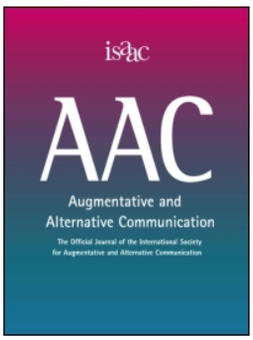

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RESEARCH ARTICLE

Constructing narratives to describe video events using aided communication

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ABSTRACT

Narratives are a pervasive form of discourse and a rich source for exploring a range of language and cognitive skills. The limited research base to date suggests that narratives generated using aided communication may be structurally simple, and that features of cohesion and reference may be lacking. This study reports on the analysis of narratives generated in interactions involving aided communication in response to short, silent, video vignettes depicting events with unintended or unexpected consequences. Two measures were applied to the data: the Narrative Scoring Scheme and the Narrative Analysis Profile. A total of 15 participants who used aided communication interacted with three different communication partners (peers, parents, professionals) relaying narratives about three video events. Their narratives were evaluated with reference to narratives of 15 peers with typical development in response to the same short videos and to the narratives that were interpreted by their communication partners. Overall, the narratives generated using aided communication were shorter and less complete than those of the speaking peers, but they incorporated many similar elements. Topic maintenance and inclusion of scene-setting elements were consistent strengths. Communication partners offered rich interpretations of aided narratives. Relative to the aided narratives, these interpreted narratives were typically structurally more complete and cohesive and many incorporated more elaborated semantic content. The data reinforce the robust value of narratives in interaction and their potential for showcasing language and communication achievements in aided communication.

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Narratives; aided communication; video events; Narrative Assessment Profile; Narrative Scoring Scheme

Introduction

Narratives occupy a uniquely important role in human interactions and have been described as a "cultural universal" (Van Deusen-Phillips, Goldwin-Meadow, & Miller, 2001, p. 311) serving personal, social, and cultural values and acting as a powerful tool for organizing and interpreting experiences. Narratives incorporate at least two related utterances about an event removed in time and place (Labov, 1972; Sperry & Sperry, 1996). As discourse forms, they emerge almost as soon as children begin to combine words and continue to develop in complexity over the preschool (Khan et al., 2016; McCabe & Rollins, 1994) and school years (Domsch et al., 2012; Ninio & Snow, 1996).

Across the many different genres of narratives, scripts are among the earliest to emerge (Ninio & Snow, 1996). They are narratives about what usually happens, rather than about specific incidents, and may support conceptual organization and event memory (Nelson, 1999). Personal narratives also emerge early (McCabe & Peterson, 1991; Ochs & Capps, 2001). They include script-like responses to routine prompts, (e.g., What did you do in school today?) as well as stories about non-routine incidents that are in some way interesting (Hudson & Shapiro, 1991). Fictional narratives entertain and support socialization in cultural norms of moral and social behavior (Ninio & Snow, 1996).

The development of narratives

Children are introduced to the storytelling and narratives of their cultural communities through oral storytelling experiences as well as through storybook reading, television, and films (Van Deusen-Phillips et al., 2001). Developmentally, the complexity and sophistication of children's narratives increases across a number of levels (Khan et al., 2016; Ninio & Snow, 1996), usually evaluated from two main perspectives: *macrostructure analysis* focuses on global narrative organization, such as how episodes and characters are introduced and how the core problem is set out and resolved; while *story grammar frameworks* (e.g., Stein & Albro, 1997) evaluate elements such as an orientation to the setting, characters, and episodes – the events that "launch the main character into forming a goal plan, a subsequent attempt to achieve

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the goal, and the outcome or consequence of the attempt" (Khan et al., 2016, p. 1395). Personal narratives are often characterized by more fluid organization and structure, and can be explored in terms of dimensions such as tellership, tellability, embeddedness, linearity, and moral stance (Ochs & Capps, 2001). Over time children incorporate more information and episodes into all types of narratives and become better at explicating the hierarchical relationships between story episodes (Khan et al., 2016). Microstructure analyses focus on the local linguistic level – word- and sentence-level devices that ensure the narrative can be understood, for example, marking tense, use of pronouns, or using cohesive devices ("and," "because," "after") to specify the sequence of events. Competence in these dimensions depends on syntactic, morphological, and pragmatic skills that develop across childhood (Justice et al., 2006; Paul & Norbury, 2012).

Bruner (1986) suggests that narrative construction is difficult because of its juxtaposition of two landscapes: the external landscape of characters and narrative events; and the internal psychological landscape of the feelings, desires, and knowledge of those characters. The ability to recognize and interpret the thoughts and intentions of others is often referred to as theory of mind (e.g., Baron-Cohen & Frith, 1985). Being able to consider others' perspectives is a developmental achievement that extends across childhood into adulthood (e.g., Wang, Devine, Wong, & Hughes, 2016). Effective storytelling relies on simultaneously attributing mental states to story characters (Bruner, 1986) and recognizing the mental state and needs of listeners (Ninio & Snow, 1996).

Given that narratives encompass multiple dimensions of psychological, linguistic, and pragmatic skills, they offer rich contexts for evaluating children's emergent language competence. These skills have been explored through tasks that involve story retelling (e.g., Adlof, McLeod, & Leftwich, 2014; Nordberg, Dahlgren Sandberg, & Miniscalco, 2015); fictional story generation, with and without picture prompts (Ebert & Scott, 2014; Khan et al., 2016); autobiographical narrative generation with or without a model (McCabe & Peterson, 1991); and natural language sampling (McCabe & Rollins, 1994).

The impact of task

Research to date indicates that children are sensitive to different tasks, genres, and contexts (Hudson & Shapiro, 1991) but that language difficulties can be thrown into sharp relief across a range of narrative tasks (e.g., Domsch et al., 2012; Norbury & Bishop, 2003). Generating a story requires a child to retrieve a memory or to construct a story on the basis of a stimulus such as a picture, and to order events into a coherent stretch of discourse intelligible to a listener who was not present. Retelling a story told by an experimenter may be less taxing than story generation because the narrative structure and content is provided. Children's re-told stories have been found to be longer and to contain more structural elements than stories they generate in response to a picture (Khan et al., 2016; McCabe & Rollins, 1994); however, story re-telling is mediated by receptive language: In order to re-tell a story, the initial story has to be understood and remembered. Incorporating picture stimuli may reduce these memory demands but this adaptation introduces new processing pressures of dividing attention between the pictures and interaction with an experimenter. Eliciting narratives using silent video clips creates demands that sit somewhere between these two tasks. No oral narrative is provided, thereby reducing the receptive language and memory demands of retelling a specific narrative (e.g., Jones et al., 2016). Videos introduce visual processing and memory demands, but offer more support for narrative content and structure than a single picture (Eaton, Collis, & Lewis, 1999), lessening the narrative generation demands. Video clips may therefore function as a useful measure of quasi-independent narrative construction.

Narratives and aided communication

Despite their prominence as a discourse form, the construction and interpretation of narratives has received relatively little attention in the context of aided communication. Evidence from the small number of available studies suggests that narratives constructed using aided communication tend to be short, with few complete episodes (Solomon-Rice & Soto, 2011; Soto, Hartmann, & Wilkins, 2006). Narratives often emerge in single-word utterances or short sentences (e.g., Soto, et al., 2006). Structurally, relative strengths have been reported in topic maintenance and event sequencing (dimensions of macrostructure) (Smith, Dahlgren Sandberg, Murray, van Balkom, & von Tetzchner, 2016; Solomon-Rice & Soto, 2011; Soto et al., 2006), with cohesion (a feature of microstructure) reported as problematic (Smith et al., 2016; Soto et al., 2006).

One of the unique features of narratives in interactions involving aided communication is the extent to which they may rely on partner interpretation and co-construction. While co-construction is relevant in all interactions and may be overtly prominent in interactions with young speaking children (e.g., Sperry & Sperry, 1996), the co-construction implicit in interactions involving aided communication may be qualitatively and quantitatively different (Solomon-Rice & Soto, 2011) and may persist (Waller & O'Mara, 2003). As noted by von Tetzchner (2015), when an utterance is generated using aided communication, communication partners often both translate and interpret aided utterances and may "take a leading role and dominate the co-construction even when the message is about an event unknown to them" (p. 183). Such partner co-construction can support more elaborated and interpretable narratives as illustrated in the detailed study by Solomon-Rice and Soto of an 8-year-old girl who used an SGD. However, elaborate co-construction by speaking communication partners may blur lines of narrative ownership (e.g., Waller & O'Mara, 2003) and result in narratives that rely heavily on partner interpretation (e.g., Smith et al., 2016; von Tetzchner, 2015). Partners may add extensive structural scaffolding to aided communication content, thereby creating spoken interpretations of those narratives that go

beyond a literal translation of aided output and that may diverge considerably from the original aided content.

In sum, constructing a narrative about an event removed in time involves complex decisions about elements to prioritize, how events should be ordered, what information to include, and how to linguistically encode that information so that a partner can understand how the characters relate to each other and participate in the events. Creating an interesting story rather than a report of facts involves inferences about the characters and consideration of audience needs. Pulling these threads together draws on cognitive and linguistic resources. When the task also involves using aided communication, with all the working memory, metalinguistic, and meta-interaction demands that entails (e.g., Murray & Goldbart, 2011), narratives offer a rich context for exploring complex discourse skills. This study explores three questions related to narrative skills:

1. How similar are narratives produced by children and youth who use aided communication to those produced by speaking peers, when relaying events viewed in a silent video vignette?
2. How do narratives produced using aided communication compare to the spoken interpretations of those narratives that emerge in interactions with speaking partners?
3. Do spoken interpretations of narratives differ by virtue of the category of communication partner (peer, parent, or professional)?

Method

Research design

The current study is part of the international project "Becoming an Aided Communicator (BAC): Aided Language Skills in Children and Adolescents aged 5–15 years: A Multisite and Cross-Cultural Investigation" that involved participants from 16 countries and different languages (see von Tetzchner, 2018). The overall project included 14 tasks designed to explore the participants' understanding of aided language and their use of aided language in communication with a partner in activities resembling everyday activities. Ethical approval was obtained from the relevant health or educational ethics board in each national site.

The current study reports on a subset of data from 15 participants who used aided communication and 45 communication partners, as well as a group of 15 peers described as developing typically, on a task that involved constructing narratives to describe video events.

The study involved the use of mixed methods. Quantitative analysis using non-parametric tools was applied to data from two structured measures of narrative analysis to explore cross-group and within-group patterns. The specific features of the narratives generated were evaluated using qualitative description.

Participants

Aided group

For the overall BAC project, participants were recruited with the help of professionals in the health care and special education systems in each of the countries and regions. A search was made for individuals who met the following criteria: (a) were between 5- and 15-years-old, (b) had speech production that was absent or very difficult to understand, (c) had speech comprehension considered adequate or near adequate for age as determined by each participant's classroom teacher, (d) had used aided communication for a minimum of 1 year, (e) had normal hearing and vision (with corrective technology as required), (f) were not considered by their teachers to have an intellectual disability, and (g) did not have a diagnosis on the autism spectrum.

The 15 participants whose data are reported in the current study were aged between 8;07 (years; months) and 15;10 ($M = 11;10$). All had a diagnosis of cerebral palsy, with GMFCS scores ranging from II to IV; eight were female and seven were male (see Table 1; grouped data are provided to protect participant anonymity). These 15 participants were from Canada, Ireland, the Netherlands, Norway, and Sweden; data from nine participants showed that, on average, they

Table 1. Characteristics of participants who used aided communication.

Age (in months)		Gender		Educational setting[a]		Primary mode of communication on task					
91–140	141–191	Male	Female	Mainstream	Special	Symbol	Sym. & spell.	Spell.	SGD: sym.	SGD: spell.	Gesture a/o sign
$n = 7$	$n = 8$	$n = 7$	$n = 8$	$n = 8$	$n = 1$	$n = 3$	$n = 1$	$n = 5$	$n = 1$	$n = 2$	$n = 3$
GMFCS score				CFCS score[a]			Viking Intelligibility Scale			Access method	
II	III	IV	V	II	III	IV	II	III	IV	Direct	Scanning
$n = 1$	$n = 2$	$n = 6$	$n = 6$	$n = 7$	$n = 2$	$n = 1$	$n = 0$	$n = 2$	$n = 13$	$n = 9$	$n = 6$
NVR *z*-score range				TROG score range			PPVT score range[a]				
2 to −1SD	−1 to −2SD		>−2SD	1 to −1SD	−1 to −2SD	>−2SD	1 to −1SD		−1 to −2SD		>−2SD
$n = 2$	$n = 4$		$n = 9$	$n = 6$	$n = 2$	$n = 7$	$n = 3$		$n = 4$		$n = 3$
Mean	Range		*SD*	*Mean*	Range	*SD*	*Mean*		Range		*SD*
−1.9	−3.7–2.1		1.4	−1.6	−3.0–0.6	1.3	−1.5		−3.3–0.2		1.2

[a]Missing data for some participants, or not all participants were assessed.
Symbol = graphic symbol-based communication system; Sym. + spell. = graphic symbol-based communication system and spelling; Spell. = spelling; SGD: sym. = speech-generating device with symbol representational system; SGD: spell. = speech-generating device with spelling; Gesture a/o sign = idiosyncratic gestures and manual signs; GMFCS = Gross Motor Function Classification System (Palisano, Rosenbaum, Bartlett, & Livingston, 2008), scores from I–V reflect increasing levels of impairment; CFCS = Communication Function Classification System (Heidecker et al., 2011), scores from I–V reflect increasing levels of impairment; Viking Intelligibility Scale (Pennington, Mjóen, Adrada & Murray, 2010); scores from I–IV reflect increasing levels of impairment; NVR = Nonverbal Reasoning, measured using Raven's matrices (Raven, 2008; Raven et al., 2000) or Kaufman Brief Intelligence Test (Kaufman & Kaufman, 2004); TROG = Test of Reception of Grammar (Bishop, 2003); PPVT = Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) incorporating scores from the British Picture Vocabulary Scales (Dunn et al. 1997).

had used their aided communication system for just over 94 months (range: 41–121 months) prior to the start of the study.

No specific level of performance on a formal measure of cognitive functioning was set as a recruitment criterion. A number of factors guided this decision. The aim was to recruit participants for whom expectations for success in the use of aided communication were high. Educator evaluations were not made in isolation but were also informed by views of other professionals, and thus reflected general impressions within the child's own environment of his or her cognitive and language functioning, including the ability to communicate with and without a communication aid. The approach thus had ecological validity, in that individual measures of cognitive ability may be at odds with classroom performance for a range of complex reasons. Furthermore, regular assessment of intellectual functioning is not routine in many jurisdictions, particularly for children with severe motor impairments, who tend not to be assessed (Kurmanaviciute & Stadskleiv, 2017). Moreover, repeated assessment for purposes other than educational placement is not universally permitted (see also von Tetzchner, 2018).

All participants in the aided group were assessed on a range of formal measures, including a vocabulary test, the Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) or British Picture Vocabulary Test (Dunn, Dunn, Whetton, & Burley, 1997) and/or the Test of Reception of Grammar (TROG-2) (Bishop, 2003), with standardized score conversions for relevant languages. Non-verbal reasoning skills were assessed using the standard or colored version of Raven's Matrices (Raven, 2008; Raven, Raven, & Court, 2000) or with matrices from the Kaufman Brief Intelligence Test (KiBIT; Kaufman & Kaufman, 2004). Although participants were referred to the study based on impressions that they were within the average range of ability, and their mean scores were within two standard deviations of the age mean, their performance on standardized measures of assessment varied (see Table 1). The 15 participants for this study were selected because they had completed relevant video tasks with three different communication partners.

Reference group

A reference peer matched for gender and age was recruited for each participant who used aided communication. The participants in the reference group were recruited either from the class of the aided communicator or, if the aided communicator attended a special school, from a class in a nearby school in the same type of neighborhood (e.g., rural or urban). Reference peers were as close in age as possible to participants who used aided communication. All were described as developing typically, with no motor, learning, communication, or sensory impairments. The purposes of including a reference group were to (a) ensure that the materials and tasks were appropriate to the age and cultural background of all participants, and (b) provide a frame of reference so that data from participants using aided communication could be interpreted against what might reasonably be expected of peers of a similar age and from a similar background.

Communication partners

Each participant who used aided communication interacted with three familiar communication partners: a parent, a peer, and a professional, yielding a partner group of 45 participants comprising 15 peers, 15 parents, and 15 professionals. Peers were students who used natural speech, and each was nominated as a classmate who was friendly with the student who used aided communication. Of the 15 professionals who participated, one was a special needs assistant; the remaining 14 were teachers ($n = 12$) or speech-language pathologists ($n = 2$). Due to practicalities of data collection, it was not always possible to ensure that reference peers interacted with three different communication partners; however, all interacted with a peer and at least one adult partner.

Materials and procedures

In all, 18 short video clips were developed as part of a larger set of materials for the international study; none involved spoken language. Participants completed six clips including one training clip with each communication partner. Each group of videos included (a) short, simple scenarios, (b) longer more complex clips with either more characters and/or more events, and (c) at least one implausible event (e.g., a girl attempting to write with a carrot rather than a pen). The scripts for three videos relevant to the data presented here (Swimming Pool story, Banana story and an adapted Spider Sandwich story) are outlined in Supplemental Table 1, online only. The Spider Sandwich story was adapted with permission from the work of Nicola Grove (Grove, 1995; Grove & Tucker, 2003; Herman et al., 2004; see Acknowledgements). These three videos were selected for analysis because they offered a broadly similar range of episodes and complexity. Data were collected individually either in a student's home or in school as part of the BAC project. Multiple visits to homes and schools were required, often extending over several weeks. The order of task and site was largely determined by availability of participants and parent and school schedules. Participant fatigue levels were closely monitored within data collection sessions, often resulting in multiple in-session breaks and multiple visits.

Procedures for all video tasks were the same for the participants who used aided communication and the reference group. A researcher explained to participants that they would see a video and then describe what had happened to a communication partner who had not been present. Participants were allowed to view each video up to five times. During the training video, the researcher highlighted core elements in the video by pointing at the screen. A communication partner then joined the interaction and was told: "___ has seen a video and is going to tell you what happened. You should wait for him/her to tell you but if you are uncertain about something, you may ask _." Partners were not required to repeat the narrative, although almost all verbalized narratives as part of the ongoing interaction. If no video description

Table 2. Communication partner category across video events in interactions involving aided communication.

Video event	Parent	Peer	Professional
Swimming Pool story	$n = 4$	$n = 4$	$n = 7$
Banana story	$n = 6$	$n = 6$	$n = 3$
Spider Sandwich story (Adapted)	$n = 5$	$n = 5$	$n = 5$

was attempted, the researcher prompted participants to explain what had happened, but did not ask specific questions, in order to avoid priming communication partner expectations. If participants wished to view the video again, the partner left the room until the participant was ready to continue. At the end of the interaction, the dyad reviewed the video and could discuss what had happened; these discussions are not included in the data reported here.

Although some participants completed all video tasks with one communication partner in a single session, many participants required several sessions. The order of videos with any individual communication partner was consistent, reflecting a general increase in complexity, but the order of partner varied depending on their availability. All participants had completed at least three videos with each partner before completing the tasks reported here. It was intended that the same number of peers, parents, and professionals would act as partners for each specific video, but there was some minor variation within the group of 15 participants described here (see Table 2). All interactions were video-recorded using two cameras, one focused on the dyad and one focused on the aided communication system. Interactions were transcribed orthographically using the conventions for multimodal communication described by von Tetzchner and Basil (2011). Where required, transcripts were translated into English.

Data analysis

The macro- and microstructures of the narratives generated were analyzed using the Narrative Scoring Scheme (NSS) (Heilman, Miller, Nockerts, & Dunaway, 2010) and the Narrative Assessment Profile (NAP) (Bliss, McCabe, & Miranda, 1998). The NAP is designed to evaluate narrative discourse in children or adults with communication impairment, profiling strengths and weaknesses across three core dimensions (topic maintenance, event sequencing, explicitness) and three additional dimensions (referencing, conjunctive cohesion, and fluency). Bliss et al. (1998) reported strengths and difficulties using descriptors such as *appropriate* or *inappropriate*, but some subsequent studies (e.g., Nordberg et al., 2015) have imposed a numerical scoring scheme onto these descriptors. For this study, a 3-point scale was developed, (1 = *absent/inappropriate*, 2 = *variable*, 3 = *appropriate*).

The NAP has the advantage of having been used in a number of studies involving participants with disabilities (Holck, Dahlgren Sandberg, & Nettelbladt, 2011; Nordberg et al., 2015), including students who used aided communication (e.g., Soto et al., 2006; Soto, Solomon-Rice, & Caputo, 2009), thus providing useful data relevant to this study. However, its use is primarily recommended for analysis of personal narratives (Bliss et al., 1998), which may be less demanding than story retelling or generating a story from a video clip (McCabe, Bliss, Barra, & Bennett, 2008). For this reason, the NSS (Heilman et al., 2010), a tool developed to evaluate narratives based on story retelling, was also applied to the data. The NSS rates seven dimensions of narrative performance: (a) key components of story grammar (Introduction, Conflict Resolution, and Conclusion), (b) metacognitive and metalinguistic dimensions, such as inclusion of Mental States and Character Development, and (c) linguistic features such as Referencing (i.e., Referential Cohesion) and Cohesion (appropriate ordering, emphasis of critical events, and transitions between events). Performance on each dimension is rated on a 5-point scale (1 = *minimal*, 3 = *emerging*, 5 = *proficient*).

For the purposes of both NAP and NSS analysis, a distinction was made between *aided* and *interpreted* narratives. Aided narratives incorporated only those elements that were independently generated by a participant who used aided communication. Interpreted narratives were operationally defined as the spoken retelling of the narrative by a communication partner within the discourse, based on the content expressed by the participant who used aided communication, including content arising from extensive questioning, guessing, and elaboration (for an example, see Supplemental Table 2, online only). Across all narratives (i.e., aided and interpreted), NAP features were marked as appropriate, inappropriate/absent, or variable, and later converted to scores. In the NSS, scores of 1, 3, or 5 were assigned because further grading was considered a threat to reliability. The first author completed NAP and NSS analysis of all narratives produced by participants who used aided communication (aided narratives), spoken reformulation of those narratives (interpreted narratives), and narratives from the reference group. The data did not meet the criteria for parametric analysis and so were analyzed using a range of non-parametric tests detailed in the Results, using the Statistics Package for the Social Sciences (Version 24).

Reliability

Three aspects of reliability were considered: identification of story elements, scoring of NAP, and scoring of NSS. Both the NAP and the NSS evaluate the completeness of a narrative in terms of key elements in a story grammar framework. Because the specific video tasks had not been validated, a framework to interpret narrative completeness was needed. The first author reviewed all transcripts from the reference group and compiled a list of potential story elements for each video. The second and third authors each independently reviewed five transcripts (33%) for the Spider Sandwich story, while two speech-language pathology undergraduate students not involved in the data collection reviewed five transcripts for each of the other two videos. Elements identified by all reviewers as present in 70% of reference group narratives were deemed core and used as a framework for interpreting narrative completeness.

The same two students carried out NAP analysis on three transcripts from each video condition (i.e., 20% of transcripts) and also counted the number of words (in any modality) produced by the participants who used aided communication.

Initial agreement ranged from 66% to 95% on dimensions of the NAP, with agreement of only 70% for the total number of words. Disagreements on the number of words arose exclusively from the fact that instructions to the raters did not specify that output generated as a phrase using an SGD should be counted only once, rather than on each verbatim repetition. Following clarification, agreement on word count was 100%. The category of fluency proved more problematic partly because of the unique features of interaction involving aided communication. These difficulties are considered in the Discussion.

Reliability of the NSS scoring was evaluated by independent scoring of 15 transcripts of participants who used aided communication (i.e., 33%) by the second author. Review of the reliability data highlighted a small number of errors in scoring on the part of both researchers. Once errors were corrected, agreement was 100%.

Results

Narratives produced using aided communication and natural speech

Core elements of narratives

Despite individual variations across the reference group, between four and six elements were identified as core in each narrative, suggesting relatively comparable complexity across vignettes. Those elements present in 70% of narratives are presented in Table 3. While additional events were also described, and each narrative was evaluated for its own unique content, this exercise provided a reference point for what was salient within the videos, at least for participants without disabilities.

These same elements seemed salient for participants in the aided group (see Table 3), although with less detail. In aided narratives, the elements most likely to be included described the setting, the characters, and the outcome (e.g., that someone swam). In the Swimming Pool story, 13 participants relayed something about a woman jumping in a pool. In the Banana story, 12 mentioned throwing a banana, while 10 mentioned slipping on the banana. Elements in the Spider Sandwich story included the outcome, the setting/characters, and the initiating event. Character responses (being angry, laughing) appeared only in the Banana and Spider Sandwich stories.

Overall scores on the NSS

Both the amount of information and the organization of that information contribute to overall NSS scores, for a maximum score of 35. Scores varied within and across the groups (see Table 4). Across the three videos, the mean total score for participants who used aided communication was 15.02 (range: 7–33, $SD = 6.78$). Correlation analysis using Spearman's *rho* indicated that NSS scores for this group were not significantly correlated with age, scores on language measures or nonverbal IQ. Only the total number of words produced (with speech; or via SGD, manual sign, gesture, or graphic symbol) was significantly correlated with scores on the NSS, $r_s(14) = .90$, $p < .001$ and the number of words was not significantly correlated with any other measure.

The purpose of including a reference group was primarily to ensure that materials were appropriate and to provide a frame of reference for interpreting the performance of participants using aided communication. However, in order to explore the extent to which the differences in the narratives produced by the participants using aided communication were reflected in the selected analytic tools, NSS scores were also computed for the reference group ($M = 24.93$, range: 13–33, $SD = 4.98$) and compared to those of the participants who used aided communication. Mann-Whitney tests indicated that scores of reference peers were significantly higher than for the aided group across each video clip (see Table 4), with intermediate to large effect sizes (Hattie, 2009).

Participants who used aided communication achieved their highest mean NSS score on the Banana story ($M = 17.66$) compared to the Spider Sandwich ($M = 15.06$) and the Swimming Pool stories ($M = 12.33$) (Table 4).

Table 3. Frequency of mention (% occurrence) of narrative events by reference group and participants who used aided communication.

	Reference group	Aided group
Swimming Pool story[a]		
1. There were three people, a boy, a girl, and a woman (at a pool).[b]	100%	53%
2. They (held hands) counted to 3 and were supposed to jump in.	100%	26.7%
3. (Only) the woman jumped in.	100%	80%
4. The mother was angry/The children laughed at her.	75%	13.3%
Banana story		
1. A girl in a wheelchair was eating a banana.	93%	60%
2. She threw the skin on the ground (and drove off).	100%	80%
3. A lady came along.	90%	13.3%
4. She slipped on the banana.	100%	66.7%
5. She shook her fist at the girl.	83%	33.3%
Spider Sandwich story: Adapted with permission (see Acknowledgements)		
1. There was a boy and a girl.	100%	60%
2. The girl made him a sandwich.	83%	46.7%
3. She put spiders in the sandwich.	88%	46.7%
4. The boy bit the sandwich/the spider/ate the spider.	76%	53%
5. He spat out the spider.	76%	20%
6. He was angry.	70%	0%

[a]All listed events occurred in at least 70% of reference group narratives.
[b]Information within parentheses was represented in multiple different ways in reference group narratives.

Table 4. Narrative Scoring Scheme scores across video events and groups and comparison of scores across groups.

	Swimming Pool story			Banana story			Spider Sandwich story		
Data source	*M*	Range	*SD*	*M*	Range	*SD*	*M*	Range	*SD*
Aided narrative	12.33	7–27	6.07	17.66	7–25	6.07	15.06	7–33	8.21
Interpreted narrative	13.85	7–27	5.80	22.86	13–31	5.57	22.13	11–35	6.77
Reference group narrative	23.60	17–33	4.92	22.86	13–31	5.52	28.33	21–33	4.51
Mann-Whitney test (aided vs. reference narratives)	$Z = -3.84$, $p < .001$ $\eta^2 = 0.49$, $d = 1.96$, (large ES)			$Z = -2.00$, $p < .05$ $\eta^2 = 0.13$, $d = 0.78$, (intermediate ES)			$Z = -3.67$, $p < .001$ $\eta^2 = 0.45$, $d = 1.80$, (large ES)		
Mann-Whitney test (aided vs. interpreted narratives)	$Z = -0.88$, $p = .375$ $\eta^2 = 0.02$, $d = 0.32$, (no effect)			$Z = -2.03$, $p < .05$ $\eta^2 = 0.14$, $d = 1.79$, (large ES)			$Z = -2.43$, $p < .05$ $\eta^2 = 0.19$, $d = 0.99$, (large ES)		
Wilcoxon Signed ranks: Aided narrative within-group comparison	Significantly lower mean rank than Banana or Spider Sandwich story			Swimming pool vs. Banana story: $Z = -2.45$, $p < .01$ $\eta^2 = 0.20$, $d = 1$, (large ES)			Swimming pool vs. Spider Sandwich: $Z = -1.89$, $p < .05$ $\eta^2 = 1.12$, $d = 0.74$, (intermediate ES)		
Wilcoxon Signed ranks: Reference group within-group comparison	Spider Sandwich vs. Swimming pool: $Z = -2.57$, $p < .01$ $\eta^2 = 0.22$, $d = 1.06$, (large ES)			Spider Sandwich vs. Banana story: $Z = -2.74$, $p < .005$ $\eta^2 = 0.25$, $d = 1.15$, (large ES)			Significantly higher mean rank than Swimming Pool or Banana story		

ES: effect size, with interpretation as recommended by Hattie (2009).

A Friedman test indicated a significant difference across the three video tasks, χ^2 (2) = 8.68, $p = .013$. Wilcoxon Signed Rank tests indicated that the scores on the Swimming Pool story were significantly lower than on the Spider Sandwich story, $Z = -1.89$, $p < .05$ and Banana story, $Z = -2.45$, $p < .01$, with intermediate and large effect size differences, respectively. Not all participants followed this pattern: Three achieved their highest score on the Spider Sandwich story, while four scored as well or better on the Swimming Pool story. Reference peers' highest NSS scores were on the Spider Sandwich story. Wilcoxon Signed Rank tests indicated these scores were significantly higher than the Swimming Pool story, $Z = -2.57$, $p = < .01$ and the Banana story, $Z = -2.74$, $p < .006$, with large effect size differences, but there was no significant difference between scores on the Swimming Pool and Banana stories (Table 4).

Overall scores on the NAP

As with the NSS, there was considerable variability in NAP scores on aided and interpreted narratives (see Table 5). The relationship between scores for aided narratives on the NAP and the NSS was explored using Spearman's *rho*. A strong correlation was found between scores for the aided narratives on both measures, $r_s(14) = .874$, $p < .001$, suggesting they capture similar information about narrative structure and content. On this basis, subsequent statistical analysis focused on scores from the NSS, given that this tool was designed to yield quantitative scores.

Aided narratives and interpreted narratives

The second research question focused on the similarities and differences between the narratives generated using aided communication and the narratives that emerged through interaction with communication partners (interpreted narratives). NSS scores for the interpreted narratives were higher than for aided narratives across each video. Mann-Whitney tests indicated these differences were significant for the Banana and Spider Sandwich stories but not for the Swimming Pool story (Table 4) and that the effect size differences were large. Despite these differences, correlation analysis using Spearman's *rho* indicated moderate to strong relationships between the aided and interpreted narratives overall (see Table 6).

Dimensions of the NSS

Scores on each dimension of the NSS were compared across the aided and interpreted narratives. Participants who used aided communication demonstrated strengths in providing an introduction, developing characters, and identifying the conflict resolution. Their narratives showed less evidence of attributing mental states to narrative participants and cohesion. Communication partners tended to add referencing information and cohesion as they interpreted narratives, as well as detail relevant to the characters and the setting. Figure 1 illustrates the mean scores (out of a possible 15) for each NSS dimension for the aided and interpreted narratives.

Dimensions of the NAP

The aided and interpreted narratives were further evaluated on the six dimensions of the NAP (see Table 5).

Topic maintenance. This dimension refers to how well utterances within a narrative relate to a central theme; irrelevant utterances detract from topic maintenance. As can be seen in Table 5, the highest mean NAP scores were on this dimension, with little difference across aided and interpreted narratives. All 15 participants who used aided communication maintained the topic on at least two narratives and 10 achieved this on all three narratives. When the interpreted narratives were evaluated, nine dyads incorporated irrelevant information into the narratives, often as a result of long sequences of talk where communication partners sought additional information. For example, one participant used his SGD to generate a Norwegian word ("*bla*") that could be interpreted as "leaf," "magazine," "turn pages," or even as "gla" or "happy." His partner tried to establish whether the boy in the video had turned pages with his teeth, had eaten a leaf, or was happy (none of which were relevant). Irrelevant or tangential topics were not solely a consequence of

Table 5. Mean Narrative Assessment Profile (NAP) scores across dimensions and comparison of NAP scores across aided and interpreted narratives and across stories.

	Total NAP score			Topic maintenance			Event sequencing			Explicitness			Referencing			Conjunctive cohesion		
Narrative type	*M*	Range	*SD*	*M*	Range	*SD*	*M*	Range	*SD*	*M*	Range	*SD*	*M*	Range	*SD*	*M*	Range	*SD*
Aided	32.73	23–52	8.07	8.53	6–9	0.91	6.40	3–9	1.95	4.80	3–7	1.26	4.46	3–9	1.80	3.80	3–9	1.61
Interpreted	42.80	30–51	6.23	8.40	8–9	0.50	6.93	3–9	1.83	5.26	3–7	1.22	7.80	6–9	1.20	7.60	4–9	1.45
				Swimming Pool story						Banana story						Spider Sandwich story		
Aided vs. interpreted narratives (Mann-Whitney test)				$Z = -3.24$, $p < .001$						$Z = 4.123$, $p < .05$						$Z = 5.93$, $p < .05$		
Aided narrative within-group comparison (Wilcoxon Signed Ranks test)				Significantly lower mean rank than Banana or Spider Sandwich						Swimming pool vs. Banana story: $Z = -2.45$, $p < .01$						Swimming pool vs. Spider Sandwich story: $Z = -1.89$, $p < .05$		

Table 6. Correlation (Spearman's rho) between Narrative Scoring Scheme scores assigned to aided and interpreted narratives by event and by narrative.

	1.	2.	3.	4.	5.	6.
1. Swimming pool aided	–					
2. Banana aided	.414	–				
3. Spider sandwich aided	.560*	.597*	–			
4. Swimming pool interpreted	.902**	.426	.524	–		
5. Banana interpreted	.152	.635*	.460	.152	–	
6. Spider sandwich interpreted	.122	.180	.658**	.294	.442	–

*$p < .05$;
**$p < .01$.

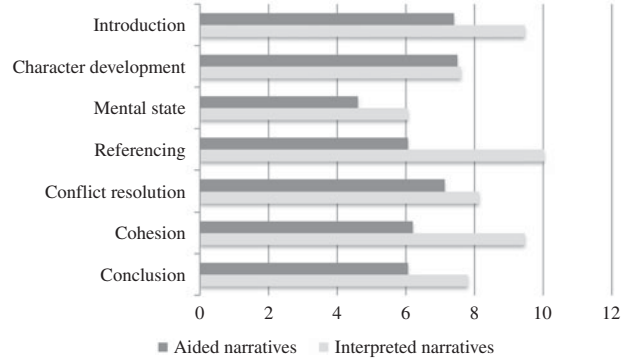

Figure 1. Comparison of scores of aided and interpreted narratives on dimensions of the NSS.

partners' attempts to resolve ambiguities. Another participant narrated the Banana story, but the basis for her peer partner's interpretation is not clear (see Table 7, Extract 1). The relevance of an utterance to a topic sometimes critically depended on the insights of the communication partner. One participant interacting with her mother started her Swimming Pool story with a pre-stored utterance, *"I've done my first communion"*; her mother responded, *Oh yes, when we went swimming… are you telling me something about that?*

Event sequencing. On the whole, participants using aided communication successfully ordered events within narratives. Only four participants did not sequence events in any narrative and seven sequenced events appropriately in at least two vignettes. Communication partners often explicitly attempted to construct a sequence between events as they interpreted narratives, but with varying success (see Tables 5 and 7).

Explicitness. Bliss et al. (1998) describe Explicitness as one of the major dimensions of the NAP, incorporating three aspects: (a) Informativeness (i.e., the critical facts), (b) Elaboration (i.e., the dimension that makes a story interesting), and (c) Completeness (i.e., the extent to which a narrative incorporates description, action, and evaluation).

One participant who used aided communication provided the basic facts (based on the elements listed in Table 3) for all three narratives (i.e., Informativeness). A further seven produced content relevant to the basic facts in two narratives, although communication partners often needed more information to make sense of the narratives. For example, one participant communicated, *MUM SWIM BOY GIRL* l-a-u-g-h, describing key actions, but omitting the shared intent to

Table 7. Extract of conversation describing events in the Banana and Spider Sandwich stories.

Communicator	Message
Extract 1: Banana story	
Aided participant	*"Stop"*
Peer	*Stop a robber?*
Aided participant	*"Girl"*
Peer	*A girl … pushing a robber out of the window*
Aided participant	*"Boy"*
Peer:	*A girl and a boy, a boy just dressed as a clown? At a circus?*
Extract 2: Spider Sandwich story (see Acknowledgements)	
Aided participant	*"He bumped into her he point inside the mouth she shakes her head he knocked on the table and point inside the mouth spider"*
Parent (after extensive discussion but no additional content provided)	*Okay, this sounds like a lazy man that only sits and nags and shouts. A man bumps into his wife … he wants more food and points inside his mouth, the wife shakes her head, he knocks on the table, points into his mouth, she goes to the kitchen, finds a slice, lays a spider on top, another slice, in and gives this to her husband, he takes a bite, notices that there is a spider in his mouth and spits it out.*

jump in together. No participant who used aided communication elaborated each narrative. However, a number added details, including one who described a video character as *"A guy with a scarf"* (a detail not mentioned by any reference peer). Often, elaboration relied on the communication partner. In interpreting the Spider Sandwich story one communication partner added elaborated detail to almost all elements of the narrative (see Table 7, Extract 2). In terms of Completeness, the elements most likely to emerge in aided narratives described the setting or characters and the outcome, with less attention to character responses (see Table 3). Partners added events, expanded descriptions of the setting or characters, developed the outcome, and occasionally added an evaluation; however, overall, the completeness of interpreted narratives mirrored that of the aided narratives.

Referencing. This dimension refers to the inclusion of "adequate identification of individuals, features and events" in a narrative (Bliss et al., 1998, p. 350). Referencing supports discourse coherence and relies on skillful use of nouns and pronouns, enabling the listener to follow a narrative. Only one participant who used aided communication fulfilled this requirement across all three narratives, and overall mean scores on this dimension were low (see Table 5). When compared using the Mann Whitney test, scores for aided narratives were significantly lower than interpreted narratives on this dimension, $Z = -3.20$, ($p < .001$), highlighting partners' efforts to establish reference and interpret relations between individuals and events.

Variation across partners

Each participant who used aided communication interacted with a peer, a parent, and a professional (see Table 2). Aided participants' NSS scores were compared based on the category of communication partner, using the Friedman test, but no significant differences emerged. Participants who used aided communication were almost as likely to achieve their highest NSS score with a peer as a communication partner ($n = 5$) as with a parent ($n = 6$); three achieved their highest score with a professional; one participant achieved equal scores across all partners. Although the Banana story featured in four of the five instances where the highest NSS score was with a peer, the same was true in only three instances with the parent as partner, and twice with a professional. It seems unlikely that the specific video content was the key variable impacting on partner success.

In sum, participants who used aided communication included many of the same elements in their narratives as the reference group, particularly in scene-setting and the outcome of events. Nonetheless, they achieved significantly lower NSS scores than reference peers on each of the video events and their NSS scores did not correlate significantly with any language, cognitive, or motor measure other than total number of words they produced in a narrative. The NSS scores assigned to aided narratives were strongly correlated with scores from the NAP. They were also correlated with the scores of interpreted narratives, although the process of interpretation often resulted in elaboration of many elements. The extent to which partners could elaborate was influenced to some extent by the particular event in question. No specific group of communication partners (parents, peers, professionals) emerged as more likely to facilitate a high NSS score on the part of the participants who used aided communication: Participants who tended to score well on the NSS did so regardless of partner and across all three video conditions, though scores on the Swimming Pool story were significantly lower than on the other two video events.

Discussion

Although the narratives produced by participants using aided communication were often less elaborated and complete than those of the reference group, they seemed to pay attention to the same features of the videos, sometimes adding details. Similarities were most obvious in narratives generated using text-based aided communication. For example, one participant relayed *"A girl eats a banana and throws it away and the screen zooms in and a guy with a scarf slipped by the banana skin and he shooked his fist."* Almost half of the participants in the aided group scored within the average range on at least one receptive language measure, but scores on

formal language and cognitive tests varied considerably. Nonetheless, the only measure that correlated significantly with NSS scores for these participants was the amount of language they produced in constructing their narratives. It is not surprising that telling complete stories is linked to producing lots of words: Access to rich language makes story telling easier. Retelling events also requires storing events in memory, organizing them in a temporal sequence, and expressing them using language that marks the events and the relationships between events and characters. Language simultaneously supports the organization and the externalization of narratives, and experiences in telling stories offer rich language-learning opportunities (e.g., Adlof et al., 2014; Soto et al., 2009).

Participants who used aided communication also differed from the reference group in their performance across the three videos. As a group their highest scores were on the Banana story; scores on the Swimming Pool story were significantly lower than either of the other two videos. At first glance, this profile is counter-intuitive. The Swimming Pool story seems the simplest clip, with fewer events and familiar vocabulary; however, it may have been complex in one key dimension. To tell the story successfully, participants had to interpret the intent of the characters, recognizing that holding hands and counting signaled an intention to jump together. Without this critical theory of mind insight, it is not clear why the mother was angry or why the children laughed. Preliminary research suggests that children with significant speech impairments (Dahlgren Sandberg, Dahlgren Sandberg, & Hjelmquist, 2003) and those who use aided communication (Falkman, Dahlgren Sandberg, & Hjelmquist, 2005) may lag behind peers in development of theory of mind, although other studies (Sundqvist & Rónnerberg, 2010) have not replicated these findings.

Generating an inference is not sufficient: Expressing a pretended intent to jump is linguistically complex, in English requiring either the use of two modal verbs (e.g., should have jumped) or phrases such as "were supposed to" or "pretended they would." This vocabulary may not have been available, or the access costs may have been too high for the perceived benefit. Only one participant using a text-based system included this nuance, relaying *"A boy and a girl were tricking a lady by pretending all 3 of them were going to jump in the pool."* The other two participants who used spelling focused on the act of jumping. For example, one narrated, *"They were going to take a bath. They were jumping in but the mother jumped in but the children did not jump in."* The Banana story required little inference; it could be regarded as complete by retelling the sequence of a girl dropping a banana skin, someone slipping on it, and an evaluative comment. In the Spider Sandwich story, some inference was needed: The girl's actions made most sense if her reluctance to acquiesce to her brother's request for a sandwich was recognized. This video also was longer, had more events, and required at least one non-routine vocabulary item, spider, making it somewhat more complex than the Banana story.

The Banana story may have had one final advantage. Slipping on banana skins features in cartoons, stories, and comedies: The sequence of events has a familiarity and predictability that may have acted as a cognitive scaffold, allowing participants to focus on the content or the logical order of the script. Together, these factors may explain why participants who used aided communication seemed to produce their most complete narratives in the Banana story. On the other hand, the group mean performance also masks individual differences. One participant produced her richest narrative in the Spider Sandwich story: *"A girl and boy are reading. The boy asks the girl to make him a sandwich. She tricked him and put toy spider in the sandwich. When he bit onto it he freaked out."* Participants who could generate rich narratives coped across all video events. Access to a script-like framework may have been particularly helpful for those who found the task difficult overall, supporting relative success on the Banana story.

For the reference group the range of events and the humor of the Spider Sandwich video triggered the most elaborate narratives. Hilvert, Davidson, and Gámez (2016), compared the narratives generated by adolescents without disabilities in response to unusual, non-routine triggers and script-based triggers and found that participants provided greater story content and made significantly more use of connectors when re-telling a non-script- compared to a script-based story. Hilvert et al. concluded that in constructing non-script narratives, narrators are sensitive to the likelihood that their partner requires more specified information in order to make sense of the story and focus their energies on rich macro- and microstructure elements. The performance of the reference group in this study tends to support this proposition: None had difficulty with any of the tasks, but their scores on the Spider Sandwich story were significantly higher.

Aided and interpreted narratives

On the whole, interpreted narratives aligned with the aided narratives: they incorporated content from aided narratives, either including only that content or extending content and structure to build a more elaborated narrative. Where the aided narratives were generated using text, the alignment was often complete. However, sometimes even in these cases, the quality of synthetic speech led to difficulties. In the Swimming Pool story, one participant relayed *"Three people were jumping into a pool the two laughed."* His communication partner misunderstood *"Laughed"* and responded *What do you mean, two left?* To clarify, the participant gestured laughing, to which his partner responded *I can't guess that. That looks like as if you're laughing at me.* When he turned his screen so that his partner could see the text, her response was *They laughed, sorry, that's that bloody [names device], the voice is desperate, they laughed.* Thus, even in situations where individuals have well-established language and literacy skills and their partners are familiar with their communication, challenges can arise.

When aided narratives were produced using graphic symbols and unaided modes, they tended to be less specific and complete. In such instances, aided communication seemed to serve a purpose of identifying the topic of the story – setting

the scene, *This is a story about X*. In the interaction that followed, co-construction between participants focused on elaborating the story as partners made suggestions or requested clarification and additional information, a commonly-identified interaction pattern (Collins, 1996; Solomon-Rice & Soto, 2011; von Tetzchner, 2015). In some instances, the elaboration was remarkably rich, (e.g., Extract 2, Table 7). Partners managed to construct relatively complete narratives from minimal information, yielding significantly higher scores for interpreted relative to aided narratives for both the Banana and the Spider Sandwich events. For example, one participant communicated *COLOR* EAT and looked at the floor. Without any additional aided communication content, the interpreted narrative that emerged was that a boy ate a banana, dropped it, and somebody fell on it.

The extent to which communication partners could offer suggestions may have been influenced by a context that allowed them to make sense of elements. For example, once "banana" and "fall" were understood, it was relatively easy to piece together a plausible scenario. Likewise, once "spider" and "bread" were understood, partners could formulate a possible story line. A key enabler may have been a script-like framework: What might happen, should a banana skin be on the ground. The Swimming Pool story lacked a script to bring these elements together. Partners found it difficult to construct a story, and there was little difference between the narratives they constructed and the content in the aided narrative, as indicated in the strong correlation between NSS scores on this task. Without a script framework, it seemed that partners struggled to link elements that they understood into something plausible they could interpret.

Variation across partners

All participants who used aided communication were familiar with their communication partners. Perhaps for this reason, no category of partner seemed more successful at eliciting complete narratives. Across all categories, some partners re-formulated narratives verbatim, even when aided narratives were sparse. Equally, partners from all three categories generated richly elaborated interpretations. They often clarified characters and roles. For example, in response to *WOMAN MAKE FOOD INSECT,* one communication partner replied *Woman making food, insect. It was her* (stressed) *making … bread with insects?* Goodwin (2013, p. 12) uses a metaphor of lamination to describe a process whereby participants in interactions may recycle a previous speaker's contribution and add layers of diverse semiotic phenomena (e.g., talk, prosody, gesture) to create a new, shared utterance. In the narratives described here, partners laminated aided communication contributions with linguistic specificity, adding syntax and morphological information, (e.g., *BOY EAT INSECT BREAD* glossed as *the boy ate bread with insects*) as well as layers of semantic detail, as illustrated in Table 7.

Partner familiarity was influential in another way, as partners could interpret communication based on a shared knowledge of the context and the experiences of the person using aided communication. Such background information allowed the parent described earlier to interpret *"I've done my first communion"* as a referring expression (Collins, 1996) relevant to going swimming. This example also illustrates the creativity of the participant using aided communication in finding a strategy to quickly set the topic. As pointed out by Ellis (2007), the benefits of such rich shared context include the advantage of being able to interpret apparently idiosyncratic messages, or what a less familiar partner might interpret as irrelevancies or errors; however, there are risks if meaning-making relies on resources uniquely accessible to one partner. Autonomy in interaction depends on being able to ensure most partners arrive at a mutually satisfactory interpretation of communicative intent. Young children learn to adapt their language to different communication partners and there may be developmental advantages to interactions where partner knowledge is less precisely tuned because such experiences stretch children's communication skills (Snow, 1995). von Tetzchner (2015, p. 183) suggests that experiences of routine conversations with little variation may be hidden challenges to developing expressive language for children who use aided communication. Partner familiarity may allow creative use of aided communication, but becomes limiting if children have few opportunities to hone skills with a diverse range of communication partners or to communicate authentically unknown content to familiar partners.

Fluency in aided narratives

As noted in the Method, the construct of fluency is difficult to apply to interactions involving aided communication. Some participants produced fluent output using their SGDs; however, such messages often required lengthy preparation. The narrative, *"A boy and a girl were tricking a lady by pretending all 3 of them were going to jump in the pool but instead they just threw her in"* took 11 min 30 s to produce. During this time, the peer partner remained present but silent. Although the final output was fluent, the interaction was not and it would not have been surprising if the partner had walked away. Where symbols were used, the aided narrative was often broken up over many turns. In contrast with some of the SGD-mediated interactions, these conversations appeared fluent but largely because of the contributions of the partner using natural speech. These findings suggest that applying the construct of fluency to aided interactions is complex and this dimension may be more usefully explored using tools such as Conversational Analysis (e.g., Clarke, Bloch, & Wilkinson, 2013).

Limitations and directions for future research

There are a number of limitations to bear in mind in interpreting the findings of this study. One is that the tools used to analyze the narratives were designed for spoken narratives, rather than the complex interaction that evolves with aided communication. Although scoring procedures were adapted (e.g., by using categorical scoring in the NSS), some dimensions (e.g., fluency) remained difficult to measure. In

addition, analysis was based on transcripts generated by multiple researchers, in some instances also involving translation. The BAC study set out a transcription protocol, but no reliability measures were carried out on the transcripts themselves. Despite these limitations, patterns emerged across multiple participants from five different countries.

The relatively large sample included here (15 participants who used aided communication) introduced both challenges and limitations. The broad nature of the recruitment criteria is reflected in an apparently wide range of motor, language, and cognitive abilities across participants who used aided communication, limiting the extent to which findings might be generalized and potentially masking important within-group differences. However, many factors may combine to undermine performance by participants with significant physical and communication impairments on formal assessments. These participants were perceived to be functioning within an average range of ability. In other words, they are a group whose skills in using aided communication should be relatively well developed and whose achievements might therefore offer insights into what is possible.

This diversity presented another limitation. Participants used a broad range of aided communication options, including text-based and symbol-based, low-tech, and high-tech systems. In addition, they were not required to use any specific mode of communication within the tasks but rather to communicate as they usually would, and some relied heavily on unaided modalities. Their performance on these tasks may align more with their typical performance than with participants' optimal capacity. Furthermore, given the size of the group reported here, it is not possible to separate out specific features that may have emerged in interactions involving SGDs rather than low-tech systems, or those who used spelling rather than symbols. However, this seems a fruitful focus for further research.

The inclusion of a reference peer group matched only for gender and overall age poses tensions and questions. The aim was not to carry out a controlled comparative study but rather to understand narratives produced using aided communication against a backdrop of what might be expected from peers, in order to avoid ascribing patterns of performance to the context of aided communication when in fact the same patterns might be related to the task or the materials. It is reassuring to see the extent to which the content of the narratives overlapped across these two groups, despite the very different communication contexts in which they emerged. One narrative stood out as more problematic for participants using aided communication. The surface simplicity of this video may have masked linguistic and inferencing demands. Further research could focus on explicating relationships between the cognitive and linguistic dimensions of narrative tasks such as those reported here.

Another factor to acknowledge in interpreting the findings relates to the communication partners. While all were familiar with the participants using aided communication, they likely varied considerably in their experiences with aided communication, their approach to the tasks, and their interaction styles and preferences. Information on these aspects was not sought in the original research protocol. The finding that no group stood out as more likely to elicit a complete narrative may simply reflect this variability within the partner groups, and may also have been influenced by the fact that the order of video presentation was not consistent across participants. To some extent, this question could be examined by expanding the data set to include all 92 participants from the larger BAC study, something that was not feasible at this point. Alternatively, replicating the study with clearly defined inclusion criteria for communication partners and with greater control of video order could also highlight the influence of particular partner groups. While it is encouraging that in the current study the ability to engage in narrative construction seemed to be unconstrained by partner category, it is not possible to conclude that either none (or indeed all) of the partner groups would benefit from intervention to support success in narrative construction.

Some preliminary implications for intervention can be inferred from these findings. One is the robustness of narrative as a discourse form and the potential to capitalize on the interest value of narratives in supporting extended discourse using aided communication. While sequencing events within narratives was relatively unproblematic for participants using aided communication, the finding that they frequently did not apply the linguistic features that identify relationships between events suggests that attention should be given to ensuring that these linguistic devices are consistently made available and that their use is modeled and supported. The finding that the least script-like vignette proved most problematic to participants using aided communication highlights the value of careful analysis of task demands. Script-like events may offer particular value in supporting use of rich narrative description and elaboration, given that the script itself may offer a robust support framework. However, individuals also need opportunities to communicate about novel, unpredictable experiences, where shared understanding relies heavily on linguistic specificity. Not only do the demands of story retelling differ from those of generating a novel story, the nature of the story itself poses differing demands. Careful consideration of the full range of demands and opportunities presented by different narrative tasks may yield a rich range of intervention opportunities.

Conclusion

Despite the limitations outlined, this study highlights both the achievements and the challenges of participants who used aided communication. Across a range of tasks and partners, they successfully constructed narratives, often over long stretches of discourse. Their narratives were less elaborate than those of the reference group but they incorporated the same elements. Topic maintenance and setting or character descriptions were robust features in their narratives, suggesting that these are aspects of narrative skills that can provide a platform on which aided communicators and communication partners can build success in interactions. Partners were often successful in creating complete narratives, particularly where script predictability could guide their efforts, but overall they did not diverge greatly from the aided content

provided: to a large extent, authorship stayed with the participants using aided communication. Examples of creativity emerged in the flexible use and interpretation of aided communication across a number of narrative tasks with a relatively diverse set of participants. These findings reinforce the fundamental value of narrative experiences and narrative tasks in both understanding and supporting successful and rewarding communication interactions. In this study, partner familiarity played a key role in making some contributions interpretable and relevant to the task. Further research is needed to understand how to best support the transfer of these skills to new communication partners and new situations.

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