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Understanding the relationship between teacher behavior and motivation in students with acquired deafblindness

Haakma, Ineke; Janssen, Marleen; Minnaert, Alexander

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UNDERSTANDING THE RELATIONSHIP BETWEEN TEACHER BEHAVIOR AND MOTIVATION IN STUDENTS WITH ACQUIRED DEAFBLINDNESS

B

ECAUSE LITTLE is known about teacher-student relationships that involve students with acquired deafblindness, the authors performed a multiple case study with a multiple-method design to investigate the relationship between need-supportive teaching behaviors and student engagement. Using self-determination theory (Deci & Ryan, 2000), they analyzed video observations of interactions. It was found that teachers' provision of structure, autonomy support, and involvement often co-occurs with higher levels of student engagement. Moreover, varying degrees of need support over time seem to result in varying levels of student engagement. Examples are provided of need-supportive teaching behaviors that can be used to foster the motivation of students with acquired deafblindness.

**INEKE HAAKMA, MARLEEN
JANSSEN, AND ALEXANDER
MINNAERT**

ALL THREE AUTHORS ARE AFFILIATED WITH THE FACULTY OF BEHAVIORAL AND SOCIAL SCIENCES, DEPARTMENT OF SPECIAL NEEDS EDUCATION AND YOUTH CARE, UNIVERSITY OF GRONINGEN, GRONINGEN, NETHERLANDS. HAAKMA IS A POSTDOCTORAL RESEARCHER/LECTURER; JANSSEN AND MINNAERT ARE PROFESSORS.

Keywords: acquired deafblindness, motivation, engagement, self-determination theory, teacher-student interactions

Research has shown that the quality of the teacher-student relationship influences students' school outcomes (Brophy, 1988; Niemiec & Ryan, 2009; Opdenakker & Minnaert, 2014). Supportive teacher-student relationships have been found to increase students' motivation (Wentzel, 2002), which leads to positive educational outcomes (Eccles, Wigfield, & Schiefele, 1998). Despite growing awareness of the importance of teacher-student relationships in general education, little is known about these relationships

among students with acquired deafblindness. Since there are indications that teacher-student relationships are particularly important for students who are academically at risk (Roorda, Koomen, Spilt, & Oort, 2011), we assume that these relationships are particularly consequential for students with acquired deafblindness.

Students with acquired deafblindness are not born with both visual and hearing losses but acquire one or both during their life (Dalby et al., 2009). Causes of acquired deafblindness include, among others, head injuries, tumors, and genetic disorders such as Usher syndrome (Dammeyer, 2014). Visual and auditory impairments, and especially the combination of both, can



cause loss of energy, problems with incidental learning, headaches, concentration problems, and diminished enthusiasm (de Kok, 2009; Ellis & Hodges, 2013). All these problems influence a student's ability to engage in learning.

When someone receives a diagnosis of progressive vision and hearing loss or acquires these impairments suddenly, this has important consequences for the person's life and education. For instance, it is difficult for a student with a progressive impairment to choose what to study, since it is difficult to predict what he or she may be capable of in the future (de Kok, 2009). This may mean that a student has to change schools or alter or say goodbye to a dream for the future—for example, with regard to professional aspirations (Ellis & Hodges, 2013). This clearly can have a great impact on a student's motivation to learn.

There is a need for research to explore how teachers of students with acquired deafblindness can create teacher-student relationships that foster these students' needs. Such research can provide input to teacher-training programs designed to prepare teachers of students with deafblindness.

Students with acquired deafblindness are often educated in schools for the deaf. Teacher preparation programs for teaching deaf and hard of hearing students often do not train teachers to work with students with deafblindness (Bruce, DiNatale, & Ford, 2008). Teachers need to realize that methods for teaching deaf and hard of hearing students are not totally adequate for students with dual sensory loss (Prickett & Prickett, 1992). Although children and youth with acquired deafblindness form a small segment of the student population, they deserve and require extensive assis-

tance in order to achieve their full potential (Hicks & Hicks, 1981).

Need-Supportive Teacher-Student Interactions

Teacher-student interactions are embedded in teacher-student relationships (Gallucci, 2014). The literature on students without disabilities tells us that teacher-student interactions in which students' needs are supported have a positive impact on students' motivation. (For a review, see Stroet, Opdenakker, & Minnaert, 2013.) *Self-determination theory* states that all students have the same three basic psychological needs: competence, autonomy, and relatedness (Deci & Ryan, 2000). Teachers can support those needs by providing structure, autonomy support, and involvement in the interactions they have with their students.

Competence

Competence refers to the experience of efficacy while completing a learning task (Deci & Ryan, 2000; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009). Competence-supportive teaching involves providing structure, which refers to the amount and clarity of information that teachers provide about their expectations and how students can effectively achieve desired educational outcomes (Skinner & Belmont, 1993). Competence-suppressive teacher behavior—for example, providing confusing or contradictory information, failing to communicate clear expectations and directions, and failing to explain how to attain an outcome—can promote chaos in the classroom.

Autonomy

Autonomy refers to the experience of choice and psychological freedom with regard to study activities (Deci & Ryan,

2000; Sierens et al., 2009). Autonomy-supportive teaching involves behaviors that promote students' tendency to engage in learning because they value an activity or find it interesting (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). Autonomy-supportive teachers acknowledge students' frames of reference; identify and nurture their needs, interests, and preferences; provide optimal challenges; highlight meaningful learning goals; and present interesting, relevant, and enriching activities (Assor, Kaplan, & Roth, 2002; Black & Deci, 2000; Jang, Reeve, & Deci, 2010; Ryan & Connell, 1989). In contrast, autonomy-suppressive teacher behavior includes using controlling language, external controls, or incentives and threats (Reeve, 2006). This behavior pressures students toward specific outcomes and thereby interferes with their self-determination and denies them the experience of choice (Deci & Ryan, 1980).

Relatedness

The need for *relatedness* refers to feeling connected to others (Baumeister & Leary, 1995; Deci & Ryan, 2000). It also involves developing secure and satisfying connections with others (Deci, Vallerand, Pelletier, & Ryan, 1991). Teachers' involvement supports students' need for relatedness. Involved teachers give timely and appropriate responses to students' initiations, signals, and needs (La Guardia, Ryan, Couchman, & Deci, 2000). They also convey warmth, care, and respect (Niemic & Ryan, 2009). Moreover, they express their attunement and understanding, show affection, dedicate resources, make themselves available, and dependably offer support (Belmont, Skinner, Wellborn, & Connell, 1992).

Student Engagement

Research on students without disabilities indicates that supportive teacher-



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student interactions are connected with students' learning, academic motivation, and engagement (Stroet et al., 2013). *Engagement* can be seen as the outward manifestation of motivation and captures the quality of students' participation in learning activities in the classroom (Opdenakker & Minnaert, 2011; Skinner, Kindermann, & Furrer, 2009).

Engagement includes behavioral and emotional participation in the classroom. The opposite of engagement is disengagement or disaffection (Connell & Wellborn, 1991). Engaged behaviors include exerting effort, persisting, paying attention, focusing, being proactive, and being on task and highly engaged in a learning activity. Disengaged behaviors include apathy, withdrawal, alienation, lack of initiation, giving up, and being reactive and passive. Emotional states characteristic of engagement include enthusiasm, interest, and enjoyment; among those characteristic of disengagement are dejection, discouragement, apathy, and learned helplessness (Skinner et al., 2009).

Objective of the Present Study

There are few studies on educating students with acquired deafblindness. As Fletcher and Guthrie (2013) have noted, most research on people with deafblindness has focused on congenital deafblindness. The studies that have addressed acquired deafblindness are mostly quantitative, with a focus on collecting data about the characteristics of people with deafblindness. In general, knowledge about students with acquired deafblindness is fragmentary and often anecdotal (Möller & Danermark, 2007). Moreover, there is a lack of qualitative studies that provide an in-depth understanding of individual experiences (Fletcher & Guthrie, 2013).

The objective of the present study was to bridge the research gap by analyzing interactions between teachers and students with acquired deafblindness. In contrast with previous studies on people with acquired deafblindness, it combined quantitative and qualitative research methods. By using a multiple-case-study and multiple-method design, we aimed to gain detailed insights into the relationship between need-supportive teaching behavior and the engagement of students with acquired deafblindness. We addressed two research questions:

1. Do teachers of students with acquired deafblindness support students' needs?
2. How does need-supportive teacher-student interaction influence students' motivation?

Method Participants

We recruited students by contacting all the schools in the Netherlands that focus on teaching deaf and hard of hearing students, blind or visually impaired students, or students with deafblindness. We also contacted Usher syndrome network groups, hospitals with cochlear implant centers, and organizations that provide diagnoses, care, and educational services to deaf, blind, or deafblind people. Criteria for inclusion were that participants be students in secondary education classes who had a combination of hearing and visual impairments.

Three students with acquired deafblindness and three of their teachers participated in the present study. In line with the guidelines described in the World Medical Association's Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects, the teachers and the parents of the participating students signed informed consent forms before the

study began. None of the students were completely deafblind, and none had intellectual disabilities. Table 1 presents background information about the participants. This information was derived from file analysis and interviews with the teachers. To protect privacy, all names have been changed.

Settings

Special Secondary School

Marie and Selina attended a special secondary school in the Netherlands for students with hearing impairments or severe speech disorders. They were the only students in either of their classes with vision loss. Both of them are able to read the teacher's and other students' sign language.

Marie and her teacher were recorded during cooking class (home economics), which had a student-teacher ratio of 5:1. Cooking classes took place in a kitchen with four countertops, each with a sink and a gas cooktop. Marie and another girl worked together, two boys worked together, and another boy worked alone. In each class period, students prepared a meal that they ate afterward.

Selina and her teacher were recorded during biology class, which had a student-teacher ratio of 6:1. The tables were arranged in a U-shape around the teacher's desk, and Selina sat opposite the teacher, facing her. Each class started with a discussion of homework assignments, followed by introduction of a new topic by the teacher. Students then worked individually on a learning task, which they discussed at the end of the class.

Regular Secondary School

Violet attended a regular secondary school in the Netherlands. She and her teacher were recorded during a Dutch-language class with a student-teacher ratio of 25:1. In this classroom, seats



Table 1
Participant Characteristics

		<i>Selina^S and Susan^T</i>	<i>Marie^S and Katherine^T</i>	<i>Violet^S and Clark^T</i>
Student	Gender	Female	Female	Female
	Age (years)	15	14	15
	Diagnosis	Duane syndrome	Usher syndrome, type 1C	Refsum disease
	Visual impairment	Abnormal eye movements. Difficulties rotating one or both eyes outward.	Mild (correctable with glasses)	Mild (correctable with glasses)
	Hearing impairment	Profound	Mild	Moderate
	Mode of communication	Dutch Sign Language	Dutch Sign Language	Spoken language
Teacher	Gender	Female	Female	Male
	Age (years)	60	31	62
	Years of experience in education	30 at this school	4.5 at this school	4 as a teacher in regular primary education; 27 as a school principal in regular primary education; 12 as a teacher in regular secondary education
	Years teaching this student	1	2	1

Notes. S = student. T = teacher.

were arranged two by two in three rows. Violet sat at the first desk in the middle row in the front of the classroom. A typist interpreter sat at the desk next to hers and transcribed the classroom communication. During class, Violet could read along on the interpreter's laptop. The teacher wore an FM system and used both a blackboard and a large screen with an overhead projector that was connected to his computer. The lessons were structured in the same way as Selina's biology classes. When the homework assignments were discussed, the answers were projected on the large screen.

Procedures

Data Collection

A trained cameraman recorded the lessons 1 or 2 days a week over a 2-month period. The home economics class was taught once a week, for 90 minutes per class. The biology class was taught once a week, for 45 minutes per class. The Dutch-language class was taught twice a week, for 45 minutes per class.

Data Selection

From all the collected video material, we selected one activity from each teacher-student pair for analysis. Following the technique used by Preisler, Tvingstedt, and Ahlström (2002), we selected video fragments that illustrated characteristic features of the interaction at the time of the video recordings and transcribed and analyzed them in detail. Analyzing a video fragment in which a common situation occurred enabled us to gain insights into what happened on a regular school day and thereby enhance the study's ecological validity. Other selection criteria were that the teacher and student both be present and that they be doing learning activities with which they were both familiar.

We tried to select activities with comparable numbers of interactions. This was possible for Susan and Selina and Violet: we selected fragments with 35 interactions for each of them. However, it was impossible to find a fragment with 35 successive in-

teractions for Katherine and Marie. This can be explained by the difference in lesson content: While Selina and Violet were recorded in a traditional classroom setting with the teacher standing in front of the class, Marie was recorded during cooking class. Fewer interactions took place between the teacher and student because students worked independently most of the time. Therefore, we selected a fragment with 9 interactions for Katherine and Marie.

Coding

The selected video fragments were analyzed in several steps. First, a trained researcher transcribed all interactions between the teachers and students. The transcriber was unaware of the study's purpose. Second, two different trained researchers coded the transcriptions. Both researchers were very familiar with the process of coding videos of teacher-student interactions, had knowledge about the characteristics of the teachers and students, and



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were well informed about the observation categories. One researcher coded all the videos; the second coded 25% of them. Cohen's kappa (a measure of agreement adjusted for chance agreement) was 0.74 for the

dimension structure provision, 0.93 for autonomy support, 0.78 for involvement, and 0.66 for engagement. All values were above the recommended cutoff value of 0.60 for kappa-like statistics.

Observation Categories

The observation categories (see Table 2) were operationalized according to descriptions of need-supportive teaching behavior and student engagement found in the literature.

Table 2
Observation Categories

Coding form			
<i>1st column</i>	<i>2nd column</i>	<i>3rd column</i>	
		Quantitative analysis	Qualitative analysis
Interaction number	Transcript	Coding	Comments
	Teacher behavior	S +/-	
		A +/-	
		I +/-	
	Student behavior	E 1/2/3/4/5	
Coding form for teachers' behavior			
<i>Behavior</i>		<i>Code</i>	<i>Interpretation</i>
Structure (S)	Provide clarity	1	Present
	Offer guidance	0	Absent
	Provide support and encouragement		
	Provide constructive, informational feedback		
Autonomy support (A)	Provide choice	1	Present
	Foster relevance	0	Absent
	Show respect		
Involvement (I)	Show affection	1	Present
	Express attunement	0	Absent
	Dedicate resources to the student		
	Be dependable and available to offer support		
Coding form for students' engagement			
<i>Engagement</i>	<i>Code</i>	<i>Behavior</i>	<i>Emotion</i>
Active disengagement	1	Disengaged: The student is actively busy with something other than the learning task.	When doing something other than the task: calm, happy. When forced to do the task: frustrated, angry, nervous.
Passive	2	Disengaged: The student is inactive or apathetic and looks withdrawn from the learning task.	Stoicism, indifference
Neutral	3	Engaged: Basic work attitude. The student does what is necessary to get by.	Calm. The student does not show clear signs of negative or positive emotions.
Active positive	4	Actively engaged: The student takes self-initiated action to participate in the task.	Happiness, enjoyment
Flow	5	Actively engaged: The student shows full involvement in the activity, is completely focused, and shows persistence when facing setbacks.	Enthusiasm, excitement



Teachers' Behavior

Teachers' provision of structure, autonomy support, and involvement was coded as either present or absent. Since all the video recordings were made in classrooms with other students, the teacher often provided instructions for everyone together, instead of individual instructions. These classroom instructions were also coded since they could also include need support and affect the student's motivation.

Students' Engagement

Students' engagement was coded on a 5-point scale ranging from "active disengagement" (1) to "flow" (5), the fullest degree of engagement. We only coded the engagement of the three students with deafblindness and not that of their classmates.

Analysis

The unit of analysis was the interaction between the teacher and the student. In Figures 1, 2, and 3 (discussed below), each number on the X-axis represents an interaction between teacher and student. An interaction refers to an action and a response, that is, an action by the teacher followed by a response from the student. For example, the teacher asks a question (which is coded as need supporting or not) and the student answers the question (which is coded on a scale for disengaged to engaged).

Each interaction in a fragment was assigned teacher codes for structure (plus or minus), autonomy support (plus or minus), and involvement (plus or minus), and a code for student engagement (1–5). These codes are presented in figures in which the X-axis represent interactions over time. The Y-axis presents the teacher's need support (1: present / 0: absent) and the student's engagement (1 = disengaged to 5 = engaged).

In addition, we thematically analyzed the videos using the phases of thematic analysis described by Braun and Clark (2006). First, we transcribed the data. Second, we identified themes within the data using a deductive method: provision of structure, autonomy support, and involvement for teachers, and engagement for students. We then analyzed and interpreted the data. Illustrative data extracts are provided below.

Results: Susan (Teacher) and Selina (Student)

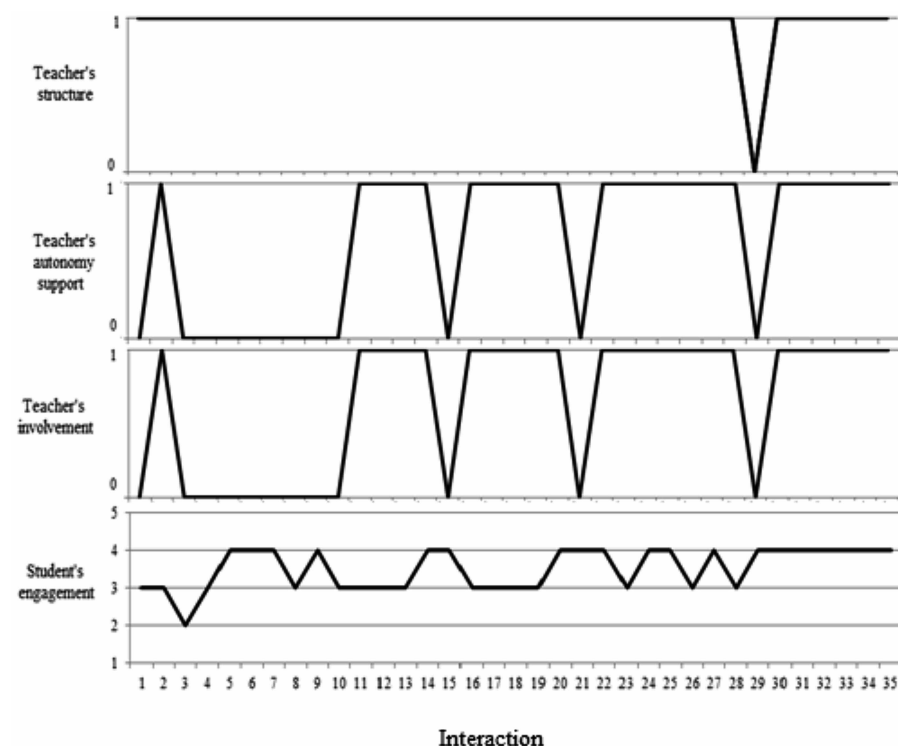
Figure 1 presents the results related to Susan and Selina. Overall, the lesson content can be divided into two parts: Part 1 includes starting up the lesson (interactions 1–10), and part 2 includes the main lesson in which a new topic was explained (interactions 11–35).

In Transcript 1, a summary of inter-

actions 1–5 is presented. In the first part of the lesson, students entered the classroom, took their seats, and handed in their homework. Susan checked whether all the students had completed their homework. She mainly provided structure. Susan took Selina's visual needs into account by asking whether Selina wanted the curtains closed for better visibility (interaction 2). At interaction 3, Selina's engagement level was low: The other students were talking, but Selina did not participate in the conversation. When the teacher asked Selina whether she had done her homework, she was eager and enthusiastic to explain what she had done (engagement level 4):

Transcript 1: The students enter the classroom and take their seats. The teacher asks whether they finished their homework assignment (a book

Figure 1
Interaction Patterns of Susan (Teacher) and Selina (Student)



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report). The teacher says, "You have to finish it by Friday. Friday is the deadline. Otherwise, you'll need to stay Friday afternoon." Selina hasn't finished the book report. The teacher says, "Friday is the deadline. If it is done tomorrow, then hand it in tomorrow." The teacher asks Selina whether the curtains need to be closed. Selina answers, "Closed." She helps the teacher close the curtains. Meanwhile, the other students are talking with each other. Selina takes her seat. The teacher tells everyone to open their books. The teacher asks Selina whether she has done her homework. Selina replies enthusiastically that she has and that she did even more than was asked.

In Transcript 2, a summary of interaction 11–15 is presented. In the second part of the lesson, the teacher introduced a new topic and asked related questions. Susan's instructional style was generally supportive of all three needs:

Transcript 2: The teacher asks another student if he knows the title of today's theme. The student gives the wrong answer. She repeats the title of the theme. Selina answers, "People and the environment." The teacher says to the whole group, "Look at her, she said 'People and the environment.'" She writes it on the blackboard. "What do these two have in common?" Several students give incorrect answers. One student says that they have to pay attention to it. The teacher responds, "Yes, people need to pay attention. They need to take into account the environment because they are . . . ?" Another student finishes her answer: "dependent." The teacher says, "Yes, dependent on their environment."

Teacher Behavior Structure

Susan provided structure in the sense that she provided clear instructions, clearly explained her expectations, gave informative feedback, and organized the classroom in an orderly manner. Since Selina had lost her vision on the outer left and right sides of her visual field, she was unable to see students signing on her left or right. Susan helped Selina by pointing to the student who was talking and repeating what was said.

Autonomy Support

Susan provided interesting and challenging learning activities. The lesson content seemed to be adjusted correctly: It did not seem too easy, since the students' answers were not always correct, but it did not seem too hard, since students also provided correct answers. They all paid attention and actively participated in the classroom.

Susan communicated in an open manner; she encouraged students' own initiations and communicated nondirectively. A lot of interaction took place between the teacher and the students and between students.

Selina often raised her hand to answer a question or share some thoughts about the lesson subject. Susan did not always respond to Selina's raised hand. In other words, Selina was not always given the opportunity to say what she wanted to say. This would seem to suppress autonomy, but Susan explained that she did this because she wanted to equally distribute students' input. Selina had to learn to wait her turn. Otherwise, only Selina would get the opportunity to provide input.

Involvement

At the beginning of the lesson, Susan's involvement was mostly absent. She

was focused on collecting the homework and did not want to hear any excuses for not completing it. When they moved on to discussing the lesson's topic, Susan almost continuously showed involvement. She divided her attention among all the students and was responsive and available. Moreover, she was friendly and kind and made jokes; she showed interest and understanding.

Student Engagement

Selina was eager to learn. She was always the first to raise her hand to answer the teacher's questions. The only time she was disengaged was during a classroom discussion in which she did not participate. She might have been unable to follow the discussion because of her sensory loss. However, Selina was engaged most of the time: She did what Susan asked and took initiative to share ideas.

Relationship Between the Teacher's Behavior and the Student's Engagement

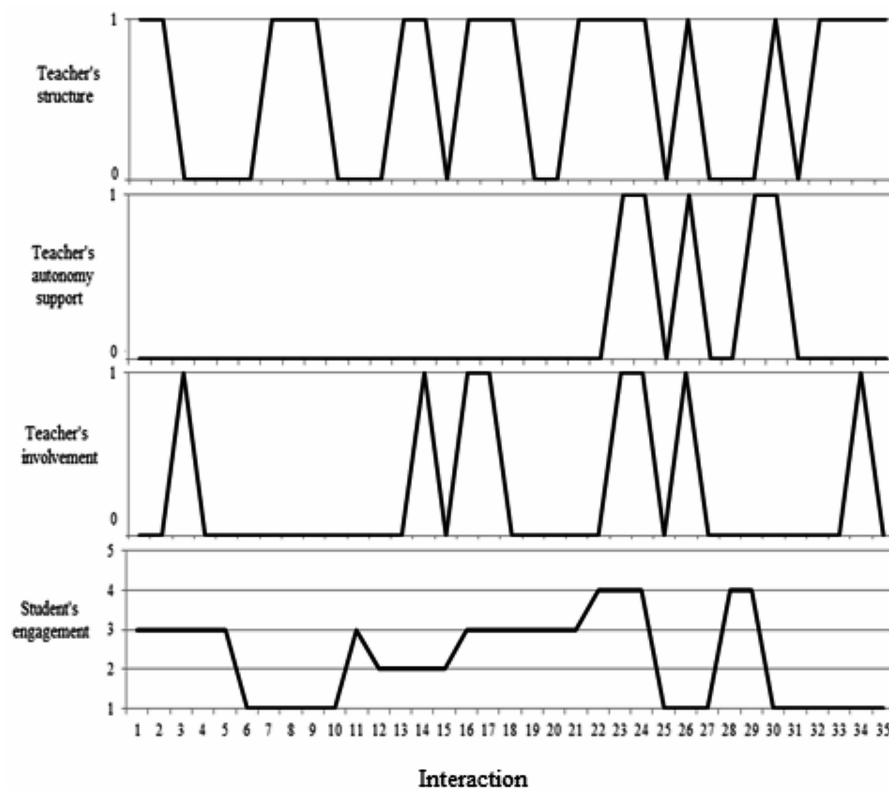
The patterns of fluctuation in the amount of need support provided by Susan was different from the pattern in the level of Selina's engagement. In general, Susan supported all three needs most of the time, and Selina was engaged most of the time.

Results: Clark (Teacher) and Violet (Student)

Figure 2 shows the results for Clark and Violet. The lesson can be divided as follows. First, Clark gave classroom instruction: He explained a topic and asked students questions (interactions 11–18). They then checked the answers to an assignment (interactions 19–25). Thereafter, Clark continued giving classroom instruction.

As Figure 2 shows, Violet paid attention during the first part of the lesson,

Figure 2
Interaction Patterns of Clark (Teacher) and Violet (Student)



but her attention seemed to drift after a while. She often looked around, yawned, and wrote in her diary. Her attention returned when Clark asked her a question. However, as described in Transcript 3 (a summary of interaction 11–18), she barely reacted because she did not seem understand the question.

Transcript 3: Clark says to the whole class, “You can derive the meaning of a word by looking at the context of the text.” He asks Violet, “Where should you look for it in the context?” Another student wants to give the answer, but the teacher corrects him by saying “Sshhh!” Violet looks up at Clark. She thinks for a second and asks, “What exactly was the question?” The teacher replies, “It is about how you look at the context of a text. How do you know the meaning of a word?

By looking at the context. And where exactly should you look for it?” Violet does not respond. Clark looks around to see whether other students have an idea. Another student says, “Examples.” Clark repeats the student’s answer. He asks Violet if she knows another example. She does not respond. Three other students add “contradictions,” “pictures and illustrations,” and “descriptions.” Clark repeats all the answers for Violet and asks whether she remembers them. Violet looks vaguely at the teacher and does not react. Clark again asks, “Yes or no?” The expression on Violet’s face is difficult to read; it appears that she still does not understand. Clark directs his attention to the whole class and repeats where to look in the context of the text. Although he directs his attention to other students, he keeps involving Violet by

looking at her occasionally. Violet looks at Clark while he is explaining and nods every now and then. He ends his explanation with “Do you understand?” Violet nods. Clark says to the whole class, “Any questions about this subject? Then let’s continue with the answers. Check the answers in your workbook.”

In the second part of the lesson, Clark wanted to check the students’ answers to an assignment (interactions 19–25). He used an overhead projector to display the answers and asked the students to correct their own assignments. At interaction 22, Violet asked whether the screen could be enlarged, because she could not read it.

At interaction 25, Clark continued with his instruction. He asked questions and explained the answers. However, Violet was still busy checking the answers to the assignment. She kept looking at the screen instead of listening to Clark. On the one hand, she was engaged since she was really active and was independently correcting her answers. On the other hand, she was simultaneously disengaged because she was not paying attention to what the teacher said.

At interaction 28, Violet asked whether the next assignment could be put on the large screen. Clark interrupted his instruction and responded to Violet that the next assignment was not part of the homework. Violet replied that she had already done the assignment. Clark put the answer on the screen and continued with his classroom instruction. Meanwhile, Violet kept checking her answers.

Teacher Behavior Structure

Clark tried to provide clarity, support, encouragement, and constructive feedback. However, his explanations were sometimes vague. Students often

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indicated that they did not understand the question or the explanation. Instead of trying to explain it in another, clearer manner, he kept repeating what he had already said.

This is also visible in the transcript. Violet did not seem to understand Clark, even after he would repeat a questions several times. Violet nodded in the end to indicate that she understood, but it is unclear whether she really did. It thus appears that the lack of structure was mostly caused by the teacher's choice of words.

Moreover, sometimes the classroom could be a bit chaotic. Students often spoke out of turn. However, Violet did not seem to be affected by the classroom noise. She continued with her task even when other students were talking.

Autonomy Support

Clark did not provide a lot of autonomy support. He did not clearly indicate the relevance of the learning task or adjust the content to the students' interests. However, he did try to activate students by asking them questions. Overall, the students' participation levels were low, and most were distracted very quickly.

Involvement

In a classroom with nearly 30 students, it seemed difficult for Clark to show personal involvement. He mostly stuck to the lesson content and showed little personal interest in the students. However, he was available to and responsive to his students. For instance, he enlarged the screen for Violet and asked her numerous times if she really understood the lesson content.

Student Engagement

Violet's engagement level fluctuated a lot over time. Sometimes she paid attention, looking at Clark or writing things down. Other times, she seemed

unfocused and inattentive. When she was checking her answers, she was strongly focused on the schoolwork although she was not paying attention to the teacher.

Relationship Between the Teacher's Behavior and the Student's Engagement

Clark showed a lot of variety in his provision of need support. Violet also showed great variety in her engagement level. Violet's engagement level was highest when Clark expressed autonomy-supportive behavior.

Results: Katherine (Teacher) and Marie (Student)

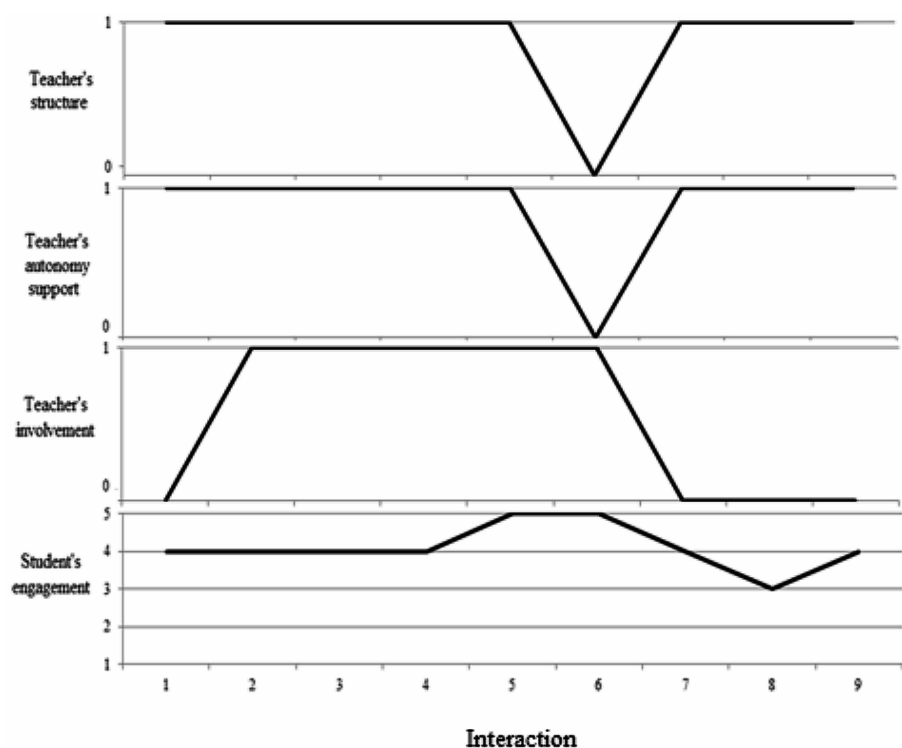
Figure 3 presents the results related to Katherine and Marie. In this classroom setting, students prepared a meal in pairs or alone. They could choose the meal they wanted to make a week before cooking class: One week they

shopped for groceries, and the next week they cooked.

Transcript 4 summarizes interactions 1–9. Marie was working with another student (Julie) to make rice with vegetables.

Transcript 4: Katherine says to all the students, "Put on your aprons, wash your hands, and start cooking." Marie reads a food package. Katherine asks Marie, "What are you going to do? Can you tell me?" Marie explains what she is going to make. Katherine reads the package with Marie. Katherine says, "Yes, indeed, the rice needs to be cooked." She grabs the package with the rice and shows it to Marie. Marie further explains how she is planning to prepare the meal. Katherine nods and reacts to some signs. Then Marie does a funny walk to the other kitchen counter. Marie returns to her kitchen counter. Katherine says to the girls, "I'm going to check

Figure 2
Interaction Patterns of Clark (Teacher) and Violet (Student)



with the boys. Is that alright?" Marie nods.

Teacher Behavior

Structure

Katherine sometimes provided instruction to all the students together. More often, she provided individual guidance since different students were making different meals. Katherine often checked in with the students, tasting the food or providing feedback.

Autonomy Support

Students were given a lot of choice, since they could choose the meals they wanted to prepare. Katherine did not express the relevance of the learning task, but it seemed clear: They were going to eat the meal after they made it. Katherine did not use controlling language.

Involvement

Although Katherine was not always present in the classroom and she often helped other students, overall she was approachable and available to support Marie. She expressed attunement and showed affection. There was plenty of room for informal contact between Katherine and her students.

Student Engagement

As Figure 3 shows, Marie was engaged in the task most of the time. She did not need much encouragement. Instead, Marie initiated the task herself, continued it, and finished without much help from Katherine. She seemed to enjoy the task: She looked relaxed and happy, and worked steadily.

Relationship Between the Teacher's Behavior and the Student's Engagement

At the beginning of the activity, Katherine supported all three needs and Marie was engaged. After a while, Katherine started providing less struc-

ture and autonomy support. Her provision of involvement also declined, and remained low. The decline in Katherine's support was followed by a decline in Marie's engagement.

Overall Patterns

The results provided indications that the provision of need support is associated with positive student engagement levels. In general, Susan and Katherine provided more need support than Clark did. Their students' levels of engagement were correspondingly higher than that of Clark's student. The extent to which teachers provided need support during their lessons also varied. Overall, teachers provided structure in their lessons the most. Within their lessons, some teachers showed much fluctuation in their provision of need support. For instance, Clark showed more variations in his need support than Katherine. Fluctuations in teachers' need support were accompanied by fluctuations in students' engagement level. As the figures show, Violet's engagement level fluctuated more than Marie's. Furthermore, the presence or absence of need support did not always immediately led to enhanced or decreased levels of student engagement. Another finding is that in some cases the levels of different forms of need support seemed to co-occur. Katherine's provision of structure was exactly the same as her provision of autonomy support. This was also the case for Susan's provision of autonomy support and involvement. Last, teachers' need support and students' engagement also seemed to depend on the lesson content. Students' engagement levels seemed to change in accordance with particular parts of the lesson.

Discussion

In the present study, we aimed to answer two research questions: (a) Do

teachers of students with acquired deafblindness support students' needs? (b) How does need-supportive teacher-student interaction influence students' motivation? In this section, we will discuss the main findings that answered these two questions.

First, our analysis of videotaped teacher-student interactions revealed that provision of need support might indeed lead to student engagement, as suggested in previous research. This finding is similar to that of previous research, which has found that need-supporting teacher-student relationships greatly affect students' school engagement and achievement (Connell & Wellborn, 1991; Opdenakker, Maulana, & Den Brok, 2012; Opdenakker & Minnaert, 2011).

Second, we also found that variations in teachers' need support over time might lead to more variation in student engagement. A lot of variation in a teacher's instructional style might confuse students: They might lose track of the teacher's intentions and expectations, which consequently could lead to varying levels of engagement.

Third, when looking at the effect a lack of support has on student engagement, we found that the former is not always directly followed by a decline in the latter. For instance, at one time Susan provided no support for any of the three needs. However, this did not affect Selina's engagement level. It could be that a temporary lack of need support does not result in a decline in a student's engagement when the teacher provides need support most of the time. Furthermore, the presence of teachers' need support did not always immediately led to enhanced engagement levels.

Stroet, Minnaert, and Opdenakker (2014) also found that need-supportive teacher behavior does not always have an immediate positive effect on students' motivation. Guided by self-

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determination theory, they videotaped teacher-student interactions in regular educational settings and coded them in terms of being supportive of the three needs. They found that students appeared to be more motivated when they were taught by a teacher who, over the course of the school year, expressed higher levels of need support. However, when Stroet et al. looked at a teacher's behavior at a specific moment, they found no association between the teacher's need support and students' motivation. They concluded that need-supportive teaching has a positive impact on students' motivation, but the impact is not immediate. These findings seem to be consistent with those of our research and indicate that changing teacher behavior, even if doing so makes it more need supportive, might cause unpredictability.

Fourth, our findings indicate that teachers' need support and students' engagement seem to depend on the lesson content. For instance, Susan first mainly provided structure. Later on, when introducing the lesson's topic, she provided more autonomy support and involvement. In addition, Selina was more engaged when Susan asked probing questions than when classroom discussions were occurring. Classroom discussions might be difficult for Selina to follow because of her sensory loss.

All in all, we can conclude that there are indications that students are most engaged when teacher-student interactions are need supportive. This implies that it is worthwhile to create teacher-student interactions that support students' needs for competence, autonomy, and relatedness. However, given the sample size of three students, the findings must be applied cautiously, as they might not be transferable to every other teacher-student pair.

A strength of the present study is the combination of both quantitative and qualitative analysis. Reeve, Jang, Carrell, Jeon, and Barch (2004) reported that almost all previous studies on the relationship between teacher behavior and student engagement had relied on correlational designs with self-report measures. However, self-reports may be susceptible to social desirability bias (McLachlan & Hagger, 2010). Given the need for more observational self-determination theory research, the specificity of the target group, and the need for ecological validity, we chose to use video observations instead of self-reports.

A disadvantage of using video is that it is difficult to know whether students actually perceive that their needs are being met. According to Connell and Wellborn (1991), the social context influences students' perceptions, which, in turn, influences their engagement and consequently their outcomes. However, we cannot tell from observations whether students actually perceive their needs as supported. Future studies should combine video observations with students' self-reports.

Another disadvantage of using observations is that they are very time consuming. Observers need to be trained to correctly code the teachers' and students' behavior. For example, when coding student engagement, the observer needs detailed information about what kinds of behavior can be identified as engaged or disengaged. The coding process itself is also time consuming. Observers need to take time for the coding process and use caution when drawing conclusions. For instance, we often saw Violet writing in her diary while her teacher was talking. At first glance, it seemed that she was not paying attention to the teacher. However, after a while, she said to the teacher, "Sir, haven't we already checked this assignment?" In-

stead of being inattentive, she was verifying whether he was right. This example shows that coding should be done carefully, and that it can therefore be time consuming.

In future research, it would be interesting to study other aspects of the learning environment that might affect students' motivation, such as peer interactions. The present study's results show that it is not always easy for students with impairments to connect with other students. For instance, Selina did not always appear able to follow classroom conversations. Moreover, Violet was seated in front of the classroom next to her interpreter, which hindered her social inclusion. She could not hear conversations behind her and could not link up with a neighboring student for pair activities. From research on deaf students, we know that students who feel at ease communicating with teachers and peers are more likely to be engaged by school tasks (Long, Stinson, & Braeges, 1992). Long et al. (1992) demonstrated that ease of communication is related to achievement in school. In line with earlier studies (e.g., Furrer & Skinner, 2003; Hughes & Chen, 2011), future studies might therefore address the possible influence of peer relationships on students' motivation, or possible correlations between teacher-student relationships and student-peer relationships and their impact on the motivation and achievements in school of students with acquired deafblindness.

A final consideration is that only female students participated in the present study. Previous research has found that teacher support is more closely related to motivation for girls than for boys (Goodenow, 1993). Hence, future research should investigate the influence of need-supportive teacher-student interactions on male students with acquired deafblindness.



The present study analyzed teacher-student interactions through the lens of self-determination theory, which gave us an in-depth understanding of the effects of need-supportive teacher-student interactions on students with acquired deafblindness. This study confirms the utility of using self-determination theory to study teacher-student interactions that involve students with acquired deafblindness. Moreover, this study produced concrete examples of need-supportive behaviors that teachers can use to educate students with acquired deafblindness in both mainstream and special education settings.

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