

Social Peer Interactions in Persons with Profound Intellectual and Multiple Disabilities: A Literature Review

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Abstract: Social interactions may positively influence developmental and quality of life outcomes. Research in persons with profound intellectual and multiple disabilities (PIMD) mostly investigated interactions with caregivers. This literature review focuses on peer interactions of persons with PIMD. A computerized literature search of three databases was conducted. Based on specific inclusion criteria eight articles were selected. In these studies, social peer interaction was not clearly operationalized. More interactions with typically developing peers were observed compared to interactions with peers with PIMD. Both groups of peers can be trained to interact or to use technological support systems during peer interactions. After training, interactions with peers increased and interactions with professionals during peer interactions decreased. Interactions with normally developing peers positively influenced specific behaviours of persons with PIMD. Not much research is available on peer interactions of persons with PIMD, especially peer interactions between persons with PIMD remain unclear.

Individuals with PIMD are characterized by profound cognitive disabilities (IQ < 20–25), profound neuromotor dysfunctions (such as spastic quadriplegia) and often sensory impairments and medical problems (such as seizures, respiratory problems and/or feeding problems) (Nakken & Vlaskamp, 2007). They communicate on a pre- or protosymbolic level, using body movements, muscle tension, vocalisations and other subtle signals which are context bound and idiosyncratic (Hostyn & Maes, 2009). Because of their physical, cognitive, and communicative limitations they do not often show behaviours such as waving, smiling or pointing that draw attention from other people and initiate social interactions. Additionally visual and/or hearing impairments and the delay of the reactions form difficulties during social interactions (Vlaskamp, 2011).

Despite these difficulties, social interactions are of high importance. Parents and direct

support staff indicated social interactions and relationships as a core dimension of the quality of life of persons with PIMD (Petry, Maes, & Vlaskamp, 2005). Long-lasting and high quality relationships are highly necessary to be able to understand the person's idiosyncratic expressions and to offer him/her a basic security. The most important bond persons with PIMD have, is the bond with their parents, family, and support staff. Hostyn & Maes (2009) conducted a literature review on social interactions of persons with PIMD with support staff and they suggested the importance of sensitive responsiveness, co-regulation, joint attention, and an emotional component in the interactions. Not only parents, family, and support staff are interaction partners of persons with PIMD. Most of the time they go to special day care centers, special schools, or residential facilities. In these contexts persons with PIMD get in contact with their peers (Lancioni, O'Reilly, & Oliva, 2002). These peer interactions may also have an influence on their quality of life (Petry et al., 2005).

Against the background of the general literature on social interactions, peer interactions are important and critical in everyone's life (e.g. Hay, Payne, & Chadwick, 2004; Rubin, Bukowski, & Parker, 1998). We pre-

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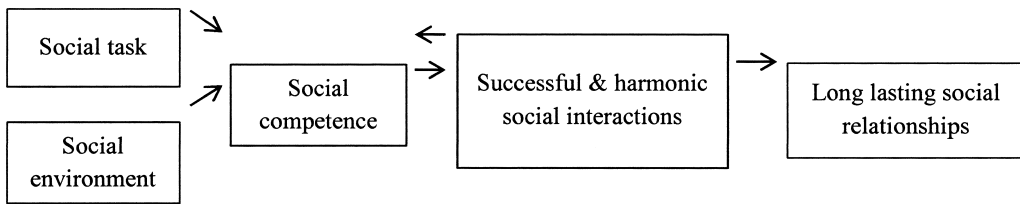


Figure 1. Social Interactions.

sume that this general assumption is also applicable for persons with PIMD. This makes it interesting to start from definitions and concepts related to social interactions based on the general literature (see Figure 1).

Beauchamp and Anderson (2010, p. 40) define social interactions as “events in which people attach meaning to a situation, interpret what others are meaning and respond accordingly”. According to Gleason (1989), who focuses on social interactions in persons with PIMD, ‘social’ refers to what persons do with one another when they are left to themselves. Successful social interactions form the foundation for long lasting supportive social relationships (Beauchamp & Anderson, 2010). These social relationships can positively influence different outcomes: they benefit subjective well-being (e.g. Karelina & De Vries, 2011; Rook, 1984), they facilitate stress coping of both interaction partners (e.g. Hartup & Stevens, 1997), they have a positive effect on mental and physical health (e.g. Cohen, 2004; Cacioppo, Bernston, Sheridan, & McClintock, 2000; Karelina & De Vries, 2011; Lincoln, 2000; Umberson & Montez, 2010), and they benefit cognitive and language development (e.g. Canevello & Crocker, 2010; Hartup, 1989).

Social interactions can only be understood in light of the social task which must match with the demands of the social context (Dodge, Pettit, McClaskey, Brown, & Gottman, 1986). Someone is social competent when the person is able to solve a personal social task while taking the social environment into account (Rubin & Rose-Krasnor, 1992). And only by considering the context, the message within the behaviour can be understood (Gleason, 1989). When a person is social competent successful and harmonic social interactions can arise (Dodge et al., 1986). In children social interactions support the devel-

opment of social competence. Social competence is developed through the combination of experiences in child-adult and peer interactions (Hartup, 2009; Rubin et al., 1998; Williams, Ontai, & Mastergeorge, 2010). Child-adult interactions and interactions with a peer with a higher developmental level are hierarchical, the interaction partner has greater knowledge and social power (Hartup & Moore, 1990; Mueller & Silverman, 1989). During these social interactions children learn more advanced interactive skills (Berk, 2003). To describe this learning process, Vygotsky (1978) introduced the concept of ‘the zone of proximal development’, Bruner (1990) called it ‘scaffolding’. Social interactions with peers with the same developmental level are horizontal, equivalent and egalitarian as they are built with persons with the same social power and the same social developmental level (Hartup, 2009; Hartup & Moore, 1990; Mueller & Silverman, 1989). It is in this social context that children learn skills, needed to develop social competence that cannot be attributed to the adult-child interactions. They learn for example to resolve conflicts, initiate as well as maintain social interactions and relationships, and built the social confidence (Hartup & Moore, 1990).

Looking at social interactions and friendships in persons with PIMD a qualitative in depth description (Gleason, 1989) of the living together of persons with PIMD showed that they demonstrate the whole range of human contact during social interactions with other persons with PIMD and with staff, limited by their disabilities and the environment. Friendship in persons with PIMD has been studied by use of qualitative methods, however, it is not yet clear how friendship is talked about and how it compares with other kinds of relationships of persons with PIMD (Hughes, 2010). However, speaking of inclusion these

friendships and the participation in other people's lives are emphasised instead of citizenship (Reinders, 2002; Reinders, 2008).

The main focus of this paper is to review recent empirical studies that focus on peer interactions of persons with PIMD. Firstly, it will be described how the concepts of 'peers' and 'social interactions' are operationalized in those studies. Who participated in these studies as peers? How are social peer interactions and relations defined and measured? Secondly, it will be investigated what is already known about social relationships and social interactions of persons with PIMD and their peers. Finally, the gaps in this research domain will be identified. What are opportunities for future research? To answer these questions a systematic literature review on this topic was conducted.

Method

Literature Search

A systematic literature review was conducted using PsycINFO, ERIC and Social Science Citation Index (Petticrew & Roberts, 2006). All keywords were combined in singular, plural and verbal forms. One keyword of the (a)-category was always combined with one keyword of the (b)-category, all combinations were searched. The used keywords are: (a) multiple disabilities OR multiple impairments OR profound intellectual disability OR profound learning disability OR profound mental retardation AND (b) peer OR inclusion OR interaction. Inclusion is a relevant search term for this study because social peer interactions in children mostly arise in school settings. Based on our inclusion criteria relevant articles were selected. Afterwards, while reading the selected articles and their reference lists, references that possibly met our inclusion criteria were marked. A selection of these marked references was made, based on the abstracts of the articles and the inclusion criteria. At last a computerized author search was conducted with the first author of every earlier selected article. This combination of different techniques made our search as complete as possible.

TABLE 1

Overview of the Selection Process

<i>Criteria to Exclude Articles</i>	<i>Number of Publications Excluded</i>
1. Target group: no persons with PIMD	
a. Mild, moderate or severe disabilities	108
b. Disabilities in general	19
c. Learning disabilities	21
d. Physical disabilities	10
e. Behavioural problems	33
f. No disability	20
g. Additional psychiatric disorders	1
2. No focus on interaction	
a. Inclusion	22
b. No link with interaction	31
3. No focus on interaction with peers	
a. Training caregivers to interact	9
b. Interaction with caregivers, parents or teachers	28
c. Communication training and technical support	37

Inclusion Criteria

The articles had to meet the following inclusion criteria: (1) English-language articles; (2) peer-reviewed studies, published between 1991 and September 2011; (3) empirical studies with a quantitative or qualitative design; (4) studies investigating the target group of persons with PIMD, according to the definition mentioned in the introduction; (5) interaction with nondisabled or disabled peers as main focus of the studies. For children with PIMD, peers are all children with whom they get in contact. In adults, parents and caregivers or other professionals are no peers. All other adults are peers of adults with PIMD.

Literature Selection Process

The result of our search were over 2000 articles, of which most could be eliminated immediately because they investigate multiple sclerosis, Alzheimer, autism or depression. Also non-peer reviewed articles, books, personal notes, non-systematic literature reviews and congress abstracts were derived. After this first rough selection 346 peer reviewed stud-

TABLE 2

Overview of the Literature Included in the Review

<i>Study</i>	<i>Design</i>	<i>Aim</i>	<i>Participants</i>	<i>Interaction partner</i>	<i>Method</i>	<i>Core results</i>
Anderson & Brady, 1993	Quantitative	Investigating the improvements of specific motor responses as an outcome of interactions with teachers and peers	2 children with severe (IQ < 20) and multiple disabilities aged between 11 and 12 years old 4 peers without disabilities aged 9 to 10 years 2 adult trainers	Normally developing peers	Observation: look/record	Adult instruction and peer socialization increased the participants' motor responses
Brady, Martin, Williams, & Burt, 1991	Quantitative	Investigating the effect of a peer social interaction program on specific motor responses of students with PIMD	1 boy with severe, multiple handicaps aged 6.5 years, functioning 3.9 to 6 months 5 peers without disabilities aged between 11 and 13 years	Normally developing peers	Videotape recordings Observation: look/record	Increased social directed behaviour of normally developing peers and increased motor behaviours of student with PIMD as a result of training
Foreman, Arthur-Kelly, Pascoe, & King, 2004	Quantitative	Investigating differences in the student behaviour states and contextual indicators in inclusive and segregated classroom settings	8 matched pairs of school-aged students with profound and multiple disabilities all aged between 6 and 11 years old	Normally developing peers and peers with disabilities	Observations using coding scheme Behaviour state assessment	Teachers are the main communicators in both settings More peer interactions in general classrooms.
Hanline, 1993	Quantitative	Investigating the nature of spontaneous peer interactions in a preschool program that fully included children with profound disabilities	3 children with profound mental disabilities aged 45 to 60 months old 3 peers without disabilities aged 43 to 59 months old	Normally developing peers and peers with disabilities	Observation using coding scheme	Children with disabilities had many opportunities to participate in peer social interactions Interactions are comparable in length to interactions of peers without disabilities
Hunt, Alwell, Farron-Davis, & Goetz, 1996	Quantitative	Evaluating the effectiveness of an intervention designed to facilitate the social inclusion	3 students with significant physical and intellectual disabilities aged between 7 and 12 years Same-aged classmates without disabilities	Normally developing peers	Observation (Interactive Partnership Scale) Interviews	The intervention has a positive effect on the nature of interactive exchanges
Kennedy & Haring, 1993	Quantitative	Investigating the effect of the use of a microswitch communication system on peer interactions between students with profound multiple disabilities and normally developing peers	4 students with profound multiple disabilities aged between 5 and 20 years 4 nondisabled same-age peers	Normally developing peers	Video recordings Observation	Higher engagement for 2 participants when they controlled the stimuli Higher engagement for 1 participant when the peer controlled the stimuli Undifferentiated pattern for 1 participant

TABLE 2—(Continued)

<i>Study</i>	<i>Design</i>	<i>Aim</i>	<i>Participants</i>	<i>Interaction partner</i>	<i>Method</i>	<i>Core results</i>
Lancioni, O'Reilly, & Oliva, 2002	Quantitative	Investigating the persons' performance in and preference between working in dyads and working alone	4 adults with profound mental retardation and multiple disabilities aged between 29 and 40 years old	Peers with disabilities	Observation	Adults with PMD can be taught to engage cooperatively in tasks and they may prefer forms of cooperative engagement to individual engagement
Logan et al., 1998	Quantitative	Investigating the effect of the type of peer group (normally developing peers or peers with disabilities) on behaviours associated with happiness of students with profound multiple disabilities	5 elementary aged students with profound multiple disabilities aged between 6 and 10 years 6 peers with profound multiple disabilities 2 peers with moderate intellectual disabilities 8 normally developing peers aged 10 and 11 years 5 staff participants	Normally developing peers and peers with disabilities	Audiotaping and observations using a coding scheme An alternating treatments design	Higher levels of happiness behaviours in normally developing peer groups Peers with disabilities do not interact with each other, normally developing peers provide high levels of interaction

ies, published between 1991 and September 2011 were kept. Using the inclusion criteria all the titles and abstracts were screened. An overview of the selection process is given in Table 1.

After this selection seven articles were kept (2.0%). The search of the reference lists revealed us one additional article. The author search disclosed no new articles. Finally eight articles that met our inclusion criteria were selected. When not all participants met our inclusion criteria only the results of the participants with PIMD were used.

Analysis Procedure

The analysing procedure contains four steps. First, the selected literature was summarized in a table with core information of every article in order to enable a good understanding of the literature. The tabulation of the core characteristics included the design, the aim, the method and core results of each study as well as a description and the age of the participants and the interaction partner. Second, the selected articles were carefully read through while focusing on the topic of interest, social peer interactions. In the eight studies a code was allocated to all relevant results, concepts and phrases. Third, all codes were put together and similar codes were grouped in a general theme. By use of these themes the results, concepts and phrases of the different studies were synthesised. Fourth, based on the different themes it was examined how the selected studies relate to each other. Differences, similarities and limitations of the studies came clear by synthesising the studies in different themes (Aveyard, 2010).

Results

Table 2 provides an overview of the eight selected articles. All articles have a quantitative design and they all used observations, except for one article in which observations and interviews were combined. The participant groups varied from two to five persons.

First, the answers on the question 'which peers participated in the studies' and 'how are social peer interactions described' will be discussed. Afterwards the results of the different studies are summarized in five themes: social

TABLE 3

Overview of the Peers of Persons with PIMD

	<i>Children with PIMD</i>	<i>Adults with PIMD</i>
Same-aged peer		
Normally developing	Kennedy & Haring, 1993 Hunt et al., 1996 Hanline, 1993 Forman et al., 2004 Logan et al., 1998 Anderson & Brady, 1993	-
PIMD	Hanline, 1993 Forman et al., 2004 Logan et al., 1998	-
Disability no PIMD	Logan et al., 1998	-
Different-aged peer		
Normally developing	Brady et al., 1991	-
PIMD	-	Lancioni et al., 2002
Disability no PIMD	-	-

interactions in different peer groups; behavioural effects of social peer interactions; effects of peer training; effects of technological support systems and the role of the adult during social peer interactions.

The Peers of Persons with PIMD

Different groups of peers can be distinguished in the different studies, an overview is delivered in Table 3. The participants can be divided in two groups: children with PIMD and adults with PIMD. Seven studies focused on children, only one observed interactions in adults. Lancioni et al. (2002) selected three women with PIMD and one man with PIMD who formed two different aged duo's.

In children, two main groups can be differentiated, based on the age difference with the participant with PIMD. A peer is classified as same-aged when the age difference is less than five years. Six studies observed social interactions between same aged peers. Three of them exclusively focused on peer interactions with normally developing age mates. Kennedy and Haring (1993) selected for every student with PIMD a peer out of a peer tutoring program.

Hunt, Alwell, Farron-Davis, and Goetz (1996) observed social peer interactions in general education classrooms. Anderson and Brady (1993) selected normally developing peers from the same school as the children with PIMD.

Two studies investigated interactions with normally developing peers, but also interactions with other children with PIMD. Hanline (1993) observed social interactions during a full-inclusion summer program. Foreman, Arthur-Kelly, Pascoe, and King (2004) matched students with PIMD of a general education classroom with students with PIMD of a segregated classroom in which only students with PIMD participate. In one study (Logan et al., 1998) interactions with normally developing peers which are part of a peer buddy program, peers with PIMD and peers with moderate intellectual disabilities were observed.

One other study investigated the social peer interactions between children with PIMD and different-aged normally developing children. Brady, Martin, Williams, and Burta (1991) selected normally developing peers and children with PIMD from the same school.

Operationalization of Social Interaction

Kennedy and Haring (1993) do not clearly define social interactions. The children with PIMD were taught to make choices during social interactions with normally developing peers. The normally developing peers were asked to 'play' or 'hang out' with the students, this instruction must lead to social interactions.

In three studies social interaction has been operationalized as direct observable behaviour of the person with PIMD or the peers towards each other. Logan et al. (1998) observed actions of the peers directed towards the persons with PIMD. These actions are talking directly to the person with PIMD, passing materials, making physical contact by touching the person's body with their hands or activity materials, or repositioning the person's wheelchair, but not simply touching the chair. Brady et al. (1991) coded socially directed behaviours and defined this as all child-child interactions characterized by one or more of the following responses: discrete vocalizations, verbalizations, social gestures towards peers, turn taking activities, or simultaneous use of a toy. Hanline (1993) coded each

behaviour during spontaneous peer interactions as initiation, response, positive or negative behaviour or termination behaviour. All codes were defined and the idiosyncratic communicative behaviours of the persons with PIMD were added.

In other studies dyadic characteristics were taken into account in observing social interaction. Lancioni et al. (2002) speak about social interaction as cooperation and friendship but do not explain the connexion between these concepts. They focus on the cooperative engagement between persons with PIMD in a task in which one participant must put an object in the other participants' container. Hunt et al. (1996) investigated the interactive partnership between students with PIMD and normally developing peers by use of the Interactive Partnership Scale. This coding instrument codes communicative initiations by the student with PIMD or the peers, reciprocal interactions, the interaction as social or task related, the communicative function and its quality or emotional characteristics.

Two other studies focused on behaviours of the person with PIMD which are not socially directed, but assumed to be behavioural conditions needed to interact with others. Anderson and Brady (1993) assume that children with PIMD use motor behaviours to interact with their environment. They recorded the number of intervals in which one participant uses an adapted walker and the other holds her head upright while in prone over a wedge. These motor behaviours were selected because of their necessity to interact with others and the environment. Additionally adult and peer interactions were recorded: both physical interactions (e.g. physical prompts, assists, corrections) and verbal interactions (e.g. verbal prompts, information, correction). Foreman et al. (2004) observed the behaviour states of persons with PIMD and contextual indicators including communicative behaviours, activity, and social grouping. Communicative interaction is described as: "the exchange of meaning between partners with curing and responding behaviours" (Foreman et al., 2004, p. 186). The Awake-Active-Alert state is described as "the person engages/interacts by making contact with a person and/or object" (Foreman et al., 2004, p. 186).

Social Interactions in Different Peer Groups

Logan et al. (1998) observed children with PIMD during small group activities in special education classrooms. In total 40 recording intervals (ten-second interval alternating with five-second interval) were observed during a ten minute session. In four participants a higher percentage of intervals with peer interaction was observed during group activities with the normally developing peers (68%; 57%; 37%; 32%) compared to group activities with peers with moderate to profound intellectual disabilities (7%; 8%; 17%; 29%). In one participant a higher percentage of intervals with peer interaction was observed during group activities with persons with moderate disabilities (29%) compared to the normally developing peer group (18%).

Hanline (1993) observed three normally developing children and three same-aged children with PIMD during 240 minutes indoor and 240 minutes outdoor supervised play. Every behaviour during spontaneous peer social interaction involving the child with PIMD was recorded and coded as initiation, response or termination behaviour and as positive or negative social behaviour. No differences in interactions were found comparing the two settings. Children with PIMD got the chance to interact with other children with PIMD, but no such interactions were observed. On the other hand interactions with normally developing peers were observed. The three participants with PIMD were engaged in interactions with normally developing peers for 95%, 79%, and 92% of the observation periods. The children without disabilities initiated 80%, 95%, and 68% of these interactions. When a child with PIMD positively initiated an interaction 36% of their interactions were followed by a positive response of the peer. But in ongoing interactions a positive response of the child with PIMD was followed in 55% of the interactions by a positive response of the normally developing peer.

Foreman et al. (2004) observed every participant by use of an observation schedule in a general or special classroom for 60 five minutes periods. The schedule existed of behaviour state and contextual codes. The Awake-Active-Alert status was observed in 63% of all observations for the students with PIMD in

general classrooms, compared to only 44% for students in special classrooms. Also communicative interactions occurred more frequently in general classrooms (49%) compared to special classrooms (27%). For 56% of the time students with PIMD in special classrooms had no interaction partner compared to 31% of the time in general classrooms. However, only a small part of these interactions were peer interactions. In 17% of the observed interactions the peer was the interaction partner for students with PIMD in general classrooms, the teacher's aides were the main interaction partners (44% of the time). The teachers themselves only interacted in seven per cent of the observed interactions with the person with PIMD. In special classrooms, the peer was the interaction partner in only four per cent of the observed interactions, the teachers in 20% of the observed interactions and the teacher's aides in 11% of the observed interactions.

Generally, very few social interactions have been demonstrated between persons with PIMD. Persons with PIMD seem to have more social interactions with normally developing peers and peers with moderate disabilities.

Effects of Social Peer Interactions

Logan et al. (1998) compared the impact of interactions between persons with PIMD and normally developing age-mates to interactions with peers with moderate to profound disabilities on the happiness behaviour of the persons with PIMD. The happiness behaviour is operationalized as 'smiling' and 'opening eyes'. The peer was asked to keep the student with PIMD happy during small group activities. Information about the likes and dislikes of the student with PIMD was provided. The mean percentage of intervals of happiness behaviours was higher during group activities with normally developing peers compared to group activities with peers with disabilities (41%–5%; 76%–36%; 68%–37%; 43%–12%; 91%–69%). Interactions with normally developing peers seem to have a greater impact on happiness behaviours of persons with PIMD compared to interactions with peers with moderate to profound disabilities.

Effects of Training

Hunt et al. (1996) designed an individualized multicomponent training for normally developing peers to facilitate social inclusion of three students with PIMD in general education and to increase the interactive partnerships between the students with PIMD and their classmates. Three major components can be distinguished in the training: (1) information and friendship programs were provided, (2) media for social interactions were identified (e.g. multimodal communication systems; interactive computer activities; toys, games, and cooperative educational activities) and (3) third-party facilitation was introduced through interactive activities, buddy systems and prompts to promote interactions. Before implementing the intervention a baseline measure was conducted. After the intervention higher percentages of reciprocal peer interactions (baseline: 9%, 13%, 6%; intervention: 24%, 34%, 28%) were observed. Also an increase in the percentage of reciprocal interactions initiated by the student with PIMD (baseline: 9%, 6%, 2%; intervention: 22%, 13%, 11%) and an increase in the percentage of interactions in which the student with PIMD made a comment to another individual (baseline: 10%, 6%, 4%; intervention: 24%, 15%, 16%) were observed. After the training the student with PIMD was no longer only receiver of communication or assistance. The outcome of the interviews suggested that the students with PIMD and their peers were friends and aspects of the intervention supported these relationships.

Brady et al. (1991) designed a social peer interaction program to increase the socially directed behaviours of normally developing peers towards persons with PIMD and to improve the specific motor responses (holding head (partially) upright) of the person with PIMD. During training the normally developing peers were taught how to initiate social interactions, how to recognize and respond to the initiations of the person with PIMD and how to include toy play in social interactions. First, a baseline was set, during which the normally developing peers were asked not to initiate social behaviours. During the peer interaction intervention the normally developing peers had to engage in continuous play

with their peers with PIMD. The training resulted in an increased percentage of intervals of socially directed behaviours of the normally developing students towards the student with PIMD during the peer intervention (baseline: <3%, intervention: from 89% to 100%). After a return to baseline the socially directed behaviours of the normally developing peers dropped back under three per cent. Only during baseline the person with PIMD started socially directed interactions (<3% of the intervals) towards his peers. During peer interactions the specific motor responses of the person with PIMD, holding the head upright or in a partial upright position, increased (baseline: from 14% to 17%; intervention: from 28% to 78% of the intervals). After a return to baseline, the motor responses dropped back to the original levels.

Anderson and Brady (1993) trained normally developing peers in social interactions with students with PIMD. During baseline the child with PIMD, peers and teacher were together in a room, the peer and teacher were asked not to initiate social behaviour towards the child with PIMD. Throughout the baseline no adult interactions were observed for both participants. For one participant no peer interactions were observed, for the other participant the percentage of these interactions ranged between zero per cent and three per cent. Afterwards the intervention took place. First, observations were conducted when the teacher provided instructions about the target motor behaviour to the child with PIMD. During this condition the percentage of adult interaction ranged from 50% to 100% and peer interactions from zero per cent to three per cent for one participant and for the other the percentage of adult interactions ranged from 88% to 100% and no peer interactions were observed. During the second observation two normally developing peers socially interacted with the child with PIMD and encouraged him to show the target motor behaviour. For both participants no adult interactions were observed during this condition. The percentages of peer interactions ranged from 89% to 100% for one participant and from 73% to 85% for the other. Also the impact of normally developing peer interactions and teacher instructions on specific motor responses of the students with PIMD was inves-

tigated. During baseline the first participant used her walker 3% to 12% of the time and the other participant controlled her head from 5% to 64% of the time. Both, adult instructions (participant 1: ranged from 78% to 100%; participant 2: ranged from 21% to 100%) and peer social interactions (participant 1: ranged from 76% to 100%; participant 2: ranged from 76% to 100%) increased the motor responses of the persons with PIMD, but no significant differences were found between the different conditions.

Lancioni et al. (2002) designed training for persons with PIMD to learn how to participate in cooperative tasks (putting an object in specific containers) together with a peer with PIMD. A preference assessment for individual and cooperative tasks was conducted. Five phases can be distinguished in the training: (1) setting a baseline for cooperative and individual tasks; (2) training both tasks; (3) presenting the participants an object cue for the engagement and the reinforcement situation; (4) learning the participants to choose between the engagement related object cue and the reinforcement related object cue; (5) offering a choice between the individual and cooperative task. After the training, three participants showed a greater preference for cooperative tasks in comparison to individual tasks. In respectively 83%, 94% and 86% of the trials of phase five they chose the cooperative tasks. One participant did not succeed to link an object cue to the engagement and reinforcement situation and was therefore not presented to the next phases.

So we may conclude that normally developing peers can be trained to interact with persons with PIMD. Training or interventions increase reciprocal peer interactions, initiations and comments of the person with PIMD, and socially directed behaviours of the normally developing peer. These interventions can also have a positive influence on specific motor responses of the person with PIMD. Persons with PIMD can be trained to work together, and they show preferences for cooperative tasks.

Effects of Technological Support Systems

Kennedy and Haring (1993) taught persons with PIMD how to use a microswitch commu-

nication system during social interactions with normally developing peers. By use of the communication system the persons with PIMD can chose their preferred stimuli. Kennedy and Haring (1993) investigated whether the students with PIMD generalize their use of the communication system to social interactions with their normally developing peers. Firstly, they conducted a preference assessment for each student with PIMD. The most and least preferred stimuli were used during the training. Stimuli were for example a ball, drinking water or listening to music. Secondly, the students learned how to use the microswitch communication system, they learned for example how to control the stimulus presentation. Thirdly, the use of the communication system was expanded to social peer interactions. A baseline in which the student with PIMD had access to the microswitch system was set. Afterwards a student-determined, a peer-determined and a yoked control condition were organized. During the yoked control condition the student and the peer were presented to the stimuli with the same duration and sequence as in the student-determined condition. This was done to control for the sequence and duration of the exposure during the student-determined condition. Two participants preferred to change stimuli themselves by use of the microswitch communication system (85% and 74% engagement with the stimuli) compared to the peer control condition (61% and 53%) or the yoked control condition (45% and 47%). One participant engaged with the stimuli for 58% of the time during the student-determined condition, this increased to 84% and 82% during the peer determined and yoked control condition. The last participant showed no clear preference. The engagement was high during the peer determined condition (67%) and low during the yoked control condition (59%). This study showed no clear results.

The Adult during Peer Interactions

Logan et al. (1998) investigated the differences in interactions of teachers with the student with PIMD during group activities with peers with disabilities and group activities with normally developing peers. The percentage of intervals of teacher interactions with the stu-

dent with PIMD is relatively constant over the normally developing peer condition and the condition with peers with PIMD for all participants respectively: 39%–41%; 48%–47%; 41%–45%; 43%–32%; 29%–49%.

Hunt et al. (1996) implemented training for normally developing peers to increase the interactive partnership between the students with PIMD and their classmates. They observed a decrease in the percentage of para-professionals' interactions after training the normally developing peers (baseline: 15%, 10%, 10%; interactions: 7%, 5%, 2%).

When both peers and adults are present during social peer interactions, adults interact more with the child with PIMD compared to the peer. These interactions with adults decrease after training normally developing peers to socially interact with persons with PIMD.

Discussion

Based on this literature review some general conclusions can be made and answers on the research questions can be formulated. In the results of the eight studies similarities and contradictions can be found. But, since the studies are conducted in very small participant groups, generalization of the findings is impossible.

Firstly, based on this literature review is made clear how the concept of 'peers' is operationalized in the literature. The concept of 'peers' is used differently in different studies. It is useful to make a distinction between children and adults when speaking of their peers. Most studies focused on interactions of children with PIMD, only one focused on adults. In peer relations of normally developing children it is assumed that age-mates have the same developmental level. But, being equal in chronological age does not imply equality in social skills or intellectual abilities (Hartup, 1983). In most studies the peers of children with PIMD are normally developing children with the same chronological age but a different developmental age. During these developmental unequal peer interactions scaffolding can arise (Vygotsky, 1978). This may be a reason why more social peer interactions were observed in the studies that focus on this type of peer interactions compared to studies fo-

ocusing on interactions between persons with PIMD. When speaking of peers, there must always be an equality between the two partners: equality in age and/or equality in developmental level. For children with intellectual disabilities, 'peers' can theoretically be age-mates with the same developmental level, age-mates with a different developmental level and younger children with the same developmental level. Between normally developing adults of a different age, no developmental inequalities exist. This makes differences in age irrelevant when speaking of peers in adults. For adults with an intellectual disability 'peers' can theoretically be age-mates with the same or a different developmental level and persons of a different age with the same or a different developmental level. An exception is interactions of adults with PIMD with caregivers. These interactions are hierarchical rather than egalitarian due to the specific client-caregiver relationship.

Secondly, we want to clarify, based on our literature review, how 'social interactions' are operationalized in those studies. In several articles no clear definition or description of social interactions was given. In the other studies we noticed different levels and ways of operationalization: either as direct observable verbal or physical behaviour directed at peers or as including more dyadic characteristics such as turn-taking activities, simultaneous use of toys or cooperation. Over the eight studies no general operationalization or definition of social interactions can be found. It is required to establish this in future work to create consistency in the research field on social peer interactions in persons with PIMD. A clear operationalization and definition makes research questions and findings more transparent, social interactions observable, and results of different studies comparable.

Thirdly, in this literature review we want to describe what is already known about social relationships and social interactions of persons with PIMD and their peers. Some information about social peer interactions of persons with PIMD was collected. Interactions between persons with PIMD seem to be very rare, interactions with normally developing peers appear more frequently. Social peer interactions, especially interactions with normally developing peers, have a positive effect

on happiness behaviours of persons with PIMD. Normally developing peers can be trained to interact with persons with PIMD. The training for normally developing peers includes receiving information and training how to interact with persons with PIMD. These trainings increase reciprocal peer interactions, initiations and comments of the person with PIMD, and socially directed behaviours of the normally developing peers. Persons with PIMD can be trained to conduct cooperative tasks with their peers with PIMD. When both adults and children with or without PIMD are present, more interactions between the child with PIMD and the adult were observed. By training the normally developing peer, adult interactions during peer interactions can be reduced.

Fourthly, we consider several limitations in the study of social peer interactions of persons with PIMD. First of all the overview is based on only eight studies, all using a quantitative design. By means of this design an evaluation of the outcome of social peer interactions and a comparison of social peer interactions in different conditions can be made. However, a qualitative method could deliver richer descriptions of the social peer interactions and give us a more nuanced image of the nature and the course of social peer interactions of persons with PIMD. Additionally, half of the studies in our review focused on peer interactions with normally developing children, just one only focused on social peer interactions between persons with PIMD. However most of the time persons with PIMD are together with other peers with PIMD in day care centers, special schools and residential facilities. Persons with PIMD do not often participate in inclusive settings. Because of this separation they do not get frequently in contact with their non-disabled peers (Lancioni et al., 2002). This makes research on interactions between persons with PIMD important. Another consideration, when interactions between persons with PIMD were object of the study only very few interactions were observed. However, based on practical experiences, we are convinced of the occurrence of more peer interactions between persons with PIMD. Reciprocal interactions between persons with PIMD are not expected because of the fact that they mostly interact and are in environ-

ments with many caregivers. This decreases the chance of peer interactions. The low cognitive developmental level and the difficulties to move and react physically also form a threshold to peer interactions. Therefore, future research should be looking at other behaviours and refine the idea of what social peer interactions may be for persons with PIMD.

This review indicates that research on social peer interactions of persons with PIMD is restricted. So more studies are needed, since the potential positive effects of social peer interactions on different life domains and the possibility to support interactions positively. Some questions about interactions of persons with PIMD with normally developing peers have already been answered. Nevertheless the nature and influencing factors of these interactions and the possible interventions to facilitate them, need further research. Social interactions between peers with PIMD remain unclear. Research questions that could be asked include: do they interact, how do they interact, what are influencing factors of these peer interactions and what can facilitate these peer interactions? Also studies about the effects of both types of interactions, with normally developing peers as well as with peers with PIMD, on developmental and quality of life outcomes would be worthwhile. Finally, social peer interactions may be the basis of friendship relationships, so questions about social peer interactions implicate questions about friendships between persons with PIMD.

The research to date has been paid little attention to social peer interactions in persons with PIMD. Only eight recent empirical studies focusing on peer interactions of persons with PIMD that met the inclusion criteria were found. This review made it possible to summarize a few initial findings, identify gaps and make propositions on this topic.

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