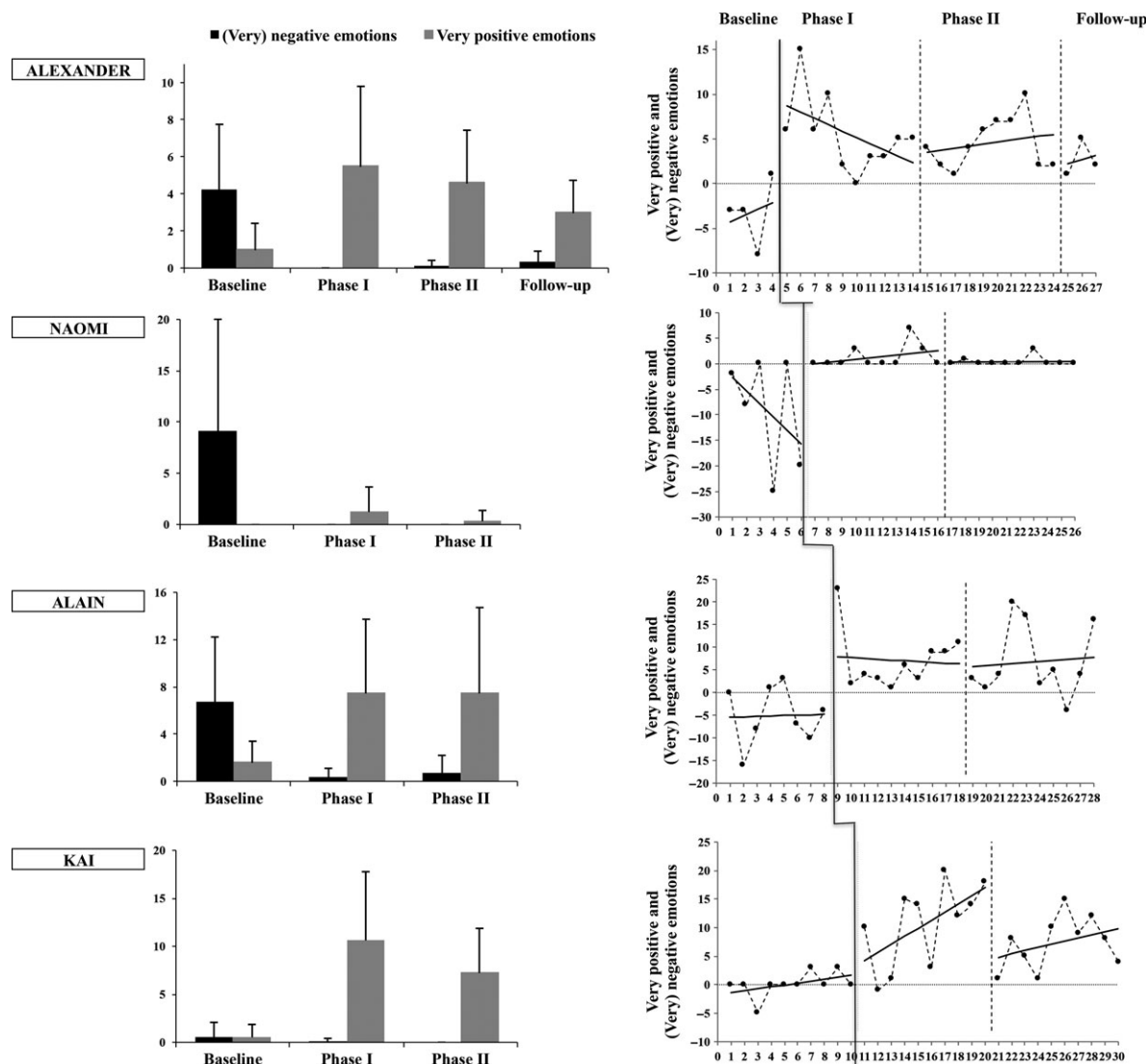


Figure 3 (Very) negative and very positive emotions: mean occurrence and standard deviations for the intervention conditions (left), and differences between the occurrence of very positive and (very) negative emotions (calculated as very positive minus (very) negative emotions) (right).

video feedback was judged with the highest scores ($M = 4.7$). Individual coaching was rated as 'highly effective' (4.7) and team coaching as 'effective' (4.1). Alexander's communication partners judged their own attitude (4.6) and the client's behaviour (4.3) as 'very positively changed'. Across all clients, these judgments were 4.1 and 3.8, respectively. Affective involvement, sharing attention, and recognizing and interpreting initiatives were regarded as 'easy to implement' (3.8, 3.9 and 3.9, respectively). Regulating intensity (average rating of 3.7) varied from 'somewhat easy to implement' (Alain, 3.2) to 'easy to implement' (Naomi, 3.6;

Alexander and Kai, 4). Sharing experiences (2.8) was judged to be 'rather difficult' to implement. Sharing meaning (2.5, for all clients) was judged to be 'difficult to implement' (2) for Alexander and 'rather difficult' to implement for Naomi and Alain (2.6) and Kai (2.9).

Discussion

This study examined the effects of an IMAI-based intervention that was applied to four clients with CDB and intellectual disabilities and their 13 communication partners in four Dutch care organizations specialized in

intellectual and/or visual disabilities. In all cases, the results show an increase in dyadic affective involvement, an increase in the client's very positive emotions and a decrease in the clients' negative and very negative emotions compared to baseline.

The intervention was effective for all clients with CDB and intellectual disabilities. Moreover, the effects were observed in different interactional situations – given that the intervention was applied in a different interactional situation for each client. Furthermore, the effects were found, on average, across the multiple communication partners that were involved with the same client. The design and sample size of the present study do not allow to draw stronger conclusions about the effectiveness of the intervention in different interactional situations, because this would require to use more situations per client. Nor can we conclude that the intervention was effective for each individual communication partner, because the relatively small sample size did not allow analysing this. Given these restrictions, we may yet conclude that our results are in line with those of earlier IMAI-based intervention studies (Martens *et al.* 2014b,c) which showed that the intervention was in general effective for different communication partners and in different interactional situations.

Although a clear intervention effect was found for the category 'very positive emotions', we cannot draw the same conclusion for the category 'positive emotions'. As shown in the text of the Results section, the mean scores for 'positive emotions' were very high as compared to those for (very) negative emotions and for very positive emotions that are depicted in Figure 3. The mean scores for 'positive emotions' were not only high, but they also did not differ across the different intervention conditions and across the different clients (mean occurrence was around 20 for all clients in all intervention conditions). Seeing these mean scores, we realized that we defined the category 'positive emotions' too broadly by including more 'neutral' behaviours such as exploration and cooperation that do not represent 'real' positive emotions. In future studies, a sharper and more restricted behavioural definition of positive emotions should be used.

The mean scores of the outcome measures for the clients across the subsequent conditions of the intervention allow the above conclusion that the intervention was effective in general. The trend lines within conditions, however, could differ for the individual clients, with considerable variability between measurement points. High variability has also been observed in previous IMAI-based intervention studies

(Martens *et al.* 2014b,c). The behavioural variability in the present study might be explained by differences in communication partners or interaction situations across measurement points, or by variability in mood of the client and/or communication partners over time.

In contrast with the upward trend lines for affective involvement during Phase I of the intervention (for Naomi, Alain and Kai), trend lines were either relatively flat during Phase II of the intervention or decreased (remaining a marked change compared to baseline). This may suggest that fostering affective involvement is difficult while sharing experiences and meaning which is analogous to the social validity outcomes.

Alexander's communication partners indicated that it was difficult to share experiences and meaning with Alexander because he was easily overwhelmed. That may be because Alexander had rarely ever had the opportunity to build social communicative relationships and he may need more time to develop a secure base (Bowlby 1982) from which he can explore the world, learn to regulate emotions and acquire skills for interpersonal communication (Trevanthen & Aitken 2001). It is also likely that Alexander's communication partners may need more time to improve their communicative competencies because they were not previously trained in using tactile strategies for communication. Nevertheless, the strong upward trend line for affective involvement during Phase II suggests potential in Alexander and his communication partners.

For Naomi, it was remarkable that negative and very negative emotions decreased considerably after baseline, although the occurrence of affective involvement and very positive emotions remained relatively low. A ceiling effect may have been reached because of limited cognitive abilities, which involve difficulties in changing focus from one topic or stimulus to another (Wilder *et al.* 2004). It remains unclear whether Naomi and her communication partners would have been able to improve their mutual coordination and affective involvement if coaching had lasted longer and her communication partners had been trained more extensively on tactile strategies.

In Alain's case, only two communication partners received individual coaching during the whole intervention: three selected communication partners dropped out of individual coaching due to external factors. Moreover, team coaching sessions revealed that the communication partners had different opinions about interacting and communicating with Alain. Despite the dropouts, we observed an increase in dyadic affective involvement and in Alain's positive emotions, and a

decrease in negative emotions during the intervention. This strengthens the idea that coaching communication partners could help prevent challenging behaviours.

Study limitations

This study has some limitations. First, the high variability of scores across the different measurement points urges practitioners to be cautious about the effectiveness of the intervention. Future studies should isolate as many sources of variability as possible among individuals and should more closely investigate which specific communication partner behaviours bring about changes in a client's affective involvement and emotions. Because people's learning strategies may differ (Clark *et al.* 2012), some communication partners may need more explicit information or may need structured guidance in a more multifaceted intervention (e.g. video feedback and coaching on the job). It is also important to monitor whether the coaching sessions are structured properly by the coach.

Second, due to time limitations, follow-up measurements could only be made for Alexander. No conclusions can therefore be drawn about the durability of the intervention effects.

Third, the generalizability of findings is limited due to the small number of clients who participated in the intervention (Barlow *et al.* 2009).

Implications for practice

As stressed by Hostyn *et al.* (2011) and Forster & Iacono (2014), more interventions on improving emotional interactions should be provided to increase well-being in people with profound intellectual and multiple disabilities. This study was the first to examine the effects of an intervention on fostering affective involvement between people with CDB and intellectual disabilities and their communication partners. It is remarkable that, despite the differences in historical contexts and expertise among the four organizations that run the group homes where the clients lived, the IMAI-based intervention was successfully implemented for each client. This underscores that the IMAI-based intervention is a useful method for training communication partners systematically and effectively in various contexts and that it could contribute to preventing challenging behaviour in clients. Nevertheless, in line with previous studies (Janssen *et al.* 2003a; Martens *et al.* 2014b,c), follow-up measurements in the present study also showed a decrease in affective involvement in one participant (i.e.

Alexander). This decrease suggests that maintaining affective involvement is difficult over time. This could implicate that communication partners need routine coaching on fostering affective involvement for the sake of durability.

Funding

This study was funded by Royal Dutch Kentalis. We would like to acknowledge the contributions of Maartje Hofman at the University of Groningen, Marie Voorbij and Claudia Tamis, and the staff of 's Heerenloo, Foundation Philadelphia Care, Bartimeus, and Royal Visio, the Netherlands.

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