Effects of School Staff Communication on Initiations and Repair Strategies of Students with Severe Intellectual and Developmental Disabilities

Orit E. Hetzroni and Maayan Shalev
University of Haifa

Abstract: The study examined the effects of the types of communication breakdowns of the communication partners on the repair strategies of students with severe intellectual disability during interaction within the natural school environment. Forty-eight staff members, divided into two groups based on daily vs. weekly contact with the student, and 12 students, ages 9–16, were videotaped during various activities. Results demonstrate that students used several types of repair strategies when faced with communication breakdowns adjusting some of them to breakdown types. Some of the students demonstrated attempts to shift partners as a systematic method when confronted with communication breakdowns, thus implying an alternative repair strategy. There were no significant differences among staff members based on their level of contact with the students except for more 'request for clarification' and more 'substitution' in the daily basis group.

The ability to initiate, communicate, and maintain interactions is critical for developing social skills, transferring messages to achieve communication goals, and becoming an active participant in society (Brady & Halle, 2002). Individuals with severe intellectual disability (SID) are characterized as having limitations in their language and communication abilities, low rates of initiations, and difficulties in conveying successful messages, thus resulting in limited interactions, reduced social skills, and lack of independence (Bunning, Smith, Kennedy, & Greenham, 2013). Research demonstrates that children with SID depend mainly on their communication partners for leading interactions and refer mainly to responses rather than to initiations (Bunning et al., 2013).

Limitations in the development of language and communication of children with SID place them at risk for communication delay or failure that occurs upon limited or no transfer of their intentions. The difficulties the communication partners have in identifying, decoding, and responding to the initiations of the children may enhance the dependency and develop learned helplessness. Learned helplessness develops when outcomes in the environment (i.e. communication partner’s response) are independent of the individual’s behavior (i.e. communication signal) resulting in limited correspondence between the initial communicative attempt and the consequence (Carter, 2002). These difficulties could be the result of the limited understanding of the idiosyncratic nature of the communicative attempts. As a result, communication partners succeed in interpreting more messages that are sent in response, within a context of a situation initiated originally by the partner, rather than by the child with SID. Research demonstrates that teachers respond to 79% of the child’s responses and to 39% of their initiations (Calculator & Dollaghan, 1982), while 40% of the communication attempts of children ages 5–7 with severe com-
munication difficulties resulted in communication breakdowns (Steeple, 2002).

A communication breakdown occurs when the original message, created by the sender, is not recognized or not understood by the receiver, who thus, does not produce the expected response. Communication breakdown can occur if the partner misinterprets the original message or fails to acknowledge the message in a reasonable time (Meadan, Ostrosky, & Halle, 2006). A communication breakdown can be manifested in several ways: (1) ‘request for clarification’; (2) ‘ignore’; and (3) ‘topic shift’ (Dincer & Erbas, 2010; Meadan et al., 2006; Ohtake et al., 2005).

Difficulties in interpreting communication intents could be attributed to the tendency of individuals with SID to use idiosyncratic behaviors as part of their communication, which may be misidentified by the partner as non-communicative self-inflicted behaviors. These communicative attempts result in miscommunications that could prevent continuity of the interaction and minimize adult responses (Harwood, Warren, & Yoder, 2002; Stephenson & Dowrick, 2005). School staff working with students with significant disabilities often find it difficult to identify the communicative intent and the content specific behaviors of the students, and fail to continue interactions with them (Stephenson & Dowrick, 2005). ‘Request for clarification’, asking for explanations and elaborations, is most effective for maintaining interaction, as it presents a clear message that indicates that the intention was not understood, and channels the sender to repair the original message, usually with specifications regarding the type and nature of the breakdown. Young children during early stages of developing their communication respond positively to ‘request for clarification’ breakdowns and less to ‘ignore’ (Brady, Steeple, & Fleming, 2005). ‘Request for clarification’, associated with developing language skills among typically developing toddlers, enhances awareness to the situation, encourages repair, and provides clues, thus presenting a breakdown that has potential for educational and therapeutic purposes (Gozzard, Baker, & McCabe, 2008).

‘Ignore’, in which the partner disregards the communicative attempt, is a behavior that may occur due to off-topic or non-related rea-sons such as noise that masks the student’s initiation. These interferences could result from background noises in the classroom, from attention to other sounds or events in the environment or from the nature of the communicative intent that prevents the adult from noticing or understanding it as intended (Brady & Halle, 2002; Brady, McLean, McLean, & Johnston, 1995; Volden, 2004). This type of communication breakdown does not give the child any indication regarding their level of input or the message comprehension efforts, which results in a significant obstacle in communication development (Brady et al., 2005). More so, such a breakdown may add to the initial cognitive and communicative demands and requires additional resources to regain the partner’s attention and resume communication when trying to send the message again (Halle, Brady & Drasgow, 2004).

‘Topic shift’ is a communication breakdown that includes a response to the student, but not to the communicative intent. Although the communicative partner, in this case, is attentive to the participant and continues the flow of communication, there is no clarification as to the nature of the problem and the level of misunderstanding (Meadan et al., 2006). The participant remains with a limited understanding that the message transfer was unsuccessful, with no clue to the nature of the failure. This type of communication breakdown, also called ‘wrong response’ or ‘misunderstanding’ (Brady & Halle, 2002). ‘Topic shift’ can result from a purposeful intent of the adult to distract/redirect the attention of the child (Brady & Halle, 2002), or when the adult misunderstands the behaviors as a communicative intent, or when the nature of the message itself is misinterpreted (Tomasello, Conti-Ramsden, & Ewert, 1990). ‘Topic shift’ places the student in an ambiguous situation, confused, as the response does not match the original message and does not provide the appropriate response desired. More so, the student is required at that point to rethink the situation, reflect on the complicated outcome, to create a new message required from the changing of the topic as suggested by the communication partner, resulting in a cognitive load (Brady & Halle, 2002; Meadan et al., 2006). Thus, ‘topic shift’ is the hardest com-
communication breakdown to repair (Brady & Halle, 2002; Ohtake et al., 2005; Tomasello et al., 1990). In this study, the use of the concept ‘communication breakdown’ will be termed from the student point of view to include situations in which the student does not achieve the requested goal and refutes to using repair strategies. In line with this view, we included a fourth type of communication breakdown – ‘noncompliance’ whenever the partner states to the student his understanding of the message without giving the student what he wants.

Communication breakdowns appear frequently during interactions between children with SID and their communication partners (Dincer & Erbas, 2010). Any attempt to maintain the interaction or to achieve the communication goal requires use of repair strategies, even if bound by their limited language abilities. Thus, repair strategies refer to the ability to maintain the interaction and persist in the communication by modifying, repeating, or changing the topography of original message once a communication breakdown is identified (Dincer & Erbas, 2010; Meadan et al., 2006; Ohtake et al., 2005; Snell, Chen, Allaire, & Park, 2008; Weiner, 2005). Repair strategies used by children with SID include: (1) ‘repetition’, in which the whole topography of the original message is reiterated; (2) ‘modification’ (addition and reduction), in which information, behaviors, or intensity of the original message are increased or reduced; and, (3) ‘substitution’ of all or most on the original components of the original message (Dincer & Erbas, 2010). Yet, at times, when no repair strategy is used, the communication continuum terminates (Dincer & Erbas, 2010; Meadan et al., 2006; Ohtake et al., 2005).

‘Repetition’ is a basic strategy that appears early in language development (Brady & Halle, 2002), requiring minimal resources. The advantage of this strategy and the limited resources it requires, place it as an effective strategy to be used for all purposes by children with limited cognitive, language, and communication abilities. ‘Substitution’ requires a higher level of resources and abilities needed for reconstruction of the message, changing the whole topography of the original message, to convey the idea again to the communication partner (Halle et al., 2004).

A successful interaction requires the use of communication breakdowns and repair strategies for maintaining the consistency of the conversation (Meadan et al., 2006). Communicative competence is required to establish a successful repair. The participant has to have sufficient abilities to both understand the mechanism of the communication breakdown and to devise a repair strategy with the required modifications. In addition, competence is required to express the modified message after the repair strategy has been selected. The partners has to have social and strategic competence to analyze the source of the breakdown as well as the required repair strategy (Volden, 2004). Repair strategies require cognitive abilities that develop over time, which in turn lead to the use of complex repair strategies, enabling the child to modify the message based on the ability to analyze another person’s perspective (Halle et al., 2004). Children with SID have been found to utilize repair strategies upon communication breakdowns, even when communicative competence is limited to non-verbal communication and use of idiosyncratic pre-symbolic communication (Weiner, 2005). Hence, their idiosyncratic symbolic and pre-symbolic communication are used to maintain the conversation and persist in transferring the message despite their limited communicative competence (Dincer & Erbas, 2010).

When observing the use of repair strategies among typically developing toddlers, the intensity of the interaction with the child had an impact on the use of communication breakdowns and the type and use of repair strategies (e.g., Tomasello, Farrar, & Dines, 1984; Tomasello et al., 1990). Thus, various social networks and differences in the intensity level of the interaction between communication partners and children with SID may be related to variation in the use of communication breakdowns and repair strategies.

Research demonstrates that different communication breakdowns may lead to an increase or a decrease in both use and type of repair strategies. Adapting and modifying responses and using repair strategies are pragmatic abilities that enable flexibility in maintaining communication goals (Brady et al., 2005; Reichle, Drager, & Davis, 2002).

Most of the research investigating communication breakdowns and repair strategies pertain
to young children early in their communication development, primarily while interacting with their main caregivers (e.g., Tomasello et. al., 1984, 1990). Yet, children with SID maintain many of the basic communication functions later in life, for example when interacting with various staff members at school. More so, the limited research predominantly addressed children with verbal language abilities (Dincer & Erbas, 2010), and controlled environments that present various types of communication breakdowns without viewing the frequency in the natural school setting (Brady et al., 2005; Brinton & Fujiki, 1991; Meadan et al., 2006; Volden, 2004). Thus, the purpose of the study was to examine communication behaviors of school age students with SID and their communication partners in the natural school environment. Communication breakdowns used by staff members and repair strategies used by students with SID were examined. In addition, correlations between repair strategies and communication partner’s type of communication breakdown and intensity levels of contact with the student in school (daily vs. weekly basis) were examined.

Method

Participants and Setting

Twelve students, eight girls and four boys, ages 9–16 (M = 12.7) participated in the study. The criteria for inclusion in the study were: (1) a diagnosis of SID based on records of the school local child developmental center and the school’s diagnostic team, as pertained by the DSM-IV-TR criteria (APA, 2000); (2) school-age children; (3) normal hearing, normal or corrected vision; (4) use of intentional communication, who are able to understand simple sentences, and initiate communicative acts for basic needs as determined by the speech language pathologist (SLP) working with the child. Students participating in the study were all identified with significant language deficits, mostly using pre-symbolic communication or one-to-two word sentences, with a limited vocabulary. All participants were found to be functioning within the low functional range in their general and communication abilities and were identified as less than 3 years in their mental age based on the Vinland II (Sparrow, Cicchetti, & Balla 2005). Table 1 presents functional profiles and demographics of the students.

For each student participating in the study, four staff members were identified as communication partners: two staff members that meet with the student on a daily basis (home room teacher and teacher assistant working in close contact with the child most of the time during school hours), and two that meet with the student weekly (professional staff working in the school who meet with the child once or twice a week for pre-scheduled 1 or 2 hour activities). Observations were conducted in the school during daily routine classroom activities (such as music lessons, home economics, occupational therapy, etc.), either in the classroom or in the yard for the duration of 20 minutes for each observation.

Materials and Measures

Vinland-II: Teacher rating form, used for evaluating mental age and four functional levels - communication, activities of daily living (ADL), socialization, and motor skills. This has been found effective in assessing adaptive behaviors of children with SID (Sparrow et al., 2005).

Intentional communication: Level of intentional communication was defined using the report of the SLP and the COSMIC - The classroom observation schedule (Pasco, Gordon, Howlin, & Charman, 2008). Inter-observer agreement ranged from $\alpha = 0.59$ to $\alpha = 0.97$ (Pasco et al., 2008). Based on the COSMIC schedule, two coders review the transcribed videos and determined intentional communication for each student. Inter-observer agreement was computed to 10% of the observations using Kappa coefficient resulted in Kappa 0.73. (See Table 1 for examples).

Communication breakdown observation form: A coding form was created for the study. The coding tool included four categories identified as communication breakdowns in the literature: (1) ‘request for clarification’ – asking the communicator to explain or elaborate by repeating the message or changing it. The request can be verbal or non-verbal suggesting “What did you say?” or “What did you want?”, “I didn’t understand?” “did you mean . . .?” etc. (Brady & Halle, 2002); (2) ‘ignore’ – complete disregard of the communicative attempt within a reasonable time frame, the
## TABLE 1

Students Demographics, Vinland II based Developmental Levels and Expressive Abilities

<table>
<thead>
<tr>
<th>Name</th>
<th>Year of Birth</th>
<th>Age in the Study</th>
<th>Adaptive Level</th>
<th>Socialization</th>
<th>Daily Living Skills</th>
<th>Communication</th>
<th>Age Equivalent</th>
<th>Students’ Expression Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nirit</td>
<td>2003</td>
<td>F 9 + 9 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, uses eye contact, facial expressions, gestures and sounds to communicate, signs her wants by approaching and withdrawal</td>
</tr>
<tr>
<td>Anna</td>
<td>2003</td>
<td>F 10</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, uses eye contact, facial expressions, gestures and sounds to communicate. Uses few conventional gestural signs (yes/no, waving for ‘hello’ etc.), points to few graphic symbols as a reply to simple questions</td>
</tr>
<tr>
<td>Ayelet</td>
<td>2002</td>
<td>F 10 + 5 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Uses a few words, uses eye contact, facial expressions, gestures and sounds to communicate. Points to few graphic symbols as a reply to simple questions</td>
</tr>
<tr>
<td>Hagar</td>
<td>2001</td>
<td>F 11 + 6 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, uses eye contact, facial expressions, gestures and sounds to communicate. Signs her wants by approaching and withdrawal</td>
</tr>
<tr>
<td>Mika</td>
<td>2001</td>
<td>F 12</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, uses consistently some sounds as words. Uses eye contact, facial expressions, gestures and sounds to communicate. Uses few sign language signs (‘want’). Points to few graphic symbols as a reply to simple questions</td>
</tr>
<tr>
<td>Topaz</td>
<td>2000</td>
<td>F 12 + 1 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, uses eye contact, facial expressions, gestures, posture changes and sounds (shouting) to communicate, signs her wants by approaching and withdrawal</td>
</tr>
<tr>
<td>Hagay</td>
<td>2000</td>
<td>M 12 + 3 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
<td>Non-verbal, say only the word ‘no’. Uses eye contact, facial expressions, gestures and sounds (shouting) to communicate. Uses few consistent gestural signs</td>
</tr>
<tr>
<td>Name</td>
<td>Year of Birth</td>
<td>Sex</td>
<td>Age in the Study</td>
<td>Adaptive Level</td>
<td>Socialization</td>
<td>Daily Living Skills</td>
<td>Communication</td>
<td>Age Equivalent</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
<td>-----</td>
<td>------------------</td>
<td>----------------</td>
<td>---------------</td>
<td>--------------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Amir</td>
<td>1999</td>
<td>M</td>
<td>13 + 5 months</td>
<td>Low</td>
<td>Low</td>
<td>Low (moderate-low in the school community sub domain)</td>
<td>Low</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Elia</td>
<td>1998</td>
<td>F</td>
<td>14 + 4 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Ben</td>
<td>1998</td>
<td>M</td>
<td>15</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>&lt;3</td>
</tr>
<tr>
<td>Dor</td>
<td>1997</td>
<td>M</td>
<td>15 + 5 months</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Between &lt;3 and 4:6 over the domains</td>
</tr>
<tr>
<td>Maya</td>
<td>1997</td>
<td>F</td>
<td>16</td>
<td>Low</td>
<td>Low</td>
<td>Low (moderate-low in the interpersonal relationship sub domain)</td>
<td>Low</td>
<td>Between &lt;3 and 5:7 over the domains</td>
</tr>
</tbody>
</table>
partner does not respond and ignores the communicative behaviors (Brady & Halle, 2002); (3) ‘Topic shift’ – the communication partner reacts to the attempt, but shifts to a topic that differs from the original topic. In the case of a topic shift, the partner in fact, addresses the child’s communication act but ignores the child’s message (Brady & Halle, 2002), the interaction progresses but as the topic shifts, the interaction followed evolves in a non-relevant manner (Dincer & Erbas, 2010; Meadan et al., 2006; Ohtake et al., 2005); (4) ‘Non-compliance’ – occurs when the partner clearly understands the intent of the message but refuses to comply (Marcos & Bernicot, 1997). Occurs when the partner repeats the meaning of the message but declares he is not going to allow the request: “I know you want to play the computer, but now you have to finish your lunch”.

Repair strategy observation form: A coding form created for the study. The coding tool included five patterns describing the change in the topography of the communicative behaviors among the students following a communication breakdown (Brady & Halle, 2002). Four of the behaviors were identified as repair strategies (including the two modification repair strategies: addition and reduction), while the fifth behavior referred to a complete interaction arrest (Brady & Halle, 2002): (1) ‘Repetition’ of the whole topography of the original message; (2) ‘Addition’- an increase of information, behaviors, or magnitude of the original message; (3) ‘Reduction’ of information, behaviors, or magnitude of the original message; (4) ‘Substitution’ of all or most of the original components of the original message to construct a new communicative behavior; and a non-repair strategy: (5) ‘communication arrest’. Behaviors were coded as repair strategies when appearing after a communication breakdown. Content analysis was used to evaluate behaviors, for deducting all behaviors that were not responses to communicative breakdowns. Inter-observer agreement computed for 10% of the observations resulted in Kappa coefficient of 0.79.

Procedure

After obtaining permission from the Ministry of Education’s Ethics Committee, school principals were asked to select potential participants for the study. Once signed consent forms were obtained from the parents, classroom teachers were asked to fill out the Vineland-II questionnaire, and four staff members were asked to participate. Each student was observed twice in various activities conducted by each of the four staff members participating in the study, a total of eight observations per student, conducted during various days, times, and activities. All activities were part of the curriculum, conducted in the natural setting, including various activities such as morning meetings, music lessons, snack time, playground activities, and gym. All the activities included interaction between the student and the adult communication partner and several other students participating in the school activities. Activities were videotaped, transcribed, and coded to include all information pertaining to the study. For the purpose of this study, any gesture or word used along with eye gaze were coded as a communicative act.

Data Analysis

Coded observations were separated into communicative events defined as a communicative cycle, i.e., the interaction, created by either communication partner, continuing until terminated fully by both partners. A communicative attempt was defined as any initiation provoked by the student or by the staff member, directed specifically towards the partner. The end of the interaction was defined as the moment in which the both partners stop trying to communicate with each other. Overall, 529 communication events were coded, of which 176 were communicative attempts by the staff member not responded by the student, and 105 were communicative attempts by the student not responded by the adult. For the purpose of the study, we used the COSMIC (Pasco et al., 2008) definitions of initiation and intentional communication to define opening and closing of communication event. Each communicative event was analyzed to detect communication breakdowns by the staff and repair strategies by the students.

Communication breakdowns refer to lack or irrelevant response by the communication partner following a communication attempt by the student. The coding of the interactions revealed four types of behaviors relating to
communication breakdowns of the communication partners. The communication breakdowns are ‘ignore’, ‘request for clarification’, ‘topic shift’ (Brady & Halle, 2002). ‘Non-compliance’ (based on Marcos & Bernicot, 1997) was also referred to as a communication breakdown, regardless of the communication partner’s understanding of the message; although the communication attempt was understood, it was denied by the partner; the student maintained communication and used repair strategies after the noncompliance response by the staff. Thus, the assumption was that from the students’ point of view, the goal of the communication was not achieved, but rather a communication breakdown in the form of ‘noncompliance’ required them to attempt to repair.

Coding the behaviors of the students revealed four repair strategies: ‘repetition’, ‘substitution’, ‘addition’ and ‘reduction’ (Brady & Halle, 2002). When the student stopped communicating with the original partner this was coded as ‘communication arrest’. After reviewing all observations, another pattern of behavior was revealed for some of the students, who showed persistence and maintained the communicative attempt through transfer of the message to another partner. This behavior was identified as ‘partner shift’. ‘Partner shift’ occurs following a communication breakdown, in which the child terminates the communication with the original partner, and chooses a different partner to convey the same message.

**Results**

**Communication Breakdowns**

Analysis of the 96 video sessions of the 12 students with SID participating in the study revealed four communication breakdowns used by the staff members working with the students: ‘ignore’, ‘request for clarification’, ‘topic shift’, and ‘non-compliance’. ‘Non-compliance’ appeared most with 24% of the occurrences, ‘ignore’ with 16.5%, ‘topic shift’ with 10%, and ‘request for clarification’ appeared the least with 6.5% of the occurrences. Communication breakdown behaviors represent 57% of total communication and 43% represent the adjusted flow of the communication between the two partners (see Table 2).

Repeated measures analysis of variance (ANOVA) was conducted to investigate the differences between the four types of communication breakdown identified. Results demonstrate a significant difference between the four types of communication breakdown: \( F(3,141) = 15.24, p < 0.001, \eta^2 = 0.24 \). To determine the nature of the differences, post-hoc analysis using Bonferroni correction was conducted. Results reveal that ‘non-compliance’ appeared most often, with significant differences between ‘non-compliance’ and

**TABLE 2**

Repair Strategies After Different Types of Breakdown: Mean Percentage, Standard Deviation, ANOVA

<table>
<thead>
<tr>
<th>Communication Breakdown</th>
<th>Non Compliance A</th>
<th>Topic Shift B</th>
<th>Request for Clarification C</th>
<th>Ignore D</th>
<th>F ( df(3,141) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition</td>
<td>3.21 (3.106)</td>
<td>0.97 (0.87)</td>
<td>0.95 (0.85)</td>
<td>2.95 (2.838)</td>
<td>5.380* A&gt;B,C,D</td>
</tr>
<tr>
<td>Addition</td>
<td>0.44 (0.414)</td>
<td>0.20 (0.162)</td>
<td>0.06 (0.01)</td>
<td>1.13 (1.079)</td>
<td>7.787*** D&gt;A,B,C</td>
</tr>
<tr>
<td>Reduction</td>
<td>0.39 (0.129)</td>
<td>0.35 (0.226)</td>
<td>0.29 (0.137)</td>
<td>0.6 (0.111)</td>
<td>1.718</td>
</tr>
<tr>
<td>Substitution</td>
<td>2.12 (2.051)</td>
<td>1.16 (1.083)</td>
<td>1.04 (1.038)</td>
<td>0.98 (0.514)</td>
<td>5.932*** A&gt;B,C,D</td>
</tr>
<tr>
<td>Communication arrest</td>
<td>1.96 (1.821)</td>
<td>1.43 (1.34)</td>
<td>0.34 (0.26)</td>
<td>2.89 (2.504)</td>
<td>8.519*** D&gt;B,C</td>
</tr>
</tbody>
</table>

* \( p < 0.05 \). *** \( p < 0.01 \).
‘topic shift’ and between ‘non-compliance’ and ‘request for clarification’. ‘Ignore’ was the second most used communication breakdown, with a significant difference between ‘ignore’ and ‘request for clarification’, but not between ‘ignore’ and the other communication breakdowns.

Repair Strategies

To identify repair strategies used by the students, all behaviors that appeared after breakdowns were coded. Five different behaviors were identified that represent a change in the topography of the communication behaviors of the students, of which four were recognized as repair strategies: ‘repetition’, ‘addition’, ‘reduction’, and ‘substitution’ (Brady & Halle, 2002) and one, ‘communication arrest’, representing complete halt of the interaction. Of the repair strategies, ‘repetition’ appeared most with 13% of the occurrences, ‘substitution’ with 11%, ‘addition’ and ‘reduction’ appeared 4% and 3% respectively, resulting in approximately 31% use of repair strategies. ‘Communication arrest’ appeared with 12.5% of the occurrences.

Repeated measures ANOVA conducted to investigate the differences between the six types of behaviors appearing after communication breakdown revealed a significant difference between the six types of behaviors: \[F(4,188) = 36.29, p < 0.001, \eta^2 = 0.44\]. To determine the nature of the differences post hoc analysis using Bonferroni correction was conducted. Results reveal that ‘communication arrest’ appeared most often, with significant differences between ‘communication arrest’ and both ‘addition’ and ‘reduction’ modification repair strategies. ‘Repetition’ was the most frequently used repair strategy, with a significant difference between ‘repetition’, ‘addition’, and ‘reduction’. ‘Substitution’ was the second most used strategy, with a significant difference between ‘substitution’, ‘addition’ and ‘reduction’. No other significant differences were found.

After reviewing all observations, another behavior was detected, used by some of the students when encountering communication breakdowns. This behavior was identified as ‘partner shift’ representing a shift to a new communication partner, which in fact replaced the original communication partner without terminating the cycle. ‘Partner shift’ appeared with 5.5% of the occurrences, those were coded preliminarily as ‘communication arrest’, following the termination of the communication with the original partner, resulting in ‘communication arrest’ with 7% of the occurrences.

Student and Staff Communication Behaviors

Repeated measures ANOVA was used to assess differences in the repair strategies between the communication breakdowns. To determine the nature of the differences, post hoc Bonferroni correction was used. Table 3 presents analysis of variance for mean differences with post hoc comparisons for repair strategies after communication breakdowns. Results demonstrate ‘repetition’ is the repair strategy used significantly most frequently after ‘non-compliance’ in comparison with ‘repetition’ after all other breakdowns. ‘Repetition’ was also used frequently after ‘ignore’ communication breakdown, with significant difference between ‘repetition’ after ‘ignore’ and ‘repetition’ after ‘request for clarification’ and ‘topic shift’. ‘Addition’ was significantly most frequently used after ‘ignore’ communication breakdown in comparison with ‘addition’, after all other communication breakdowns. ‘Substitution’ was significantly most frequently used after ‘non-compliance’ communication breakdowns in comparison with ‘substitution’, after all other communication breakdowns. ‘Communication arrest’ was significantly most frequently used after ‘ignore’ communication breakdowns in comparison with ‘communication arrest’ after ‘request for clarification’ and ‘topic shift’. ‘Addition’ was significantly most frequently used after ‘ignore’ communication breakdowns in comparison with ‘communication arrest’ after ‘request for clarification’ and ‘topic shift’. ‘Communication arrest’ was also frequently used after ‘non-compliance’, with significant difference between ‘communication arrest’ after non-compliance and ‘communication arrest’ after ‘request for clarification’. ‘Communication arrest’ appeared less frequently after ‘topic shift’, with significant difference between ‘communication arrest’ after ‘topic shift’ in comparison with ‘communication arrest’ after ‘request for clarification’. No significant differences were found for ‘reduction’ as a repair strategy after any of the communication breakdowns.
Nine of the 12 students used ‘partner shift’ following communication breakdowns. It was used in a varying degree across partners and across situations. To identify differences between the type of communication breakdown and ‘partner shift’, a repeated measures ANOVA was used. ‘Partner shift’ appeared after all types of communication breakdowns, with no significant differences between the types of breakdowns that resulted in ‘partner shift’.

Differences in the staff intensity level on daily and weekly contact with the students were identified through independent samples t-test to compare between communication breakdowns and repair strategies of the students. Significant differences were found between staff member who work daily with the students and those who see the students on a weekly basis in their use of ‘request for clarification’. Staff members who work with the students on a daily basis use ‘requests for clarification’ significantly more often. A significant difference was also found for the use of ‘substitution’ as a repair strategy, indicating that students use more ‘substitution’ repair strategies with staff members who work daily with them. No significant differences were found across all other variables when comparing the intensity level of the staff members.

Table 3 presents differences between daily/weekly basis groups regarding all staff and students behaviors.

**Discussion**

Communicative behaviors of students with SID were investigated to identify measures of communicative competence within the school environment i.e. repair strategies. Possible correlations between repair strategies and communication partner parameters were investigated from an environmental perspective. Partner’s parameters were defined by differences between daily and weekly contact of the school staff members in contact with the student and the types of communication breakdowns.

**Communication Breakdowns**

Students with SID who demonstrate significant language delays encounter communication breakdowns that may hinder their interaction with peers as well as with adult communicators. Results of the study demonstrate that the communication partners present several behaviors that could be recognized as communication breakdowns by the student with SID with more than 50% of interactions.
ending in communication breakdowns. The communication breakdowns identified included ‘ignore’, ‘request for clarification’, ‘topic shift’ (Brady & Halle, 2002; Halle et al., 2004), and ‘non-compliance’ (Marcos & Bernicot, 1997). In this study we included ‘non-compliance’ as a communication breakdown from the student point of view. As the findings show the students indeed used repair strategies after ‘non-compliance’ of the adult. Non-compliance’ breakdown appeared most, ‘ignore’, second in frequency, while ‘topic shift’ and ‘request for clarification’ appeared least. Results support previous findings in which communication breakdowns dominated the interactions, with ‘topic shift’ and ‘request for clarification’ appearing less than ‘ignore’. For example, research findings demonstrate that teachers of children with SID ignore 30%–60% of the child’s communication (Calculator & Dollaghan, 1982). Those teachers requested clarifications after 28% of the communication attempts, and changed the topic after 8% of the attempts. In another study, research revealed that only 40% of the attempts made by children with SID who were AAC users resulted in a desired response (Wetherby, Alexander, & Prizant, 1998).

The high frequency of communication breakdowns might imply a reduced ability of the students to achieve their communication goals. This presents a potential obstacle to the development of communicative competence of the students. Students may learn that their communication attempts are not effective and leads to non-relevant consequences, this may cause learned helplessness and reduction in communication initiation.

Noncompliance—which was the most frequent breakdown—can achieve few goals for the adult, as it can- preserve school boundaries (i.e. “now it is not time to eat”), prevent escape behaviors (i.e. “I know you don’t want to dance but now you have to.”), and increase participation (“I know you want to go outside, but now you have to finish your assignment”). However, the question remains whether the student understood the nature of ‘non-compliance’, as part of the interaction, remaining in participation mode, or reacted towards it as if the communication partner failed in communication.

The second most frequent communication breakdown identified in the study was ‘ignore’. This behavior was observed significantly more frequently than the other two communication breakdowns. This is also supported by previous studies researching interactions with students with SID (Calculator & Dollaghan, 1982; Weiner, 2005). Results of this study demonstrate that the staff used ‘request for clarification’ and ‘topic shift’ the least, leaving the student with limited possibilities to use it as opportunity to increase communication. Low expectations and limited experience in successful interactions could be the causes for such results, as the communication partners have limited expectations regarding the future of the potential interaction (Tomasello et al., 1990). ‘Request for clarification’ and ‘topic shift’ are breakdowns that are geared and motivated towards a continuation of the interaction, while ‘ignore’ is usually intended to arrest the interaction and does not seek repair strategies (Tomasello et al., 1990). Thus, the student’s environment is characterized by a frequent failure to achieve communication goals and by types of breakdown that do not support further communication.

Repair Strategies

Analysis of the students’ behaviors revealed five patterns depicting the changes in the topography of the message (Brady & Halle, 2002). Four of the behaviors were identified as repair strategies, appearing after communication breakdowns: ‘Repetition’, ‘substitution’, ‘addition’ and ‘reduction’. ‘Repetition’ and ‘substitution’ were used more frequently than ‘addition’ and ‘reduction’, although all were part of the students’ repertoire. These results support previous findings that document the use of ‘repetition’ as the most dominant repair strategy used among children with SID and other developmental disabilities (Brady et al., 1995; Calculator & Delaney, 1986; Erbas, 2005; Ohtake et al., 2005). These findings reflect on the ability of students with SID to amend communication breakdowns using a variety of repair strategies, and might indicate that those students relate to understanding another’s perspective (Halle et al., 2004). The dominance of ‘repetition’ and ‘substitution’ may be due to the difficulty in identifying the
source of the breakdown among the students. In light of the nature of most frequent breakdowns, ‘ignore’ and ‘topic shift’ that provide little or no information regarding the basis of the breakdown. It might be that the use of the above strategies are inevitable.

In addition to the four repair strategies, students participating in the study demonstrated a ‘communication arrest’ behavior that appeared frequently after breakdowns. Previous studies demonstrate similar findings (e.g., Brinton & Fujiki, 1991; Ohtake et al., 2005). The tendency to withdraw and terminate communication could result from the limited support provided when attempting to repair, leading to a conclusion about the unworthy nature of such efforts. In addition, the use of preempting by the communication partners that guide the student, and precede communicative intents, reduce the need to initiate, thus resulting in less attempts to initiate repairs, and in an increase in ‘communication arrests’ (Calculator, 1988). This finding supports the hypothesis regarding learned helplessness in reference to initiation and repair by students with SID (Rechlie, 1997).

When observing the activities, a striking finding revealed that 10% of the communication breakdowns resulted in changing the communication partner, 5.5% of all interactions. Although ‘partner shift’ does not qualify as a repair strategy, as it does not focus on changing or repeating the message to the original partner, it does serve as an adaptive behavior that the student retracts to when sensing a communication breakdown. As interaction with the original communication partner did not yield the desired result, this strategy was used as an alternative, in an attempt to persist and continue the original intent, terminating the communication with the original partner, and using another communication partner. By turning to another resource, the student activates the new partner as if using a repair strategy to pursue in achieving the communication goal. As in this study, nine of the twelve students used this strategy. It could be assumed that previous history taught them that a different partner within the school could be as beneficial as the preliminary one, or that similar effort and resources are required regardless of the partner. By highlighting this behavior, we wish to expand the discussion about repair strategies among children with SID as this interesting behavior may suggest flexibility and pragmatic behavior used to overcome breakdowns. This finding is preliminary, as in this study, not all the observations included a second staff member, so opportunity to shift partner was not always available. Further investigation of this behavior is required.

Communication Breakdowns and Repair Strategies

Results of this study demonstrate that students were able to adjust some of the repair strategies to the communication breakdowns. The correlations found between breakdown and repair may present the students’ ability to distinguish between types of breakdowns and to adjust the repair strategies to the types of breakdowns presented. The results demonstrate that complete ‘communication arrest’ appeared mostly after ‘ignore’ and least after ‘request for clarification’, which suggests that when the student was not receiving clear information regarding the message, communication stopped more often, and when information regarding the clarity of the message was present, a repair strategy was used. These findings are supported by a previous study demonstrating such findings among parents and typically developing toddlers (Tomasello et. al., 1990). Thus, use of communication breakdowns that provide information regarding the nature of the breakdown supports the continuation of the interaction, and invites efficient and effective communication, which in the long run enables less breakdowns and a better communication flow.

‘Substitution’ significantly appeared mainly after ‘non-compliance’ in comparison with all other communication breakdowns. The use of ‘substitution’ after ‘non-compliance’ could indicate a reaction to the response that sends a clear message to the student regarding the dissatisfaction of the adult towards the behavior of the student. The response of the adult does not promote any encouragement to the original topography of the student, leading to a decline or deletion. Therefore, his response could direct the resources of the student to creating completely different message topog-
raphy, thus using ‘substitution’ as the preferred strategy (Erbas, 2005).

A surprising finding in this study was the use of ‘addition’ as a repair strategy used significantly more often after ‘ignore’ than all other communication breakdowns. This type of repair strategy is usually associated with ‘request for clarification’, a strategy that requests clarifications regarding specific areas to be targeted by adding to the original message. However, as the use of ‘request for clarification’ as well as ‘addition’ was so sporadic and scarce in this study, further research should investigate this finding.

Social Networks

Two types of communication partners working with the students in the school were identified for the study based on their relative intensity level: weekly vs. daily. Differences in their patterns of communication with the students were identified with respect to their communication style across all variables investigated in the study. It was assumed that the intensity level would be related to familiarity with the child’s idiosyncratic communication, hence increasing the ability to identify and react to the communication signals of the students, especially concerning populations that tend to use non-verbal and pre-symbolic communication (Siegel & Cress, 2002). Results of this study demonstrate almost no significant difference between the staff based on their intensity level across most parameters investigated in the study.

Significant differences were found between staff members in the use of ‘request for clarification’ as a communication breakdown. Staff members that maintain daily contact with the students used more ‘request for clarification’ breakdown in comparison with staff members who interact on a weekly basis with the student. Other communication breakdowns were not represented differently between both groups. Similarly, no significant differences were found in the total frequency of communication breakdowns. Thus, results of this study suggest that staff members who have daily interaction with the student may also have a prior inclination to attempt to understand the student and further maintain interaction, thus, presenting more opportunities to repair and continue the interaction while communicating with the student. The motivation to understand the student may be the result of the intense contact with the student and the mutual need to understand one another in order to keep a productive routine in the classroom. Further research is needed to expand understanding of these findings.

Repair strategies used by the students after communication breakdowns differed between staff members only in the use of ‘substitution’, wherein, significantly more uses of this strategy were found when interacting with staff members who work on a daily basis with the students. ‘Substitution’ is a strategy that requires great effort, as it requires the student to gather many resources to change all components of the original message (Halle et al., 2004). It could be assumed that staff members who work more frequently with the student are focused more on understanding, thus placing a significant effort in the process. As a result, the student might learn in return to engage and incorporate more resources when attempting to convey an idea. Following a communication breakdown, the student engages in gathering all resources to change the topography and convey the message in a new format. With partners of lesser intensity, the student might not have the resources or even the ability to utilize this strategy. Further research is needed to investigate these findings.

Although intensity level varied among the staff members, all were professionals working closely with the students. As such, the limited differences in the results could be attributed to the similarity between the staff members rather than the intensity level. Results demonstrate no significant difference for all other variables across the two groups. Yet, further research should address various characteristics associated with different staff members such as attitudes, level of familiarity with the student, and the staff’s turnover in the school. Further research should address these issues within the different social networks of the students as well as across different school systems.

Limitations

Interpretation and generalization of this study’s results must consider these following limitations: limited study sample and the in-
Instruments used for the study. In this study, 12 students with SID ranging in age and abilities participated. Given the diversity of the students, results of the study have limited generalization. More so, due to the limited number of participants and the high number of behavior categories, some of the behaviors measured were scarce in their appearance, thus, influencing analysis. Further research is needed to understand the complexity of the findings resulting from the characteristics and the varying abilities of the students and the complexity of the instruments created for the study. Results of the study should also take into consideration the presence of the camera during school activities. Although staff members were blind to the study’s questions, their communication behaviors and their overall conduct could have been influenced by the presence of the camera in the room.

As part of the scope of the study, all activities were employed in the natural environment, at various activities, resulting in a variation with different kinds of demands from the students. Thus, some activities demand participating in a restricted environment such as cognitive activity beside a table and some were more open in nature such as therapeutic music group or playing outside. All the activities included interaction between the student and the adult, all including at least three more students.

Conclusions

Results of the study reveal that students with SID were able to demonstrate repairing communication breakdowns using a variety of strategies, especially ‘substitution’ and ‘repetition’. Results of the study demonstrate that the communicative environment of students in the school was characterized with a high frequency of communication breakdowns. Most of the communication breakdowns included ‘ignore’ and ‘non-compliance’ behaviors that resulted in termination of the interaction, especially in comparison with the lower appearance of ‘request for clarification’ that promoted more repair strategies and less ‘communication arrests’. Thus, ‘request for clarification’ was the most effective breakdown for use with the students, for increasing productive repair strategies that maintain interaction. To a certain extent, students with SID succeed in matching the repair strategy to the specific communication breakdown used by their partner.

In this study, results demonstrate that students with SID were able to use a variety of repair strategies to overcome communication breakdowns during interactions in school. Although, by far, these are encouraging findings, the limited use of communication promoting breakdowns by the communication partners revealed only limited use of repair strategies for maintaining interaction. The interesting finding concerning the use of ‘partner shift’ as an additional strategy for pursuing the original communicative attempt by the students in the study may also provide additional evidence as to the nature of strategies used for maintaining communication. Further research should investigate whether the nature of using ‘request for clarification’ would enhance the use of specific strategies such as ‘addition’ and ‘reduction’ rather than ‘substitution’ and ‘repetition’ that are more general in nature. Research could also further investigate the effects of expansion and elaboration of sophisticated repair strategies for effective message transmission. In this study, students with SID responded with specific repair strategies based on the nature of the breakdowns. However, as the students were not able to identify and effectively use the strategies for repairing the breakdowns, research should further investigate methods for overcoming such limitations, thus enhancing the communicative competence of students with SID.

The daily versus weekly contact of the staff members did not have a major impact on communicative behaviors of the students and the staff communicating with them. Two differences were found in favor of the daily basis group, which may imply a difference between the motivations of the two groups to continue interaction. The resemblance between the groups could be the results of the similarity in the basic nature of the characteristics of the staff members, the general environment within the school system, or even the turnover of the staff that could provoke the students to interact in a similar basis with all school staff. However, these results could also signify the restricted abilities of the students and their inadequate repertoire that limit their abilities.
to modify their strategies across different communication partners. More so, these behaviors of the students with SID could be the result of their limited ability to decode communication partners based on their intensity level resulting in the same limited resources. An indication of this above assumption could be reflected in the ability of the students to maintain and modify repair strategies when their communication partners’ breakdowns incorporated ‘requests for clarification’. Those breakdowns, used mainly by staff members with the greater intensity level enabled the use of ‘modification’ and ‘substitution’ rather than ‘repetition’ and ‘communication arrest’. The results are promising as all repair strategies were evident in the behavior of the participants as well as all types of communication breakdowns. Further research should expand on these findings.

References


Received: 8 September 2016
Initial Acceptance: 7 November 2016
Final Acceptance: 11 January 2017