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ABSTRACT

In the Netherlands, the trend towards inclusion has led to the development of a 'To School Together' programme in which students with profound intellectual and multiple disabilities (PIMD) receive tailored care and education during the school day in a special classroom ('To School Together' class) within a mainstream school. Besides shared activities with other students with disabilities in the 'To School Together' classroom, inclusion moments are organised in which students with PIMD engage in activities with typically developing peers. A teaching assistant (TA) is present to support the student with PIMD. In this study, we explored the type of activities offered during these inclusion moments, the interaction between students with PIMD and their peers, and the role of TAs. Video recordings were made of three inclusion moments for eight students with PIMD. We coded the contact initiations of students with PIMD, their peers and TAs, and the responses to these initiations. The results show a total of 246 contact initiations by peers where students with PIMD responded positively 82 times, TAs attempted to facilitate interactions 55 times and students with PIMD responded positively 11 times. Based on our findings, we make several recommendations that can guide inclusive practices for students with PIMD.

Introduction

Students with profound intellectual and multiple disabilities (PIMD) are not yet included in mainstream classrooms as a matter of course. However, this particular student population has the right to be included in mainstream schools (United Nations 2006) and their inclusion could lead to increased opportunities for social interaction with typically developing peers (hereafter called 'peers'). High-quality interactions are crucial for the quality of life of persons with PIMD (Hostyn and Maes 2009; Petry, Maes, and Vlaskamp 2005). Therefore, it is important to explore the possibilities for including students with PIMD in mainstream schools, to assess whether inclusion has a positive effect on their social

interactions with peers and to identify the role of a teaching assistant in supporting these interactions.

A 'To School Together' project was recently initiated in the Netherlands to promote the integration of students with PIMD into mainstream schools. In this project, a classroom in a regular primary school is specially designed and adapted for students with severe disabilities. In a 'To School Together' class, students with severe disabilities, such as PIMD, receive tailored care and education from trained direct support professionals during the school day. Direct support professionals are involved in the support of persons with PIMD on a daily basis. In the Dutch context, these are professionals with either a medical or educational background (Jansen, Van Der Putten, and Vlaskamp 2016). Students in a 'To School Together' class undertake activities with other students with disabilities and occasionally join their typically developing peers during activities in regular classrooms. Since the 'To School Together' classroom is located within a regular primary school, it is a short distance from one classroom to another. Conversely, children in regular classes sometimes join in activities with students with disabilities in the 'To School Together' classroom. In addition to these inclusion moments, a student with PIMD may be matched to a typically developing peer and take part in activities in either the mainstream classroom or the 'To School Together' classroom.

These inclusion moments provide opportunities for peer interaction. However, engaging in peer interaction is not self-evident for students with PIMD. Individuals with PIMD can experience difficulties during peer interactions due to their profound and multiple disabilities (Nijs et al. 2016). Their profound intellectual disabilities, profound or severe neuromotor dysfunctions, possible health problems, sensory impairments and limited understanding of verbal language (Nakken and Vlaskamp 2007; Van Timmeren et al. 2017) seriously hinder their ability to interact with others. Such interaction is also difficult because communication is mostly pre- or proto-symbolic and consists of movements, sounds, body postures, facial expressions or muscle tensions (Maes et al. 2007). Nonetheless, research shows that individuals with PIMD can show peer-directed behaviours (Nijs, Vlaskamp, and Maes 2015; Nijs et al. 2016). These studies were conducted in day care facilities accommodating only children with PIMD. There is a lack of research on the interactions of students with PIMD with peers in mainstream primary schools.

We know from research on students with special educational needs (SEN) that including students with SEN in inclusive classrooms does not automatically lead to an increase in interaction (Koster et al. 2010). Koster et al. (2010) studied the social participation of students with special needs (behavioural disorders, autistic spectrum disorders, motor disabilities, intellectual disabilities or speech/language disabilities) in regular primary education. Their results show that, in general, students with SEN have fewer friends and fewer interactions with classmates than their typically developing peers. For some students, inclusion can even result in negative outcomes, such as loneliness and rejection, rather than the assumed positive outcomes. Teachers have the vital task of monitoring the social participation of students and, in doing so, they can prevent the harmful long-term effect of negative social experiences at school (Koster et al. 2009). As well as teachers, teaching assistants (TAs) also have an important role in facilitating the social participation of students with SEN.

Internationally, the movement towards including students with disabilities in general education classrooms has led to an increase in the number of TAs (Sharma and Salend

2016). TAs have been employed in the primary classroom, especially to support the needs of students with SEN (MacKenzie 2011). The TA's work includes tasks to make education accessible and available for a variety of students. TAs supplement teacher input, provide opportunities for one-to-one and small group work, and work with students outside the classroom (Webster et al. 2010). The main goal of their work is to assist and support students during the learning process (Takala 2007).

Earlier research has not always shown positive results regarding the impact of a TA's presence on peer interactions. TAs frequently teach students with SEN separately individually or in small groups, which means that students are rarely included in whole class instructions and spend less time in the classroom (Webster and Blatchford 2013; Sharma and Salend 2016). This leads to an experience of separation from the classroom, teacher and peers, which may have a negative effect on the interactions that students with SEN have with their peers (Blatchford and Webster 2018; Giangreco et al. 1997; Sharma and Salend 2016). The presence of the TA can therefore create a physical or symbolic barrier that interferes with interactions between a student with disabilities and their classmates (Giangreco et al. 2005).

Similarly, research suggests that the presence of a direct support professional in day-care centres for children with PIMD does not positively influence peer interactions among children with PIMD. Research by Nijs, Vlaskamp, and Maes (2015) revealed that children displayed significantly less peer-directed behaviour in the presence of a direct support professional than in situations where a direct support professional was absent. Rather than facilitating peer interactions, direct support professionals spent most of their time focusing on other things, such as organising the activity or one-on-one interaction with one child. They also displayed distracting behaviours that interrupted peer interaction, such as displacing an object used by playing peers, or calling a child's name. In addition, they paid little attention to the position of the children. Children were put in place at the start of an activity and were not moved during the activity. As a result, children who were placed where they could see and touch their peers displayed the greatest number of peer-directed behaviours. A study by Kamstra et al. (2019) also showed that interactions among peers with PIMD was nearly impossible due to their physical positioning by direct support professionals. These studies indicate that TAs and direct support professionals do not always have a facilitating role in promoting peer interactions and may in fact hamper such interactions.

In the context of the present study, direct support professionals provide care and/or education to students with PIMD throughout the school day. They do so during activities with other students with disabilities in the 'To School Together' classroom, as well as during inclusion moments when students with PIMD engage in activities with students without disabilities. During these inclusion moments the direct support professional is present to assist the student. The direct support professional may offer one-to-one support to the student when needed, by helping them to express themselves or by helping peers understand these expressions. Direct support professionals may also offer suggestions to peers on how to interact with the student with PIMD. In addition, they may offer medical support when needed. Since direct support professionals support the needs of students during inclusion moments and help to make education accessible and available for students, their task is similar to the role of a TA. However, we do not yet know how TAs (the direct support professionals in the context of the present study)

actually support students, since research on this topic in this context has not yet been conducted.

We do not yet know what happens during these inclusion moments. There is no research on the kind of activities undertaken and whether students with PIMD engage in interactions with peers during inclusion moments. More specifically, we do not know whether students with PIMD initiate contact with peers and whether peers respond. Nor do we know whether peers initiate contact with students with PIMD and whether students with PIMD respond. The role of TAs (i.e. the direct support professionals in the 'To School Together' classes) in supporting peer interactions is also unclear. Earlier research indicates that TAs and direct support professionals may have a negative influence on peer interactions. As mentioned, their presence seems to hamper rather than facilitate peer interactions. This study was set up to fill this knowledge gap by answering the following research questions:

1. How can we describe the inclusion moments for students with PIMD and the interactions between them and peers during these inclusion moments?

2. What is the TA's role in supporting interactions between students with PIMD and peers during these inclusion moments?

It is important to gain insights into what happens during inclusion moments, whether peer interactions take place and what the TA's role is during these moments. These insights will add new knowledge to the research base on inclusive education and social participation. They will also fill the research gap on the peer interactions of students with PIMD in mainstream schools and can be used to tailor and improve inclusive practices for students with PIMD.

Method

Participants

An approach was made to all Dutch primary schools with an inclusive classroom for students with severe disabilities (i.e. a 'To School Together' class). Eight students from three schools were selected to participate. These students met the following inclusion criteria: a) they attended a 'To School Together' class in a mainstream primary school in the Netherlands; b) they were aged between 3 and 12 years; c) they had a profound intellectual disability not determinable by standardised instruments (Nakken and Vlaskamp 2007); and d) they had a profound or severe motor disability (Nakken and Vlaskamp 2007). (Table 1) provides an overview of the students' characteristics.

Procedure

Written informed consent to participate in the current study was obtained from the parents of the students with PIMD. In accordance with the general policy and guidelines of the participating schools, passive consent was obtained from the peers' parents, the TAs and the teachers at the mainstream school. Approval was therefore assumed unless TAs or teachers indicated that they did not wish to participate, or parents indicated that they did not want their children to participate. Prior approval to carry out the current

Table 1. Students' characteristics.

Student	Gender	Age (in years)	Sensory impairment	Specified motor impairment
1 (School A)	Boy	9	–	Spasticity
2 (School A)	Girl	9	Visual	Spasticity and malformations
3 (School A)	Boy	4	Visual	–
4 (School A)	Girl	3	Visual	Hypotension, malformation, scoliosis
5 (School B)	Boy	9	Auditory	Spasticity, hypotension, malformation, frontometaphyseal dysplasia, joint contractures
6 (School B)	Boy	7	Visual	Hypertension, spasticity
7 (School C)	Girl	9	Visual	Hypotension and hypermobility
8 (School C)	Boy	9	–	Hypertension

study was also obtained from the ethical committee of the Department of Pedagogical and Educational Sciences at the University of Groningen.

Data collection

Video recordings were made of inclusion moments in which the student with PIMD engaged in activities with peers. No criteria were formulated for inclusion moments: the TA and primary school teacher discussed and made decisions about the types of activities that were suitable for inclusion. Video observation is the method most frequently used to examine interactions of persons with PIMD (Hostyn and Maes 2009). Video recordings were made of three inclusion moments for each of the eight students. The video recording was carried out in 2016 (school A) and 2017 (schools B and C) in the second half of the school year, in March, April and May. The lengths of the inclusion moments differ, but most lasted about 45 minutes. A total of 24 video recordings were made. Each recording started at the beginning of the activity and ended when the activity ended (see Table 3 for an overview of the activities).

Coding scheme

To analyse the interaction between peers, the student with PIMD and the TA, we developed a coding scheme for the videos (see Table 2), based on previously developed coding schemes for peer interactions of students with severe disabilities (Baulminger, Shulman, and Agam 2003; Hauck et al. 1995; Nijs, Vlaskamp, and Maes 2015; Nijs et al. 2016). We coded all contact initiations by students with PIMD, peers or TAs, as well as the response from the person addressed in this initiative. For example, if a student with PIMD touched the arm of a peer (an initiative by a student with PIMD) and the peer responded by touching the arm of the student (a response from the peer). We categorised the responses into three groups: a positive response (e.g. the peer responded by touching the student's

Table 2. Coding scheme.

Actor	Action		Example

- Student with PIMD
  - Peer
  - TA
	Initiative		- Offering object
			  - Physical contact (touching/grabbing)
			  - Verbalisation (making sounds)
			  - Asking questions
			  - Giving information
			  - Pointing

	Response	Positive response	- Physical contact
			  - Eye contact
			  - Accepting an object
			  - Imitation
			  - Verbal response

		No response	- No response of any kind

		Negative response	- Turning away
			  - Avoidance
			  - Unrelated behaviour
			  - Becoming irritated

arm), an absence of response (e.g. the peer did not respond), and a negative response (e.g. the peer pushed the student's hand away).

Data analysis

The video recordings varied in length, depending on the activity. To make the video recordings comparable, we selected 15 minutes from each of the 24 videos for data analysis. Since this study focuses on the TA's role in supporting peer interactions, we selected video fragments that showed (in this order): 1. interaction (at least one initiative followed by at least one response) between a student with PIMD and typically developing peer(s), facilitated by a TA; 2. interaction between a student with PIMD and typically developing peer(s) without the facilitation of the TA; 3. at least one initiative by a student with PIMD or a typically developing student, without a response of the addressed student; 4. no signs of interaction between the student with PIMD and typically developing peer(s). In other words, if the first occurred, we would select this fragment to code, followed by 2, 3, and 4.

To answer the first research question, the first author described the setting, location, activity and presence of other students with and without PIMD and teachers for each video. To answer the second research question, initiatives and responses were coded using the previously mentioned coding scheme. The first author coded all the selected video fragments. To ensure the reliability of the first author's coding, a research assistant coded 25% of the material. Cohen's Kappa statistic was 0.72, which is above the recommended cut-off value of 0.60.

We calculated the frequency of the initiations and responses (positive/negative/absent) by students with PIMD, peers and TAs. In addition to the frequencies, we added examples of initiative-response patterns to illustrate the nature of the initiatives and responses.

Results

Inclusion moments

The video recordings showed that inclusion moments occurred in various settings and locations (see Table 3). Students 1, 3 and 4 were included in a regular classroom, where they undertook an activity together with a class of typically-developing peers. Student 2 joined a small group of peers during an activity in the corridor. Students 5 and 6 were each matched with a peer (buddy), with whom they engaged in various activities in the 'To School Together' classroom or the mainstream classroom. Students 7 and 8 were recorded during the same activities in the 'To School Together' classroom. Together with another student with PIMD and two peers, students 7 and 8 participated in activities guided by three TAs.

During all the inclusion moments for students 2, 4, 5, 6, 7 and 8, the TA was close to the student with PIMD (within a reachable distance) most of the time. One of the TAs for students 1 and 3 was close by, while the other two TAs were present at a distance (not within the student's reach). With regard to proximity to peers, students were closest to peers in freer and more open settings, such as physical education lessons and playtime (e.g. students 1 and 4), compared to more fixed settings, such as sitting at a desk or in a circle (e.g. students 2, 7, 8).

Some students engaged in the same activity in each of the three inclusion moments (students 1, 4, 7, 8), while the activities of others varied (students 2, 3, 5, 6). Due to their physical and intellectual disabilities, students had difficulty taking part in some activities, such as playing tennis, playing chess, or learning about contradictions in a language lesson. Some TAs tried to adjust the activity to make it possible for the students to engage. For example, student 1 took part in a tennis lesson during physical education. Student 1 relied on his wheelchair and was not able to handle a racket and hit a ball independently. Student 1's TA explored various ways to engage him in the lesson. She took him out of his wheelchair and got him to stand up and lean against her as they held the tennis racket together and tried to hit the ball. After a few tries she sat down with the student, faced him and rolled the tennis ball towards him. Student 2 took part in a language lesson, in which typically developing students learned about contradictions. The TA tried to include the student by writing down the words mentioned by the peers and showing them to the student. During the third inclusion moment for student 2, two peers played board games, including chess. The TA asked the peers how the student could join in their games. In addition, TAs often tried to find the best position for a student to join in an activity. For example, during playtime (students 3, 4 and 5), TAs would take the student out of their wheelchair and place them near a group of peers who were playing on the ground.

Interactions initiated by students with PIMD

Students 1, 3, 5 and 6 initiated contact towards peers four, four, one and 24 times respectively (see Figure 1). No initiations were observed for students 2, 4, 7 and 8. Peers responded positively to all four of student 1's initiations and either negatively (once), positively (once) or not at all (twice) to student 3. Student 5's single initiation was followed by a negative response from the peer. Peers responded negatively

Table 3. Description of inclusion moments.

Student	Setting	Location	Activity	Presence of other people	
				Peers	Teachers
1.	Inclusion in the regular classroom	Physical education classroom (1,2,3)	Physical education (1,2,3)	Full class of peers (1,2,3)	- Primary school teacher (1A, 2A, 3A) - TA, close by (1A) or at a distance (2B, 3 C)
2.	Inclusion in a small group	Corridor (1,2,3)	Language class (1), playing board games (2), listening to a story (3)	Two peers (1,2) Group of peers (3)	- TA, close by (1A, 2B, 3 C)
3.	Inclusion in the regular classroom	Mainstream classroom (1,2,3)	Music class (1,2), playtime (3)	Full class of peers (1,2,3)	- Primary school teacher (1A, 2A) - TA, close by (2A) or at a distance (1B, 3B)
4.	Inclusion in the regular classroom	Mainstream classroom (1,2,3)	Playtime (1,2,3)	Full class of peers (1,2,3)	- Primary school teacher, at a distance (1A) - TA, close by (1A, 2B, 3B)
5.	Inclusion in the 'To School Together' classroom	'To School Together' classroom (1,2,3)	Physical education (1), playtime (2), art class (3)	A buddy (peer) and other students with PIMD (1,2,3)	- TA, close by (1A, 2B, 3A)
6.	Inclusion in the 'To School Together' classroom Inclusion in the regular classroom	'To School Together' classroom (1,2) Mainstream classroom (3)	Cooking class (1, 3), cooking class and watching a movie (2)	A buddy (peer) and other students with PIMD (1,2). A buddy (peer) and other peers (3).	- Primary school teacher (3A,B) - TA, close by (1A, 2B, 3A)
7.	Inclusion in the 'To School Together' classroom	'To School Together' classroom (1,2,3)	Art class (1,2,3)	Three students with PIMD and two peers (1,2,3)	- TA, close by (1A, B, C, 2A, B, C, 3A, B, C)
8.	Inclusion in the 'To School Together' classroom	'To School Together classroom (1,2,3)	Art class (1,2,3)	Three students with PIMD and two peers (1,2,3)	- TA, close by (1A, B, C, 2A, B, C, 3A, B, C)

Note. Numbers 1, 2 and 3 refer to inclusion moments 1, 2 and 3. Letters A, B, C refer to the primary school teacher or TA present. For example, the same teacher (A) was present during each inclusion moment for student 1. A different TA (A, B or C) was present during each inclusion moment.

most often (23) to the 24 initiations by student 6, and positively only once. A total of 33 contact initiations by students with PIMD were observed. Most peer responses were negative (25 times), followed by positive responses (6 times) and the absence of a response (2 times). An example of interactions initiated by a student with PIMD is presented in the text box.

An example of interactions initiated by a student with PIMD (see Figure 2). In this 11 example, student 3 is included in a regular classroom setting with peers aged 4–5 years old. The teacher is giving a music lesson. All the peers are sitting on chairs in a circle. The student with PIMD is placed in his wheelchair in the middle of the circle. The TA is seated on the other side of the circle, next to the teacher. The teacher starts the lesson by telling the group that student 3 loves music and they are going to sing a song for him. The teacher hands out instruments to some students. The peer seated to the left of the student with PIMD is playing the maraca. The student tries to grab the maraca twice (11:06 and 11:13), without the peer noticing (see Figure 2). The peer seated to the right of the student is playing the tambourine, which the student also tries to grab. The peer notices this and pulls back the hand holding the instrument. The peer to the left with the maraca then makes physical contact with the student twice by stroking his head (11:45 and 13:33). The student does not respond to this.
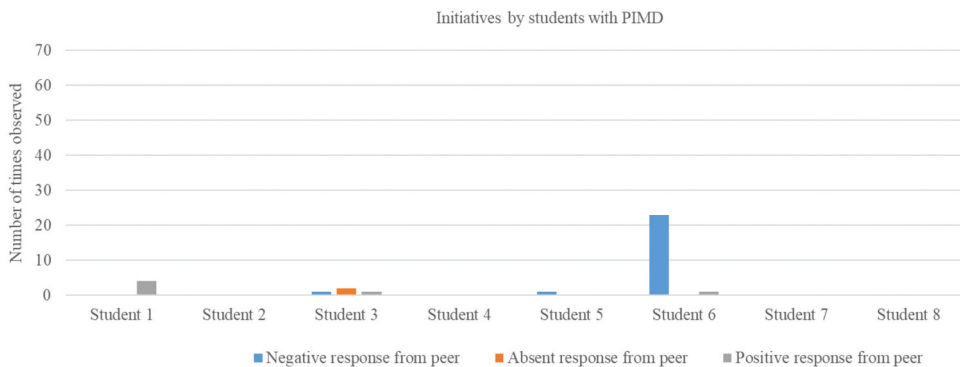

Figure 1. Initiatives by students with PIMD.

Interactions initiated by peers

The peers present during student 1's inclusion moments made 11 contact initiations (see Figure 3). The student with PIMD responded negatively six times and did not respond the other five times. The peers of students 2 and 3 each made 28 initiations. Student 2 did not respond to any of these initiations, while student 3 showed a negative response five times, a positive response seven times and no response 16 times. Student 4's peers made 30 contact initiations, to which the student responded negatively once and did not
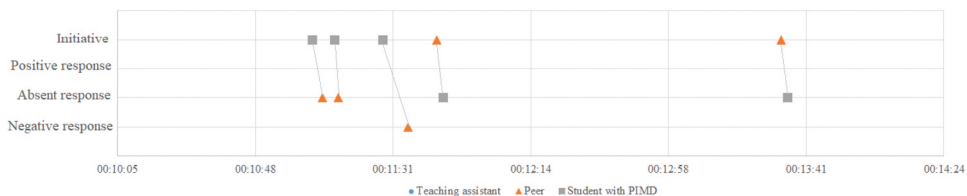

Figure 2. An example of student initiations (student 3).

respond the other 29 times. The peers present during student 5's inclusion moments made 90 initiations. The student reacted negatively three times, positively 58 times, and no response was observed 29 times. Student 6's peers made 45 initiations. The student reacted negatively six times, positively 17 times, and no response was observed 22 times. None of the peers present during student 7's inclusion moments made initiations. Student 8's peers made 14 initiations, none of which the student responded to. A total of 246 peer initiatives were observed. On most occasions, students with PIMD did not respond (143), followed by 82 positive responses and 21 negative responses.

> An example of interactions initiated by a peer (see Figure 4) In this example, student 5 is sitting at a table in the 'To School Together' classroom, with a peer (buddy) sitting next to him. The TA is seated on the other side of the table with another student with PIMD. They are going to make a clay heart, a Mother's Day present. The peer gives a piece of clay to the student with PIMD (32:52) and the student starts pressing the clay. The peer starts rolling another piece of clay herself (34:29). The TA enthusiastically comments on the peer's work to the student, who does not respond. The student tries to take the peer's piece of clay, which the peer does not allow. The peer (35:39) places a heart shape on the clay and asks the student to press it. The student presses the form into the clay.
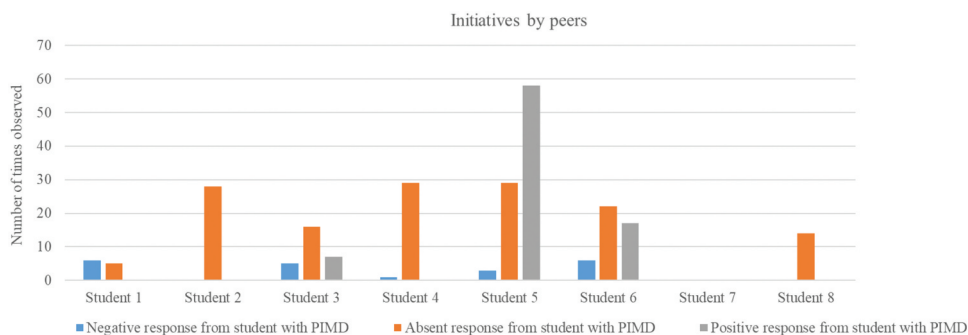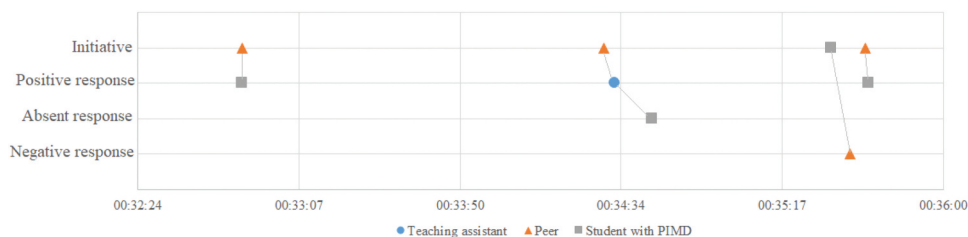

Figure 3. Initiatives by peers.

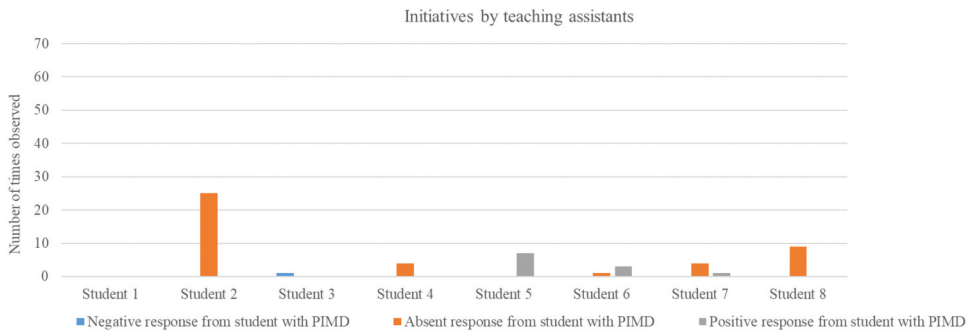**Figure 4.** An example of peer initiations (student 5).

Figure 5. Initiatives by teaching assistants.

Interactions initiated by teaching assistants

The TAs present during student 1's inclusion moments did not initiate the facilitating of interaction between the students and peers (see Figure 5). The TAs present during student 2's inclusion moments made 25 attempts to create interactions between students with PIMD and peers. The student with PIMD did not respond to these initiations. One of student 3's TAs made an initiation that resulted in a negative response from the student. Student 4's TAs made four initiations that were not responded to by the student. The TAs present during student 5's inclusion moments made seven initiations, to which the student made seven positive responses. In the case of student 6, the TAs made four initiations. The student did not respond on one occasion and responded positively the other three times. Student 7's TAs made five initiations, to which the student responded positively once and made no response four times. The TAs present during student 8's inclusion moments made nine initiations, none of which provoked a response from the student. In sum, TAs tried to initiate interaction between the students with PIMD and peers 55 times. The students with PIMD mostly did not respond (43 times), followed by a positive response (11 times) and a negative response (once).
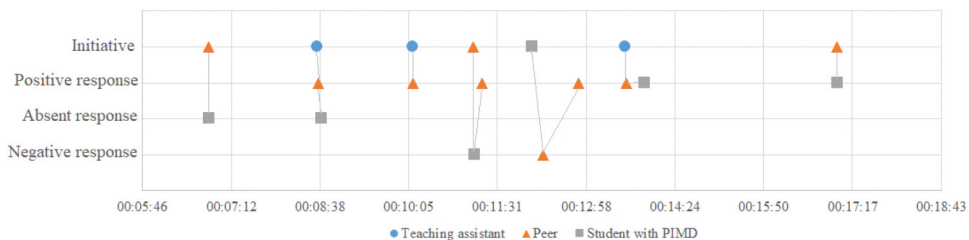

Figure 6. An example of TA initiations (student 6).

An example of interactions initiated by a TA (see Figure 6). In this example, student 6 and a peer (his buddy) are sitting at a table in the school corridor near a kitchen. The TA and another student with PIMD are sitting at the same table. The peer sets out the ingredients to make a dessert. The student is watching the peer. The peer strokes the student's arm (6:50). The student does not respond. The TA suggests that the peer let the student smell the ingredients (8:36). The peer does so. The student does not seem to respond. The TA suggests that they go to the kitchen to use the mixer and let the student feel the mixer when it is switched on (10:09). The peer goes to the kitchen. He starts mixing (11:08) and lets the student feel the mixer. The student does not seem to like this. He pulls back his hands and covers his ears. The peer tries to calm him by stroking his arm. When the mixing is finished, the student puts his hand in the batter (12:05). The peer says the student's name and pulls his hand out of the batter. He then laughs and cleans the student's hand. The TA indicates that the peer can fill cups with the batter on the student's wheelchair tray. The peer does this so that the student can smell the dessert. The student looks at the peer filling the cups. The peer puts an apron on the student and lets him eat the batter left in the bowl.

Discussion

Our results indicated that inclusion moments occurred in various settings and locations. Overall, our findings show that peers initiated more contact with students with PIMD than vice versa. Students with PIMD did not respond to most of the initiations by peers. It is not possible to ask the students with PIMD to explain why they did not initiate contact or respond to initiations. However, there are possible explanations that could be explored in further research. The first is that some activities were difficult for students with PIMD to engage in because of their physical and intellectual disabilities. Examples are tennis lessons, language lessons and games of chess. Some TAs tried to make the activity accessible by adapting the content of the activity or adjusting the student's position. For example, by taking a student out of their wheelchair and placing them on the ground among a group of playing students. Research shows that the positioning of individuals with PIMD can be improved to encourage interactions with other people (Kamstra et al. 2019). Positioning can therefore influence the number of peer-directed behaviours. Given the perception behaviours of students with PIMD (looking, listening, tasting, touching and smelling), it is important to place the student near peers, which gives both the student and the peers opportunities to perceive each other and reach out to each other.

A second explanation could be a mismatch in the communication modes used by peers and students with PIMD. Peers, for instance, tend to opt for physical contact in contact initiations, such as stroking the student with PIMD, or laying an arm around their shoulder. Not all students with PIMD appreciate this physical approach. Peers may also fail to notice the expressions of students with PIMD, who usually communicate by subtle facial or bodily expressions and vocalisations that are difficult to interpret (Penne et al. 2012). In addition, they often do not show behaviours such as waving or pointing to attract the attention of others in order to initiate social interactions (Nijs and Maes 2014).

A third explanation is that the complex disabilities of students with PIMD can hamper interaction. For example, many students with PIMD have sensory impairments (Evenhuis et al. 2001), as was the case for six students in this study.

A fourth explanation is that students with PIMD do not necessarily need peer interactions in order to enjoy or benefit from inclusion moments. We gave an example of student 3 taking part in a music lesson. As mentioned in the text box, the teacher commented that the student loved music. The observations do indeed show that the student reacted positively when his peers sang a song. He was also very interested in the instruments that they played. In other words, this student seemed to enjoy listening to other students sing despite not being able to sing himself. Seeing and hearing peers playing instruments can also be very interesting in itself.

This raises the question of whether social interactions should be the main outcome of inclusion moments. Enjoying the presence of other students, and being in a new, different environment that triggers a student's interest and alertness might also be very valuable outcomes. In addition, inclusion moments may have positive effects on peers who have an opportunity to meet students with PIMD.

With regard to the TA's role in supporting peer interactions, we found that TAs tried to facilitate interactions between students with PIMD and peers. However, they differed in the degree to which they tried to do so. A possible explanation is in our setting, TAs may have seen their main role as that of direct support professionals who offer medical and practical support to the students, while the teacher is responsible for the lesson content. These different views may lead to different approaches and could explain why one TA does not intervene in the situation, while another tries out a variety of ways to enhance peer interaction. However, even when TAs feel responsible for facilitating interaction, they still need the knowledge and skills to do so effectively. TAs may intend to foster interaction, while unintentionally hampering it. We know from previous research in other settings that the presence of TAs does not always have a positive influence on the peer interactions of students with disabilities. For example, a study by Blatchford and Webster (2018) showed that students with SEN have more interactions with TAs and fewer interactions with peers compared to students without SEN. For children with PIMD, research by Nijs et al. (2016) found that direct support professionals in day-care centres for children with PIMD do not usually focus on facilitating peer interactions. Rather, they spend most of their time doing such things as organising the activity. Also, examples were found in which direct support professionals drew the attention of children with PIMD to themselves instead of to interaction with other students with PIMD. The results of our study did not indicate that TAs drew attention away from peer interactions. Nor did TAs engage in interactions with the students that excluded peers.

The interplay between the TA, the peer and the student with PIMD seemed to be very effective in settings in which a peer (buddy) was matched to a student with PIMD. The text box examples of students 5 and 6 provide an illustration of how the three worked together. The TA was present, offering suggestions and answering the peer's questions when needed. However, the TA's focus was on supporting another student with PIMD. This left the peer to take the lead in executing the activity with their buddy. Since they had all known each other for some time, they were well attuned to one another, which is reflected in the interactions that took place. The peer tried various ways to activate the student's senses and include him in the process of making the dessert: he let him smell

and taste the batter, which the student seemed to enjoy. When the student expressed his discomfort at the loud noise made by the mixer, the peer calmed him down, after which the student put his hand in the batter. This was not the peer's plan. The peer was startled and pulled the student's hand out of the batter, and then immediately started laughing at the student's action. They both seemed to find it very funny. Even though their contact initiations and responses were not always perfectly in tune (in the sense that every initiative was followed by a positive response), it is evident from the videos that they enjoyed each other's company. This particular setting – matching students to peers – allows an opportunity for friendships to develop. More interaction can occur as the student and peer get to know each other better.

Strengths and limitations

A strength of this study is that it adds to the knowledge on social interactions of students with PIMD. Most research so far has focused on interactions between children or adults with PIMD in residential or day-care facilities (Nijs, Vlaskamp, and Maes 2015; Kamstra et al. 2019). The current study offers a new perspective on the interactions of children with PIMD who are included in a mainstream school.

A limitation of this study is that we only used observations to answer our research questions. Although we cannot ask students with PIMD to describe their experiences, we could have asked TAs, teachers and peers about their views on and experiences of the inclusion of students with PIMD. We could also have used video-stimulated recall to invite them to reflect on their behaviours. Another limitation is that we did not consult knowledgeable others in the coding process. Students with PIMD often display very idiosyncratic behavioural expressions that are difficult to identify and interpret. This may have influenced our coding. Consulting the parents, for example, might have improved the coding process. Because they know their children best, they may have been able to identify idiosyncratic behavioural expressions that we perhaps missed.

Research implications

Our suggestion for future research is to investigate outcomes of inclusion moments for students with PIMD and their peers other than social interaction. We have already suggested aspects such as enjoyment, interest and alertness as potential positive outcomes of inclusion moments. A suggestion for practice would be to initiate meetings in which TAs, teachers, peers, parents and siblings of children with PIMD share their knowledge about the student. Integrating these various perspectives will provide insights into the student's abilities, disabilities, needs and preferences, which may help in the selection of activities that are adapted to the abilities and wishes of the student. Given the heterogeneity of students with PIMD and the severity of their disabilities, they are dependent on staff being sufficiently knowledgeable to provide them with appropriate activities. Therefore, teachers and TAs must have detailed and extensive knowledge about the preferences and abilities of each student in order to offer appropriate activities (Ten Brug, Van Der Putten, and Vlaskamp 2013; Vlaskamp, Hiemstra, and Wierdsma 2007).

Besides exploring what kind of activities can best be offered during inclusion moments, these meetings can also be used to discuss how students with PIMD can best be addressed by others. TAs, parents and siblings of students with PIMD could inform peers about how the student likes to be approached and how and when they might respond. Siblings grow up with the person with PIMD and adjust the way in which they make contact (Nijs et al. 2016). Siblings mainly use non-verbal attention-directing behaviours and often use physical support, such as helping the child with PIMD to grasp an object by manipulating their hand. Presenting a combination of verbal and non-verbal behaviours is more likely to attract the attention of the student with PIMD. Therefore, siblings might have valuable input for optimising inclusion moments. These meetings could be organised on a regular basis to evaluate how things are going and to make adjustments where necessary, in order to create inclusion moments that are most beneficial for students with PIMD and their peers.

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